

November 4, 1963

28% COTTON
ACID FREE

FILE



OFFICE OF DIRECTOR - MSFC

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REMARKS

Attached are the remaining notes with comments of 11/4/63.

CODE DIR	NAME J. Freya	DATE 11/14/63
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B 11/5

1. OUTLOOK ADVANCED SYSTEMS STUDIES FOR MANNED MISSIONS FY 1964

Last Monday we had a major review on the FY 1964 study budget with Ed Gray, the new Director of Advanced Space Flight Mission Studies in Washington. Previously, we had submitted to OMSF projects totaling 13.5 million dollars. After Ed Gray redistributed the funds, the following picture emerged:

		(Million)
Center Distribution	MSFC	\$13.0
	MSC	10.3
	LOC	0.75
	HDQRS	4.9
	<u>Total</u>	<u>\$28.95</u>

Our share is distributed as follows:

		(Million)
12 Launch vehicle studies		7.0
2 Manned satellite studies		0.7
10 Manned lunar studies		4.0
6 Manned planetary studies		1.3
<u>30 Advanced systems studies</u>		<u>\$13.0</u>

A total of about 3.7 million dollars is earmarked for the MMM, the APOLLO Logistic Support System, and related studies, and will be managed by the Systems Concepts Office of AERO-ASTRODYNAMICS.

Only 1.5 out of the 13.0 million dollars has been authorized so far for NOVA, indicating a serious problem ahead. We will have great difficulties in obligating this money this fiscal year, if the red tape at Headquarters is not reduced. To make matters worse, the new reorganization leaves many open questions - "who will do what?"

Yes, and who will fight the daily battles to get things unstuck in Washington! B

2. PERIHELION BRAKE MANEUVER: Krafft Ehricke has discovered an effective way to reduce the reentry problem upon return from fast planetary missions - the brake maneuver at the perihelion near the sun. For a velocity reduction of 1 km/sec at this point, you obtain a reduction of the reentry velocity by 2.5 km/sec. This is a significant discovery, as it tends to make the unfavorable years much more acceptable again from the energy requirement viewpoint.

The reverse, to get more aphelion with less initial injection velocity by using a perihelion maneuver, is suggested by Oberth 15 years ago B

HHK
 Think of the items enumerated in your Nov 5 letter to E.Z. Gray are handled by defined office? I'd like to learn a bit more about his specific plans of these studies. B

1. American Ordnance Association Meeting: The meeting of the Welding Section of the AOA, sponsored by you, took place here at MSFC last week with 76 representatives from industry and government participating. Included in the attendees was the Director, British Welding Research Association; the President of the American Welding Society; and Dr. R. C. McMaster, Professor of Welding Engineering of the Ohio State University. Very interesting presentations were made and during the following panel discussions valuable exchange of information and experience was achieved. ✓

2. Saturn V, S-IC Stage:

a. The two halves of the Fuel Test Container were moved over the week end into the Tower Building for final vertical assembly. This operation is 17 weeks behind Plan V schedule. The time from BOD (August 1) until now has been utilized in very tight schedules to modify moving platforms which were not operational as designed; to install turntable and welding equipment; to modify pumping systems for hydrostatic testing and cleaning which started already rusting; to proof test and verify welding techniques with actual skin panels; and to add environmental control enclosure to welding station. The extra overtime money allotted to the contractor for the early completion of the building has really helped to reduce schedule slippages. ✓

b. Some improvements in delivery promises from Boeing for components and sub-assemblies for the heavy -T Thrust Structures have been obtained. However, this is still the most critical and pacing structural item for the Static Test Vehicle. Status according to these latest promises is between 20 to 24 weeks delay in Plan V schedule. ✓

3. Saturn V, S-II Stage: In support of the new light weight insulation developed by P&VE we have initiated an experimental program to build a 70" test tank with this insulation bonded to the outside of the cylindrical portion of the tank. Bonding will be accomplished in our Autoclave. Target date for completion is January 1964. ✓

4. Zero Leakage Tube Connection Development: Besides the induction brazing equipment we have acquired a miniature arc welding tool from NAA for welding of tubing to machined tube end fittings, tees, crosses, etc. A qualification program for welded tube connections is being established jointly with P&VE and Quality Laboratories. ✓

B 11/5

1. OSS SUPPORT (LACK OF SUPPORT) FOR SATURN IB, S-VI STAGE -

Initial efforts toward development of an S-VI stage were started in FY 63 with \$500 thousand in the OSS-sponsored SRT program. We proposed approximately \$1900 thousand of SRT effort to OSS to continue and broaden our S-VI stage program in FY 64. Advance, oral information indicates that we will receive no funding from OSS for this effort in FY 64 due to budgetary cuts from Congress. Steps are being taken to obtain written confirmation of this. Alternative funding would be to include the S-VI (MMM) as a high priority item in our FY 64 "Dry Lake" to be funded from Saturn funds.

As you probably know, OSS also did not lend active support to OMSF in their September 63 request for FY 64 funding for the Multi-Purpose Cryogenic Space Stage (MMM).

H/M
of course,
we have
1.25 M
for MMM
from E.2.
Stay's office,
via
Koelle/de Fries
B

2. PERT

Assistance to LOC - LOC has asked us for assistance in developing PERT application to facilities projects. Tom Smith was at LOC October 30 - 31 and gave an explanation of our system to their project and facility office personnel. LOC is considering the development of a master plan for MILA, similar to the MTF PERT application. ✓

NASA PERT Coordination Meeting - The NASA PERT Coordination Meeting scheduled to be held at MSFC November 6 - 7, has been postponed for approximately one month. ✓

1. CRACKED TUBE FITTINGS: (Reference NOTES 10-28-63 MRAZEK, paragraph 4.) Approximately 10,000 tube fittings (sleeves) of the type reported in the reference are in stock at this Center and will require reheat treatment to salvage. The Materials Division began heat treating enough for one vehicle (approximately 1,700) on 10-30-63 on a 24-hour day basis. Also, approximately 1,000 sleeves are being shipped from Michoud. All of these will be completed in four or five days. There are also some fittings which will require heat treatment in stock at the Cape. An attempt will be made to get someone to heat treat the 8,000+ on contract. ✓
2. S-IV-6 CONTAMINATION SAFEGUARDS: S-IV-6 is in checkout in Test Stand 2 at Sacramento. The LOX system contamination problem has been determined to be of little significance and the system has been pronounced acceptable. The liner material present in the LH₂ tank outlet elbow below the screen is being removed to prevent S-IV-6 engine contamination similar to S-IV-5 contamination at the Cape. ✓
3. RIFT THRUST VECTOR CONTROL (TVC) EVALUATION: The evaluation of the two proposed RIFT/NERVA powered flight attitude control system has been completed. Based upon the comments and recommendations from the three Laboratories (Aero-Astroynamics, Astrionics, and Propulsion and Vehicle Engineering) involved in the evaluation, the TVC Ad Hoc Group is recommending that the Aerojet TVC system efforts be continued. The MSFC report, combining the laboratory inputs, is being reviewed for signature. ✓
4. LH₂ TECHNOLOGY FUNDS: A line item has not been established in the Program Operating Plan for the LH₂ area as requested in your memorandum dated August 28, 1963, subject: Liquid Hydrogen Technology Program Funding Requirements for Fiscal Year 1964. ✓

B 11/5

1. S-IC STAGE: A proposed change to further mill the "Y" Ring with a resultant weight saving of about 3000 pounds per stage is being reviewed. Tool design, fabrication, equipment procurement and installation will require approximately \$170,000 of R & D facility funds. ✓

The Test Fuel Tank is expected to move into the Vertical Assembly Building for final structural assembly within the week. ✓

The first meridian weld of gores was completed 4 weeks behind schedule. Installation of x-ray equipment and heat treat fixtures were cause for schedule slippage. ✓

Reference 10/28/63 notes, item 2, concerning possible requirement for rework of S&ID Master Interface Gage; the Gage has been shipped back to S&ID for complete rework and will be inspected by MSFC prior to reshipment to Michoud. ✓

2. S-II STAGE: A Saturn S-II GSE Ad Hoc Group will be formed to expedite the review and approval of all GSE changes that will be forthcoming during the next few months. Laboratories have been requested to assign individuals who will be responsible for work in their areas. ✓

On October 30, the vertical assembly building contractor cut through temporary welds tying together the work platforms in the first step toward expediting occupancy of that building by early January. The amount of deflection at the top of the building was 5/8 inch which has been judged as being within acceptable limits by the Facilities Project Office. ✓

The last PERT report indicated that S-II-2 delivery to AMR has a negative slack of 10.2 weeks and the S-II-1 (flight dummy) delivery to AMR was shown as a positive 0.1 week. The primary critical paths reported by S&ID are in the area of fabrication of the forward common bulkhead gores; the vertical assembly building joint occupancy date; propellant re-circulation system procurement specification release; and pneumatic servicing equipment. ✓

3. S-IVB STAGE: Bonding of the Dynamic Test Stage common bulkhead is approximately 90% complete. Fitting of the forward dome to the aft dome has been completed, and the bulkhead is ready for the final bonding cycle. ✓

The battleship tank is expected to be mounted in the test stand by December 1. ✓

The MSFC battleship test stage is presently being assembled by Chicago Iron and Bridge Company in an area behind P&VE Lab. ✓

The request to reprogram S-IVB facility items in order to relieve critical facility fund shortages in S-IVB is awaiting approval at NASA Headquarters. ✓

4. Vehicle GSE: Reference 10/28/63 notes, item 5, concerning requirement for NASA Headquarters' decision to proceed with RCA Computer Contract; NASA Headquarters has stated they concur in the general conditions of the recent negotiations. Official notification to P&C is expected within the week. ✓

B11/5

Visit of Congressional Staff: Dr. G. P. Wilson, Staff of the Senate Space Committee, Col. Harry Tufts, Advisor on Facilities to the Senate Space Committee, and Mr. R. V. Mrovinski, Staff Member of the Space Council visited Huntsville, Michoud and Mississippi Test Facility on October 30 and 31. This visit was in preparation for the Senate Hearings on the NASA FY-65 budget which will begin March 1964. All NASA Centers are to be visited including the MSFC West Coast facilities. I feel these officials were favorably impressed with the briefings, tours, and high rate of construction activity at Huntsville, Michoud and MTO. The following comments and observations were made by the group:

Edwards
I think no personnel will be more than busy until we have that moon in the moon. But a long-range facility which may be possible. It might be very useful in Hq. discussions on R&D Lab, Aero's Fluid Lab, etc. Comment invited B

1. Dr. Wilson expressed concern with MSFC's programmed use of existing facilities and personnel as current programs begin to taper off here and moves to Boeing, Chrysler, and others for production. His concern emphasized our urgent need to develop a long-range MSFC mission and an implementing facility plan.

2. Dr. Wilson was concerned that Marshall was not taking advantage of Saturn flight payloads from the standpoint of publicizing scientific gains. He feels that the U. S. public is not really impressed with putting water in space and suggest that we need a payload such as a 1,000 ft. diameter Echo Balloon.

3. Dr. Wilson was concerned about the apparent facility duplication between various of Marshall locations, with particular regards to F-I test stands. He was advised that the stands at Edwards were for engine acceptance; for Huntsville the stand was for R&D use in integrating the engine and stage; and for Mississippi the stand was for engine testing and engine fix at the stage acceptance location.

4. That FY-64 funds may be delayed until mid December. This will result in delay of award in several construction contracts.

5. That since presidential nominating conventions will begin in September 1964, FY-65 funds should be available to NASA by that time. Such early receipt of FY-65 funds provides two fiscal years funding within a 9 months period and dictates preparedness on our part for some what earlier than normal obligations.

6. The group was impressed with the apparent need for the Michoud Air Strip however, Dr. Wilson said that considerable justification will be required to Congress to demonstrate the need of the Michoud Air Strip in lieu of the facilities that exist at the Lake Front airport. Guppy! F-1 transports! B

7. As in previous instances Chrysler, in the briefing, brought up funding difficulties. I subsequently requested that George Constan caution Chrysler to refrain from discussing funding difficulties with people who were unable to resolve or understand this internal problem.

1. METEOROID MEASUREMENT PROJECT: While the three flight Meteoroid Measurement Capsules currently being produced by Fairchild-Stratos Corporation would have met the original contract requirements, it has recently become apparent that an additional but relatively minor investment of time and money would result in a considerably improved system reliability. As a result, a modification was recently negotiated to the basic contract to allow the incorporation of the necessary system simplifications. Fairchild has been granted a ninety-day delivery time extension on the three capsules to permit this product improvement. In view of the extended Saturn schedule, this three-month extension can easily be accommodated. ✓
 Some of the personnel currently working in the MMC Project Office on loan are being recalled to fill positions in their own laboratories, made vacant by the current reorganization of Marshall. We are attempting to replace the two or three men involved by additions to the permanent staff, and to assure continuation of the program with more junior men who have been actively participating in supporting roles. ✓

OART recently requested RPL to submit a detailed Project Development Plan for the Meteoroid Measurement Satellite. Earlier in the project, this requirement for a very detailed PDP had been dropped because of pressing time schedules and shortage of manpower. Although this situation still exists, we will try to comply with OART's requirement, and we will incorporate in the PDP the new time schedules, and the technical modifications which were necessary because of the radiation damage problem. ✓

2. PAYLOAD FOR SA-10: Representatives of M-R&D, Astrionics, P&VE, Aero-Astro, and RPL held discussions, chaired by Lee James, about possible payloads for SA-10 (see NOTES 10-21-63, Stuhlinger, Attachment #1). It appeared that a combination payload with a lighter shroud, the third meteoroid measurement capsule, and several space technology and space science experiments would be MSFC's proposal, provided that MSC does not propose a re-entry test with SA-10 which probably would have the higher priority. Fairchild-Stratos Corporation recently made a proposal for a payload of the space experiment type; This proposal is useful as a basis for our present study. Joe Fikes will serve as coordinator of this study to which RPL will make substantial contributions.

ES.
 → How about OART funds for 3rd Meteoroid flight on SA-10?

B → Oh, here we are! but who pays? That's the key to whole question! Dr. Mueller is in no mood to sink the money saved in Sat-I program into "new starts"! B

B11/5

1. PAYLOAD FOR SA-10: RPL suggests two possible uses for SA-10; first, to carry the third meteoroid flight capsule; or second, to carry a "space laboratory" type payload. A number of scientific and technological measurements could be made with a slight modification of the existing third flight capsule of the meteoroid project. Structure, separation, power supply, antennas, communication system, and flight plan would remain unchanged; the detector panels would be replaced by other measuring instruments. If you agree, RPL will make a short preliminary study of a possible scientific and technological program. ACTION REQUIRED

See my remark on NOTE 5 11-4 Stuhlinger

2. ALSS PROJECT: As directed by Tom Evans (OMSF) and Verne Fryklund (OSS) through Joe de Fries, RPL has begun work on a "Mission Operations Plan" for an ALSS vehicle. Besides scientific objectives, this plan should also include operations such as unloading, antenna alignment, remotely controlled vehicle motions, and the like. A preliminary report is due by the end of November. This work is a follow-up to the earlier RPL report on "Scientific Packages for Apollo Logistic Support System or Saturn V Lunar Logistic System."

B

3. INTER-CENTER RESEARCH COORDINATION PROGRAM: The MSFC Inter-Center Research Coordination Program has been initiated with visits to Langley Research Center and Goddard Space Flight Center. Contact was made with 11 groups at LaRC and 13 groups at GSFC to review in detail the MSFC ART/SRT Programs. A total of 1063 specific requests from LaRC and GSFC for additional information resulted. Information on the LaRC and GSFC ART/SRT Programs will be coordinated with the Marshall laboratories. Similar visits to each of the remaining major NASA Centers are planned. ✓

4. APOLLO SHIELDING EFFECTIVENESS PROBES: In a meeting at MSC on October 15, 1963, personnel from United Nuclear Corporation discussed their studies under a MSFC-RPL contract on the gamma ray probe evaluation of proton shielding effectiveness. They also presented conceptual designs of scanning equipment to be submitted to North American Aviation for Apollo module checkout. MSC Apollo project personnel seemed satisfied with the feasibility of this approach and plan to obtain a policy decision concerning its possible use.

→ to scan what? B

E.S. Would like to see old and new report. B11/5

Brown

NOTES TO MUELLER 11-5-63 DEBUS

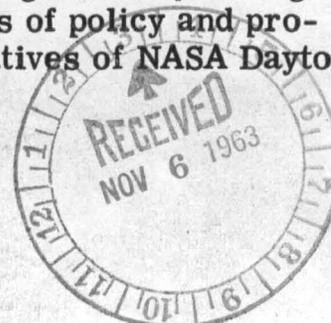
1. SA-5 Status: As a result of the hurricane threat and the S-IV engine contamination investigation, a revised work plan was prepared this week. The overall effect of these items (mostly hurricane) delayed the target launch date until the Wednesday following the original forecast date. Wednesday was chosen because of the operational advantage to maintain the final three days of operations consecutive and not during the weekend since they are critical with respect to each other and require considerable Range Support. At the present time, the S-IV stage has completed all electrical sub-system tests required prior to electrical mating with the S-I and IU.

2. Source Evaluation Board Reports: We plan to present "Dry Run" reports to you on the following items on Nov. 7, then to Mr. Webb on Nov. 8th.

- a. Administrative Management Services (MILA)
- b. Operations & Maintenance of MILA Communications System
- c. Propellant Management Services (MILA)

3. SATURN I/IB Pad Utilization: A study is being conducted to determine what amount of money could be saved by terminating the almost complete SATURN I Block II modifications to Complex 34 and the associated wet test. At the same time, we are re-examining the SATURN IB pad utilization based on the above, on costs to modify each pad for SATURN IB. We expect to complete this study on November 6, 1963.

4. GE Contract Administrator's Conference: A conference of all DoD and NASA Contract Administrators concerned with the administration of General Electric Company contracts was held at the GE Plant in Valley Forge on 24 October. This meeting followed a similar meeting of DoD and NASA Audit personnel held at the same facility on 21, 22, and 23 October. These conferences are considered valuable in that there is a free interchange of information and discussions of problems encountered due to the various government agencies operating independently and without coordination on major items of policy and procedures. Both meetings were attended by representatives of NASA Daytona.



5. GE Personnel Reduction at Daytona: Mr. Fancher, General Manager, General Electric Company, Apollo Support Department, has informed LOC that it is his intention to make an immediate reduction in personnel employed by GE at Daytona Beach.

This action is being taken because of the reduced work content of Contract NASw-410, and because of the lack of apparent prospects for a substantial increase of workload in the near future. Implementation of this decision began on Monday, November 4.

6. VAB Foundations: Low bay foundations will be complete Nov. 25, 1963. Originally scheduled completion date was Nov. 4, 1963. Slippage will have no impact on structural steel follow-on contract. 460,000 l. f. of 674,000 l. f. of piling driven to date. Pile driving is complete for low bay area. 8,500 c. y. of approx. 37,500 c. y. of concrete placed for foundation footings and grade beams. Total work in place on this contract is approx. 60% complete.

7. VAB Outfitting Contract: The bid opening for this contract is scheduled for December 10. Corps of Engineers requires \$49,000,000 available before they will open bids. We have requested reprogramming of \$7,700,000 from FY-63 Land Acquisition and Utility Installation in order to meet the requirement.

8. Design Review of the Arming Tower: The 80% design review and the Arming Tower was held in the Rust Engineering Offices in Birmingham on Tuesday and Wednesday of last week. Two interface problems exist in the present design. One of these is the clearance between the LUT, Arming Tower, and the pad; and the other is clearance between the Arming Tower support legs and operator cabs on the Crawler Transporter. Action is underway to resolve these problems without a major redesign effort.

9. Launcher/Umbilical Towers for LC 39:

a. All work has been completed on "Architect-Engineer Services for Launcher/Umbilical Tower for LC 39." The contractor was Reynolds, Smith and Hills. Negotiations for closing the contract are in process by P&C.

b. The Invitation for Bid has been issued for the "Electrical Mechanical Portions of the Three Launcher/Umbilical Towers for LC 39." Bids are due on November 21, 1963.

c. On October 25, a contract was awarded to the Pittsburgh Testing Laboratory for the "Non-Destructive Testing of Welding for the Three Launcher/Umbilical Towers for LC 39." This testing will be done in the shops of Ingalls Iron Works Co., in Birmingham and Decatur, Alabama. Cost will be on a unit price basis. Only two of the three prospective bidders responded to the Request for Bid.

10. Pneumatic and Electrical Distribution System for LC 34: On October 22, all contract work was completed on the "Fabrication and Installation of the Pneumatic and Electrical Distribution System for LC 34." The contractor (American Machine and Foundry Co.) is in the process of turning in all GFE, and completing records; final negotiations will follow these actions.

11. Crawler-Transporter for LC 39: On October 25, we were informed that the strike at Pittsburgh Steel Foundry Company (corner castings subcontractor to Marion Power Shovel Company) was settled. Work has been renewed on the corner castings. Any delay in the delivery date of the crawler-transporter has not been determined as yet. October 21-25, 1963, meetings were held at Marion Power Shovel Company, Marion, Ohio, between representatives of the crawler-transporter prime contractor, and to negotiate contractual changes. These changes were for the increase in hydraulic leveling cylinder size (was 18 inches; now is 20 inches) and the increase in size of the auxiliary AC diesel-generators (was 100 KW; now is 150 KW) for the Launcher/Umbilical Tower.

12. MILA Potable Water: City of Cocoa has all pipe laid from SR 520 to Gate 2. They are in process of flushing and sterilizing the line. The on-site work from Gate 2 to MILA is completed except for flushing and sterilization including a 24" by-pass of the incomplete pumping station. It would appear that potable water from Cocoa could be available to the Industrial Area by 10 Nov. 63.

13. RCA Strike - AMR: Current strike (starting Oct 29) against RCA by International Alliance Theatrical and Stage Employees Union (IATSE) has had impact on construction through sympathy walk-out of iron workers. All workers returned on Oct 31, 63 even though union pickets remain posted.

B_{11/5}

Lee B

Hermane Geidner

Any hidden problems here?

NOTES 11/4/63 BELEW

I guess this is the 4th time that I've confirmed in writing that you have the full green light to go ahead!

H-1 ENGINE PROGRAM

Engines of the qualification configuration, scheduled for delivery in February 1964, may be uprated and allocated to either S-I-201 or S-I-204, depending upon the amount of obsolescence we are willing to swallow; however, a firm Center position to uprate the engine to 200K was needed by November 1, 1963, in order to meet the February delivery schedule without a crash program. Every day a delay will result in a higher cost for the uprating development program since the current development effort is devoted to qualification at the 188K level.

B
(What are you saying for?)

RL10 ENGINE PROGRAM

Action is being taken to "stretch-out" the RL10 engine production contract starting on January 1, 1964, in accordance with the decision to eliminate Saturn I operational vehicles. A delivery schedule has been coordinated with the Lewis Center to allow continued procurement of engines at the proper rate for the Centaur Program.

Pratt & Whitney will be at MSFC on November 13, 1963, to discuss incentive contracting for the follow-on research and development program.

Unofficial word has been received that the FY-64 R&D budget will be cut by \$5.0 million. This will result in a 30% to 40% decrease in effort at P&WA since one-third of the FY has passed and propellant costs cannot be reduced further. ✓

J-2 ENGINE PROGRAM

Verification testing of the engine control system, a prerequisite of PFRT, is proceeding on schedule. During this period the GG control valve and the pneumatic control package completed their verification test series.

The Rocketdyne specification for J-2 flight instrumentation has been completed and agreed upon. ✓

* F-1 ENGINE PROGRAM

Engine F-1001 (the first to be delivered to MSFC for ground-static testing) has arrived at MSFC. The engine was shipped via the "Pregnant Guppy." This delivery was accomplished to a schedule contractually established 16-months ago, in spite of numerous development problems which required solution during the intervening months. ✓

1. S-I-8 Status

S-I-8 was moved from the final assembly area to the functional checkout bay area at 3:00 p.m. on October 27, 1963. The manual ground electrical test set 250 checkout power distribution was completed and accepted (less 96 steps). These steps were omitted due to late delivery of approximately 15 cables. Schedule date of delivery of these cables is October 30, 1963. Manual cutoff test was completed but not acceptable to NASA. The problem is now being resolved. TM Ground Station was accepted for vehicle checkout. ✓

2. Partial Termination of Contract NAS8-4016

Contract NAS8-4016 with Chrysler Corporation Space Division was partially terminated by Contracting Officer's letter dated October 30, 1963. The partial termination deleted S-I Stages, S-I-111 through S-I-116 and all related stage work. ✓

The revised Launch Vehicle and Propulsion Data for MORL (Manned Orbital Research Laboratory) study has been distributed by OMSF. Saturn/Apollo Systems Office has copies. Request one. B

KD

The re-examination of NASA Launch Vehicle Program preliminary report was presented to Mr. G. Low on 11-1-63. Emphasis was made that the present Saturn vehicle program is the absolute minimum required for manned lunar landing. Additional vehicle requirements for missions such as a 3-stage Saturn IB/S-VI for Apollo re-entry; Saturn V Apollo Lunar Logistics System and/or LEM Truck; Saturn IB and Saturn V vehicles for Manned Orbital Laboratories; and many prospective unmanned Office of Space Sciences programs which indicate over 50 more Saturn IB's (2 and 3 stage) and 10 more Saturn V's (2 and 3 stage) were included. (R-SA has draft copies) ✓

Dr. Mueller's revised schedule for Launch Vehicle and Spacecraft deliveries and launches is being sent to the Centers for comment and approval. (R-SA has draft copy) ✓

Note: All draft copies mentioned will be included in Dr. Shratter's trip report. ✓

Key personnel of IO and R&D met and made some preliminary agreements on the joint operation of Working Groups and Panels. You will be informed on details as they become available. ✓

Based on the experience of the last mission realignment, a joint "Flight Mission Planning Panel" will be proposed by us to the Panel Review Board next Thursday. ✓

B 11/5

1. MTF Activation Plan: Development of MTF Activation Plan by MTO and GE personnel is progressing satisfactorily. Final draft of initial plan is scheduled for presentation to the MTF Planning Board at the regular November meeting. ✓

2. Raytheon Contract: Raytheon Contract (Acoustic operations @ MTF) has been extended for five months and transferred to MTO. GE will be expected to assume these operations prior to April 1, 1964. ✓

3. Meetings with SBT&T: Meetings were held with representatives of Southern Bell Telephone & Telegraph Company of Mississippi to finalize their furnishing permanent telephone service. Agreements were reached on all points except ownership of outside cable. (MTF approach will be almost identical to that established at MILA.) ✓

*Harry F.
Do we see
eye-to-eye
with HQ?
on this?
B*

4. New Personnel: Mr. Stephen Bartley joined MTO as Program Officer and will function as Huntsville administrative liaison with offices in Building 4200. ✓

5. General Electric Personnel (MTSO): As of October 27, 1963 GE(MTSO) had following personnel:

Huntsville:	Overhead, 23;	Direct, 25;	Total, 48.
Mississippi:	Overhead, 5;	Direct, 45;	Total, <u>50</u>
	Grand Total	-	98

Further staffing is curtailed pending development of the activation plan. ✓

1. Apollo Mission Control Support: In several meetings a compromise solution for the joint LOC-MSFC support to IMCC has been worked out. MSC's request for a supporting staff room (at IMCC) would be accepted. This SSR would be linked with LOC and MSFC on an equal basis. All flight controllers would have to be supplied by MSFC. The planned LIEF facilities need only moderate modifications to accommodate this additional support. A memorandum outlining this proposal is being circulated for concurrences and will be submitted for your approval. ✓
2. SA-504, 505 Reentry Profile: Preliminary results have been obtained from the SA-504 and 505 reentry profile analysis which involves direct injection into an elliptical parking orbit and transfer from the parking ellipse to the reentry ellipse via the S-IVB stage second burning period (Method 5 of Saturn V Design Review, Oct. 8, 1963). The propellant consumption during the first burn was limited to 100,000 pounds (instead of approximately 80,000 pounds on operational LOR profile) with a resulting payload of 74,700 pounds. The parking ellipse has an apogee altitude of 2440 km, a perigee altitude of 108 km, and a flight time from cutoff to reignition of 1.57 hours. The flight time from the second cutoff of the S-IVB to reentry is 2 minutes. Conditions at reentry are: altitude of 120 km, velocity of 11,033 m/sec, flight path angle of -5.5 degrees. These results are based on standard Apollo propulsion data and latest weight estimates.
3. New Cost Picture on MMM: We have made a first estimate of MMM cost, assuming it is separated from any stage development, but is treated in the same manner as an engine program. The following is the approximate picture: MMM development: \$42 million and 34 1/2 months. For comparison's sake, a typical stage development following and being independently costed of the MMM would be: \$85 million and 18 months. (MMM would of course be G. F. E.) Procurement of a MMM would require approximately \$4.7 million. ✓

→ E.G.

You know that Dr. Mueller wants us to fly these re-entry missions not on 504 and 505, but on 501 and 502. I'd like to discuss this with you at your earliest convenience

B

1. S-I-6 POST-STATIC CHECKOUT: The S-I-IU Mated Test was run with satisfactory results and the S-I-6 stage was released to Manufacturing Engineering Laboratory October 30, 1963. ✓
2. S-IU-6 FINAL CHECKOUT: Remaining tests are being completed on the S-IU-6 vehicle. ✓
3. S-IV-6 PRE-STATIC CHECKOUT AT SACTO: Pre-static checkout operations have started on S-IV-6 at Sacramento. ✓
4. S-I-9 PRE-STATIC CHECKOUT: Vehicle S-I-9 has been transferred to building 4708 for weight and alignment testing, and is scheduled to begin electrical checkout in Station "B" building 4708 today. ✓
5. S-II QUALIFICATION STATUS LIST: An agreement has been reached with North American Aviation, Space and Information Division, on implementation of the April revision to NASA document NPC 200-2. This revision includes a requirement for the Qualification Status List for which a price increase of \$140,000 was negotiated. ✓
6. EVALUATION OF AIR FORCE QUALITY CONTROL, DAC, SACTO: A recent evaluation of Air Force Quality Control at DAC, Sacramento, revealed an inadequate level of inspection effort. The Air Force was notified of this deficiency and action was taken to secure additional inspectors. Two inspectors have already been added. ✓
7. APOLLO SYSTEM TEST REQUIREMENTS REVIEW: The second draft of the Apollo System Test Requirements has been received from OMSF (George M. Low) and submitted for a final review. This Laboratory was designated the point of contact to coordinate the review of the original document entitled "Apollo System Test Plan Document"; however, it has been agreed that the Saturn Apollo Systems Office, R-SA will be the point of contact to OMSF and will take care of the coordination with Industrial Operations. This Laboratory will coordinate the review only within Research and Development Operations. The document is to streamline the testing effort for the Apollo System, its subsystems, and components, and, when issued, will be binding on MSFC, MSC, and LOC. A thorough review will be necessary and R-SA has to bring several requirements to your attention for your concurrence. ✓
8. GENERAL ELECTRIC COMPANY (HUNTSVILLE) INSPECTION COVERAGE: The General Electric Company (Huntsville) manufacturing operation was visited to determine the extent of inspection coverage which Birmingham Procurement District will be required to perform. This visit also served as an orientation for the Birmingham Procurement District Resident Inspector. A requisition for inspection coverage is being initiated, and it is anticipated that Birmingham Procurement District will begin coverage of this work within the next week. ✓

SA-5 Status

1. Diodes: As you might be aware, we have in SA-5 approximately 2500 diodes that became suspicious and caused postponement of the Ranger shot for three months. In close cooperation with R-ASTR and R-QUAL, we are determining the critical circuits and have to probably exchange a few black boxes in the critical areas. Dr. Haeussermann is personally pushing the investigation in R-ASTR. We hope that exchange of the components during our normal schedule will not delay target launch date, but we are not sure. ✓
2. S-IV Overall Test: A complete overall test of the S-IV stage was run last week without any obvious discrepancies. The stage is now connected electrically to the IU and S-I and combined launch vehicle tests have begun. ✓
3. Cooperation of DAC: I had a meeting with Mr. Bromberg and his Cape people and it seems that the exercise we went through on the unsatisfactory workmanship of the flight sequencer cleared the air somewhat. No complaint at the moment in that regard. ✓
4. Pad Utilization: We are going through an exercise which would utilize Area 34 for the S-IB firings as was proposed by Dr. Mueller at the last Council Meeting. Personally, I think the 37 Complex with its larger blockhouse is preferable as primary S-IB launch area. On the other hand to stay on 37 with the rest of the S-I launchings, eliminating the 34 S-I wet test is a definite operational advantage. We will cost it out in detail. There is no doubt in my mind that we will need both blockhouses for the S-IB program eventually; otherwise, the slip of one vehicle automatically necessitates slippage of the following one because the distance between the two 37 pads does not allow simultaneous pad operations which would be possible if both blockhouses were utilized. ✓

NOTES 11/4/63 HAEUSSERMANN

B 11/5

1. GOLDFLAKES IN DIODES: JPL found malfunctions of diodes in their Ranger control system; the same diodes are to a larger extent in the GE guidance system. We do not use exactly the same type diode but have diodes of the same "technical family" in GSE and vehicle components. A thorough inspection and evaluation of deficiencies is presently being carried out and I cannot yet determine the effect on our next Saturn firing. ✓

2. RCA 110A CONTRACT: It was decided that for the present RCA 110A contract (NAS8-5423, purchase of six computers) no attempt would be made to incorporate any redundancy features. Although these features are desirable and are listed as items to be done in the Bell Comm study report, implementation within this contract is not feasible. ✓

Dr. Davis says Headquarters rewrote it
& it went to St. Seaman's last
Thursday. Has not been signed
as far as he knows.

1

NOTES 11/4/63 HEIMBURG

B 11/5

Serious
schedule
slippage?
eh?
B

1. S-1-7: This stage will be removed from the test stand on 11/4. Post firing inspection revealed a leak from the thrust chamber tubes to the outside on engine 8 (see attached photo). This problem has not been previously encountered. Investigation determined that Rocketdyne had repaired this same spot twice. Repair or exchange will be conducted inhouse at MSFC. ✓
2. F-1 Testing (Static Test Tower West): During a water flow test conducted 11/2 on the lox suction line and pre valve, the lower expansion and gimbal bellows (S-1C design) were severely damaged by a 535 p.s.i. pressure surge (water hammer). This condition is inherent in the present design of the valve. Investigation is presently underway to determine a solution for this problem.
KH → but couldn't be predicted? B
3. S-IV-6: Firing preparation work remains on schedule; however, difficulty is being experienced in the removal of insulation pieces in the LH₂ suction lines. ✓
4. S-IVB Static Firing Working Group: A meeting of the Working Group was held with DAC during the week of 10/28. DAC refused to accept the group's direction regarding instrumentation. Problem was settled by S-1B Systems Office (Mr. James) who concurred with the Working Group's direction. DAC accepted MSFC direction in this matter. Capt. Freitag was represented by Mr. Barzill, who was in agreement with MSFC action to resolve this problem. ✓
5. Swing Arms (LC-34): Reference NOTES 10/28/63 HEIMBURG (copy attached). For the S-IV GH₂ vent coupling, in addition to the "fix" previously described, one 1/8" hole was drilled in the coupling housing to prevent water from accumulating and freezing. Subsequent tests made with high humidity (95%) and high temperature (95°F) external to the coupling and with internal cryogenic temperatures for 1½ hours showed that the coupling would release. This modified coupling is considered satisfactory for servicing Saturn I, Block II vehicles, provided this "fix" is incorporated and a check to verify the installation of the insulation sleeve is made during the launch countdown. ✓
6. Incident in Components Test Lab: Reference NOTES 10/28/63 HEIMBURG (copy attached). Cleaning of the lox system is 75% complete. The contaminants found are, for the most part, soluble in trichloroethylene or Freon. The source of these contaminants still has not been ascertained. Cleaning and reassembly of the test positions will be completed during the week of 11/4. ✓
7. MTF Working Group:
 - a. The bid opening of the Navigation Lock, which is a major pacing item for MTF, has been rescheduled from 10/31 to 11/4. Further postponement is likely, since bid opening is contingent on release of FY 1964 funds. ✓
 - b. The decision on a protest by the apparent low bidder (George A. Fuller) for the S-11 Complex is expected to be received from Office Chief of Engineers during the week of 11/4. ✓
 - c. MSFC is still awaiting NASA Headquarters approval of procurement plan for MTF Phase II and Phase III Technical Systems. ← *Harry Borman*

ATTACHMENT 1: Photograph (on Dr. von Braun's copy only) *What's the latest on*
 ATTACHMENT 2: NOTES 10/28/63 HEIMBURG (on Dr. von Braun's copy only). *this one?*
 B

1. VISITORS TO MARSHALL DATA CENTER: Three representatives from the U. S. Navy Ordnance Test Station, China Lake, California spent three days with the Projects and Industry Applications Division, Computation Laboratory, discussing the Marshall Data Center study and progress to date. A similar effort is about to begin at NOTS, and their representatives requested participation by Marshall personnel in their management presentation concerning the magnitude and problems involved in a data center study. At the request of Computation Center personnel of MSC, similar information was discussed two weeks ago in Houston by ADPS personnel from our Laboratory. ✓

2. GAO AUDIT: The General Accounting Office has completed its audit of our Laboratory and we held the formal exit conference on October 29. They presented findings and recommendations in the areas of rental overpayment, magnetic tape, lease versus purchase, and internal review. In the rental overpayment area, they found that we had overpaid IBM some \$68,000 on the old 705 systems and approximately \$184,000 on our 1401 systems, and that we had overpaid the General Electric Company approximately \$9,000 on the GE-225 computers. They recommended that all of this money should be recovered from these companies. We intend to comply with this recommendation. In the magnetic tape area, they found excessive idle tapes in our tape library and recommended that we improve our system for returning these tapes to the active files. In the tape procurement area, they found we were not procuring tapes in sufficient quantities to obtain the best price. They recommended that our Procurement people buy tapes in larger quantities. The GAO representative considered that both of these items had been corrected prior to the exit conference. In the lease versus purchase area, they recommended the purchase of some miscellaneous equipment, including the SC-4020 (magnetic tape to microfilm device) plus some small analog computers, and we will probably comply with their recommendation if purchase funds are available. In the internal review area, they "gigged" both Hardeman's internal review people and Noel's NASA Headquarters auditors for not having done a better job. In general, we think we came out very well in view of the fact that their team spent some five or six months here, and that the majority of the overpayment finding was possible only because we had improved our time-keeping system on the computers. ✓

Harry S.

SATURN I: Operational Program Termination - Prime contractors, CCSD and DAC were notified of the termination of the operational flights SA-111 thru 116. All procurement actions are being returned from contracts office for review to insure no operational requirements are placed on contract. No definitive contract action can be taken with CCSD & DAC regarding the schedule of the remaining R&D flights until an approved launch schedule is received from OMSF. Current indications are that a revised schedule will be approved approximately November 8. ✓

SA-10 Payload Study - A meeting was held with R&D Operations on Friday, November 1, to establish guidelines for a study of payloads for SA-10. Approximately 15 different payloads were discussed. Most of these payloads were eliminated due to complexity and the fact that only one flight will be available. It was decided that this study should concentrate on the following three payloads. (1. Apollo re-entry test with or without service module, priority by MSFC if requested by MSC. 2. Micrometeoroid capsule III covered with a light shroud, to allow sufficient payload for other experiments, such as: Saturn IB type IU cooling system (passenger only), simple MSC Bio-capsule, micrometeoroid special measurements, etc. 3. Micrometeoroid capsule III with same design as SA-9 & 8.) It is planned to have the results of this study completed for presentation to the Director on November 21. ✓

Launch Complex Utilization Study - At the request of Dr. Mueller, LOC is preparing a study on pad utilization for Saturn I/IB programs. It appears that LOC would like to convert VLF-34 to the Saturn IB configuration after SA-7. VLF-37B would be retained throughout the Saturn I program and converted to the Saturn IB configuration presumably by SA-202. LOC plans to have the study completed by November 6, 1963, and will meet with MSFC representatives prior to release to Headquarters. Based on this study LOC has requested that the shipment of SA-D5 to LOC be delayed approximately 10 days from November 12 to November 22. This shipping schedule was based on wet test of VLF-34 beginning about mid-November. Further shipping dates will be predicated on the result of the above schedule. ✓

SA-5; Checkout of SA-5 at LOC is proceeding satisfactorily. P&VE has confirmed that the expected SA-5 flight vibration levels and frequencies are not detrimental to IU-5 components. ✓

SATURN IB/S-IVB: The OMSF/MSFC schedule validation team completed their examination of S-IVB activities at DAC on October 29, and a final report is expected this week. The preliminary indication is that the MSFC target schedule for Saturn IB will be corroborated. ✓



NOVEMBER 12, 1963

OFFICE OF DIRECTOR - MSFC

CODE	NAME	INIT.	<input type="checkbox"/>	<input type="checkbox"/>
DEP-A	Mr. Newby		A	I N F O R M A T I O N
	DHN		C	
			T I O N	

REMARKS

Attached are the remaining NOTES with Comments for 11/12/63. The first comments to these NOTES were returned at an earlier date.

CODE DIR	NAME F. L. Williams	DATE 11/27/63
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11/22

B 11/25

NOTES 11-12-63 JAMES

*fw

SATURN I/IB PROJECT OFFICE ORGANIZATION - The designation of key personnel of the Saturn I/IB Project Office has been completed as follows: Acting Deputy Director - S. R. Reinartz; Project Plans - J. C. Swearingen; Project Resources - Mel Johnson (Effective 25 Nov); Saturn I Systems Requirements and Integration - J. E. Fikes; Saturn IB System Requirements and Integration - F. E. Vreuls; Resident Project Manager, AMR - W. C. Cooper; Management Support Office - Mrs. E. S. Gober, Resident Manager, DAC - G. E. Stoops; S-I/IB Stage Manager - Arthur Thompson; S-IV Stage Manager - W. A. Ferguson; S-IVB (IB) Associate Stage Manager - Acting - Leroy Roberts; IU Stage Manager - W. K. Simmons; GSE Manager - Porter Dunlap.] The primary area remaining to be staffed is the contractor plant resident offices. The working relationships between the S-IVB (V) Stage Manager and the S-IVB (IB) Associate Stage Manager have been finalized between the respective Project Directors. The working relationship of the respective IU Managers is under study and will be resolved by the two Project Directors. ✓

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S-I Stage In-House Schedules - This office will publish this week a working schedule for the remaining in-house S-I Stages, S-I-6, 7 & 9. The schedule will be based on no scheduled overtime and will reflect the MSFC target schedule. This of course will not relieve the schedule situation at CCSD until MSFC receives an official Saturn IB schedule from Headquarters. The S-IB stage design and production at CCSD has not been modified from the original contract schedule. ✓

S-I/IB STAGE: - Inboard Turbine Exhausts - The S-I Stage mockup (now at Michoud) is being modified to investigate routing the turbine exhausts through the flame shield. Indications to date reveal that structural interference is encountered with this proposed scheme. This matter is under further investigation by P&VE. ✓

*fw

Saturn IB - RCA 110 Computers - RCA Display System Contract 5433 was released by MSFC Contracts Office. This contract contains Headquarters imposed drawing requirement (MIC-D-70327) and reliability requirements (NCP-250-1). RCA is in process of submitting a proposal covering MSFC's minimum approach covering these requirements. Contract 5423 covering RCA 110 computer deliveries using MSFC's approach was approved by Headquarters last week. MSFC must again seek Headquarters approval since Headquarters will not give blanket approval of MSFC's minimum approach. ✓

FY-64 Program Status - An internal FY 64 program review was conducted on November 6, 1963. Initiations and obligations of the Saturn I/IB were discussed. They have been running low due to the uncertainty of the schedules and 64 budget. It is expected that we will be in a much better position for the next reporting period. A memorandum has been sent to the Laboratories requesting that they rapidly initiate procurement actions. ✓

7w 11/25

B 11/25

NOTES 11-12-63 Koelle

1. ALTERNATIVE STAGE FOR S-I SUGGESTED BY MSC: We have received advanced notice that MSC will request a study in which a half-length 260-inch solid propellant motor, recently placed under contract, will replace the present S-I stage. The objective of the exercise is to find a solution for an early and substantial performance increase for the SATURN IB, which OMSF claims it needs. A letter is expected to be forwarded to MSFC in the near future containing this study request.

4/11/63
OK with me. But I don't see how, in present funding situation, we could get this project started (hardware-wise). Present 260-in program includes only feasibility demonstration.

→ Is that in the cards? B

2. OMSF HEADQUARTER ORGANIZATION, ADVANCED MANNED MISSIONS PROGRAM: The following people in Ed Gray's office have been appointed to key positions, reporting directly to him:

- Director, Systems Engineering: Douglas Lord
- Director, Special Studies: W. Taylor
- Acting Director, Manned Orbital Missions: Dr. M. Yarymovych
- Acting Director, Manned Lunar Missions: Major Thomas Evans
- Director, Manned Planetary Missions: Vacancy (Confidentially, Krafft Ehricke is considered the leading applicant. A decision is expected soon.)
- Acting Director, Program Control: Merle Vaughn
- Director, Advanced Technology: Vacancy
- Acting Director, Launch Vehicles: Lester Fero

His office will probably end up with more than 100 people.

Plus direct contracts to Rand and Bellcom.

3. SPACE STATION STUDY: We gave a status report on the general situation and on our inhouse study last week to the R&D Council, and we are now ready to make our report to you. Mr. Weidner has requested an appointment with you, tentatively scheduled for November 26, 1963. We need your guidance at this point as to how to proceed.

Now Scheduled on 26 Nov 2:00 to 3:30

No thrust vector control etc. How about modifications of Canaveral sites? B

And that's what's called decentralization. B

NOTES 11-12-63 KUERS

B 11/25

July 12

Saturn V, S-IC Stage:

a. Fuel Test Container

Handling operations of container halves in the tower building did not proceed as planned because the cranes did not operate as smoothly as required. We succeeded, however, in completing the alignment check of both halves by clamping both halves together with our strap clamps. The container halves mate almost perfect around the circumference, and deviations of T-stringers alignment have also been found to be acceptable. Welding operations are planned to start this week. ✓

b. The meridian welds for the lower fuel bulkhead of the T-vehicle were completed last week. Quality of these welds is excellent with no repairs required on any of the eight weld seams. Welding of outlet fittings for the upper bulkhead has also started. We are still hampered by missing parts from Wichita. ✓

c. The Thrust Structure for the T-vehicle becomes more critical every week because of manufacturing problems at Wichita. All four engine support fittings (2,000 lbs. forgings each) have now been scrapped at Wichita. The problem here is the heat treatment of these large 4130 steel fitting resulting in cracking and excessive warpage. The Wichita plant is not under the direct supervision of the Saturn Booster Branch. We feel that a stronger technical input and supervision at Wichita by Mr. Coenen's people is required. As a result of a letter from us to Mr. Coenen, proposing an organizational change in this set-up within the Boeing Company, Mr. Stoner had taken this matter to the corporate level at Seattle. Mr. P. Jansen, assistant to the executive Vice President of the Boeing Company, visited me last Saturday for discussion of a possible organizational improvement. He suggested to appoint a top level project engineer for manufacturing as a staff member to Mr. Stoner whose function would be to coordinate the Saturn work at Wichita and Seattle in order to find timely solutions for manufacturing problems, schedules, machine capacity etc. ✓

NOTES 11-12-63 MAUS

B 11/25

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1/2

1. MEMORANDUM OF AGREEMENT - PROJECT SUPER - The Memo of Agreement between MSFC - AEDC for Project SUPER (Support Program for Extraterrestrial Research) is still held in abeyance per instructions from Adm Boone. Russ Bollinger discussed this with Milt Rosen in Adm Boone's office last week, and learned that hdqs go-ahead is awaiting OART comments and concurrence.

OART's concern is apparently for assurance that we will not assign entire research areas to the Air Force. We have advised that all work assigned to AEDC (AFSC) will be on an individual task order basis, for specific tasks within our approved research programs. ✓

Meanwhile, AEDC is proceeding on the first task assignment "Hypervelocity Impact Data for Cratering Study," under an approved MSFC Procurement Request. (This study, sponsored by Research Projects Lab, will include shot experiments with controlled particle size and velocities to provide basic data for extrapolation of cratering on the lunar surface.) ✓

2. CONCEPTUAL STUDY - COMPONENT AND MODEL TEST FACILITY - Representatives from AEDC visited MSFC Nov 5, to discuss technical approach to the conceptual study for the MSFC Component and Model Test Facility which AEDC has agreed to conduct under Project SUPER. Even though this facility was deleted by OMSF from the FY 65 CoF Budget submission, we are continuing this study with AEDC for the following reasons:

- (1) The data derived will be beneficial to future planning and justifying the facility,
- (2) AEDC and their operating contractor, ARO, Inc., are considered the best qualified organization in the country for doing this study, and,
- (3) AEDC has agreed to do this study without cost to MSFC.

As agreed in these discussions, we are to provide AEDC with test assumptions for the study; the statement of work is to be completed by Dec 15, and the study will be approximately a 6 months effort. ✓

3. APPROVAL AND IMPLEMENTATION OF ORGANIZATION CHANGES - We have received, for review and comments, a proposed revision to the NASA hdqs procedure "Approval and Implementation of Organizational Changes." Comments are to be forwarded to hdqs by Nov 18. ✓

7w
1/2

B 11/25

NOTES 11-12-63 MRAZEK

1. QUALIFICATION TEST OF S-IV STAGE: One of the major items of concern that must be qualified before S-IV-5 flight is the cold helium sphere assembly. The first test was not sufficient to develop the desired degree of confidence in the design, and a retest was initiated. Douglas began the planning and design for a retest on 10-25-63. Indications are that the test can be completed on schedule. (As of 11-1-63 at least 34 tests had not been completed.) ✓

2. SIXTH SATURN/APOLLO MECHANICAL INTEGRATION PANEL MEETING: This meeting was held in Houston on 11-6-63. Some major points of discussion were:

a. MSFC dynamic test hardware requirements and definition. General agreement was reached for vehicles SA-7, SA-8, and SA-9. SA-10 was undefined due to lack of mission definition. ✓

b. Probability of elimination of Launch Escape System on SA-8 and SA-9. This will also eliminate the MSFC Q-ball. ← Ernst Geissler result that needed for

c. Location of MSFC instrumentation packages in the spacecraft adapter for vehicles SA-201 and SA-203. Tentative agreement was reached; MSFC will furnish more design detail. ✓

d. It was agreed that our instrument unit panels could extend, within certain limits, into the adapter volume, but no cables were to be physically mounted to the adapter (cantilevered extension of our panels). ✓

e. The Coordinate Axis System. No agreement could be reached other than that we should have a uniform system, at least for the space vehicle. (We withdrew our agreement with the MSC system, due to internal MSFC disagreement. MSFC proposal to you is being prepared.) The Panel agreed to refer this item (Coordinate Axis System) to the Panel Review Board. ✓

3. F-1 TESTING: (Reference NOTES 11-4-63 HEIMBURG, paragraph 2.) During referenced test, flexible LOX ducting and pre-valve were damaged due to surges in excess of 535 psi introduced by fast valve closing. This situation was triggered by the use of flow rates of 35% above maximum vehicle flow rates. ✓

Test Laboratory was informed prior to the test that the valve and ducting were unqualified hardware. R&D contracts on both items are still in force. ✓

The fuel pre-valve, which has undergone flow testing during the Pre-flight Certification (PFC) program, has functioned properly. The LOX pre-valve is of the very same design, and has not, as yet, been flow tested. For this reason, closing characteristics could not be predicted. ✓

Tests to determine valve closing characteristics began 11-8-63 utilizing the damaged ducting and the repaired valve at flow rates beginning at 2,000 gpm. Test information will be used to size actuator orifices of presently available double pneumatic actuator. It is anticipated that this actuator will provide controlled closing of the valve. An investigation is also underway to provide for the replacement of pneumatics with hydraulics as an actuating force. ✓

No schedule slippage is anticipated at this time. ✓

We feel that the basic design of the valve is sound, based on experience obtained during fuel pre-valve PFC testing. Some engineering modification might be required as is prevalent in R&D programs. ✓

The valve and ducting remained intact under most severe conditions. (Flow Rate at First Test: 35,000 gpm; Valve Closing: 120 milliseconds.) ✓

B 11/25

Fu 14/2

- * Fu 1. S-IC STAGE: Discussions are being held within MSFC on initiation of development of an alternate design for the S-IC Retro Motors. Due to the serious funding limitations and to ensure close monitoring of the design for any alternate approach, the effort will be accomplished in phases. The alternate design gives promise of a potential weight reduction. ✓

↓

There is concern at MSFC that Boeing does not have the capability at Michoud for checkout, test and calibration of S-IC-T Instrumentation. The Boeing Company stated that the major problem in meeting the S-IC-T schedule is in receiving instruments from the vendors; not due to inadequate capability of Michoud. The contractor will meet with MSFC during the week of November 11, 1963, to discuss this item. ✓

* Fu

2. S-II STAGE: The S&ID Form 533 financial report ending September 28, 1963, indicates an overrun (variance) of \$14,425 million. The overrun is basically in high energy forming, burden, labor and G&A. In addition to authorized work, the contractor has listed anticipated additional costs to completion. The total S&ID estimated cost is listed as \$450,000,000. ✓

↓

The decision to expedite the occupancy dates of Station 1, 2 and 6 of the Vertical Assembly Building has been made. The cost of regaining 8 weeks of a possible 13 weeks slip in these stations will be \$217,000 which will come from an existing contingency now available from programmed funds for the VAB. ✓

3. Instrument Unit: A presentation on MSFC's approach for the fuel cell use in the SATURN IB and SATURN V Instrument Units was given to members of NASA Headquarters on November 7, 1963. The Procurement Plan in total was not available for discussion; however, all of the pertinent questions from NASA Headquarters were answered. This included answers to a list of ten questions received from Captain Freitag via Mr. Nicholas, Monday, November 4, 1963. The new schedule for submission of the Procurement Plan is now December 2, 1963 with an anticipated approval by NASA Headquarters on January 10, 1964. ✓

Reference your comment to 10/28/63 notes regarding Dr. Mueller's comment on S-IVB fuel cell; a discussion of pertinent factors is being prepared. ✓

Astrionics Laboratory and Propulsion and Vehicle Engineering Laboratory are presently engaged in three studies concerning the Instrument Unit which are of major significance. They are: a. Increase the height of the Instrument Unit by 2' to facilitate cable routing. b. Possibility of utilizing space in the LEM Adapter and the forward S-IVB skirt for raceways to facilitate cable routing. c. The use of printed cables. ✓

4. Vehicle GSE: The Procurement Plan for RCA 110A Computer systems for the remainder of the SATURN V Program was released with the procurement request for 8 systems to be purchased in FY 64. ✓

Mr Weber, ASTR

Here you have a classical example of what mockups are good for. Why didn't we build one 1/2 Year ago? B

NOTES-11-12-63-SHEPHERD

B 11/25

fw
11/12

UGF: The 1963 Marshall UGF campaign closed on November 1. A Marshall goal was established for internal use at the beginning of the campaign of \$101,000. As of November 7, \$105,538 had been collected compared with \$99,580 collected in 1962. Of this amount \$91,000 or 87% is designated for use within Madison County. Counties other than Madison County will receive \$14,000 or approximately 13%. The average contribution of each participating employee was \$16.85. 92% of the Marshall employees participated and 43% contributed a "Fair Share". In retrospect, considering all factors, the campaign is considered to be very successful. ✓

*fw

F-I Facilities at Edwards Air Force Base: Test Stand 1 D and the Control Center is approximately 95% complete. Activation by Rocketdyne is to begin on December 1 and is scheduled for completion January 23, 1964. At this time Test Stand 1 D will be available for F-I engine testing. The elapse time from start of design until this date is 24 months. ✓

S-II Facilities: The General Accounting Office (GAO) audit of the S-II facility at Seal Beach has been completed and the exit interview was held with the NASA Western Regional Audit Office. The exit report was critical of NASA in the management of the contract with S&ID. The general statement was made that "the problem could have been avoided by more aggressive management by NASA of its prime contract". As you know the S-II facilities situation has been reviewed in great detail since last April. No new findings were uncovered by GAO. I feel that the Myers Report and the following investigating report by Marshall answers the questions that have arisen. Corrective actions have been applied (prior to the GAO audit) to those areas where necessary. ✓

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12

B 11/25

NOTES 11-12-63 Stuhlinger

1. SUPPORTING RESEARCH PROGRAM: Program authority was received November 7, 1963, from OMSF in the amount of 4.511 million dollars. This brings the total funding level in this area, to 9.575 million dollars. There is reason to believe that an additional 2.534 million will be forwarded to MSFC within the next two weeks, because these tasks have been technically approved by OART. This new total (12.109 million dollars) represents 90% of the total funding level of the OMSF SRT program. The remaining tasks are being coordinated with OART to determine who should have cognizance. If an agreement cannot be reached at the working level, a management policy decision is anticipated between Capt. Freitag and Dr. Bisplinghoff as to which office will fund the remaining 23 tasks.

OART authorized approximately 9 million dollars, or one-half of our requested tasks. Some areas, such as lunar science and technology, remained virtually unfunded. We continue our effort to obtain more funding support from OART. ✓

2. MOVE OF RESEARCH PROJECTS LABORATORY: The Research Projects Laboratory moved to Building 4481 last Saturday, November 9. ✓

July 12

B 11/12

NOTES 11-12-63 BELEW

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H-1 ENGINE PROGRAM

The H-1 development contract has been reoriented toward qualification of the engine at 200K. NASA Headquarters approval is expected by November 12, 1963. Rocketdyne's cost estimate will be here by November 12, 1963, which will enable us to meet our budget reprogramming requirement submitted to Headquarters by November 15, 1963. ✓

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2

RL10 ENGINE PROGRAM

The liquid hydrogen plant at West Palm Beach has been shut down because of a union contract dispute. There is a three-day supply for RL10 engine testing in storage. Arrangements are being made to ship minimum requirements of LH₂ from west coast sources.

Centaur Project Management at LeRC indicated on October 9 a desire that MSFC continue purchasing engines for Centaur and continue the R&D program in support of both the Saturn and Centaur Flights.

Pratt & Whitney personnel previously reported injured in a fire on the hypergolic ignition stand in Florida are O.K. now. ✓ Damage to people and facility was minor. ✓

J-2 ENGINE PROGRAM

The second engine simulator (pneumatic, hydraulic and electrically responsive mock-up) has been bought off by the Government and is ready for shipment to S&ID. ✓

F-1 ENGINE PROGRAM

R&D Engine 010 is now being tested with the heat exchanger in the turbine exhaust system. Preliminary running, without flowing helium or LOX through the coils, was satisfactory. Also, a 40-second test with partial helium and LOX flow was successful. The objective of the next test will be to accomplish full-flow of the pressurants through the coils. During a recent nozzle extension test of 145 seconds, one of the shingles on the top row failed (apparently structurally). ✓

A mating mock-up of the F-1 was delivered to Boeing at Michoud on Friday, November 8, 1963. ✓

Jw
11/12

B 11/12

1. F-I Mock Up Engine

The F-I Mock Up Engine minus the skirt was received at this installation November 8, 1963. The engine in itself is a mock-up for the dynamic test vehicle to be utilized on the test stand in Huntsville and it is on loan to the Boeing Company until approximately mid-March, 1964. ✓

2. Check-Out of S-I-I

Power was applied to Michoud's first Vehicle S-1-8 on October 30, 1963, at 7:30 p.m. Power Distribution Test, manual and automatic, has been verified. Testing of S-1-8 has progressed satisfactorily, CCSD is not performing Mechanical Test and Measurement Calibration. Systems Integrated Test Set (SITS) Actuator Linearity Test has been completed manually and automatically. ✓

3. Partial Termination S-I Contract

Chrysler Corporation Space Division was given the formal notice of partial termination for convenience of the Government on October 30, 1963. Chrysler is making a comprehensive analysis on required actions at their major vendors to determine necessary modifications to make hardware on order for S-I-III, etc. applicable to S-IB-1 and subsequent. ✓

* Jw
3

4. S-I Schedule Adjustment

Chrysler Corporation Space Division was directed to make the necessary adjustments in their internal schedule of S-1-8 and S-1-10 to eliminate the storage time at Marshall prior to static testing. Since no new official schedule has been received, the Marshall Planning Schedule is being used as a guide in determining schedule requirements. ✓

NOTES 11-12-63 DANNENBERG

B 11/12

July 12

Dr. Mueller chaired the Panel Review Board meeting at OMSF, on 11-7-63. PRB Charter and scope of new Documentation Panel were approved, ✓
Dr. Mueller reserved decision on our proposal for formation of Flight Evaluation Panel and Flight Mission Planning Panel. ✓

First Pad abort flight of full scale Apollo boiler plate was successful at White Sands. Powered flight was stable but descent had large oscillations. ✓

General Electric was given indication to renew their lease on the School house facility based on the fact that approximately 40 GE personnel at present housed at Quality could be moved to the GE facility, and fund status vs task requests indicate about a 10% increase (50 personnel) could be expected by the first of the year. ✓

← KD I'd like to attend B

Formal dedication of the GE Parkway facility is scheduled for 11-15-63. ✓

*1
f

The letter report on the re-examination of the NASA Launch Vehicle Program was forwarded by Dr. Mueller's office to Dr. Seamans on 11-4-63. The report concluded that the present Saturn vehicle program is the minimum required for Manned Lunar Landing; additional Saturn vehicles for Apollo Re-entry tests, Saturn V or LEM Truck LLS, MOL, and unmanned OSS missions should be phased into the program as soon as possible; and no Titan III C vehicle missions could be found in the manned lunar landing program. ✓

The Saturn Vehicle Brochure Task Group met on 11-7-63 and discussed the brochure formats prepared by GE. Final decisions on format and contents will be made by 11-21-63. ✓

1. Your Question Regarding Electric Power Last Week: Your note regarding this was correct. The problem applied only to power for the construction contractors. It has been resolved by the Corps of Engineers in that they have agreed to purchase the Coast Electric Sub-Station and equipment in the fee area, turn these over to Mississippi Power, and have the latter furnish whatever additional capacity is required during the construction. Our own permanent sub-station and distribution system for operational purposes is proceeding satisfactorily. ✓

2. Road Problems: The thin surfaced county roads are breaking up badly under usage by the heavy construction vehicles. Permanent roads will not be available in time to alleviate use of the county roads. The Area Engineer has requested that we pave Lower Gainesville Road for about a mile. Approximately \$35,000 was made available to the Corps of Engineers for erection of GE's Butler Buildings. In order to save money and time we are having GE sub-contract this so we can use the \$35,000 for the road. The Area Engineer can apply the job as amendment to the contract all ready in existence for paving one of the permanent roads. ✓

*fw
5
3. Community Planning Status: The Administration has still not released 701 Planning Grants to the various communities so that proper zoning, street lay out, sanitation, water, and other needs are not being properly planned by our local civic officials. We thought a block had been lifted when announcement was made that Bay St. Louis had received a loan for additional hospital capacity. There have been no other releases made known to us; however, Bay St. Louis particularly needs aid for their sanitation system. ✓

4. Speaking Engagement: I filled speaking engagement at the Annual Conference of Extension Workers of the Mississippi Cooperative Extension Service in Jackson, Mississippi. I was informed that almost the entire Extension force of approximately 700 white and colored workers in Mississippi attended the address entitled "Mississippi In the Space Age." ✓

*fw
6
5. Interstate Highway 10: Representative of this office attended the State Highway Department public hearing, Gulfport, Mississippi, as to the location of Interstate Highway 10 in Harrison County. The suggested location in Harrison County will fit well into a more southerly location of I-10 in Hancock County. In talking to Mr. Brownlee, District Highway Engineer, he stated that a public hearing would be held in the very near future on the location of I-10 in Hancock County and that it would be their recommendation that it be located in a more southerly direction than the original survey. This will be better for us. ✓

1. Flight Evaluation Panel: In the Panel Review Board Meeting, Dr. Mueller postponed the decision for one week, concerning establishment of the Flight Evaluation Panel. He was critical of the fact that the preparatory discussions about the desirability of this panel (going on for more than a year) were made without OMSF participation. Also he suggested that most of the proposed panel functions appear applicable to the new Test Offices to be established in the centers and at OMSF.

11
B

2. Apollo Lunar Support System: For four weeks our efforts in this area have been concentrated on choosing payloads and plans for lunar operation. To date, we have agreed with Ed Gray and Major Evans at OMSF to (1) Concentrate efforts on a Roving Vehicle Mobile Laboratory (MOLAB); (2) Treat Stationary Shelter or Combination Shelter/Roving Vehicle as an appendage to main effort; (3) Prepare for two large conceptual design study contracts with industry (.75 to 1 million dollars each) by approximately March 64; and (4) use .4 million dollars at MSFC for continued engineering support. Mr. Mueller has approved all of this with the exception of item (4). Instead he put the .4 million dollars with the larger contracts. He shows little sympathy for the idea of engineering support. Our in-house efforts (mainly at P&VE, Astrionics, RP, and Aero) are directed at working out the constraints and guidelines we should give to these two industrial contracts. This obviously means trying to make one complete cut ourselves. We are preparing a meaningful work statement for the big contracts. The lack of civil service personnel is for the time being overcome by working the Northrop and Hayes people hard.

In the case of Bellcom he's all for it! B
*7w
7

3. SA-6 and SA-7 Injection Velocity: In view of the high sensitivity of circular orbits to perturbations and the rather large uncertainty in lifetime prediction, it is planned to select a nominal injection velocity slightly above local circular velocity for SA-6 and SA-7. About 10 m/sec overspeed will produce a nominal increase of about 40 km apogee altitude. This will raise the confidence in at least three revolutions lifetime from about 83% (for the circular injection) to about 99% for SA-6 where the guidance loop will not be closed. The nominal lifetimes are 1.9 days and 3.1 days respectively. A repetition of the same nominal profile for SA-7 is desirable, even though the guidance loop will be closed and the assurance of a long lifetime will be inherently better.

E.F.

Has this been explained to Dr Mueller?
Shouldn't we make a redama?
I'm glad to sign a letter you may want to draft! B

B11/12

JW
11/12

1. S-IU-6 FINAL CHECKOUT: Final checkout on the Instrument Unit for the SA-6 vehicle is proceeding satisfactorily. ✓
2. S-I-8 PRE-STATIC CHECKOUT AT CSD, MICHLOUD: Pre-static checkout of the S-I-8 stage began at CSD, Michoud, October 27, 1963. Progress to date is satisfactory. ✓
3. S-I-9 PRE-STATIC CHECKOUT: The S-I-9 stage electrical pre-static checkout began in station "B" of building 4708 November 5, 1963. ✓
4. S-IV STAGE SACRAMENTO CHECKOUT FACILITY: The MSFC S-IV Project Manager proposed, for scheduling reasons, that the post-static checkout of the S-IV-7 be performed on the test stand rather than in the Engineering and Development Building at Sacramento. This Laboratory agrees with the proposal. Therefore, the effort of writing and reviewing test procedures for use in the checkout in the building has been reoriented to checkout on the stand. This has its impact mainly in the instrumentation area since in other areas many of the procedures for pre-static checkout, which is presently performed on the stand, will apply to post-static tests. ✓
- *1 5. CSD QUALITY SURVEY: The quality survey of Chrysler Corporation, Space Division was completed at Michoud during the period October 21-25, 1963. The survey revealed that CSD possessed an effective quality program with few deficiencies. ✓✓
6. QUALITY AND RELIABILITY ASSURANCE LABORATORY/INDUSTRIAL OPERATIONS WORKING AGREEMENT: This Laboratory reached an agreement with the Saturn I/IB and Saturn V Project Directors, Industrial Operations, that the Stage Project Engineer of the Quality and Reliability Assurance Laboratory is at the same time on the staff of the Stage Manager and located in the Stage Manager's office for a major part of his time. ✓ This will provide for the necessary close contact between this Laboratory and the stage manager, eliminate difficulties due to communication shortcomings, and contribute to the strengthening of the MSFC position at contractor's facilities. At the same time, it eliminates duplication of effort and thus conserves manpower for MSFC. ✓



Eberhard

This sets an interesting pattern.
 Maybe we can do this kind of
 thing in some other areas also.
 B

NOTES 11-12-63 GRUENE

B 11/12

7w
11/12

1. SA-5 Status:

a. During a pressurization test of the H-2 chilldown ducts, the internal stub fin ducting was damaged. The cause was traced to an unfortunate human error during DAC panel operations. The necessity to utilize an alternate procedure because of a different stage configuration contributed to the error. (The DAC engineer involved is otherwise considered by us as one of the most reliable test operators.) ✓

b. New stub fins were delivered to the Cape and are in the process of being installed. No delay of schedule is predicted. ✓

c. During the investigation, no other damage due to this over-pressurization could be detected. ✓

2. RCA Strike: The RCA camera men have been on strike for the last two weeks. This strike has no direct effect at the present. ✓

3. GE Personnel Reduction at Daytona: Mr. Fancher of GE has informed LOC that he intends to make an immediate reduction in personnel employed by GE at Daytona Beach. This action is being taken because of reduced work content of contract NASw-410 and because of the lack of apparent prospects for a substantial increase of workload in the near future. ✓

Jan 14/12

NOTES 11/12/63 HAEUSSERMANN

B 4/12

No submission this week.

B 11/12

fw 1/12

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

Attempts to control the 17-inch lox preclude closing time by simple orifice changes were proven fruitless in water flow tests made on 11/7 and 11/8. P&VE modified the actuator design to provide a double-acting piston (still pneumatic-operated) and safe closing times of 6 seconds were obtained at 31,000 g.p.m. water flow (F-1 design flowrate is 28,000 g.p.m.). First firing of the F-1 engine is now targeted for 11/27/63. ✓

fw 2. S-IV-6:

Initial static firing of this stage remains on schedule. ✓

3. INCIDENT IN COMPONENTS TEST LAB (CTL):

A thorough cleaning of the lox system at CTL has been accomplished, and testing on the sound suppression model stand is scheduled to resume 11/12. With the exception of several valves and filters, the entire system at CTL has been cleaned and should be in operation during the week of 11/12. ✓

4. MTF WORKING GROUP:

a. A briefing to inform Dr. von Braun regarding the status of facility build-up and activation at MTF is planned during the first week of January 1964. ✓
At the present time, we do not feel that there is enough interesting to report to require a formal briefing. ✓

fw b. The bid opening of the Navigation Lock has been postponed indefinitely and will be rescheduled within 10 days after release of FY 1964 funds. ✓

fw c. The protest of George A. Fuller on The S-II Complex bid has been rejected by Office Chief of Engineers. A contract was awarded on 11/8 by Mobile District to C. H. Leavell and Peter Kiewit & Sons (a joint venture) to cover their base bid of \$13,391,873. The option consisting of utilities and other miscellaneous work will be negotiated by supplemental agreement without re-advertising. ✓

d. Informal advice received from OMSF on 11/7 indicates that approval of the procurement plan for MTF Phase II and III Technical Systems may be given on 11/28. ✓

5. S-II:

S&ID officially submitted their activation plan for MTF on 11/7, as agreed to in the October meeting. They also presented a justification for the Santa Susana facility design. It is evident that their philosophy is different from that applied to the design of the MSFC test stands. Some fundamental inadequacies, brought to their attention by MSFC Test Lab personnel, such as instrumentation and purges are being corrected. The adequacy of the S&ID design can only be proven by experience.

KH Do we go along? Please include details in your Jan briefing
B

Jul 4/12

B 11/12

NOTES 11-12-63 HOELZER

1. GE CONTRACT: The request for proposals on our in-house support contract has been released. The company proposals are due in on December 9. ✓
2. PURDUE UNIVERSITY MEETING: Dr. Cassity, of the General Electric Huntsville Operation, attended a founders meeting of the Society of Engineering Sciences at Purdue University. One of the featured speakers was Dr. Richard E. Bellman of Rand Corporation. Dr. Bellman's comments were critical of the moon program and the implication was that Rand Corporation is, or will be, compiling evidence to support efforts to direct money from NASA to the National Institute of Health. Specific reference was made to Dr. von Braun and MSFC.

Bart Slattery

Please get me details on

- what he said
- what is cooking



Smokescreen.
 He means Air Force,
 because they own RAND,
 B

NOVEMBER 18 1963

LIBRARY
NOVEMBER 18 1963



RL10 ENGINE PROGRAM

* B [A budget authorization document was received this week which shows a \$5.0 million cut in FY 1964 for RL10 Research and Development, with an indication that further reductions may be coming. We are preparing a document in answer to this. We feel that the budget should not be cut until the crucial Centaur and Saturn flights, now being readied at the Cape, are successfully accomplished. ✓

The AC-2 Centaur Flight is now scheduled for next week. Last-minute changes were made to the engines to provide a dry helium purge (as is done in the Saturn) to prevent moisture in the interstage from freezing in the engine in the event of a "hold." ✓

The liquid hydrogen plant at West Palm Beach is still down due to a strike, but we are supplying liquid hydrogen from the west coast at a minimal 350,000-gallons per week. Our industrial relations people are optimistic for an early settlement. ✓

F-1 ENGINE PROGRAM

The single-shingle failure reported last week in connection with the 24-slot nozzle extension tests is considered a local failure rather than a design defect. Testing will resume on engine 013 following repair and reinstallation of the extension. ✓

J-2 ENGINE PROGRAM

* fw Test stand Delta-2B (500-second capability) was activated this week. Four short duration engine system tests were conducted to evaluate stand operation. ✓

H-1 ENGINE PROGRAM

* fw As a result of external thrust chamber leakage experienced on engine H-2015 installed in Stage S-I-7, all thrust chambers manufactured at Neosho are being leak-checked to determine if this condition exists on any other engines. To date, approximately 25 thrust chambers have been inspected and only one significant leak was discovered. This was on engine H-5027, also from S-I-7. Investigation into the cause and corrective action is in progress. A spare engine is available in the event this engine cannot be repaired. ✓

FW 11/18

NOTES 11/18/63 CONSTAN

B 11/23

* FW

1. S-I QUARTERLY REVIEW

FC Date of "Apollo Company Presidents" at Michoud!

The second FY-64 quarterly review will be held at Michoud Operations on December 4 and 5, 1963 in lieu of the original dates of November 19 and 20, 1963.

2. STOP-WORK ORDER ON S-IB-1 and S-IB-2 TAIL SECTIONS

* FW

The Chrysler Corporation was issued a stop-work order on tail sections for S-IB-1 and S-IB-2. There will be no effect on the vendors with the exception of Republic. Republic is the only vendor who has a fabrication contract at the present time. The type of work they are doing is on tape-type fabricating machines for which they have a large backlog. They will put the SI work aside and work on the backlog. The only problem will be in getting our work rescheduled into the large amount of work they have yet to perform. ✓

3. VISITS TO MICHLOUD OPERATIONS

* FW

Col. Bob Long and Col. Bob Kasper, NASA Headquarters, will visit Michoud Operations on November 20 to review the facilities program. Mr. James Shepherd is aware of this visit. ✓

* FW

Col. Harold Beyer, Consultant to the House Space Committee, will visit Michoud Operations on November 21 for a general orientation and tour relative to the construction of facilities at Michoud. Mr. James Shepherd is aware of this visit. ✓

7/11/63

BH/23

NOTES 11-18-63 DANNENBERG

Requests for Saturn vehicle information continue to come into OMSF from DOD and other NASA Centers. From the nature and contents of these requests, it is apparent that the information submitted in reply will have a great affect on future Space Program Plans for both DOD and NASA. It, therefore, appears mandatory that the specifics of this information, most representative of the MSFC interests, thinking, and plans, be included in these replies. ✓ Since MSFC may not always become aware of these requests for timely action, or may not be requested to participate directly in these activities because of the recent reorganizational changes in OMSF; it behooves us to continuously generate, update, and present this data in such a manner that it is always known and easily accessible to those who require it. An excellent start in this direction is the present MSFC effort to prepare Saturn vehicle brochures and technical description documents for marketing purposes.

Frank Williams

This is of utmost importance.
 Please check with Ronnie D. that
 help we can give him to expedite this undertaking.
 B

1. Acquisition of Fee Area Real Estate: The Mobile District Corps of Engineers has made an offer to the Coast Electric Co. for their property located in the MTF Fee Area. Preliminary negotiations indicate that the offer will be accepted in the near future. ✓

2. MDE to Change Contracts to Provide for Gov't Furnished Power: Coast Electric has advised the Mobile District Corps of Engineers that they will be unable to supply any power to the fee area at MTF in the near future. Mississippi Power Company has the capability but would have to supply power direct to the government rather than construction contractors since they do not have an "area franchise." Consequently, arrangements will be made whereby the Mobile District Corps of Engineers will prepare future contracts providing for "government furnished" power and issue change orders on existing construction contracts calling for "government furnished" power. Next week the details of this arrangement will be refined and a letter will be issued to the Mobile District Corps of Engineers confirming our agreement to furnish power to contractors at no cost. This plan will eliminate the necessity for the involved bookkeeping that would result if contractors were periodically billed by the government for power requirements. ✓

3. MTO to Compile Data on Towns in Test Site Area: Because of the numerous telephone calls received at MTF regarding the economic and cultural benefits available in the surrounding towns, it has become necessary to compile data to supply this need. The study made by the University of Southern Mississippi in connection with this subject has not yet yielded results. Our compilation of data regarding the area towns will be available in the near future. ✓

4. MTO Float at Orange Bowl Parade: The Picayune High School Band has been invited to participate in the Orange Bowl pre-game parade on January 1, 1964. Plans are being formulated, with the help of the high school principal, to display a float to represent MTO at the parade. ✓

5. The Raytheon Company Contract (Acoustics) has been extended for five months to run until the last day of April 1964. The basis for extension of the contract with Raytheon was to cover the winter months when readings are most critical. ✓

6. Review of Southern Railroad - Government Contract Made: On 5/11/63 the Southern Railroad completed a 16 mile spur track into the MTF fee area at no cost to the government. The contract with Southern has been reviewed in regard to track maintenance and car switching. The company is to maintain track at company expense, will effect the initial placement of railroad cars and remove empty cars at no cost to the government. MTO will provide for additional service such as maintenance of government-owned track and internal switching of cars by written agreement between the Government and Southern. To date, twenty trains and a total of 162 cars have moved into the area. ✓

Feb 11/18

NOTES 11/18/63 GEISSLER

B 11/23

1. Structural Strength of Saturn V and Saturn IB: Several meetings took place recently between P&VE and AERO concerning the discrepancy between design load and predicted load for Saturn V. In view of the fact that Saturn IB will have to be redesigned anyway for the 200 K engine, we concentrated on Saturn V. so far. In a few days you will get a writeup covering the essential results of these meetings, where we stand today, and the reasons for the discrepancy. We have to verify and check a few numbers obtained from P&VE and will coordinate the document with them. It appears that the spread between design values of maximum bending moment and predicted value is not as large as it first appeared (order of 20% rather than 30 - 40 %). Whether we will be able to bridge the gap by alleviating ground rules about safety factors, probability of launch delay due to wind, or introducing gimmicks such as wind biased tilt programs depending on month of firing, or whether we will have to redesign by either strengthening the structure (interstages), or increasing the fins size will take approximately 4 - 6 weeks to settle. We are investigating all the avenues with highest priority. For Saturn IB the discrepancy will probably be higher and may eat up a good part of the performance gain obtained from increasing the thrust level. ✓

2. MSFC Mission Control Support in MSC: The two P&VE representatives (Messrs. Boone and Davidson) who have been supporting Apollo mission control activities for the Flight Operations Division, MSC, were reassigned by P&VE. Mr. Barnes, P&VE, was nominated as replacement with permanent station in Huntsville. MSC has (informally) agreed to this effective reduction in our current FOD support efforts ✓

*Direct Flight Pair: First phase of study with STL is concluded. STL shows the following major results: (a) Use of MMM for cargo delivery to surface is optimum. Thus, our MSFC concept on LLS is confirmed and Washington is satisfied. ✓ (b) Use of MMM for a manned vehicle all the way (including lunar return) brings about a performance penalty, such that lunar return is not possible. (c) Optimum is achieved by descending to moon with MMM's and returning with "some" tailored stage. ✓ (d) STL also concludes that with 90,000 lbs. at earth injection, 12,200 lbs. can be put into earth return. ✓ (e) For comparison Apollo CM plus the surface equipment and the SM's stand at 11,700 lbs. today. This indicates to us that the Direct Flight Pair with a Saturn V warrants further effort but also strongly demands a look at the uprating chances of Saturn V₁ since the margin is too slim for comfort. ✓

Please arrange
w/ Frank W.
+ Ronnie

E.P. Request
a 1-hr briefing
on all
this B

4. Correction to Notes 11/11/63 Geissler: In item 3, line 7 of above notes, (copy attached), 99% should have been 94%. ✓

5. SA-504, 505 Reentry Profile: In Notes 11/4/63 Geissler, item 2, copy attached, preliminary study results were given for the SA-504 and 505 reentry profile which considers direct injection into an elliptical parking orbit and transfer from parking ellipse to reentry ellipse via S-IVB stage second burn (called "method 5"). Revised results are ^{NOW} available for the -5.5° reentry path angle (given in Notes 11/4/63) as well as -10° reentry path angle. Please see attached table, enclosure 3. Variations in the old and new "-5.5° reentry path angle" figures are due to modified assumptions of elliptical orbit characteristics necessitated by landing sight selection changes.

See also my remarks on enclosure 3

In view of Dr. Mueller's all-up philosophy and his desire to fly re-entry missions on 501 and 502, I'd like to have a sober appraisal as to how much a "method 5" re-entry profile would affect (and invalidate) such flights for Apollo launch vehicle certification. We shall need hard facts to convince Houston that "method 5" is out and they must provide a dual-burn service module B

1. Flight Evaluation Panel: In the Panel Review Board Meeting, Dr. Mueller postponed the decision for one week, concerning establishment of the Flight Evaluation Panel. He was critical of the fact that the preparatory discussions about the desirability of this panel (going on for more than a year) were made without OMSF participation. Also he suggested that most of the proposed panel functions appear applicable to the new Test Offices to be established in the centers and at OMSF.
2. Apollo Lunar Support System: For four weeks our efforts in this area have been concentrated on choosing payloads and plans for lunar operation. To date, we have agreed with Ed Gray and Major Evans at OMSF to (1) Concentrate efforts on a Roving Vehicle Mobile Laboratory (MOLAB); (2) Treat Stationary Shelter or Combination Shelter/Roving Vehicle as an appendage to main effort; (3) Prepare for two large conceptual design study contracts with industry (.75 to 1 million dollars each) by approximately March 64; and (4) use .4 million dollars at MSFC for continued engineering support. Mr. Mueller has approved all of this with the exception of item (4). Instead he put the .4 million dollars with the larger contracts. He shows little sympathy for the idea of engineering support. Our in-house efforts (mainly at P&VE, Astrionics, RP, and Aero) are directed at working out the constraints and guidelines we should give to these two industrial contracts. This obviously means trying to make one complete cut ourselves. We are preparing a meaningful work statement for the big contracts. The lack of civil service personnel is for the time being overcome by working the Northrop and Hayes people hard.
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94

Enc. 1

NOTES 11/4/63 GEISSLER

1. Apollo Mission Control Support: In several meetings a compromise solution for the joint LOC-MSFC support to IMCC has been worked out. MSC's request for a supporting staff room (at IMCC) would be accepted. This SSR would be linked with LOC and MSFC on an equal basis. All flight controllers would have to be supplied by MSFC. The planned LIEF facilities need only moderate modifications to accommodate this additional support. A memorandum outlining this proposal is being circulated for concurrences and will be submitted for your approval.
2. SA-504, 505 Reentry Profile: Preliminary results have been obtained from the SA-504 and 505 reentry profile analysis which involves direct injection into an elliptical parking orbit and transfer from the parking ellipse to the reentry ellipse via the S-IVB stage second burning period (Method 5 of Saturn V Design Review, Oct. 8, 1963). The propellant consumption during the first burn was limited to 100,000 pounds (instead of approximately 80,000 pounds on operational LOR profile) with a resulting payload of 74,700 pounds. The parking ellipse has an apogee altitude of 2440 km, a perigee altitude of 108 km, and a flight time from cutoff to reignition of 1.57 hours. The flight time from the second cutoff of the S-IVB to reentry is 2 minutes. Conditions at reentry are: altitude of 120 km, velocity of 11,033 m/sec, flight path angle of -5.5 degrees. These results are based on standard Apollo propulsion data and latest weight estimates.
3. New Cost Picture on MMM: We have made a first estimate of MMM cost, assuming it is separated from any stage development, but is treated in the same manner as an engine program. The following is the approximate picture: MMM development: \$42 million and 34 1/2 months. For comparison's sake, a typical stage development following and being independently costed of the MMM would be: \$85 million and 18 months. (MMM would of course be G. F. E.) Procurement of a MMM would require approximately \$4.7 million.

Enc. 2

"Method 5"

Reentry Flight Profiles for

Vehicles 504 and 505

Characteristic Features	Profile #1 (Maximum Total Heat Input)	Profile #2 (Maximum Heat Rate)
Reentry: Path Angle (deg.)	-5.5	-10.0
Velocity (m/s)	11,033	11,033
Altitude (km)	120	120
S-IV B Stage:		
1st Burn Propel. (lbs)	100,000	100,000
2nd Burn Propel. (lbs)	127,200	127,200
Payload Weight (lbs)	74,269	67,569
Parking Ellipse:		
Apogee Altitude (km)	2,297	2,819
Perigee Altitude (km)	108	108
Time in Park. Ellip. (hrs)	1.53	1.60
Flight Time from Cutoff to Reentry (Min.)	2	2

E.F.
 This is far more than I had thought. Does a flight with payloads so close to the nominal 90,000 lbs payload really affect loads and dynamic behavior so very drastically??
 Enc. 3 B

7/11/18

B11/23

NOTES 11-18-63 GRAU

1. S-IU-6 FINAL CHECKOUT: The S-IU-6 Instrument Unit is undergoing weight and pressure tests. All major electrical testing has been completed. Only minor circuits remain to be tested to complete electrical checkout. ✓
2. S-I-8 PRE-STATIC CHECKOUT AT CSD, MICHOU: The S-I-8 stage is undergoing pressure and functional checkout at CSD, Michoud. No major problems have been encountered to date. ✓
3. S-I-9 PRE-STATIC CHECKOUT: Power Distribution and Components Tests have been completed on the S-I-9 stage and test evaluation is in process. Preparations are being made for G&C testing which is scheduled to begin this week. ✓
4. S-IV QUALIFICATION TEST PROGRAM AT DAC, SANTA MONICA: Since July of this year, Quality and Reliability Assurance Laboratory personnel have monitored S-IV component qualification testing at DAC, Santa Monica. The attached graph represents number of components which had been qualified as of 10-30-63. Differences in DAC and MSFC completion levels reflect test deferrals requested by DAC but not yet granted by MSFC. As of 10-30-63, DAC had accomplished approximately 61% of the effort required to complete the qualification test program, and it is estimated that the program will be approximately 70% complete by flight of S-IV-5. This lag resulted from an inadequate qualification test program in the original contract, delays incurred in accomplishing a scope change to provide an adequate program, and the inability of DAC to accelerate the program to the extent required once the scope change had been accomplished. Action is being taken now to prevent recurrence of this situation on S-II and S-IVB.



Lee James, Art Rudolph

Let's heed this lesson!

B

NOTES 11-18-63 GRUENE

B 11/23

Feb 11/8

1. SA-5 Status:

a. Oil Contamination: According to the latest word we received from Dr. Lucas, brazing within the oil filters ahead of the servo valves seems to be the culprit in our contamination problem. P&VE is checking into a possible solution. We hope to have a final decision within a few days. ✓

b. Diodes: LVO was provided by Astrionics Laboratory with a list of components to be exchanged because of the well known diode problem. The components can be exchanged without delay in our schedule. ✓

c. Overall Test: The first swing arm overall test was run successfully last Wednesday with operation of the disconnects and swing arms completely satisfactory. Only small problems (e.g., an error in the RCA 110 Computer Program) were encountered. The problems will be corrected before the next overall systems test. ✓

d. Test Delay: The overall systems test planned for November 18 had to be delayed by one day to incorporate minor GSE changes. The overall schedule should not be affected by this delay. ✓

2. Saturn I Firings: A decision by Dr. Mueller was made to continue Saturn I firings from Blockhouse 37 and to modify Blockhouse 34 for 201. ✓

3. RCA Strike: The RCA strike affected our construction program last week when construction workers partially honored picket lines. In the meantime, a truce was called which will expire on December 15. SA-5 should not be affected by this strike. ✓

7/11/18

NOTES 11/18/63 HAEUSSERMANN

B 11/23

*Zw

1. GOLD FLAKE PROBLEM: (Reference Item No. 1 in notes of 11/4, copy attached*) Internal electrical shorts by gold flakes have occurred in diodes of Consolidated Devices Corp. of Hawthorne, California. Gold flakes consist of a solidified paste used to cement the semi-conductor to its electrode. We reviewed all components suspected as containing this particular type diode; no clear case was found where the defective diode type was used, however, we replaced components and modules in critical areas whenever proof could not be established that only healthy diodes were built in. I do not see any more diode gold flake problem for the next flight vehicles. ✓

2. ELECTRONIC RESEARCH CENTER (ERC): At the last meeting (11/12) of the Advisory Committee for Guidance, Control and Navigation all aspects to the ERC were thoroughly reviewed. The discussions went as far as criticizing the soundness of the new research center. All my view points were adopted in addition to many other limitations requested. Thus no supporting, only limiting view points were recommended. Notes on the meeting have not yet been finalized and I doubt that OART will consider them seriously; as mentioned by OART members, the advise of the committee was sought only to support the ERC idea. ✓

3. PILOT CONTROL OF SATURN V LAUNCH VEHICLE: (Reference Item No. 3 in notes of 6/10, copy attached*) Simulation studies of the joint MSFC, Ames Research Center, investigation on pilot control of the Saturn V launch vehicle were initiated at the end of June, 1963, using the facilities of the Ames Research Center. Since that time, a preliminary feasibility study has been completed and will be the subject of a forthcoming joint MSFC-ARC report. Immediate future studies will include refinement of the control system and pilot techniques determined during the course of the preliminary studies and, in particular, emergency situation studies assuming primary automatic control with a piloted back-up system. To date, the studies have been conducted on a fixed base assumption (a stationary cockpit), however, the present schedule calls for moving base studies to begin on February 1, 1964, with the Ames centrifuge providing boost stage acceleration and vibration environment. ✓

WH
Very interesting.
Please keep me posted
B

Astrionics personnel participating in the Ames simulation report that the enthusiasm and technical competence exhibited by ARC personnel has done much to enhance the value of the investigation. It should also be noted that the considerable piloted system experience possessed by ARC, has permitted a more rapid and meaningful study than would have been the case if that experience could not have been utilized. ✓

* Copy attached to notes distributed in M-DIR and R-DIR.

Jw
11/18

B 4/23

NOTES 11/18/63 HEIMBURG

1. F-1 TESTING (STATIC TEST TOWER WEST): Reference NOTES 11/4/63 HEIMBURG (copy attached). Although P&VE Lab was responsible for the design and procurement of the pre-valve, Test Lab should have noted the deficiency in the operating principle of the valve. Measures have been taken to correct this problem. The F-1 test date has slipped from 11/5 (original) to 11/27 (target). Further slip cannot be predicted at this time. We are installing a back-up lox line and bellows of our own design. ✓

*Jw

2. S-IV-6: The initial static firing remains on schedule. Spin-up tests are scheduled on 11/19. Three Test Lab personnel will witness the firing of this stage. ✓

3. S-11: Reference NOTES 11/12/63 HEIMBURG (Copy attached). The S&ID design has been reviewed, and no features have been detected which would indicate any safety hazards. Our principal question is whether the design will result in any limitations being placed on the gimbaling program at the specified frequencies. This question can only be answered with actual test experience. ✓

4. Transportation: A meeting was held with the Navy Military Sea Transportation Service (MSTS) at NASA Headquarters to review the NASA/MSTS working agreements and to discuss the preliminary design modifications for the cryogenics barges. Satisfactory progress is being made in these areas. ✓

Attachment 1: NOTES 11/4/63 HEIMBURG
Attachment 2: NOTES 11/12/63 HEIMBURG

70
11/18

B 11/23

NOTES 11-18-63 HOELZER

SYSTEMS STUDY FOR REDSTONE LIBRARY: The ADPS Branch, through the GE contractor, has completed a systems study for automating certain portions of the Redstone Technical Library. The system will be presented at an Information Retrieval Conference called by Mr. Melvin Day at NASA Headquarters on Tuesday, November 19, 1963. ✓

7w
11/18

NOTES 11-18-63 JAMES

*fw SATURN I: SA-10 Payload Study - The Systems Ofc., R&DO, reported MSC's interest in a Bio-medical experiment for SA-10 payload; presentation to be made by MSC Nov. 18 to SA-10 Payload Study Committee. The Nuclear Ofc. is interested in an SA-10 Payload; further investigation required. A firm MSC position on Apollo re-entry mission will be available Dec. 2, 1963. The SA-10 Payload Study Presentation to M-DIR rescheduled to Dec. 9. ✓

*fw SA-5 Prelaunch Review - An SA-5 Prelaunch Review will be held on Dec. 5 to review the checkout and preflight operations of SA-5. ✓
Launch Complex Utilization - Hdqtrs. has approved the LOC recommended LC utilization for Saturn I. All Saturn I vehicles will be launched from Complex 37B. LC 34 will be modified for initial Saturn IB launches. The planned wet test of LC 34 and shipment of SA-D5 to AMR has been cancelled. Decisions regarding subsequent modifications of LC 37 to the Saturn IB configuration will be made later. ✓

*fw S-I Stage - As of Nov. 11, CCSD had released 108 employees as a result of the cancellation of S-I-111 thru 116. Twelve firm commitments previously made by CCSD have been cancelled. An additional 39 will be released by Nov. 30. Most of the employees released are mfg. and quality personnel. The engineering force work load will not substantially decrease as a result of the termination since they are primarily involved with the S-IB redesign. The work load for the engineering force will increase as a result of the 200K engine impact. ✓

S-IV Stage - Saturn I termination has resulted in 4 approved changes being cancelled and 7 pending changes being disapproved. ✓

① SATURN IB: 200K H-1 Engine for S-IB Stages - IO and R&DO met Nov. 15, 1963, regarding 200K H-1 Engines in S-IB Stages; conclusions reached: (1) No major technical barriers are raised in the engine, vehicle, stage or facility programs by raising the H-1 SL thrust to 200K; (2) Engine and stage contractors can include 200K in S-IB-1 Stage (heavy version); (3) 200K effective with S-IB-1 results in obsolescence of 27 H-1 engines and requires additional funding. Saturn I/IB Ofc. approved the use of the up-rated engines for 201, pending receipt of additional funding from NASA Hdqtrs. for purchasing replacement engines. ✓

*fw S-IVB(IB) Contract - S-IVB(IB) contract with DAC has reached a point of urgency and immediate action is needed by both MSFC and NASA Hdqtrs. for speedy approval. Approximately \$3.5M in costs has accumulated at DAC that cannot be paid for lack of contract. After approximately 2 months in clearing the fixed fee question, the contract was rejected by Hdqtrs. for further justification of overhead runout, '65-'67. The contract is in the Contracts Office for further action.

*fw Instrument Unit - Procurement request submitted for Fuel Cells cites the urgency for NASA Hdqtrs. approval of issuance of letter contract to meet scheduled IU-201 delivery to AMR. A month-for-month schedule delay for IU-201 can be anticipated for each month (after Jan., 1964) delay in approval of the plan of issuance of a letter contract. ✓

→ Lee J.
What action on my part,
if any, do you suggest?
B
(U.F.?)

Jul 14/18

NOTES 11-18-63 Koelle

B11/23

1. FLYBY STUDY: The past week we kicked off the in-house study on a SATURN V, based on Venus flyby in the early 1970's. It is a small effort (a few man years) in the area of SATURN V marketing. This also may be an application of the RIFT stage. ✓

2. MR. GRAY'S VISIT: Mr. Edward Gray and Mr. Douglas Lord are planning to be here this Wednesday and Thursday for discussions with Dr. Stuhlinger and me. We will give him a good rundown of what we are doing and we will hopefully make further progress in settling the FY 1964 study budget. He also intends to integrate, to a greater degree than before, the advanced studies with supporting research. He is now in charge of both programs under AA-MSF. Are you interested in talking to him? He would appreciate an occasional opportunity to discuss with you such problems as M-I and Post-SATURN launch vehicles. - Scheduled for 16 DEC. 2-4:30PM Tu

Yes
Scheduled for 16 DEC. 2-4:30PM Tu

3. BELLCOM AND RAND: Ed Gray intends to get a larger number of Bellcom people on his staff and has also initiated action to have a larger RAND group under contract to him (\$700,000 this year) to do the long range planning, or part of it. While we are not afraid of this "competition," we are questioning the wisdom of letting other organizations do the work for NASA in this area. If Congress should hear about this, I am afraid they will take a dim view of it, as they severely criticized the Air Force on this. If NASA cannot even do its own long range planning in-house, there is something wrong. My preferred alternate approach would be a real team effort between Ed Gray's office and the three Centers. Jointly, I think we can do the job quite adequately. You may want to take this subject up with Ed Gray or Dr. Mueller personally. I think you should.

o.k. Bi

o.k. First with Gray

I agree completely with HHK. We should take a stand on this. Tu

NOTES 11-18-63 KUERS

B 11/23

7/11/8

Saturn V, S-IC Stage - Fuel Test Containers: The lower and upper halves of the fuel tank were successfully joined by a continuous circumferential weld through the .4 inch thick outerskin and 205 individual weldments at the integral milled stringer joints. Completion of the tank welding requires now only one more circumferential filler pass weld, which is not a critical operation. ✓

7w 11/8

B 11/23

NOTES 11-18-63 MAUS

1. MANNED SPACE FLIGHT PROGRAM REDEFINITION - We have contacted MSC and LOC for their comments to Dr. Mueller's program and schedule proposals.

MSC's comments are summarized as follows:

Saturn I Boilerplate spacecraft schedule is tight, but possible. MSC recommendation on SA-10 payload will be available by December 1, 1963. ✓

Saturn IB Schedule extremely tight. LEM pacing. Considering flying LEM airframe only prior to SA-207 - violates "all-up" concept. Supporting 3-month launch spacing. ✓

Saturn V No particular problem since spacecraft development is geared to Saturn IB schedule.

Funding No additional FY 64 funds required. Some additional FY 65 funds may be required. Test program under scrutiny to accommodate new program plan. ✓

LOC's comments are summarized as follows:

LOC can meet proposed schedule. Minor rescheduling and pad usage changes recommended. No additional FY 64 and FY 65 funds required. ✓

MSF Consolidation - MSF Staff Personnel are presently consolidating the Centers' replies and will make a recommendation to Dr. Mueller today, Nov 18. Preliminary feeling is that if the other Centers can meet the proposed schedule without increased FY 64 and FY 65 funding, MSFC should be able to do likewise, perhaps by accepting a somewhat higher risk program.

MSC fund ceiling is adequate, in our opinion, because the first manned flight was slipped by 25 months from the official SA-111 schedule to the proposed SA-207 schedule. MSFC fund ceiling is not adequate because (1) ceiling doesn't adequately cover our stated requirements, (2) the "all-up" concept requires additional funds, and (3) the slippage in vehicle delivery dates from official schedules to proposed plan is much less than in MSC's case.

2. MANPOWER - As of Nov 8, we had 149 unfilled, uncommitted permanent spaces. In addition to those openings, we were advised Fri., Nov 15, that MSFC's new ceiling will be 7,881 for FY 64. This represents an increase of ~~500~~ spaces over our presently authorized FY 64 ceiling. ✓

593

HM
 This logic escapes me! B
 ! ↑
 Let's substantiate why this reasoning is false

fw 11/18

B 11/23

NOTES 11-18-63 MRAZEK

1. TWO CONFIGURATIONS OF S-IC STAGE LOX PREVALVE ACTUATORS TESTED SUCCESSFULLY: Water flow tests at 55% (15,000 gpm) operational flowrate, utilizing a spring-loaded closed actuator, revealed a surge pressure of 275 psig (duct is designed for 335 psig surge pressure) and oscillation of the valve closure element in mid-travel. Tests with a pneumatic opening and closing actuator resulted in no oscillations up to 92% operational flowrate; at 115% operational flows, oscillations and surge pressures were well within acceptable limits. ✓

2. S-IV-5: The heatshield is undergoing testing. If vibration failure occurs, SA-5 will be delayed.
The cold helium sphere mounting assembly is now in test. If failure occurs, SA-5 will be delayed. ✓

*fw

3. RIFT FISCAL YEAR 1965 BUDGET: We have been informed by Mr. Novik, Office of Nuclear Systems, OART, that the fiscal year 1965 budget for RIFT (including supporting technology) has been reduced from \$19.3 million to \$15.6 million. Formal notification by letter is pending. The result of this reduction will be a three-month delay in the initiation of fabrication of SN-TA-1 at Lockheed and a reduction in MSFC supporting technology. The \$10.6 million Construction of Facilities budget remains intact. ✓

Bob Young
Suggest you
take this
up
B 11/23

4. S-IVB RELIABILITY PROGRAM PLAN: The initial scope of work on the S-IVB Reliability Program Plan, written by Quality Assurance and Reliability Laboratory, did not have the concurrence of the cognizant design laboratories. Independent action on the part of any of MSFC's laboratories, usually results in conflicting direction to our contractors and unnecessary expenditures. This type of problem could be resolved by proper definition of area of responsibility of each laboratory and a forced concurrence procedure.

*B

5. VIBRATION AND SHOCK SPECIFICATIONS: Documentation of the vibration, acoustic, and shock environmental criteria for the Saturn V vehicles has been accomplished and the document is available for release. The specifications (IN-P&VE-S-63-2) were determined from Saturn I, Block I, static test data and a comparison of the Saturn I, Block I, and Saturn V structural parameters, acoustic sound pressures, and engine parameters. The specifications are presented for different areas of structure of the Saturn V stages. ✓

7/1/18

NOTES 11/18/63 RUDOLPH

B 11/23

*fw

I was, I discussed it with Dryden and Seaman at the Cape, and there seems to be no way out.

1. Saturn V: The IO Facilities Office has notified this office that the November 14 bid opening for the MTO Navigation Lock, a pacing item, has been cancelled due to lack of FY 64 C of F funds being "in hand." Discussions have been held with Mr. Gorman and Mr. Newby to investigate alternate methods of interim funding; however, no specific relief is known as of this time. The best estimate for availability of FY 64 C of F funds is four to six weeks. Considering a requirement of 10 days to re-establish the bid opening date, a minimum delay of two months is estimated - possible more unless alternate funding can be promptly applied.

2. S-IC Stage: The Boeing Company has been directed to procure hardware for activation of only two Test and Checkout Complexes at Michoud for the present. Arrangements for activation of the third complex will be made when schedule requirements are better defined. ✓

A meeting with Boeing, P&VE, ME, and S-IC Stage Office was held on Tuesday, November 12, 1963, to review configuration changes on S-IC-T which are delaying progress. A list of these changes was made during the meeting, and accelerated release of critical documentation was requested from Boeing. Boeing agreed to assign priorities to critical design efforts for S-IC-T and ME Laboratory will reassess documentation demand dates. A follow-up meeting has been scheduled for Tuesday, November 19 in the ME Laboratory. ✓

3. S-II Stage: The engine thrust cone for the S-II battleship vehicle has been completed by the L. A. Division of NAA and has been shipped to the Santa Susana Test Facility. ✓

*fw

The S-II quarter scale test tank to evaluate the S-II stage insulation configuration has been installed, instrumented, and calibrated in the Beech Aircraft Test Facility at Boulder, Colorado. The test program will be inaugurated on November 13, 1963. ✓

July 11/18

B 11/23

NOTES - 11-18-63 - SHEPHERD

S-IC Hydrostatic Test Facility: The test fuel tank was moved into the test tower on November 2, which was 20 months after the start of design, 13 months after the start of construction. Beneficial occupancy was available to the Manufacturing Engineering Laboratory on June 25. ✓

*fw

S-II Facilities at Seal Beach: To increase the development time for the Test Common Bulkhead and stage tank welding procedures, BUDOCKS was directed to advance the completion of Stations I, II and VI of the S-II Vertical Assembly Building by approximately 8 weeks. At a cost of \$217,000, the S-II contractor will be provided joint occupancy of these three stations to install tooling and begin process development. To meet this schedule change, the construction contractor has increased his labor force, gone on overtime and is expediting delivery of material and equipment. The construction is moving along rapidly and all reports indicate the new schedule will be met. ✓

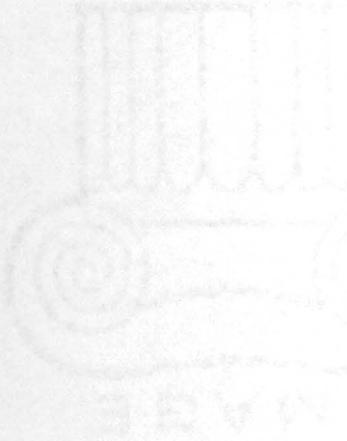
7w
11/8

B 11/23

NOTES 11-18-63 Stuhlinger

1. APPOINTMENT OF PROGRAM DIRECTOR IN OMSF: Dr. Mueller has appointed Mr. E. Z. Gray as Director of Advanced Manned Missions Program within his Office. It is our present understanding from OMSF that the total coordination of the SRT program for Marshall among the Headquarters Program Offices (OMSF, OART, OSSA) will be the responsibility of Mr. Gray. We are preparing to brief Mr. Gray on November 20 when he visits Marshall. ✓

2. OART FUNDING FOR SA-10 PAYLOAD: A budget request for the FY-65 budget to be forwarded to OART has been submitted to Financial Management. A total of 9.3 million dollars has been requested for the years 1964 to 1967. In FY-64, 450 thousand dollars will be needed and in FY-65 5.8 million. It can be expected that OART will be highly interested. As soon as it is decided what MSFC intends to do, a direct request can be sent to OART. ✓



NOVEMBER 26, 1963

NOTES TO MUELLER 11-26 & 12-3-63 DEBUS

1. SA-5 Operations: The SA-5 checkout has progressed through all systems tests except for cryogenic loading. An attempt to perform cryogenic loading on Tuesday was terminated after passing through the critical LH₂ transition period when a leak in the hydrogen vent line caused an explosion and fire in off-pad portion of the trench. During the cryogenic loading test, no vehicle discrepancies or malfunctions occurred; however, numerous GSE problems occurred, all of which were satisfactorily resolved before continuing on through the test.

Our corrective action indicates that we will probably have to install the hydrogen vent line "over-ground" and have forced ventilation (or open ducts) for underpad areas.

After repair of the hydrogen vent line, cryogenic load test will be repeated. This is the only remaining milestone prior to Simulated Flight Test. All operational schedules are pending analysis and correction of the hydrogen vent line problem.

2. Package V, VAB: Bid opening on this contract has been slipped to 7 January 1964. This slippage was decided after consultation with Col. Bagnulo and investigation of effects on schedule. No problem in meeting need dates.

3. VAB Foundations: 584,478 l. f. of 674,000 l. f. piling driven; 14,500 c. y. of 37,500 c. y. of concrete placed at close of business 26 Nov. 1963.

4. JPL Explosive Safe Assembly Facility: NASA Hqs. has indicated funds will be provided in about 10 days to permit opening of bids. Bid opening was delayed from 13 November because the government estimate exceeded available funds in the project.

5. AF LH₂ Plan 74 (West Palm Beach): The liquid hydrogen plant at West Palm Beach has been on strike since November 8th. There appears to be some progress made in talks between the Union and Sterns Rogers, the contractor for the plant operation, but to date no final solution. The West Coast plant is in operation and NASA has propellants for its needs.

6. Bid Opening for E&M Outfitting of LUT's: Bids for the electrical and mechanical outfitting of the three LUT's (Phase II) were opened on November 21. The apparent low bid, in the amount of \$9,847,000 was submitted by Paul Smith and E. C. Ernst, a joint venture. The government estimate prior to bid opening was \$9,300,000. Funds are available

to cover this bid. A resume of bid prices: W. V. Pangborne & Co., Inc. - \$10,989,000; Boeing-Catalytic, J. V. - \$10,375,000; Paul Hardeman, Inc. - \$9,875,000; Paul Smith Construction Co. - The E. C. Ernst Co., Inc., J. V. - \$9,847,000.

7. Estimated Cost for Outfitting VAB and Area: Previously we had been furnished an estimate of \$51,000,000 for this contract, which is now scheduled for bid opening December 10. This estimate was based on 90% design. We have now been advised that the estimate has been revised to approximately \$60,000,000. We are looking into reasons for the increase.

8. Headquarters Visit on Manpower Requirements: Capt. Thompson (Capt. Freitag's Office) and Mr. Draper (Mr. Bothmer's Office) spent a day with LOC in evaluating the validity of our manpower requirements for submission. They were satisfied with our justification and recognized our requirements to be minimum needs only. We assume our manpower figures to be: End FY63-1229, End FY64-1738, End FY65-2169.

9. Legal - Protest of Monitor Systems, Inc: P&C contract over \$2 million with Radiation, Inc., for equipment MSC/POD-PACE System purchased from GSA schedule. Monitor Systems, Inc. filed an official protest with NASA Administrator, GSA, Small Business Administration, and the Contracting Officer. Headquarters directed a "hold" on further progress by Radiation, Inc., until LOC/MSD furnishes more information on why this decommutation equipment cannot be placed on a competitive procurement. Siepert, Preston, and Michaud followed this with Low, Hilburn, and Vehietti in Headquarters. The final result as reported this week was that Monitor Systems withdrew the protest and Hq. requested that LOC and MSC-POD furnish information as to why Radiation was chosen.

10. Labor Relations - RCA Photographers' Strike: Temporarily ended when truce settlement was reached between company and union 11/13/63. Strike had little effect until carpenters decided to honor picket lines. This was direct violation of the Project Stabilization Agreement "no strike" clause. NLRB is conducting investigations.

11. Use of NASA Land at MILA for Recreation Purposes: Press Release has been prepared and coordinated with all interested LOC elements, as well as interested county, state, and other federal government agencies, announcing policies on this subject. Briefly, policies permit fishing in all areas except where it interferes with construction; use of Playalinda Beach if appropriate arrangements can be made with county for development and control; hunting in Area IV in accordance with state and county.

laws. These policies which have been adopted primarily for present conditions will be continuously reviewed and revised to meet future needs.

12. NASA Office of Grants and Research: LOC was notified of the awarding of the following grants:

a. The University of Florida - a one-year economic study in the fields of population growth and projections, retail and service trades, industrial development activity structure, and labor market composition. Amount \$40, 000.

b. The Florida State University - a one-year economic and sociological study in the fields of impact on local government, local financing, governmental functions, and employee satisfaction along with an institutional study. Amount - \$58, 750.

c. The East Central Florida Regional Planning Council contract award of \$24, 000 covers study and reports of close-in (to Cape and MILA) land development controls and land use practices, adequacy of existing and proposed water and utility systems. This study will be of nine months duration.

13. Cape Kennedy: After the President's announcement, the Range re-named Cape Canaveral Missile Test Annex (Station #1 of AMR) to Cape Kennedy. No clarification has been received as to other geographic and NASA organizational elements name changes.

B11/27

H-1 ENGINE PROGRAM

All thrust chambers manufactured at Neosho, Missouri, (SA-7 effectivity) have been checked for internal leakage between chamber tubes and the Mae West. One engine is unacceptable, and another is questionable. We have sufficient spares. Contamination (carbon) has been found inside the LOX dome on inboard engines of SA-6 and SA-7. Contamination of this nature normally results from an insufficient LOX system purge at cutoff. The tentative plan for corrective action is to flush the LOX dome with trichloroethylene. ✓

F-1 ENGINE PROGRAM

Construction of the three new F-1 engine test stands at EAFB has progressed to the point of checkout of various systems and sub-systems, prior to acceptance of the first stand (1D). A team of three Test Lab specialists has been organized and will participate in the validation checkouts which will be conducted on Stand 1D starting late next week. Development of the design criteria, as well as the design and construction of these facilities has been supported and monitored by Test Lab. The cooperation and willingness to support this effort by Test Laboratory in view of the heavy work load of other facilities responsibility has been noteworthy. ✓

RL10 ENGINE PROGRAM

Predicted date for the CENTAUR launch is now Wednesday, November 27, 1963.

* *fw*
A teletype was sent to NASA Headquarters last week indicating that the FY-64 RL10 R&D budgeting should not be reduced at this time in view of the imminent SATURN I and CENTAUR flights from AMR. (We had received notice the previous week that the FY-64 program authority had been reduced by \$5.0 M.) We have not had a reply to our teletype yet. If no reply is received this week, we will take action to reduce the effort at Pratt & Whitney Aircraft. Immediate action will be required in order to minimize the impact of the cut. ✓

J-2 ENGINE PROGRAM

* *fw*
A successful 405-second engine system test was conducted on Test Stand Delta-2B. During the first activation test, on Test Stand VTS-3B, the restraining arm clevis broke resulting in considerable damage to the engine and minor damage to the test stand. We issued a report on this incident on November 22, 1963: You have a copy. ✓

700
11/25

B 11/27

NOTES 11/25/63 CONSTAN

1. VISIT OF COLONEL HAROLD DYER

Colonel Harold Dyer, Consultant to the House Space Committee, visited Michoud Operations on November 21 and was thoroughly briefed on the entire facilities program at Michoud Operations. Colonel Dyer was accompanied by Mr. James Shepherd MSFC Assistant Director for Facilities Engineering. ✓

2. VIP VISITS

A delegation of NASA officials headed by Dr. Mueller and some executives of major Apollo contractors will visit the Michoud Operations on December 4 for presentation by the Chrysler Corporation Space Division and The Boeing Company, Saturn Booster Branch, on their respective Saturn booster contracts. ✓

NOTES 11-26-63 DANNENBERG

B 11/27

- Jw 11/25

1. Saturn IB Emergency Detection System (EDS) - After decision to delete manned flights on Saturn I, the EDS Committee decided to accelerate EDS for Saturn IB by flying as many IB EDS components on Saturn I as possible, and directing stage contractors to implement IB EDS on the basis of preliminary specs recently accepted by Crew Safety Panel. ✓

2. Biological Payload - Dr. Voas, MSC, presented to MSFC an Air Force/MSFC proposal for biological bonus payload on SA-9, 8, and 10 consisting of 340 lb zero g "Mouse House" orbiting 4 mice for 9 months. Follow-on experiment would also include biological radiation and environmental experiments. No recovery. *Any action? Lead time is running out fast! B*

3. Bellcomm - Quarterly progress reports now available indicate considerable Bellcomm systems activities ranging from S-VI stage studies to reference trajectories. *Let me have one! B*

4. Re-Entry Missions for Saturn V - Since Dr. Mueller has asked for a coordinated re-entry proposal of the Centers at next Management Council, MSC participation in our discussions seems advisable. Early MCM - requires quick action. *Since we established our position, we agreed to get in touch with MSC. Who carries the ball? B*

5. MSFC Liaison at Houston - After informal negotiation, Dr. Gilruth's Office has indicated that our proposal is acceptable to install William E. (Bill) Davidson as MSFC liaison at Houston (Davidson is already residing there). Formal letter for your signature is being prepared. *O.K. B*

Feb 11/25

NOTES 11/25/63 FORTUNE

B 11/27

1. Week of Visits for MTO: Writers and photographers from "Life Magazine," "Readers Digest" and the "Nashville Tennessean" have been down preparing articles on MTO and the impact upon local communities. Tuesday, key personnel from MTO and GE visited Arnold Engineering Development Center (AEDC), which will be discussed later. Wednesday, Ed Guilian called on legal matters and Foster Haley checked in to help with PIO. Thursday, Bob Long who is Special Assistant to Dr. Seamans for Construction and his assistant, Bob Kasper, looked into progress of construction, past and future rates of commitment of funds, etc. He seemed better pleased this time with our facilities, setup, etc. Captain Ray Thompson and Captain Jack van Ness from Bob Freitag's office joined in the same briefing and a get acquainted tour of MTO. Friday, Colonel Palmer assisted in the briefings and tour.

I guess you wrote Sundays, right? B

2. New Record for Speeches: Thursday also saw a new record, MTO personnel being called on for five speeches -- in Mobile, Biloxi, Picayune, McNeill, and Pass Christian. ✓

3. Mack Herring, our PIO, in Hospital: Mack Herring was driving home late Thursday night, Nov. 14, on Highway 90 where he was involved in a two car, side swiping collision on so called "Dead Man's Curve." Mack suffered compound fractures of left leg and arm, internal bleeding, cuts and bruises. He will be in the hospital for another week or so and laid up at home for some time. Fortunately, Joel Meriwether had reported in as his assistant and with help from Bart Slattery, (e.g., Foster Haley visit), we hope to get along with our heavy public affairs demands.

I wrote Mack to the hospital B

4. Indoctrination at AEDC: Messrs. Eaton, Roy, Teague and Ward of General Electric, Fortune, Auter, Williams and Sanders of MTO, Maxwell of P&C, MTO had a very good day with Major General Rogers, his staff, and ARO, Inc., at Tullahoma Tuesday. They briefed us on their operation, modus operandi, agreements, understandings and procedures, then gave us a tour of the facility. ARO, Inc., of course does more at AEDC than General Electric will at MTO in that they conduct tests in their tunnels and other facilities, whereas stage contractors will do that here. We learned a great deal that should be very useful in our contractor relationship at MTO. ✓ Outstanding lesson was that clear definition and understanding of each one's part will do a great deal to facilitate smooth working relationships and effective results between the Government and its operating or support contractors.

I think that visit was very worthwhile. Maybe one day you should all take a trip to Canaberal to discuss the relationship Air Force vs PAA vs RCA. B

→ Suggest to advise Debus of this plan in advance

NOTES 11/25/63 GEISLER

B 11/27

Jan 1/25

1. ALSS General Engineering Support: Re: your comments on this subject in item 2, Notes 11/11/63 Geissler, copy attached. We propose to continue working with Dr. Mueller's people toward creating a more favorable reaction to MSFC Engineering Support contracts. We appreciate your offer concerning the letter, however, we would rather reserve this approach until all other methods have been tried. ✓
2. Systems Study Funds: Again with reference to Item 2, Notes 11/11/63 Geissler. The \$3.7 million of OMSF funds being managed by Mr. de Fries' Systems Concepts Planning Office is divided into \$2.45 million for ALSS and \$1.25 for MMM. Our planned use of \$2.45 million is agreeable to OMSF. Use of \$1.25 million is still being negotiated. Our present planned use of it is: Expend \$1 million for 2 identical contracts for MMM concept and program definition which would (1) make industry tell Washington the MMM story, (2) provide us with detailed identification of interfaces between MMM and the stages to be built with it, and (3) put the bait out for a future contractor to get working on the MMM with his own funds in order to have a head start when and if approval comes. These 2 contracts would run until June 1964. We are working towards a May project approval. Necessary documents we're preparing will be explained in your Dec. 5 briefing. Current plans call for using the remaining \$.25 million on mission studies of potential Saturn IB markets and on performance data pertinent to the Saturn IB Vs Titan III Controversy.
3. SA-5 Real Time Data Displays in Huntsville: There will be an engineering test on SA-5 for real time operations as they are planned in Project LIEF. The data sources available to us at this time are: Telemetry received from Green Mountain between 112 and 475 sec of flight; launch status information from LOC; real time trajectory and orbit data from GSFC. We shall attempt to display in near real time within the Evaluation Center (Bldg. 4663): (1) Countdown status, (2) 15 telemeter measurements, (3) 6 computed vehicle performance parameters, (4) Vehicle altitude and velocity; (5) Primary flight events; (6) Orbit insertion conditions. Additional information will be available shortly after the flight. Flight evaluation personnel will analyze all available data. There is limited space reserved for top management (approximately 10 persons) to participate in this activity. Important event times will be transmitted to the Center Conference Room (Bldg. 4200). ✓

E.F.

→ I'd like to discuss with you and Joe de Fries at your earliest convenience. Suggest no big meeting, - just the two of you. I think I can give you some important inputs on MMM situation in Washington B

Please lay on
to a
Bougie

B11/27

Fu
1/25

1. S-IU-6 FINAL CHECKOUT: Final checkout on the S-IU-6 Instrument Unit continues with satisfactory results. The scheduled release date to Manufacturing Engineering Laboratory for preparation for shipment is December 8, 1963. ✓
2. S-I-6 PRESSURE TEST: The S-I-6 stage was released to this Laboratory November 19, 1963, for "clean-up" pressure tests after completion of rework by Manufacturing Engineering Laboratory. The test was accomplished and the vehicle returned to Manufacturing Engineering Laboratory on November 22, 1963, for preparation for shipment. ✓
3. S-IV-6 PRE-STATIC CHECKOUT AT DAC, SACRAMENTO: Pre-static checkout of the S-IV-6 stage continues at DAC, Sacramento. Contamination problems similar to those found on S-IV-5 are being encountered. The static firing schedule was advanced from November 25 to November 22, 1963, due to cancellation of the turbine spin test. *I know we had a good static test. So* ?
4. S-I-8 PRE-STATIC CHECKOUT AT CSD, MICHIGAN: Mechanical checkout of the S-I-8 vehicle is scheduled for completion and component checkout will begin November 27, 1963. ✓
5. S-I-9 PRE-STATIC CHECKOUT: Power Distribution and Component Tests results on vehicle S-I-9 were evaluated and found satisfactory. General Networks and Malfunction Cutoff Test, G&C Tests and Instrumentation Calibration are in progress. ✓
6. MICROMETEOROID PROJECT: Inspection, including alignment and weighing, was performed on the spare APOLLO Service Module (BP009) upon completion of modifications by Manufacturing Engineering Laboratory. Results were satisfactory. The Module is now scheduled to be transferred to Propulsion and Vehicle Engineering Laboratory to undergo testing. ✓
7. SYSTEMS CHECKOUT WORKING GROUP MEETING: The Systems Checkout Working Group met with DAC and NAA on the S-IV, S-IVB, and S-II stages during the week of November 4, 1963. Both meetings were quite fruitful, resulting in sixteen (16) action items which initiate work to solve most of the current problem areas. In particular, we appear to be getting "ahead of the game" on Saturn V to avoid the type of checkout problems encountered on previous programs. Due to the effectiveness of the Electromagnetic Compatibility Sub-Group, a second Sub-Group, Alignment and Mass Characteristics, was formed to enhance our ability to use small-scale meetings to maintain contact in the future. Full-scale working group meetings will continue to be held as required. ✓

Jw
11/25

NOTES 11-26-63 GRUENE

B 11/27

1. SA-5 Status

a. During last week's two important overall systems tests, both were completed satisfactorily. One test without and one test with disconnecting umbilical plugs. This finishes the overall systems test series. The next test will be the Simulated Flight Test. ✓

b. The oxygen and hydrogen loading test of the launch vehicle is in progress today. If this test is successfully terminated, we are more assured of keeping the schedule. ✓

c. Oil Contamination. It was decided in a meeting in MSFC that no changes will be made in the hydraulic system S-IV. All six systems will be cleaned between Simulated Flight Test and launch date. We are waiting for a decision from P&VE if any filters within the systems are to be exchanged. ✓

d. Measuring System Calibration Summary

	<u>S-I Stage</u>	<u>I. U.</u>
Total number of measurements on Stage of I. U.	671	210
Total number of measurement calibrations completed	649	184
Number of measurements that needed adjusting to meet required tolerance	356	67
Number of signal conditioners replaced	31	12
Number of transducers replaced	13	2

* Jw

2. Strike at the Hydrogen Plant at West Palm Beach. The strike at the West Palm Beach plant has been on for more than two weeks now. We procured hydrogen from the west coast to run the loading test and fill the 34 tank. We have enough hydrogen for the SA-5 launch. ✓

7w
14/25

B 11/27

NOTES 11/26/63 HAEUSSERMANN

1. IBM-GUIDANCE COMPUTER: Dr. Shea has decided to use the IBM Guidance Computer as back-up for the Apollo-MIT guidance system. The MSC and the MSFC versions will differ in their assembly and shape to care for the different built-in requirements; however, functionally they be almost identical. To satisfy the MIT guidance demands, we will expand the logic system by about 10%, thus also obtaining several advantages for our guidance system. ✓

FW 11/25

NOTES 11/26/63 HEIMBURG

B 11/27

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

Engine checkout is proceeding; a small quantity of lox was loaded on 11/23 with no major difficulties being experienced. The initial static firing is now targeted for 12/3. This slip from the previous target date of 11/27 is due in part to the learning necessary for efficient handling of the large F-1 engine components. Some difficulty has also been experienced with the spark ignition system for the gas generator. ✓

2. S-IV-6:

This stage was fired for full duration at the Douglas Sacramento facility on 11/22. Only major difficulty known at this time was the loss of hydraulic oil on one engine. ✓

*What element failed?
Must test be repeated? B*

3. MTF WORKING GROUP:

I talked to Seaman & Dwyer about this. B

NASA Headquarters has authorized MSFC to request Mobile District Corps of Engineers (MDE) to open the bids for the Navigation Lock in advance of receipt of FY 1964 funds. ✓ MDE requested approval from Office Chief of Engineers on 11/20; no reply has been received to date.

We have been advised by MDE of a fund shortage for completion of the Land Acquisition Program at MTF. The MDE estimate of this shortage is \$3.075 million. Details of this shortage were presented to representatives from NASA Headquarters and MSFC at Office Chief of Engineers on 10/30. These facts were subsequently confirmed by MDE. The causes of this fund shortage are varied and complex. If you are interested in the details regarding this situation, we will provide you with a briefing at your convenience. We are processing a reprogramming action to NASA Headquarters requesting additional funds to make up this shortage. ✓

No, I am not, because it wouldn't help one bit B

*fw

Negotiations with Linde Company and Air Products & Chemicals for the Hydrogen Plant were substantially completed on 11/22. The Source Evaluation Board is presently evaluating the results of the negotiations, and their findings are scheduled for transmission to NASA Headquarters for final selection on 12/15. ✓

July 14/85

B 11/27

NOTES 11-26-63 HOELZER

No Report

LATE QUOTE FROM MOSCOW

"We have never said that we are going to give up our lunar project. You're the ones who said that . . . you keep expecting us to give up."

Khrushchev, Nov. 6, 1963

Taken from "Electronics" Nov. 1963

Jaw
1/25

B 11/27

NOTES 11-25-63 JAMES

*Jaw
*Jaw

SATURN I: SA-5 - The SA-5 Pre-Flight and Launch Review has been re-scheduled for December 2 instead of December 5. ✓

S-IV-6 - A successful 460 second duration static firing was conducted on November 22. Cutoff was manual on a time basis. Some instrumentation channels were lost which effected some vibration measurements. Fuel fill and drain valve will have to be replaced. No. 4 engine hydrolic oil transducer blew out and oil pressure was lost. This component will be replaced. ✓

SA-10 Payload Study - A presentation on a proposed Biological experiment for an SA-10 payload was made by Colonel White, USAF and Dr. Voas of MSC on November 18, 1963. This office requested a detailed description of the proposed payload be submitted by December 2, 1963. This report should also include weight and volume breakdowns in order that the payload committee can properly analyze the proposal. Saturn I flight environmental data was requested by MSC and the USAF for the Boilerplate #9 and is being collected. A meeting was held November 19, 1963 to review the progress of the study. A nuclear payload proposal was made to the study committee by P&VE. This payload consists of a reentry on successive orbits of an intact Nerva engine and a reentry of a destructed Nerva engine to determine the hazards involved. This payload will be investigated further for additional details. ✓

Lead.
How about the 3rd micrometeoroid experiment?
B

*Jaw

S-IV-7 - On November 22, during engine gimbaling tests, engine number 5 received a dent in the turnaround manifold. Dent is approximately one inch long and one quarter inch deep. The engine contractor is evaluating the effect but as yet has not made a recommendation. There is an S-IV-9 engine build up which can be installed in place of the damaged engine. It is anticipated that this engine will have to be changed. ✓

200K H-1 Engine - The new external loads criteria impacting the up-rated H-1 engines will be released by R-P&VE November 22. With this criteria, CCSD can be directed to develop internal loads and stress data to effect design changes as required in the S-IB stage to accommodate the up-rated engines. This development schedule could permit incorporation of the 200K engines on S-IB-1 depending on the allocation of FY-64 funds. ✓

*Jaw

SATURN IB: S-IVB - In absence of an approved contract (Mod. 66) for Saturn IB S-IVB Stage, Contracts Office has requested Headquarters approval for the use of a letter contract. Action has been taken for preparation of such a contract, and it is to be issued immediately upon receipt of Headquarters approval. ✓

7w
1/25

NOTES 11-26-63 Koelle

B 11/27

No NOTES this week.

NOTES 11-26-63 KUERS

3/1/27

July 15

1. Engine Management Support by ME Laboratory: Mr. Lee Belew and I have concluded an agreement for support of engine management by ME Laboratory. This support will be rendered in the areas of tooling, facilities, manufacturing processes, fabrication, assembly, and manufacturing management techniques. It is intended to send 2 or 3 ME field representatives to Los Angeles who would work directly for the H-1, J-2, and F-1 engine managers and would in turn call for support by our in-house specialists in the different disciplines of manufacturing as needed. This is in principle the same mode of operation as we have established--and I believe with good success--for the ME Working Group activities for the upper stages of the Saturn program. ✓

2. Saturn V, S-IC Stage:

a. The final filler pass for the circumferential close-out weld of the Fuel Test Container has been successfully completed. The last operation on the container--the installation of the lox tunnel--will start this week. All components and tooling for this operation are available. The aft adapter for the Fuel Test Container has also been completed in our shops and the Half Inter-Tank Stage has arrived from Michoud. Both items are needed for temporary support of the Fuel Test Container during structural testing. ✓

b. The Y-ring has been welded to the dome of the lower fuel bulkhead for the T-vehicle. The upper bulkhead for this container is also well under way. ✓

c. The schedule for the Thrust Structure for the T-vehicle is slowly improving. We have finally received from Boeing the engine support fittings and the Upper Thrust Ring assembly. With these parts we can at least start the Thrust Structure assembly in 4705. We will, however, come to a complete hold up again in about 2 weeks if Boeing cannot improve their delivery dates for the Thrust Posts, Holddown Post, and Auxiliary Shear Panels. The Center Engine Support sub-assembly (cross beam) has been completed in our shops. The biggest problem is foreseen in the area of the heat shield installation which is still in re-design. I have called Mr. Stoner's personal attention to this item. ✓

d. As a result of my conversation with Mr. P. Janson, Assistant to the Executive Vice President of the Boeing Company, a new man, Mr. Hans Beble, has been appointed as a Staff Member to Mr. Stoner. His function is to coordinate the Wichita and Seattle manufacturing activities for support of the Saturn Booster Branch. ✓

3. Full Scale Saturn V Tail End Mock-Up for New York World's Fair: There is no in-house capacity available in support of this project, beyond consultation of a contractor. Letter on this subject to Hyds is in preparation for your signature fw. ✓

7w
11/65

B 11/27

NOTES 11-26-63 MAUS

1. FY 65 BUDGET - The following information was received from Bill Lilly's office on current actions in headquarters on FY 65 Budget. It is interesting in that it reflects Dr. Mueller's thinking as to the relative softness of MSFC vs. MSC budgets.

	<u>MSF</u>	<u>NASA Total</u> (Reference)
(1) Original Seamans submission to BOB	3357.6	6,000.0
(2) Bureau of Budget mark up, base	2927.8	5,165.0
BOB add-on, if necessary for Apollo	200.0	200.0
Total, BOB mark up	<u>3,127.8</u>	<u>5,365.0</u>
(3) Mueller changes, to reduce 3357.6 to 3,127.8:		
RL - 10	- 7.0	
M - 1	- 20.0	
SAT I, Termination	- 110.0	
MSFC in house	- 70.0	
MSFC Major Contractor anticipated changes	- 72.0	
Spacecraft	<u>- 72.8</u>	
Subtotal	-351.8	
Mueller "Alternate Subsystems Backup Development" kitty	<u>+122.0</u>	
Net (3357.6 - 229.8 = 3,127.8)	-229.8	
(4) Additional Seamans' reduction to balance programs (applied by Mueller to MSFC)	- 50.0	
(5) Final MSF Mark	3,077.8	5,365.0
(6) MSFC Portion:		
Approved Programs	1,449.3	5,365.0
MSFC portion of Mueller "Alternate Subsystem Backup" kitty	61.0	
Total MSFC portion	<u>1,510.3</u>	<u>5,365.0</u>

The 1449.3 above compares to our previous guideline figure of 1439.4, which we have stated is 313.9 short of accomplishing Dr. Mueller's schedule. (which he seems to be willing to concede) B

2. FUNCTIONS AND AUTHORITY - MSFC - We have received (on Nov. 22) a request from Clyde Bothmer for an official mission statement for MSFC for publication in the NASA Management Manual. Requested submission date is November 27. Since this allows too little time for preparation and staffing of a meaningful paper, I am requesting a more realistic submission date of January 15, 1964.

Feb 14/65

B 11/27

NOTES 11-26-63 MRAZEK

1. RIFT FISCAL YEAR 1965 BUDGET: (Reference NOTES 11-18-63 MRAZEK, paragraph 3.) The letter notification of budget reduction has been received. The R&D budget for RIFT is \$15.0 million, Supporting Research and Technology - \$0.6 million, and facility budget remains intact at \$10.7 million. In addition, Mr. Finger has concurred in our need for advanced design funds of \$3.5 million for the initiation of design of the Nuclear Rocket Development Station facilities in fiscal year 1965. ✓

2. FEASIBILITY OF FLYING LIVE S-IVB STAGE ON SA-502: An analysis of the feasibility of flying a live S-IVB stage on SA-502 indicates that the prime mission reliability would be decreased approximately 0.18 percent. ✓ This analysis was based on a comparison of the critical items and their loss effects for both inert and live S-IVB stage configurations.

Sounds negligible
B

3. S-IC DYE INSPECTION: Due to a potential LOX compatibility problem in dip tank inspection of S-IC stage components for surface defects with dye penetrants, Materials Division requested The Boeing Company to investigate a penetrant spray application technique. The result of this investigation has shown that approximately \$1 million can be saved by going to the spray application technique without degrading the reliability of the inspection. Furthermore, the LOX compatibility problem is significantly reduced. Quality Assurance and Reliability Laboratory has concurred in the change. ✓

? 600k

4. S-IV-5 HYDRAULIC SYSTEM: After engine #5 of S-IV-5 went hard-over in checkout at the Cape, a sample of the hydraulic fluid and critical filters from the system were given to the Materials Division for investigation. An unusually large number of small white particles (less than 10 microns in size) are present in the fluid. Attempts to chemically identify these have not been successful. However, examination of the actuator filters indicates that such particles are abundant at the ends of the filter and will pass through the filter. Attempts are underway to clean these filters, and to thoroughly examine the cleanliness of filters supplied from stock by Douglas Aircraft Company. ✓

5. J-2 ENGINE, BLOCK II, CONFIGURATION FAILURE ON FIRST TEST AT VERTICAL TEST STAND (VTS) 3-B: Engine #2010 failed at approximately three seconds into mainstage because of structural failure of the thrust chamber attachment points for the restraining arms. This failure is of major importance because the attachment points on the chamber are the Block II flight configuration. Testing has ceased on all engines until this structural problem can be fully analyzed. ✓

6. S-IC 17-INCH LOX PREVALVES TESTED WITH DOUBLE-PNEUMATIC ACTUATORS: Pressure surges were not excessive. Tests are being continued with various orifices to reduce valve closing. ✓

B 11/27

Fu
11/25

1. S-IC STAGE: Notes of 11/11/63 reported that MSFC was concerned that Boeing does not have the capability at Michoud for checkout, test, and calibration of S-IC-T instrumentation. A meeting with Boeing on 11/14/63 clarified certain aspects. Although several problem areas still exist, the feeling now is that with proper emphasis and coordination between MSFC and Boeing, an acceptable instrumentation plan should be obtained for S-IC-T. ✓

A decision has been made to spray penetrants on the materials, rather than dipping in the conventional tanks available at Michoud. This process will result in a saving in excess of \$600,000 during the life of the program. ✓

*Fu 2. S-II STAGE: The first thrust structure for the S-II Stage has been delivered from the contractor's Tulsa facility to the Seal Beach plant. ✓

The first common bulkhead upper facing plate gore fabricated by the Chemical Contour Co., by means of stretch forming, was delivered to NAA/S&ID. Preliminary evaluation indicates the quality of the product is excellent. ✓

↓
Action has been inaugurated with NAA/S&ID to improve the quality and timeliness of budget and firm cost proposals submitted by the contractor. Examples of difficulties being experienced are: (1) four engineering changes for which a budget cost of \$6.0 M was submitted at the time the change orders were issued has increased to \$24.0 M and (2) 16 of 18 firm cost proposals resulting from GSE changes are delinquent.

*Fu 3. S-IVB STAGE: Plans are now underway for the next S-IVB Quarterly Review, tentatively scheduled for December 18-19, 1963. ✓

4. Instrument Unit: On Tuesday, 11/19/63, a meeting was held with Industrial Operations, Research and Development Operations, and Purchasing Office personnel to discuss comments on IBM's cost/contract proposal for Instrument Unit system development and integration contract. This is the first incentive fee contract for the Saturn V Instrument Unit and Astrionics. It was agreed that the incentive would be based on price and performance. Negotiations with IBM started Wednesday, 11/20/63, and are still continuing. ✓

NOTES - 11-26-63 - SHEPHERD

B11/27

Jul 11/25

Visit of Congressional Staff: Colonel Harold Dyer, U. S. Corps of Engineer Consultant to House of Representatives Space and Astronautics Committee visited Huntsville, Michoud, Slidell and Mississippi Test Operations on November 18 - 22. Three days were spent in a very comprehensive tour of the Huntsville area, one day each at Michoud and MTO. The over-all reaction of Col. Dyer is considered to be favorable. He seems to be a competent person and one that considers facilities as only a means to a program objective. He was quite interested in the relation of the R&D program to the facilities. His predecessor, Lt. Col. Gould, was not so inclined. The following comments and observations were made:

1. The following laboratories were toured by Col. Dyer: Test, Manufacturing Engineering, Quality Assurance & Reliability, Propulsion and Vehicle Engineering, Astrionics, Computation and the Launch Support Equipment Office of LOC. ✓

2. Col. Dyer asked several people about what type of work would be placed in an Electronic Research Center (ERC) by Marshall. He was also concerned about the definition of basic and applied research and development, as there appeared a possibility that the ERC would be performing work that should be assigned at the Centers or industry. ✓ Agree

3. Any appearance of duplication was noted by Col. Dyer, particularly in the computer field. ✓

4. Col. Dyer expressed the opinion that the use of Engineering Services Contractors was a method whereby NASA circumvented the personnel ceiling imposed by Congress. I believe NASA may expect considerable questioning in the FY-65 hearings in regard to both equipment and facility duplication, as well as, employment of Engineering Services contracts. ✓

5. During conversation with Mr. Poppel, Col. Dyer expressed the opinion that he found it difficult to understand why LVOD was a part of LOC rather than Marshall. This was based upon a comparison of work assignments for the ground support equipment design in the Saturn and Centaur programs. ✓

6. Col. Dyer is to visit the NASA West Coast contractors after the FY-65 book is submitted to the Congress. After these visits Col. Dyer, as well as, the Senate Staff Members will have visited all of the NASA Centers and large contractors. ✓

NOTES 11-26-63 Stuhlinger

B 11/27

Jul 11/25

1. METEOROID MEASUREMENT PROJECT: Following the recent change in SA-9 and SA-8 launch schedules, Fairchild introduced some modifications in the impact detector electronics. The testing at LTV of these components in combination with sensors at normal and at LN₂ temperatures will extend over a few more weeks. ✓

2. FY 1965 RESEARCH BUDGET: Following screening of the various laboratories' FY 1965 research submissions, we forwarded to the Executive Staff and FMO the following budget:

	<u>Guidelines</u>	<u>Total Requirements</u>
OART	10.875 M	18.764 M
OMSF	17 M	22.098 M
OSSA	2.9 M	6.225 M ✓

3. ALSS PROJECT: In paragraph 2 of NOTES 10-21-63 Stuhlinger (attached), you asked for two reports. The requested information was sent to you last week. ✓

4. APOLLO SHIELDING EFFECTIVENESS PROBES: NOTES 10-21-63 Stuhlinger (attached) contained a question in paragraph 4 - answer:

The scanning equipment consists of a γ -ray source (Co-60), to be applied on the outside of an Apollo capsule, and of detectors, to be applied inside the capsule. This system allows the experimental evaluation of the crew shield effectiveness. ✓

1 Enc:

NOTES 10-21-63 Stuhlinger