

March 4, 1963

* 1. S-IC QUARTERLY REVIEW

The S-IC Quarterly Review will be held at Michoud Operations in New Orleans on March 5 and 6, 1963. ✓

2. BOEING CONTRACT NAS8-5608

NASA Headquarters approved Boeing Contract NAS8-5608 covering one test stage and 10 flight stages of Saturn 5 boosters, in the amount of \$418,820,967. ✓

3. MODIFICATION 4 TO BOEING CONTRACT NAS8-5606 (F)

Modification 4 to the facilities contract with Boeing obligates an additional \$2,536,711 making total funds available under contract \$7,736,371. ✓

* 4. A-E CONTRACT FOR ENGINEERING AND OFFICE BUILDING

August-Perez and Associates signed a contract to perform design and construction management of the \$9 M engineering and office building to be built at Michoud Operations. P&C is expediting this contract through NASA Headquarters. ✓

5. LABOR PROBLEMS

On Thursday, February 28, 1963, at approximately 2:30 p. m. 22 carpenters left their job on the vertical assembly building in protest over work that was awarded to the iron workers. On Friday, March 1, 1963, the Ross Corporation filed a charge with the National Labor Relations Board against the carpenters for their illegal action. On Monday, March 4, 1963, the carpenters returned to work. ✓

1. GROUND BREAKING CEREMONIES FOR MISSISSIPPI TEST OPERATIONS

* Discussion with the Corps of Engineers indicates that 15 May 1963 will be a good time for Ground Breaking Ceremonies at MTF. We can use either the warehouse or the construction harbor and dock as the center of attraction. Parking space, sufficient open area, probable weather, etc., will be considered in determining the Site. If this particular time period is satisfactory to you, I will get together with Slattery on details.

2. VISIT BY HANCOCK & HARRISON COUNTY PERSONNEL TO MSFC

Friday 8 March we have invited Boards of Supervisors and other Mississippi personnel who will be concerned with local development, Sanitation, Schools, Zoning etc. Purpose is to acquaint them with how Huntsville has reacted to the build-up around here so that they can be better prepared for the impact of MTO in coming months. Army C-54 will be used to and from Gulfport. A tour of MSFC, then get-together with their counterparts in this area will be followed by witnessing full duration firing of SA-5, if this proceeds on schedule. ✓

3. LOC BAR-GRAPHS ON PROGRESS OF CONSTRUCTION

Joe Read, CPO, and myself originally planned to visit AMR to-day to discuss this subject. Budget preparations precluded this so I called Rocco Patrone's office this a.m. His assistant, Robertson, will forward us copies for study. ✓

4. NEWTON'S PRINCIPIA

Your introduction to the Scientific Classics intrigued me, so I read Newton's Principia once again. It struck me that his remarks on centripetal force, directed to some center, or more particularly a body in that center, might be applicable to the dilemma facing you regarding studies for headquarters' personnel. Newton specifically mentioned Circum terrestrial, Circum-lunar and Circum-jovial. A Circum-jovial study group, composed of representatives from all the divisions here, having direct in-puts to current divisional work, and without superseding any of the divisional mission responsibilities, should be more useful to Taylor than assignment of just one man to his office.

→ With Taylor being Jupiter? B

B.F. Believe it or not: We're reached a peace settlement!

*
xx Will keep you informed on this. (fast way to Helms)

I've marked 15 May on my calendar B

- * 1. Mission Control Center Studies: A satisfactory solution has been found for the interface between the new MSC-MSFC Panel for S-IVB orbital check-out to be chaired by Mr. Richards, M-ASTR and the inhouse study group for Mission Control Center to be chaired by Dr. Speer, M-AERO. The five MSFC panel members will also be members of the inhouse group to assure the highest degree of coordination. ✓
- * 2. Meteorological (FPS/16) Radar Facility for LOC: Reference Notes - 2/4/63 - Geissler (Copy attached). Funds for the Meteorological Radar Facility have been approved and are on hand at LOC. The expected operational date is January 1, 1964, according to Dr. Bruner, LOC. A joint NASA-AFMTTC agreement on the acquiring and operation of the radar has been formulized. This agreement specifies full operation of facility by April 15, 1964. ✓
3. Saturn I, Block II Wind-Induced Lateral Oscillations: Tests are now in progress in the Langley Transonic Dynamics Tunnel to determine wind-induced lateral oscillation characteristics and static forces of the SATURN I, Block II launch vehicle. Several configurations are being studied; JUPITER and APOLLO payload, empty and loaded conditions. Preliminary test results for the APOLLO configuration, with and without strakes, indicate no significant difference in dynamic response. Overall, the dynamic response was favorably low (about 20% of static) for all tested conditions; (on the JUPITER missile, the dynamic to static load ratio was about double that). The preliminary conclusion is that the SATURN I, Block II vehicles are safe regarding wind-induced lateral oscillations. ✓
- * 4. Flight Mechanics, Dynamics and Control Coordination Meeting: The Fourth Meeting of this group was held at MSC (Houston) on February 29, 1963. Agreements reached are: (a) All performance values for the nominal missions for C-1, C-1B and C-5 vehicles don not include engine out capability. MSFC is investigating engine out capabilities on C-1, C-1B and C-5 from a control and structural viewpoint for use in abort studies and/or alternate missions. (b) LES will be jettisoned 10 seconds after S-IV ignition on C-1 vehicles. (c) MSC has no operational requirements due to tracking and communications for retro rockets on the S-IV or S-IVB stage. (d) Free flight is still considered by MSC to be the primary mode for docking. ✓
5. Duplication of Efforts: I am sorry that I have to bring up this unpleasant subject again (see item 5, Notes 2/18/63 - Geissler, copy attached). The attached report is another flagrant example of studies in P&VE which fall clearly the Aeroballistics mission and are treated adequately here. This is obviously nothing which is needed for a quick preliminary performance estimate. My efforts of personal conversation with W. Mrazek in this respect have not had the slightest result so far. I am afraid a decisive step by top management is necessary to eliminate such obvious waste of talents and resources.

see left side of folder

E.V. I hope today's discussion (with you and Mrazek) will lead to the desired change. We talked only about Mr. Krause, Mr. Burns and 2 girls, however. Attached paper is authored by Mr. Harris. Does he also belong to that group? B

1. The International Association of Machinists (IAM) has filed an appeal with the Secretary of Labor requesting that an arbitrator be appointed to investigate the MSFC plan for carrying out the President's policy for dealing with Labor Unions. The IAM is particularly protesting our decision to make all of MSFC into one unit for bargaining purposes. Since the IAM cannot get a majority of votes in an election that is MSFC-wide, they want us to break ourselves down into smaller units so they can become labor's voice within one of the smaller units. According to a recent magazine article, the Labor Department has received about 30 such protests from throughout the government.

Please keep me posted B

B 3/6 See me at your eat. convenience on this

1. SA-6 PRE-STATIC CHECKOUT: Engine deflection and clearance checks were completed and alignment is progressing. ✓

D.F.
I'd like to get your views on Qual. Ass. Division's role

* 2. QUALITY ASSURANCE SUPPORT TO LOC: MSFC has entered into an agreement with LOC regarding quality assurance support. The Quality Assurance Division will participate and support in the GSE area, i.e., equipment for which the Launch Support Equipment Office of the Launch Operations Center has the design responsibility. Any additional support will be subject to mutual agreement between this division and LOC.

3. INSPECTION COVERAGE IN THE HUNTSVILLE AREA: A survey of Birmingham Procurement District's inspection coverage of contractors in the Huntsville area disclosed that a minimum of 24 inspectors are required for NASA contracts. This requires an addition of 9 inspectors. ✓

in accepting stages slipped to the Cape direct but modified there by our Stage Contractors
D
Qual vs LOC vs LVO

Defi-
nition?
B

4. CALIBRATION ACTIVITIES: A summary of calibration activities for the month of January 1963 disclosed that the delinquency rate for the Quality Assurance Division has dropped from 11.9% in December to 4.5%. The overall delinquency rate including the other participating divisions of MSFC was 8.7%. A total of 1571 items were checked, repaired, and/or calibrated during the five-week period from December 30, 1962 to February 2, 1963. ✓

* 5. AIR FORCE SUPPORT ON MICROMETEOROID SATELLITE CONTRACT: The Philadelphia Air Force Contract Management District Headquarters has been contacted and a meeting arranged to discuss possible support on the Micrometeoroid Satellite Contract with Fairchild Stratos Corporation, Hagerstown, Maryland. ✓

6. AIR FORCE INSPECTION PLAN APPROVAL: The Baltimore Air Force Contract Management District's Quality Assurance and Inspection Plan for use at Martin-Marietta, Baltimore conforms to the detail requirements of NPC 200-1 and has been approved by the Quality Assurance Division for implementation (high pressure cylinders for Saturn V) ✓

D.F.
What's that?
B

7. IDENTIFICATION AND TRACEABILITY REQUIREMENTS: Revision B to the MSFC Identification and Traceability Requirements for Space Systems has been initiated. This revision depicts further clarification of raw material identification as applied to various identification and traceability categories referenced in the document.

8. PROJECT 60 LEAD TASK GROUP: The Quality Assurance Division presented the MSFC Quality Assurance Program to the Project 60 Lead Task Group on February 19, 1963. We received able assistance in this presentation from the Procurement and Contracts Office and the Central Planning Office. The presentation covered elements relating primarily to Quality Assurance Division functions performed in the preparation and management of space system contracts with industry. This presentation was similar to the one given to the Project 60 Quality Assurance Sub-Task Group on Nov. 26, 1962.

What's that?
B

D.F.
I guess you overestimate my intelligence. Be a little simpler, will you?
B

- * 1. SA-4 Firing Schedule: The firing date of SA-4 is in doubt. Cracked diodes were found in different Astrionics components. A group of Astrionics Division personnel, plus one person from Quality Assurance Division went down to the Cape on February 28, and an investigation into the problem was started. LVOD had to interrupt their testing to support, with all personnel, this task. LVOD will work through the weekend and by March 6, we should know what the impact on the firing date will be.

Also add for TWX to Holmes:

Special Note: Additional information received this morning indicates that by March 8 the preparations for firing will be back on schedule ✓✓

MAC (next time)
* This item is important
NOTES - HAEUSSERMANN, 3/4/63

B 3/6

1. ST-124 SLED TESTS: A total of 7 runs was made with the first ST-124 Stabilized Platform delivered from Eclipse-Pioneer on the high speed track at Holloman AFB between 11/27/62 and 2/21/63. The first three runs were made with the platform mounted with vibration isolators designed and built by Lord Mfg. Co., Erie, Pa. The last four runs were made with the platform hard mounted to the sled. No system malfunctions were experienced in any of the seven runs, although the environment was quite severe. MSFC asked for at least 8g acceleration for at least 3 seconds duration. Anticipated vibration level was +15g. Instrumentation showed that +20g was exceeded in all three directions on some of the runs particularly the last run made 2/21. The tests were made to prove the reliability of the platform in a severe vibration environment. The reliability was conclusively demonstrated by the series of seven runs. Final data has not been analyzed as yet, but quick look indications are that a bonus value in indicated accuracy may be realized from the runs. Detailed analysis of the runs will take some time. The platform is presently undergoing further tests in a high altitude, cold chamber. Results of these tests will give further indication of the ST-124 platform's ability to operate in the severe environment required of it and indicate any necessary modifications to alleviate any conditions beyond its present capability. ✓✓✓

* 2. GE MANPOWER BUILD-UP: Build-up at MSFC is progressing to a point near their latest projected estimates submitted to MSFC. ✓

3. RCA-110's: RCA-110 system No. 3, contract NAS8-2603, has been installed in blockhouse 37, tested, and accepted. This unit is the first to be delivered with a magnetic tape station. Two other magnetic tape stations are to be shipped under this contract and mated with the two RCA-110 systems presently in use at MSFC. ✓

* 4. CRACKED GLASS ENCAPSULATED SUBCOMPONENTS: SA-4 ASTR active components affected have been inspected, reworked, and returned to Cape. Instrumentation and passenger components involved will be returned to Cape this week. With fine cooperation of QD and LVOD we feel minimum delay in schedule has resulted in handling this matter. Indications are lost time will be made up by 3/8; official word should come from Dr. Gruene. ✓

SA-5 and subsequent will be treated in the following manner for components containing glass encapsulated elements:

- 100% inspection with support of QD.
- Use of HYSOL will be prohibited.
- Replace cracked elements using:
 - clear plastic sleeving
 - polyurethane for potting.

Full details are to be discussed today with QD and M-SAT to formulate actions to be taken. ✓

W.H.
Very good!
Congratulations
As everyone involved!
B

* 1. S-I-5:

A successful 33-second firing was made, Wednesday, 2/27. Full duration firing scheduled, Friday, 3/8. ✓

* 2. S-IV BATTLESHIP STATIC FIRING, DAC-SACTO:

Cut-off came at 6.5 seconds of an intended duration (460 seconds) firing, 2/25, because of a fire around the stage hydrogen cooldown manifold. Cut-off came at 125 seconds of next intended duration firing, Saturday, 3/2, because of low chamber pressure on one of the engines. ✓

3. MTF:

Mobile District Corps of Engineers (MDE) awarded a contract to Sverdrup & Parcel, 2/27, for final design of Saturn V Brick & Mortar Test Facilities. MDE also awarded contract to deLaureal & Moses, New Orleans, Louisiana, 2/27, for final design of steam plant. Following a meeting at MDE, 2/26, the S-II Complex design and construction schedules were confirmed by MDE to MTF Working Group on 3/1. ✓

* 4. GSE - Launcher Arms - Spares for VLF-37B:

Small cracks have been found in five of the eight launcher arms now under test. The cracks occurred in the same place in all arms. The cracks were forward of the lifting lug on the upper part of the arm. The effect of the cracks is being investigated. ✓

5. GSE - Swing Arms - VLF-37B:

Swing arms No. 2 and 3 with the DAC and LOC accessories were shipped to the Cape, 2/27. These arms are considered satisfactory for use during the wet test. ✓

6. FACILITIES:

Contractual troubles on the projects listed below appear to have been cleaned up and work may be expected to begin between 3/15 and 4/1, according to information received from P&C. This will constitute slips of approximately 4 months from the estimated completion dates given you in October.

Blockhouse Instrumentation
Component Test Facilities
C-5 Swing Arm Facility

K.H.
Any effect on overall
(launch) program
discernable?
B

H.H.
Please call
me when
you'd like
to give me
a
little
demonstration
B

1. LUNAR LANDING SIMULATION PROJECT: A breadboard flying spot scanner system is operating which permits simulation of a portion of the descent to the lunar surface. While the resolution leaves much to be desired, the system is satisfactory for feasibility studies. The display is to be converted to an analog computer simulated control system this week, in cooperation with Astrionics Division. ✓

* 2. ANALOG COMPUTER INSTALLATION AT SLIDELL: The three remaining analog computer consoles were delivered at Slidell on February 27. Four Flight Simulation Branch personnel are in Slidell this week to complete the checkout of the analog computer installation there. ✓

1. GENERAL: I will be in Washington on Monday to attend a symposium on the nature of the lunar surface, sponsored by the Office of Space Sciences. I plan, on Tuesday, to discuss with OSS personnel, their latest thinking and planning relative to an OSS Saturn 3rd stage vehicle configuration. ✓

2. AGENA TRANSFER: The assistance required of MSFC for the period February 25 through March 1, 1963 was accomplished by three MSFC people. Mr. Clark was in Cleveland assisting in the Plans and Program area. Mr. Trexler accompanied two LeRC PERT people to Lockheed Missiles and Space Company for general orientation, a discussion on LeRC future plans for PERT, and a review of the PERT network on Mariner C. Mr. Cook accompanied two LeRC Quality Assurance representatives to LMSC for the Quality Assurance Panel Meeting and a general orientation. For the week of March 4-8, five MSFC people will assist LeRC in the Agena operation. ✓

*reword pt
TWT to
indicate Hueter
will be in
Washington
Tuesday + purpose.*

MSFC ROUTING SLIP

	CODE	NAME	INIT.	<input type="checkbox"/>	<input type="checkbox"/>
				A	I
				C	N
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				N	R
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1		Kelly Mrazek			
2		✓ P&UE			
3		Cy to: ✓ Mr. Gorman / Mr. Hardeman			
4		Mr. Williams			

REMARKS

This business of using Saturn V funds to support Boston Engineering work in support of NOVA is strictly against the groundrules I've set repeatedly.

Please look into the matter and come up with a formula acceptable to Mr. Gorman, Mr. Williams and Mr. Hardeman.

CODE	NAME	DATE
	B	3/19

	CODE	NAME	INIT	<input type="checkbox"/>	INFORMATION
1	M-ELF-ADM	Mr. G. ...			
2		Dr. von Braun			
3					
4					

REMARKS

Regarding Dr. von Braun's question attached, I do not feel we would need additional Headquarters approval for this as long as our effort was clearly identified as NOVA Propulsion Concept Studies. I would like to point out, however, that P&VE has also advised me that in their Engineering Support Contract with Brown Engineering, for the last quarter of this fiscal year, Brown will be doing approximately \$123,000 worth of NOVA support for P&VE, but since no NOVA funds have been provided for this, the effort will be charged to SATURN V. I talked to Frank Williams on this, but he did not consider that he could make available from his unspent \$185,000 any money for this Brown contractor support. I feel that NOVA should pay its appropriate share of the P&VE engineering support with available funds in preference to starting any new work.

I agree. If we don't do a certain amount of "policing" on our own we may find ourselves going to Washington on such matters. This would not be desirable.

/s/ Harry

CODE M-FIN-CH	NAME <i>T. U. Hardeman</i> T. U. Hardeman	DATE 3/18/63
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B 3/6

1. FY 1963 STATUS

As of the 28th of February, we have committed to P&C all of our study money for outside contracts. In addition to this we have forwarded requests to Mr. Smolensky and Mr. Lord on the following items:

- a. "Low Energy Manned Planetary Missions"
Continuation with Lockheed Corp. \$100,000
 - b. "Mission Possibilities for Manned Mars Flight
in the 1975/85 Period" \$100,000
 - c. "Conceptual Design and Mission Potential of a NOVA-based
Lunar Logistics System" \$200,000
 - d. "Study of Cost/Reliability Relationships" \$100,000
 - e. "Analytical Model for Approximate Cost of Advanced
Launch Vehicles" \$150,000
 - f. "Cost Element Research" (RAND Corp.) \$ 50,000
- Total Requested not yet authorized \$700,000

The status is summarized in the following table:

\$10 ³	OART	OMSF (Lord)	OMSF (LV)	NOVA	TOTAL
Requested	965	1,075	2,250	3,500	7,790
Authorized	965	675	1,950	3,500	7,090
Committed	965	675	1,950	3,315	6,905
Obligated	0	100	350	2,109	2,559

2. FPO ACTIVITY REPORT

We have made it a habit to publish once a year a fact book which summarizes our past and expected future activities. This report is primarily for the benefit of better communications with the Divisions, Program Offices and study contractors. This report will be distributed this week down to section level. I will personally make distribution in the Program Offices in Washington this week and explain it in some detail. ✓

3. NOVA

We have \$185,000 left in our NOVA study fund this fiscal year and have explored with P&VE the possibility of spending this money in-house on some joint experimental work on advanced engines. I understood from our last discussion that you are very much in agreement with such an in-house activity if P&VE can handle it.

In principle, but...

* Left side of folder is a copy

Harry G.

Do we need Hg. approval for this? Those experiment would be directly aimed at NOVA! B

B 3/6

* 1. Saturn V, S-II Stage:

a. Rocketdyne has made two attempts on explosive forming lower gore segments. This was experimental tryouts to prove the concept using unmilled blanks of approximately 1" thickness in the center which is considered to be representative for the waffle configuration. Both attempts were complete failures; the material was completely torn off along the edges. ✓

b. A Manufacturing Engineering Working Group meeting was held subsequent to these failures with participation of SSO, Rocketdyne and S&ID. Mr. Parker and Mr. Van Leuven were invited and attended. Rocketdyne did not come up with any proposal for improvement of the technique. It was concluded, however, to wait for two more attempts--one the lower segment and one first attempt for the apex segment, the die for which looks even worse in our opinion. These firings are expected in the next few days. Results will be discussed this Wednesday, March 6. ✓

c. Possible courses of action: Utilization of the hydraulic bulge forming fixtures at Wichita is unfortunately not feasible because of incompatibility of sizes and shapes for both lower and apex segments. There is a possibility of stretch forming the apex gore which could be sub-contracted to Chemical Contour Corporation, requiring additional funding for equipment at this company. This would not resolve the problem for the lower (waffle pattern) segment. We believe explosive forming will do the job--if done by people with the experience in this field. Our opinion is supported by the fact that Ryan Company has already produced two apex segments for us--as a back-up to the hydraulic bulge forming method. Informal discussions with the Executive Vice President at Ryan indicated that this company is willing to give assistance to Rocketdyne by training their personnel, however, this would have to be done at San Diego and the dies would have to be moved to their place.

2. Saturn V, S-IC Stage: Two gores have been welded, trimmed, and passed quality control. We try the first meridian weld possibly today, March 4. We are experiencing pitting (corrosion) problems on gore segments from Boeing, Wichita. It is believed that the pitting results from the etching operation done at Wichita. This etching is part of the dye penetrant inspection operation, introduced recently and carried out in a very improvised manner. We are sending a team of people to Wichita to get to the root of this problem. ✓

W.K.

What is so peculiar about these S-II gores? Our S-IC gores of same diameter look lovely! Is it the different material thickness, - or are you talking solely about gores for the upper dome of the S-II common bulkhead with its tricky tolerance aspects? B

B 3/6

I. SATURN I: S-IV Battleship - The 6.5 sec. firing on 2-25-63 was terminated due to a fire. Post firing inspection revealed a leak in the vent collector manifold (scored seal). ✓

qm *

On 3-2-63, a 120 sec. firing was accomplished. The run was terminated due to engine #4 decreasing chamber pressure. Exact cause not known at this time. Helium heater operated satisfactorily. ✓

qm *

S-I Test Facility MTO - Dr. Seamans queried OMSF about an S-I Stand at MTO. OMSF had previously deleted stand, based on our two position capability at MSFC. OMSF will try to get reinstatement based on back-up capability and extension of S-I and/or S-IB programs. ✓

What???

II. SATURN V: Flight control system responsibilities for the three SATURN V stages remain unresolved between P&VE and ASTR. Each Division has expressed to M-SAT certain requirements in the areas of test equipment and hardware, which in some instances seem overlapping. M-SAT is preparing for your review a comprehensive development and test responsibilities plan, involving P&VE, ASTR and Test Divisions.

Good!

B

S-IC - In meeting between Boeing, ME, P&VE, and M-SAT a 12 weeks delay in release of design documentation was revealed for the test fuel tank and S-IC-T. The exact impact on the S-IC schedule cannot be determined until the full effect of work around methods already under way by Boeing and ME can be surveyed.

Procurement Request has been initiated to expand Part VI of Technical Work Statement, Contract NAS8-5608, to include Boeing in-house support to the MSFC Quality Division. The additional work will require approximately 69,200 man-hours of Contractor effort through 6-30-63. ✓

S-II - S&ID was requested to begin utilizing simulated PERT studies to determine possible impact on the program if certain changes are incorporated in the S-II work statement. The integrated PERT run made on 2-22-63, has been completed and the first critical path has been reviewed in detail by the responsible S&ID managers. ✓

The firing of the first two test shots at the El Toro high energy forming facility was accomplished. The four high energy forming dyes are in various stages of completion. *with disastrous results, I hear!* B

S&ID has been instructed to investigate methods to advance the All Systems testing program. ✓

S-IVB - DAC regards the J-2 engine side load problem, as it affects ability to achieve meaningful ground test program at SACTO, as very critical. DAC is participating in the J-2 Engine/Stage Sea Level Testing Committee (an M-P&VE established group).

Funds in the amount of \$600,000 have been requested by M-FEO for the design of the third test stand at SACTO. These funds are needed by 4-1-63. Construction funds must be available by 10-1-63, to complete stand in October 1964, and to meet the acceptance testing schedule for the SATURN IB vehicle in February, 1965. ✓

Analysis of FY63 facility funds requirements has been delayed due to non-receipt of funds requirements from DAC, now expected this week. According to informal DAC information, facility funds requirements for FY63 at Santa Monica will be reduced from \$3,570,000 to approximately \$1,870,000. The difference of \$1,700,000 can be shifted to FY64. ✓

I understand that by firing J-2 engine down during start up, it's o.k. qm * B

qm *

B316

1. DIRECTORS' REVIEW MEETINGS - The first of the Directors' Review Meetings, Manufacturing Engineering Division, is scheduled for Thursday, March 7. These will provide a complete review of Projected Workload and Projects, Organization, and Resultant Resource Requirements.

Under our present schedule, all of these reviews will be completed by the first week of April, prior to Mr. Holmes' next quarterly review of RD&O institutional requirements; which is to be held in April. Bonnie has been given the dates for these reviews and is attempting to schedule you for 3 or 4 of the more important ones. ✓ *yes*

2. FILMS FOR MANAGEMENT COUNCIL MEETINGS - Per agreement with Bart Slattery, we have assumed responsibility for the films for the Management Council meetings. I have assigned Russ Bollinger as project engineer on this. ✓
3. VISIT OF DR. MERVIN KELLY - April 4 is the tentative date for the visit by Dr. Mervin Kelly, Management Consultant to Mr. Holmes. This date conflicts with the OSS Senior Council Meeting. We are attempting to get one of these rescheduled. ✓ *2 April now! B*
4. OMSF SCHEDULES - Representatives of OMSF, MSC, and LOC will visit MSFC this week to discuss procedures and guidelines for the next submission, and to discuss "computerizing" the preparation of the schedules. ✓

5. LIQUID HYDROGEN PLANT IN MISSISSIPPI - A possible road block may be thrown in the way of the MTO LH₂ plant. Air Products & Chemical Co. is attempting to show headquarters and MSFC that it would be less expensive to postpone the MTO LH₂ plant by one year. Their case is based upon a high risk approach - surplus capacities on the west coast during the period, and some rather optimistic production figures and costs for the Air Force Plant at West Palm Beach. Air products is motivated by difficulties in obtaining financing for the plant. They may also get Air Force support in pressuring NASA headquarters to delay construction of the plant, due to Air Force interests at West Palm Beach. This will probably come to the attention of Brainerd Holmes and you may get an inquiry from him.

H.M.
Suggest you give Brainerd some advanced warning that

acceptance of this may risky proposal may seriously endanger our vital S-II schedule! B

1. VEHICLE SYSTEMS INTEGRATION OFFICE: During the past year the requirements for systems integration work have grown considerably. The Vehicle Systems Integration Office was created as a small coordinating office. By establishing this office as the Marshall Space Flight Center focal coordination point for systems engineering, systems integration requirements, weight controls and recently as the central coordinator for inter-center Interface Control Documentation between the APOLLO Program Centers, the workload imposed on this office has grown to such proportions that none of the areas can be covered properly and on time. More than half of the persons employed in this office are contractor employees, who really should not be employed at all in the coordination among Marshall Space Flight Center organizations and in the generation of Marshall Space Flight Center systems engineering requirements.

An effort must be made to obtain civil service spaces at least in adequate numbers to supervise or coordinate the various contractor activities in these typical government operations.

A minimum additional 55 spaces to the present civil service strength are required.

The number of supporting contractors will amount to approximately 100 people and funds must be made available. *Maxe please look into this together with SSO. B*

2. FIN LOAD TEST: Load test on S-I-5 type S-1 stage fin, simulating aerodynamic loading during flight was conducted. The test was conducted to 140% design load with no evidence of failure. ✓

3. PAYLOAD SATURN IB: Slippage in the design schedule of the SATURN IB has been realized because the APOLLO payload has not been defined. The Structures Branch cannot furnish directions to the concerned contractors, Douglas Aircraft and Chrysler Corporation, until structural loads have been defined. When the APOLLO payload configuration and other necessary data are available, a certain amount of time will be necessary to determine the loads.

4. LUNAR EXCURSION MODULE (LEM): Wisdom of attaching the landing legs to Instrument Unit is questioned. This concept, of course, relieves the payload separation problem. The implications to the SATURN V and SATURN IB designs are significant: (a) eliminates the clean bolted interface between payload and Instrument Unit; (b) SATURN V/S-IVB stage forward skirt may be affected; (c) SATURN IB/S-IVB stage forward skirt may be affected; (d) SATURN V/Instrument Unit is affected (structure and environmental control equipment); (e) SATURN IB/Instrument Unit is affected (structure and environmental control equipment); (f) possible reduction of SATURN V guaranteed payload (90,000 - 500 = 89,500 pounds); (g) possible reduction of SATURN IB guaranteed payload of 32,500 pounds.

It should be noted that this concept of LEM support constitutes a compromise to Lunar Orbital Rendevous basic philosophy in that the design problem associated with lunar landing is no longer separated from other phases of the APOLLO mission. Previous design assumptions showed the LEM supported by the payload adapter.

5. CONTROL EQUIPMENT FOR SATURN V/IB: Any decision to provide attitude control for the SATURN V/APOLLO payload by using the SATURN S-IVB stage and Instrument Unit must be made taking into full account the possible impact on the SATURN I and SATURN IB Instrument Unit. ✓

Max Neubert
Hans Maus
Suggest we analyze this situation and come up with some practical remedy in view of our space allocation. I don't see how we can suddenly cough up 55 spaces. B

W.M.
What are the auspices of getting it defined? How much delay must be expected? Sat IB endangered? B

W.M.
Hope we take this up in Mech. Integration Panel with MSC. B

W.M.
How much delay must be expected? Sat IB endangered? B

B 3/6

1. Systems Review Meeting

As previously reported, the next Systems Review Meeting is scheduled at MSFC on Wednesday, March 13, 1963, in your Conference Room.

Agenda was forwarded to you by Office of Systems.

Bonnie

I haven't seen it yet B

In answer to your question on Notes 2/18/63, Dr. Shea will chair the Meeting.

The following Bellcomm persons plan to attend:

- Dr. J. A. Hornbeck, President
- Mr. W. J. Whittaker, Vice-Pres. & Gen Manager
- Mr. W. D. Lewis, Managing Director, Systems Studies Center

agenda was read by Dr. von Braun on 3/9/63. SW

I am coordinating all activities for this meeting with Mr. Hans Palaoro, P&VE Div, as the focal point in MSFC. ✓

2. Apollo System Specifications

A series of meetings were held the week of 25 Feb thru 28 Feb 63 between members of MSFC (coordinated by Mr. Palaoro), and Office of Systems and Bellcomm to review and modify the preliminary Apollo System Specifications. Good progress was made. ✓

This week (4 thru 6 March 63) similar meetings are being held at Houston. ✓

Issue date of this document, as discussed and modified in above meetings, is April 1, 1963. (However, the document is considered only 50% complete at that time). ✓

B 3/6

1. OSS SUPPORTING RESEARCH : Program approval and funding authorization in the amount of \$400,000 has been received from the Office of Space Sciences for the FY-1963 OSS-MSFC Supporting Research Program. This FY-1963 program is significant in that it constitutes the first supporting technology program that has been established between OSS and MSFC. It consists of seven tasks; one with Aeroballistics Division and six with Propulsion and Vehicle Engineering Division. Action has been initiated to implement the program. ✓

Bhw
Borgis

2. RESEARCH AT GEORGIA TECH: In response to a letter from D. B. Holmes to you, Mr. Heller and other members of RPD visited Georgia Tech and discussed possibilities of NASA-funded research contracts. A trip report is forthcoming. ✓

|| I haven't
seen
this
letter
B

3. METEOROID PROJECT: The Fairchild-Stratos contract was signed by NASA on February 28; the scheduled date for signature was March 1. ✓

It came in later, and is now in your attention folder.

Bhw
3/9/63

1. S-IV BATTLESHIP TESTING WITH RL10A-3 ENGINES: The second battleship hot firing was conducted on 2-25-63 and was aborted after six and one-half seconds due to fire indication in the boattail. Post-test inspection revealed that the fire was caused by a hydrogen leak at engine position #4. All engines and the S-IV helium heater had normal start transients and were functioning normally at cutoff. ✓

Preliminary information on hot firing run on 3-2-63: scheduled for full duration, it was terminated by test conductor at 123.8 seconds when #4 engine chamber pressure fluctuated above and below redline value. Helium heater ran well. ✓

* 2. F-1 COMBUSTION STABILITY: Several tests were conducted during the past week in an attempt to determine a reduced thrust level at which the injector is dynamically stable. The values of the parameters at this reduced thrust level will then be designed into an injector for full thrust. At thrust level between 700K and 800K the damping time was eight milliseconds. (Instability was triggered by 13.5 grain bombs.) ✓

3. F-1 PROGRAM: A full-thrust static test was run on 2-21-63 but was terminated at 117.3 seconds because of a leaking fuel drain quick-disconnect valve. On 2-25-63 a static test firing was made at 1480K thrust. This test was smooth and stable but was terminated at 44 seconds by an erroneous, electronic (rough combustion cutoff) signal. ✓

As of 2-28-63 no further word had been received from the Office of Manned Space Flight on the facilities project requests totaling \$2.823 million. ✓

A meeting was held on 2-2-63 between Marshall Space Flight Center, Arrowhead Products, Inc., and Rocketdyne personnel to review the turbopump flange-loading problem. A decision was reached to resolve this problem by redesigning the Arrowhead suction duct components to provide uniform flange loading. At this time no attempt will be made to "beef up" the turbopump. ✓

* 4. RL10 PROGRAM: There have been 21 throttling and 22 idle-mode tests conducted on the RL10 engine at Pratt and Whitney Aircraft to date. Throttling range was between 23% and 100%, and idle-mode thrust was 3% to 5% of rated thrust. On several occasions, the engine was started at low idle, accelerated to full thrust, and decelerated to idle operation. (Engine cooldown is accomplished during the initial idle-mode operation.) These tests have definitely demonstrated the feasibility of operating the engine at a low idle-mode which could be used for low-thrust altitude control and mid-course velocity correction, and which is valuable in achieving instant starts. ✓

March 11, 1963

B 3/13

* I. ACCEPTANCE OF ANALOG COMPUTERS

fm

NASA and Boeing personnel are running acceptance tests on three consoles of analog computers. Electronics Associates, Inc. personnel are on site to assist in the testing. Acceptance of the equipment is expected by March 15, 1963.

* 1. SECURITY FOR FIRE PATROL FOR MTO

Jim

I am concerned that efforts to prepare scope in working details MTO Contractors Support for NASA Hdqtrs. may delay previously proposed plans for Hancock County to provide patrol for us. Valuable government property needs this protection right now. Better community relations will result, and in the future this agreement will help us work out Mississippi concurrence to exercise our on security jurisdiction.

2. CONTRACTORS SUPPORT OF MTO

→ LSF

I agree. What action do you suggest? Please take whatever steps and

I believe we can operate satisfactorily with a single response of contractor; instead, of functional dividing the Support as we had previously proposed. However, there have been so many capable applicants seeking the job that I foresee great difficulty in justifying selection of just one. On the other hand, the prime may parcel out several sub-contractors spreading the work greater than we would have. Suggest you talk to the GE

and needs - says but Coordinate with Harry Bowman

3. VISIT OF MISSISSIPPI PERSONNEL TO MSFC LAST FRIDAY

Man in charge. as soon as HQ gives us the green light

Thirty-eight personnel came to Marshall Friday (three by private air plane) and were very pleased by all they saw. The visit was particularly helpful in that the Mississippians gained a great deal of useful information on community development from the Huntsville line. Art Slattery, head line-up PIO, and all others that work on the program deserves well done.

✓ ✓ Bart

4. ENGINEERING DAY AT OLE MISS

Thanks to y'all! B

Engineers Day at Mississippi University is scheduled for Friday 15 March. I have been invited to speak at the banquet that night and will discuss current status for the Saturn program and the part that Mississippi will play in it.

- * 1. Support of LeRC in Centaur Program: Lewis recently requested Aeroballistics Division's support, in the following three areas, inasmuch as they had neither the computer programs nor the techniques necessary:
- Supply the necessary techniques and equations for conducting closed loop stability analyses and wind response analyses.
 - Determine Centaur sloshing instability by setting up and running the required stability analysis.
 - Determine vehicle response to synthetic wind profiles to define the severity of sloshing problems.
- Support is currently being provided for area a; work in area b to be completed in 2 weeks; work in area c is started and will be completed in approximately 1 month. ✓
2. Saturn-Apollo Aeroelastic & Acoustic Wind Tunnel Programs: Aeroballistics personnel attended subject conference at MSC on March 6, 1963. Wind tunnel programs which defined Saturn I-Apollo launch vehicle aeroelastic and acoustic problems were discussed. Results are still being analyzed but following conclusions are drawn: (a) Aerodynamic damping is positive under critical mach range of 0.7 to 1.5, (b) Acoustic environment is severe. Sound pressure levels on command and service modules over interstage between S-I and S-IV B stages show peak values of about 168 to 170 db. Results from separate tests by DAC and NAA agree well. Experimental data scaling methods will remain questionable until flight data are obtained. General conclusions following this meeting do not at present provide justification for as large an aeroelastic program for Saturn IB and Saturn V, as was conducted on Saturn I. Analyses and evaluation will continue before this decision is made firm; however, Saturn IB and Saturn V will require additional acoustic testing. *E.G. What consequences do you draw from this? - B*
3. Mission Control Center Working Group: The first meeting of this working group was held on March 7. Proposed objectives and membership of the group were discussed and will be submitted to M-DIR through Central Planning Office. ✓

- * 4. MIT Guidance Scheme: MIT Apollo Guidance Scheme documentation availability has been inadequate, so far, at Marshall. Personnel from MIT were to visit Marshall on March 15, and bring us additional information concerning the guidance scheme, in accordance with agreements reached at an MIT informal meeting attended by our personnel. We have just learned that the MIT visit to Huntsville was cancelled by instructions from MSC. This action is incompatible with agreements made with C. W. Frick at the Huntsville Apollo Systems Review meeting, January 17, 1963. It appears that somebody in the MSC Apollo Office wants to keep us out even at the risk of finally ending up with incompatible guidance systems.

Dr. Koethner - SAT

Please clarify and straighten out w/ Frick
(First get detail scope from
Ernst Geissler)

B

NOTES 3-11-63 GORMAN

B 3/13

Negative Report

1. SA-6 PRE-STATIC TESTING: Hydraulic system tests were completed and the booster is scheduled to be moved into the Performance Test area on Friday, March 8, 1963 for pre-static checkout. ✓
2. TRIP TO MARTIN-BALTIMORE: Accompanied by key personnel of this Division, I paid a 2-day visit to Martin-Baltimore. The first day was used for familiarization with the manrating effort of the company in support of the Gemini Project while the second day was devoted to a Nova review from the standpoint of quality assurance. The effort the company puts in quality assurance is very encouraging. In some areas the company does better than we do (we would have to invest more manpower), in other areas the company can still learn from us. The latter is particularly true in the area of checkout where the approach is followed that Manufacturing with support of Engineering performs the checkout, while Quality Control looks over the shoulders. I discussed this shortcoming with Mr. Taylor, the Director of Quality Control, and Dr. Hall, the Vice-President of Space Systems Division, and recommended the establishment of an independent group as we have it here. The support that the Quality Control Organization receives from Dr. Hall is noteworthy. The close contact my Nova Project Engineer, Paul Bates, on Frank Williams' team keeps with the cognizant Martin personnel has very good results and is especially important in the area of hardware, where Martin has limited experience on NASA requirements. ✓
3. TOOL DESIGN AND MANUFACTURING SUPPORT: The Quality Assurance Division has gladly accepted an offer of the Manufacturing Engineering Division and entered into an agreement which provides us with tool design and tool manufacturing or procurement services by the Manufacturing Engineering Division. Consolidation of manufacturing and inspection tools and jigs in some cases will save effort, material, money and insure delivery when required by the schedule. ✓✓
- *4. NEW QUALITY CONTROL POSITIONS: The Quality Assurance Division has been aware for some time that its sub-professional personnel were not being recognized for the degree of proficiency required by space systems. The Civil Service Master Standard for GS-1900-0 Quality Control and Inspection Group was published in December 1959 and deals primarily with production type situations, which means that its criteria was developed prior to the establishment of NASA quality program requirements. This Division, with the help of the Civilian Personnel Office and NASA Headquarters, has been successful in getting a new series of Quality Assurance positions approved. The new positions were approved by the Civil Service Commission on February 6, 1963 and separate qualification standards are being developed. The new titles will be Space Systems Quality Control Assistant, Space Systems Quality Control Representative, and Space Systems Quality Control Specialist.

DF
Please elaborate next Notes
B

Very good. Congratulations!
B

*
Fin
1. SA-4 Firing Schedule:

a. Diodes: Components with cracked diodes were replaced in all critical areas. No delay in the firing schedule is expected. ✓

b. Hydraulic Leaks: During navigation checks, hydraulic leaks at fittings to flex lines developed. Because similar leaks did not develop in previous vehicles, a combined crew, consisting of personnel from LVOD, Quality Assurance Division, and P&VE, is checking into the cause. At the moment, no leaks are apparent, and the firing date still seems o.k. ✓

2. VAB 39: Problem developed in providing the necessary height for vertical checkout of the S-II stage in the low bay area. LOC and LVOD together with NAA (Downey) have combined forces in an effort to solve this problem. ✓

3. S-IVB Checkout: With the present schedule, it seems impossible to have the VAB ready for vertical S-IVB checkout of the first Saturn IB. We hope to find the solution within the near future. ✓

W.H.
Yes, if
nothing
of
overriding
import-
ance you
interferes
B

1. SUPERCONDUCTIVE GYRO: Dr. Buchhold intends to present a status report on recent work on the superconductive gyro in about 4 weeks. If you would like to attend, I will arrange with Mrs. Holmes. This will be an informal presentation to a small group, which will include Dr. Stuhlinger. ✓

letter?

2. FOLLOW-UP ON PROBLEMS IN REGARD TO CRACKED GLASS ENCAPSULATED SUBCOMPONENTS: Mr. Wagon visited IBM, GE, and General Instruments to investigate experiences in connection with potting and ruggedizing compounds when used on glass encapsulated diodes. Mr. Angele is investigating polyol-amine cured urethane elastomer as a possible replacement for Hysol. This material contains a fluorescent dye such that inspection for coverage can be performed with ultra-violet illumination. (Astrionics has been using Hysol for about four years, since General Medaris ordered its use after AM-16 firing. Signal Corps at that time recommended Hysol and is still using it.) ✓

System should be warned, too?

3. DOD AD HOC COMMITTEE ON INERTIAL GUIDANCE: Mr. Weber returned from his one-week activity in above committee. (Reference item 2, attached notes) The investigation was in regard to Skybolt and MMRBM guidance systems and hardwares. Two days of presentations by AF-BMD and by Nortronics were followed by three days of meeting and report writing. There may be some benefit for ASTR in the information on star tracker systems and associated optical disturbances. Mr. Weber can brief you on the committee activity if you wish. ✓

Which seems to cause the trouble?

Not necessary if this is done. I'm awfully busy. B

4. IMCC DISCUSSIONS BETWEEN MSC, LOC, MSFC. Reference item 3, attached notes.

Answer to first question: After discussions with Neubert, we suggest that the project be established with R&D funding for flexibility reasons. We also suggest that after approval by Dr. Shea an internal MSFC planning group be established with personnel from AERO (Dr. Speer's branch), P&VE, COMP, ASTR, and LVOD. ✓

Answer to second question: C. Kraft of MSC believes that some good overall engineers from MSFC stationed at MSC's IMCC are sufficient and that the link to Huntsville might never be needed; his experience from the Mercury operation is that decisions have to be made almost immediately and that there will be no time for simulation and thorough investigation.

Will. But how about unmanned missions where MSFC sits in the "mission" driver's seat but may need support by the IMCC in Houston? For example, the heavy Saturn V / LLV? B

1 Enc:
Notes of 2/25/63

B 3/13

1. S-1-5:

The full duration firing was cancelled, Friday, 3/8, because of a leak on position No. 3 LOX pump outlet pressure measuring boss. Leak came from O-ring seal between fitting and boss. O-ring was replaced with K-seal on that fitting and all similar ones on other engines. Firing was again cancelled, Saturday, 3/9/63, because of unfavorable, acoustic, weather conditions. ✓

* 2. S-IV BATTLESHIP STATIC FIRING, DAC-SACTO:

gem

Next duration firing scheduled, Wednesday, 3/13, may be optimistic. Engine in position No. 6 had to be exchanged because of thrust chamber leak to outside. Low chamber pressure encountered on engine position No. 4 on last test caused by contamination in thrust controller. More contamination found in rest of system consisted of aluminum chips, balsa insulation, and molecular sieve material (used in vacuum insulation for cryogenics to "get" last molecules). System has been cleaned and purged. Mr. Ferguson, SPT

* 3. MTF:

gem

What corrective action are you taking? B

M-P&C forwarded procurement plan for technical systems of all Saturn V test facilities at MTF to NASA Headquarters, 3/4/63. Balance of funds required for this procurement has now been received. Established target activation dates at MTF are as follows: Site Support and Administrative Facilities - Summer 1964; Test Support Facilities - Fall 1964; S-1C and S-11 Test Complexes - Spring 1965. ✓

4. GSE - LAUNCHER ARMS - SPARES FOR VLF-37B:

Cracks were found in five out of eight of the Set II launcher arms now under test. The cracks were forward of the lifting lug on the upper part of the arm. (See attached photographs.) The arms are to be repaired by grinding out the cracks, filling the voids with weld material, and retesting. The cracks were due to stress concentrations. ✓

No cracks were found on any of the arms of Set I at MSFC during the test program. LOC is conducting an extensive re-inspection program on these arms at the Cape. ✓

ATTACHMENT

2 photographs

1 SKETCH

B3/E

1. PREPARATION OF WIND DATA FOR HIGH-SPEED ANALOG COMPUTERS:
 Available wind data for the years 1956-1960 consist of measurements at one kilometer intervals twice a day during this period. A method has been developed with the cooperation of Aeroballistics Division and the Data Reduction Branch to convert these data to continuous analog form recorded on magnetic tape as an FM signal. These tapes are then used to excite control systems simulated on the GPS high-speed analog computer. Playback time for each year's wind data is four minutes. The TRICE computer is used to interpolate between measured data points. The tapes will be used in studies of the Saturn control systems. ✓

2. ANALOG COMPUTER INSTALLATION AT SLIDELL: Checkout of the analog computers installed at Slidell is continuing and should be completed this week. Four Flight Simulation Branch personnel are working on the checkout this week.

- *3. MSFC DATA CENTER: The IBM 1401 Random Access Disc File, one of the initial hardware increments for the MSFC Data Center, was installed last week in the ADPS Branch, Computation Division. ✓

qfm

→ A.H.
 Could you give me a
 copy of Lairman's briefing
 on this whole subject, also
 on that increments for
 implementation
 of Data Center plans.
 Please arrange
 date & time
 (to Bureau)

Mr Hunter

Edward R. Rupp

30 January 1963

W/Director, Office of Manned Space Flight

You should read this

SD/Deputy Director, Office of Space Sciences In reply refer to SD

53/12

Large Launch Vehicle Requirements

This is in response to your memorandum, M-C M 9310.011, dated January 8, 1963. Because our plans for the use of Saturn-size launch vehicles in space sciences programs are unfirm, and because the three stage C-1D configuration is unfirm, it is not possible to answer your questions in such detail. You may use the following information for planning purposes, however.

Our first known requirement for a Saturn-class launch vehicle is Project Voyager. This project is conceived as an advanced effort to explore Mars and Venus with unmanned spacecraft. Voyager has appeared in our budget submission to Congress in FY 1962 and 1963, and was approved at \$6,800,000 last year, although these funds were subsequently reprogrammed. The project is not identified this year but is carried in FRST at Dr. Seamans' request. This reflects the concern of general management over large "new starts" and the fact that there are other competitors in this category.

The 450-pound Mariners launched with Atlas-Agenas are very limited in scientific capability. A 1400-pound Centaur-launched spacecraft, however, is more interesting. It could accomplish a heavily instrumented fly-by, a smaller fly-by plus a several hundred pound landing capsule, or a mission designed exclusively for landing with a heavier capsule. We have designed the spacecraft for the fly-by plus landing missions. The Centaur mission will not be possible before late 1965 (Venus) or late 1966 (Mars).

The Saturn-launched Voyager is conceived as being capable of placing the spacecraft "bus" in orbit about the target planet and simultaneously landing a relatively heavy capsule. The orbiting portion would provide wide area reconnaissance as normally attempted in early explorations. We have designed such a spacecraft, although other mission modes are under consideration.

It is inevitable that the unmanned planetary exploration program will move into the Saturn. The question is when, and what Saturn. We now feel that we should plan to use a three-stage C-1B starting in about 1967. Use of the C-5 should probably await the early 1970's. The 6500 to 8000 pound payload capability of the C-1B represents a sizable technological jump for the spacecraft. To go from our present capability to the 40,000 pound spacecraft of the C-5 in a single step appears unnecessarily risky. In addition, we would like to lag your use of the Saturn types by enough time to keep out of the gears. The attached table indicates our planned usage.

lager
D

As you know, there is no third stage under development for the C-1B. The best prospects in my opinion are a modified Centaur or the retro stage for the C-5 LRV. Some of our staff think we should look at a pressure fed stage with ablative nozzle. Dick Morrison's people are engaged with those of Joe Shea to help solidify planning. In addition, we are working with both Marshall and Lewis. I would hope that we can determine a course of action by midyear. We probably will need a posture for Congress in a few weeks in answer to the question, 'What other uses do you plan for Saturn?' I anticipate that the three-stage Saturn C-1B would be project managed by Marshall, although we have some concerns as to the attention the project would get in the face of other commitments at Marshall. It could be managed by Lewis, particularly if the Centaur is used as the basis for a third stage, with Marshall systems manager on the first two stages. The way the job is done would influence the answer to your question as to the type of support expected from Marshall and LOC. As a basic premise, we would plan to rely fully on the NASA Saturn capability already developed. The basic tracking and data acquisition facilities at LOC/AMR would thus be involved but would have to be supplemented by down-range equipment to cover the third stage burn and also by the DSIF to cover the spacecraft. We would, of course, provide spacecraft checkout at AMR.

oh!
oh!

oh!
oh!

That would be rough. Auto-matic check out, and all that!!
B

Since I have provided so much philosophy in lieu of fact, I would like to discuss this matter with you in the near future.

planned for 3/8

Edgar M. Cortright

Attachment
EMCortright:db
cc: SV-Morrison, Nelson, Maker (3)

LARGE LAUNCH VEHICLE REQUIREMENTS

CALENDAR YEAR

	1967	1968	1969	1970	1970..
Vehicle Type	C-1B	C-1B	C-1B	C-1B	C-1B &/or C-5
Mission	Venus	Venus & Spacecraft Test	Venus, Mars, & Spacecraft Test	Venus	Venus & Mars
Launch Dates	End of May (V)	Late Dec. (V) Jan.*	Early Jan. (V) Feb. (M) Mar. (M) Nov.*	1 June (V) 1 July (V) Last half*	
Approximate Payload	6200 lbs minimum	6200 lbs minimum	6200 lbs minimum	6200 lbs minimum	40,000 lbs
No. of Vehicles	2	2	4	3	2/oppor- tunity ; occasion- al spe- cial mission

*Spacecraft Test, probably on an out-of-ecliptic trajectory.

b

1. NEW PROJECTS

As we have heard from Mr. Lord, three new projects have been officially proposed to Dr. Seamans by OMSF: (1) Lunar Logistics Vehicle, (2) Small Space Station, and (3) Third Stage (universal) for SATURN I^b. Total money proposed for all three is 102 million for FY 1964 and 400 million for FY 1965. An interesting fact is that MSC has been told that they will not get the small space station but, on the other hand, Langley has not yet been told that they will get it. No final decision has been made. The small station will be on top of the SATURN I and thus we should expect contacts from Langley (probably) soon as to how much, if any, help we can offer (e.g., structural modifications to existing tankage, etc.).

109

the "SAUSAGE" (2RL10A2)

Yes, that's my understanding, too. B HIK

2. FY 1964 AND 1965 HEADQUARTERS PLANNING

As we learned during our Washington trip, a total of 13.4 million are in the books for advanced vehicle and system studies for FY 1964 (5.0M for NOVA, 5.0M for other launch vehicle studies, and 3.4M for system studies). This figure will go to 15.0 million in FY 1965. NOVA is listed only for 5.0 million each in both years, so that all advanced technology work for NOVA will have to be covered in the OART supporting research funds. This will force us into very close cooperation between the Divisions and our office in working out a task priority list.

Brainard told me that in 65 he plans to place a

3. ADMINISTRATORS REVIEW

Last Saturday I attended Mr. Webb's review on the following OART programs: (a) Space Vehicles, (b) Electronics and Control, and (c) Research. This review was also attended by Dr. Kavaneau (DOD), Dr. Golovin (PSAC) and Max Hunter (Space Council). Dr. Kavaneau stressed the fact that they are looking forward to receiving the results of NASA's "Design Criteria" working group, under Mr. Rhode, which they feel are needed desperately, nation-wide. Mr. Webb stated that this work should proceed on an urgent basis. Another major remark made by Mr. Webb was the request to initiate study efforts in the area of management tools to assist in "decision making." He stated that it is becoming increasingly difficult to make the one and two billion dollar decisions, and there are more "nice-to-have" projects than we can afford. He encouraged efforts leading to more rational methods for sorting out the good projects from the nice-to-have projects. In general, MSFC was mentioned quite often during the presentations and we certainly got our share of credit.

heavy (10M or so) request in for advanced technology aimed toward NOVA! Status! B

✓

* 1. Saturn V, S-II Stage:B
3/12

a. As a result of our Working Group Splinter Meeting on explosive forming NAA has made an organization change. The activities of explosive forming at El Toro is no longer a part of Rocketdyne's responsibility, but has been turned over to the LA Division under direct supervision of George Lewis, Chief Tool Engineer of LA Division. *That's a good thing*

b. Number of people working at El Toro on explosive forming have been reduced by approximately 50% but activities have been stepped up. A number of shots have been made on the waffle die and on the apex die with improved results. ✓

c. In a meeting with Dr. Lange and Mr. Fields we have agreed not to go to a second source, using a different manufacturing method, but to concentrate efforts on explosive forming. We are confident that with the right people working on the problem good parts will be produced soon. Ryan has made available their die design drawings to S&ID. ✓

2. Saturn V, S-IC Stage:

a. Three meridian welds have been made with scrap parts. Quality of welds is not yet up to standards. With some small improvements we will be able to start welding the first bulkhead for the fuel test container next week. ✓

b. We also welded the first tunnel fitting into one gore segment resulting in excessive warpage at the edge of the gore. We are confident of overcoming this by slight modifications of the welding technique. This welding is still done with incrementally formed gore segments which have higher locked-in stress than the Wichita segments will have. ✓

c. The cause for corrosion (heavy pitting) of the Wichita gore segments has not been conclusively determined. The improvised etching operation for dye penetrant inspection at Wichita is being improved. Final facilities for this operation will only become available in approximately 3 weeks from now. ✓

d. Delivery of sculptured gore segments from Wichita for the lower fuel bulkhead is becoming a problem. We have a difference of opinion with Boeing how these segments should be manufactured. We believe the parts should be formed first and then chemically milled while Boeing thinks first to mill the parts mechanically in the flat and then form in their bulge forming fixtures. Try-outs of their method have not been successful yet, resulting in breakage and cracks during forming. We are losing time by this development. A decision will probably be made this week. ✓

e. Delays in documentation releases by Boeing are becoming critical. We do not believe that we can catch up these delays in manufacturing. In a meeting with SSO, P&VE and ME we have discussed this situation in detail. ✓

f. The second "Travelift" device, an A-frame similar to the C-frame already received, has been delivered by the Drott Company and is presently being assembled in front of building 4707. ✓

B3/13

6

- * 1. SATURN I: S-IV Battleship - It has been determined that the thrust controller was the cause of the low chamber pressure in engine #4 during the 120 sec. run on 3-2-63. Decision was made to fire again as is. During leak checks on 3-7-63, engine #6 was found to have a leak in the thrust chamber under the mae-west. This engine will be replaced and returned to P & W. Next firing tentatively scheduled for the latter part of the week of March 11, 1963. ✓
0. L
Yes please
B
- * 2. SATURN V: Re my Notes 2-25-63, Para. 3. (see attachment 1) - You will recall that on 1-16-63, we met with Messrs. Gorman and Davis to discuss my objections to Clause XI of the Boeing Contract entitled "Technical Direction and Control." To date I have been unable to get the clause amended as we discussed and agreed. I am assembling all papers covering this matter, and I will seek an appointment with you to discuss further details. ✓
- * S-IC - (Contract NAS 8-5607) As of the end of February, Boeing has obligated a total of \$1.300 Mill under the Facilities Equipment Contract. A total of \$2.561 Mill has been processed as unfilled orders, making a total of \$3.861 Mill in orders processed. Contract NAS 8-5606 has been increased incrementally by an amount of \$7.779 Mill. ✓
- * S-II - On 3-1-63, S&ID inaugurated the explosive forming operation at the El Toro facility with the accomplishment of three shots on the #047 die to form the waffle gore segments for the equatorial region of the LO₂ tank. The initial results were discouraging in that the waffle material ruptured immediately in-board of the clamping mechanism. After reworking the die to permit a greater bend radius between the die clamping flange and the draw, additional tests were conducted on 3-6-63. Results of these tests appear attractive, although minor rework of the die is still required. ✓
- S-IVB - DAC is redesigning the thrust casting and thrust structure to accept the higher thrust associated with performance at the higher mixture ratios. This value, not firmly established yet, may be approximately 235,000 lbs. An increased value of tank pressurization will probably also be required. The pressure that will be required together with the extent of tank redesign or change in etch thickness has not yet been established. ✓

B 3/13

1. OMSF SCHEDULE REVIEW PROCEDURE

Two representatives of OMSF, Messrs. Risso and Fernandez will be at MSFC tomorrow, March 12, to discuss proposed changes to the OMSF scheduling procedure. They are also interested in our plans for use of a computer in preparing schedules, and will review our Managerial Data Center activities. ✓

The next Program Review Meeting has been set for April 8 - 9. ✓

2. AGENDA FOR KELLY VISIT

The visit of the Mervin Kelly group has been rescheduled for April 2, and the agenda has been completed and furnished to headquarters. ✓

3. FY 64 AND FY 65 FUNDING

OMSF has come up with their recommendations to Dr. Seamans on new program starts to be included in the Preliminary FY 65 Budget (this document has been approved by Mr. Holmes). Three new program starts are being recommended, with FY 64 funding being requested for each. The programs are:

- 1. LEM Truck ✓
- 2. Early Manned Space Station (Launched with Saturn 1-B) ✓
- 3. Cryogenic Space Stage ("Sausage") ✓

The total FY 64 funding being requested by OMSF for these new programs is \$109 M. ✓

that would help! B

It was indicated, unofficially, that they are also requesting \$90+ M. to cover MSFC FY 64 shortages. OMSF is hopeful of obtaining a good portion of this from a \$154 M. pad which Dr. Seamans had included in the FY 64 budget.

Only \$5 M. study money is being included for NOVA in the FY 65 OMSF Preliminary Budget. We had hoped for \$100 M. NOVA money not including C of F, in order to initiate long lead time hardware feasibility demonstrations and developments.

H.M. ✓
Please see me on this.
Brainerd Holmes told me that he planned to include this item.

3/11/63

W.M.

1. S-IV STAGE: (Reference NOTES 2-25-63 MRAZEK, paragraph 5, copy attached.) The problem areas described in the reference concern the alternate redesigned Moog-Bertea actuator-accumulator-reservoir assembly. Currently there are three different systems possible for S-IV: (a) original Douglas Aircraft Company (DAC) hydraulic system (not for flight); (b) reworked DAC hydraulic system (possible for SA-5 and SA-6); (c) redesigned Moog-Bertea system (possible for SA-5, SA-6 and subs). Problems mentioned in the reference have been experienced by Moog and have caused the units to be delivered three months late to DAC. If the program continues as it has, it is highly probable that serious schedule and/or reliability difficulties will be encountered at a time when schedule slippage cannot be tolerated.

Moog is continuing good work on their own, however, they intend to improve their controls over subcontractors. This was brought about by a Marshall Space Flight Center representative's visit to Moog on 2-28-63.

I have discussed the S-IV actuator problem with Dr. Hacussermann. The Moog alternate which was poorly supervised by DAC has to be cleaned up and chances for incorporation in SA-5 are still good, if we get the test runs off. We would have to change on the Cape. Launch Vehicle Operations Division has agreed to this; of course, DAC is opposed---they will do everything possible to have their own production.

2. NUCLEAR TECHNOLOGY COURSE: (Reference NOTES 2-25-63 MRAZEK, paragraph 7, copy attached.) A one-hour capsule presentation has been arranged for you by the Nuclear Vehicle Projects Office for 4-1-63 at 2:00 p.m.

*3. CORROSION--MICHOUX AREA: Corrosion test panels at Michoud were evaluated after nine months exposure. While outside panels still showed considerable corrosion, it now appears that corrosion on samples exposed inside the plant is not as severe as indicated by the previous evaluation. Accumulative corrosion on specimen inside the plant is now somewhat less than that on panels exposed for comparable lengths of time outside at Marshall Space Flight Center.

4. RIFT MISSION PRESENTATION: Drs. Roy Smelt and Jim Guill of RIFT/Lockheed presented the results of their nuclear rocket mission studies to Mr. Finger and personnel of Drs. Shea and Seamans offices on 3-8-63. Dr. Guill is scheduled to give the same presentation to Marshall Space Flight Center people on 3-12-63. Lockheed is pushing for a mission selection for RIFT, in order to increase its popularity and priority, as opposed to Harry Finger who apparently is reluctant to have it leave the R&D phase.

5. RIFT FY-65 BUDGET: NASA Headquarters had reduced the RIFT FY-65 budget to about \$18.65 million. This is in line with Harry Finger's intent to keep RIFT in a "level-effort," R&D phase until RIVM/NERVA are on firm ground. The \$18.65 million will permit initiation of tooling and manufacturing for RIFT stage TA-1 to be used in cold flow facility testing, but rules out the much more rapid expansion into fabrication of tanks, which was planned and necessary to meet NERVA scheduled target dates.

Attachment #1: NOTES 2-25-63 MRAZEK

W.M.
Haver
17
That's
one hell
of a way
to get
done a
competent
competitor
B

W.M.
What did
1/2

Is this really
such a bad idea?
B

Can
hardly
be
view
of
Moog
Went
for
meant
B

NOTES 3/11/63 Rudolph

B3/B

No Report.

NOTES 3-11-63 Stuhlinger

3/15

1. LUNAR SURFACE COLLOQUIUM: On March 4, several members of MSFC attended a colloquium on the lunar surface, sponsored by OSS in Washington. A number of excellent presentations were given (Dollfus, Gold, Pettengill, Murray, Shoemaker), and lively discussions ensued (Urey, O'Keefe). The problem of the thickness of the dust layer on the Moon is not at all resolved. Opinions range from 1/10 mm to 10 meters. More unmanned exploration before the first manned landing appears mandatory to answer the many unknowns about the lunar surface. ✓

These
B

Not comparable with the...
4/15

*-2. METEOROID PROJECT PRESENTATION: Bill Johnson, Bob Pace, and I made a presentation on the meteoroid project to R. Bisplinghoff, M. Ames, and C. D'Aiutolo from OART, and F. Eimer and another gentleman from OMSF. We particularly mentioned the need for more money before the arrival of FY '64 funds (\$4.6 M total). The presentation was well accepted. ✓

live
B

Result, money...
B

3. LUNAR LOGISTICS STUDY: Members of RPD will complete this week three contributions to J. deFries' Lunar Logistics Study: one volume on payloads, one volume on lunar surface conditions, and one volume on mobility on the lunar surface (in cooperation with G. von Tiesenhausen). ✓

4. RPD'S CONTRIBUTIONS TO LLS: We discussed RPD's past and future contributions to the MSFC-LLS project with H. Hueter, J. deFries, and G. von Tiesenhausen. A memorandum with more details is on its way to you. ✓

5. PARTICIPATION IN ELECTRIC PROPULSION SYMPOSIUM: The AIAA will hold an Electric Propulsion Specialists Conference this week where G. Heller and I have to perform several functions. G. Bucher and the Branch Chiefs will be here in case you wish to contact my Division. ✓

B 3/10

*1. F-1 ENGINE: Engine #010 was test fired on 3-1-63 for a duration of seventeen seconds at 1480K. The engine was successfully gimballed at 1.25 cps and one-half degree gimbal angle for five different gimbal patterns. The test was very smooth throughout. This test represents the first hot-firing gimbal demonstration, which is a major milestone in the F-1 engine development program.

The overall development status of the F-1 engine was reviewed last week during our assessment meeting (First Marshall Space Flight Center chaired). Next to instability problem, the status of the nozzle extension skirt is far from being satisfactory.

2. F-2 ENGINE: One engine system test was conducted this period on vertical test stand 3A. Scheduled as a three-second mainstage test it was cut after 1.5 seconds because of a faulty facility instrumentation connection. Longitudinal and circumferential cracks developed in the sub-sonic portion of the diffuser. This will require approximately one week to repair. Cannister pressure was 1.5 psia prior to start, increased to approximately 6.5 psia during transition and returned to 1.5 psia during mainstage.

*3. S-IV BATTLESHIP HOT FIRING WITH RL10A-3 ENGINES: Post-test data review has indicated improper thrust control operation due to contaminants being present in the servo chamber of the thrust control. Procedures have been given to Douglas Aircraft Company by Pratt and Whitney Aircraft to purge the thrust control in a backflow direction prior to the next hot firing.

4. GENERAL: Persistent rumors have it that Gai Fischer is resigning. His successor supposedly is Ralph Kaufman (Navy man).

I added these - you

Do you know H.W.?





TO : J. C. McCall, M-DIR, MSFC
FROM : R. F. Heiser, LO-DIR
SUBJECT: Weekly LOC TWX to Holmes

DATE 19 March 1963
TIME 13 30z

H

*Make standard
distribution to
Maus, Nimitz, Coman*

TO : J. C. McCall, M-DIR, MSFC
FROM : R. F. Heiser, LO-DIR
SUBJECT: Weekly LOC TWX to Holmes

DATE 19 March 1968
TIME 13 30z

H

*Make standard
distribution to
Maus, Neubert, Gorman*

1. **SA-4:** Checkout operations on SA-4 continue to remain on schedule with no major problems existing at this time which would affect the advertized launch date. A Delta is also forecast for the same day as Saturn which will be resolved prior to next week's Range Scheduling Meeting. If a problem exists it will be resolved "in house" prior to submittal to Air Force Scheduling.

2. **DAC/AMR Operations:** On March 13 Douglas made a presentation to LOC in which they explained how local test procedures are generated as well as the local DAC engineer technicians working arrangements. These two procedures were accepted as being in complete accord with LOC policy. No recommendations for changes were made.

3. **LCC Equipment:** On March 14, LOC and MSFC discussed launch control and checkout equipment which might involve General Electric. On March 21, Mr. Sloan will be here for presentations and discussions concerning our systems concepts, LCC layout and overall plans for checkout equipment, particularly as we envision the participation of G. E.

4. **Central Control Additions:** A temporary hold has been placed on the AMR Central Control Additions until I have an opportunity to receive a briefing on requirements and funding policy. Air Force indicates need for funds by April 15 in order to meet schedules. Our review indicates funding can probably be delayed through August without jeopardizing the schedule.

5. **Blount Brothers Construction Company:** By Notice of Appeal letter, dated March 8, 1963, Blount Brothers Construction Company filed timely appeal from the Contracting Officer's decision terminating Contract NAS8-3431 for default. The matter will be prepared and forwarded for hearing before the NASA Board of Contract Appeals. It is anticipated that the Contractor will claim substantial amounts of money covering alleged additional cost of performance. Such claims may equal or exceed \$500,000. Should the Contracting Officer, upon receipt thereof, render a final decision that such costs, or any part thereof, are not allowable under the contract, then the Contractor will undoubtedly file additional appeals, which will be prepared and forwarded to the Board for hearing.

6. **Study of Solid Propellant Rocket Exhaust Effects:** The Martin-Marietta Corporation, Denver, Colorado has been selected as the contractor to perform the "Study of Solid Propellant Rocket Exhaust Effects and Methods of Attenuation." On March 7 a meeting was held at LOC. Representatives

from appropriate segments of MSFC and LOC were present. The contractor's representatives gave a detailed description of their approach to the study. The NASA representatives furnished guidelines to the Martin-Marietta Corporation's personnel. The study is scheduled to be completed within four months.

7. Water Supply Contract for MILA: Contract between the Air Force and the City of Cocoa has been redrafted and has the approval of the City Council. Contract being hand-carried thru USAF channels. This action should be completed by 20 March. Since bonding company approval is required prior to signature by Mayor, the earliest we expect to have a signed and sealed contract is 1 April. Alternate supply sources are being investigated to furnish water to the Industrial Area for the interim period 1 Sep 63 to 1 Jan 64.

8. Unsatisfactory Condition Reporting (UCR) System was the topic of discussion at a meeting with LOC, MSC, and MSFC. MSFC Quality Division proposes an IBM keypunch card technique of gathering, storing, and disseminating failure data requirements placed upon major stage contractors. Immediate objective is to obtain contractual coverage of Douglas on the S-IV stage.

9. Press Center: Press Information Center-Auditorium sited outside MILA Industrial Area. Tentative location also selected for press observation site located some 3 miles from Complex 39 launch pads.

B 3/18

X 1. STATUS OF S-I-8 and S-I-10

Jim

a. S-I-8

1. Thrust Structure Assembly
30M02000 - Approximately 95% Complete
2. Barrel Assembly
30M02001 - Pending Final NASA Inspection
3. Spider Beam Assembly
30M00402 - 100% Complete pending final NASA inspection
4. Second Stage Adapter
30M00400 - Approximately 60% Complete
5. Tail Section Assembly
30M01000 - Approximately 75% Complete ✓

b. S-I-10

1. Thrust Out-Rigger Assembly
30M02100 - 2 each - 100% Complete; 2 each - 90% Complete
2. Fin Out-Rigger Assembly
30M02050 - 2 each - 100% Complete; 2 each 85% Complete
3. Barrel Assembly
30M02001 - Approximately 75% Complete ✓

2. VISIT BY NASA HEADQUARTERS PERSONNEL

Mr. Lilly and Mr. Diaz of NASA Headquarters visited last week for a general briefing and orientation of Michoud Operations. ✓

B 3/18

1. HANCOCK COUNTY SECURITY AND FIRE PATROL

When Harry Gorman and Wilbur Davis learned of the wrong impression gathered by personnel working on MTO support last week-end, they quickly corrected it and assigned necessary assistants to meet with the Board of Supervisors in Bay St. Louis today, as scheduled. A contract could be consummated, in short order, if the Supervisors are as forthright! ✓

2. VISIT BY HHFA REGIONAL ADMINISTRATOR

Last Monday and Tuesday Mr. Ratchford, Head of the Atlanta Office, Southern Region, Housing and Home Finance Agency, visited Michoud and Mississippi Test Operations. Marion Kent represented MSFC and MTO, the GE discussion keeping me here. George Constan provided us fine support as always, and will probably report on his own participation. The agency will have much to do about various development loans to communities surrounding the Test Facility, including Sanitation, Sewage disposal, and other assistance beyond FHA scope. Cal Towne, Key NASA Headquarters representative for such matters, came down to participate. A luncheon was arranged Tuesday at Annie's so that the local Mayors (5 attended) could thresh out their problems with Ratchford. ✓

3. LAND MANAGEMENT

My notes of 2-25-63 mentioned discussion with the Corps of Engineers Mobile District Office on this. Correspondence from NASA Headquarters proposed a detailed agreement with OCE, which was broad enough in terms for us to work with MDO, yet set forth, when amended as suggested, adequate principles for MSFC and MTO administration. ✓ FEO answered, the multi-page details not deserving your consideration. Mr. B.U. Jones, a Mississippian referred to us by Sen. Stennis, looks like he can be of great help in this area, as well as in local and state contacts, per your conversation a fortnight ago on how we can foster better relations among the displaced owners of MTO real estate, and other neighbors. ✓

4. VISIT BY LILLY AND DIAZ TO MTO LAST WEEK

Messrs. Lilly and Diaz drove from Michoud to MTO Thursday, with George Constan. They were then given a complete tour of the Fee and Buffer areas, plus surrounding communities, by Mississippi Valley Helicopter Co., who are interested in providing helicopter service to us. They were very pleased and agreed on our need for such service. ✓ A new use was found, land survey of otherwise inaccessible swamp area for appraisal purposes. ✓

B 3/18

1. Apollo Reference Trajectory Seminar: To assist Dr. Shea's office and Bellcomm in gaining trajectory computation capabilities, and to serve as a starting point for the Apollo Reference Trajectory Working Group, we have planned an Apollo Reference Trajectory Seminar for April 3 in your conference room. Attendees from Headquarters, Bellcom, other centers, and Marshall will be present. This seminar will be purely technical and informative and will cover topics concerned with propelled trajectories, free-flight trajectories (including earth-moon transits), and overall flight profiles (including launch windows). Seminar is mainly for educational purposes and will demonstrate calculation techniques currently in use by us, as well as our competence in this field. ✓

2. Status of MSC-MSFC Apollo and Saturn V Trajectory Working Group: In order to support OMSF's Apollo Reference Trajectory Working Group, it has become desirable to consolidate trajectory efforts conducted by MSC and MSFC on the Center level. After consultations with personnel from both Centers, it became apparent that the most desirable way to resolve the matter would be to establish a special sub-panel reporting to the existing Flight Mechanics, Dynamics & Control Coordination Panel with a direct feedline into the Apollo Reference Trajectory Working Group. ✓ Charters are being prepared by both MSC and MSFC and should be ready for discussion by March 20, 1963. It is intended to have Mr. J. Mayer (MSC, Ass't Chief, Apollo Mission Planning) and Mr. H. Thomae (M-AERO-D) to co-chair the sub-panel with Mr. T. Skopinski (MSC, Apollo Systems Projects Office) and Mr. L. McNair (M-AERO-PS) functioning as secretaries. The first meeting of the sub-panel preferably will be scheduled prior to the next ARTWG meeting. ✓

* 3. Saturn-Apollo Acoustic Environment: In reply to your comment on item 2, Notes 3/11/63, Geissler (Copy attached): The most interesting result from the recent wind tunnel acoustic programs is the indication that the aerodynamic noise at various points on the vehicle is more severe than the jet noise at launch. In addition, the jet noise level is high for only about five seconds whereas the aerodynamic noise may be high for 20 or 30 sec. The consequences for the vehicle are: (a) human occupants will require shielding, (b) control or measuring sensors may be excited, (c) possibly local structural failure due to fatigue (d) possible excitation of panel flutter, and (e) possible excitation of sloshing which would effect the closed loop. Items (a) thru (d) can be handled in a straight forward manner; item (e) is more intractable and is being investigated. At first glance it would appear unlikely that high frequency acoustic excitation could affect the control loop; the following chain of events appears to be possible: (1) acoustic excitation of shell (breathing) modes, (2) non-linear coupling of shell vibration and liquid motion which excites the various slosh modes and modulates the shell vibration at the slosh frequency, (3) slosh-structure-control coupling. There is no indication at this time that (e) is a major problem, however, it is an area which requires investigation. ✓ A comprehensive flight measuring program to further define the acoustic and aerodynamic environment is planned for Block II vehicles. (Additional back-up information attached.)

E.G. Does MSC know this? B
 E.F. I hope it will. Please bring data to Musazek's and Haussermann's attention! B

3/12

*1. Support of LeRC in Centaur Program: Lewis recently requested Aeroballistics Division's support, in the following three areas, inasmuch as they had neither the computer programs nor the techniques necessary:

- a. Supply the necessary techniques and equations for conducting closed loop stability analyses and wind response analyses.
- b. Determine Centaur sloshing instability by setting up and running the required stability analysis.
- c. Determine vehicle response to synthetic wind profiles to define the severity of sloshing problems.

Support is currently being provided for area a; work in area b to be completed in 2 weeks; work in area c is started and will be completed in approximately 1 month.

2. Saturn-Apollo Aeroelastic & Acoustic Wind Tunnel Programs: Aeroballistics personnel attended subject conference at MSC on March 6, 1963. Wind tunnel programs which defined Saturn I-Apollo launch vehicle aeroelastic and acoustic problems were discussed. Results are still being analyzed but following conclusions are drawn: (a) Aerodynamic damping is positive under critical mach range of 0.7 to 1.5, (b) Acoustic environment is severe. Sound pressure levels on command and service modules over interstage between S-I and S-IV B stages show peak values of about 168 to 170 db. Results from separate tests by DAC and NAA agree well. Experimental data scaling methods will remain questionable until flight data are obtained. General conclusions following this meeting do not at present provide justification for as large an aeroelastic program for Saturn IB and Saturn V, as was conducted on Saturn I. Analyses and evaluation will continue before this decision is made firm; however, Saturn IB and Saturn V will require additional acoustic testing.

14/11/63

3. Mission Control Center Working Group: The first meeting of this working group was held on March 7. Proposed objectives and membership of the group were discussed and will be submitted to M-DIR through Central Planning Office.

*4. MIT Guidance Scheme: MIT Apollo Guidance Scheme documentation availability has been inadequate, so far, at Marshall. Personnel from MIT were to visit Marshall on March 15, and bring us additional information concerning the guidance scheme, in accordance with agreements reached at an MIT informal meeting attended by our personnel. We have just learned that the MIT visit to Huntsville was cancelled by instructions from MSC. This action is incompatible with agreements made with C. W. Frick at the Huntsville Apollo Systems Review meeting, January 17, 1963. It appears that somebody in the MSC Apollo Office wants to keep us out even at the risk of finally ending up with incompatible guidance systems.

Dr. Koethner - SAT

Fisher notified 14 Mar 63

*Please clarify and straighten out with Frick
Frick get details from him
(contact Geissler)*

B

(15)

NOTE BY M-AERO-E TO DR. GEISSLER as back-up or for consolidation with T. Reed's reply to Dr. von Braun's comment regarding acoustics.

We stated that sound intensities up to 170 decibels - equivalent to about 1 PSI fluctuating RMS pressure peaks - were measured in the vicinity of the command module and the SIV-SI interstage region. Any of our present vehicles are engulfed in a turbulent boundary layer which in itself produces an average noise level of 150 decibels - equivalent to about 0.1 PSI fluctuating RMS pressure peaks. The reason that we encounter values of a whole order of magnitude higher at some stations is explained by separated flow regions which are a direct result of our unclean geometry. There is no sharp dividing line between fluctuating pressures from buffeting or acoustics. We consider buffet induced fluctuating pressures as that portion of the unsteady pressure spectrum which may induce total vehicle response in any of its significant bending modes, let's say up to the third mode; we feel sure now that we are safe in this area as a result of the recent experiments, none of which indicated negative aerodynamic damping. - As to the severe acoustic environment - which involves frequencies of let's say 50 cps and above - we don't think that the structure is endangered to the point of raising a scare. ✓ The SIV stage blow-out panels are less rigid and of low mass. ✓ However, Douglas stated last week at the acoustics meeting at Houston that their panels have been tested up to these conditions. The presently biggest worry with them - and Marshall - is the induced sound and vibration intensity inside the SIV tail compartment where sensitive electro-mechanical equipment may get into sympathetic vibration. To safeguard these sensitive components is a design problem of which both P&VE and Douglas are aware. With the environmental input from us they now can conduct ground tests (Wyley Corp.) to check the equipment. - Of course, the command module is not our business but we know that MSC is fully aware of the situation. Structural acoustic feedback from the command module onto our vehicle structures should be minimal.

To sum it up:

1. All evidence points toward no problem on SATURN I, Block II from non-stationary aerodynamics that may induce excitation of bending modes. ✓

2. The order of magnitude of the expected acoustical environment has been established. Even though it is severe at several stations, gross structural failures are unlikely. Thin panels, fairings of low mass, tank breathing modes, etc., warrant investigation to substantiate our present intuitive judgement. The degree of acoustical attenuation from the outside into the interstage compartment, also needs investigating and it may be necessary to provide some fixes.

See attached spark picture which illustrates causes of high noise and buffet.

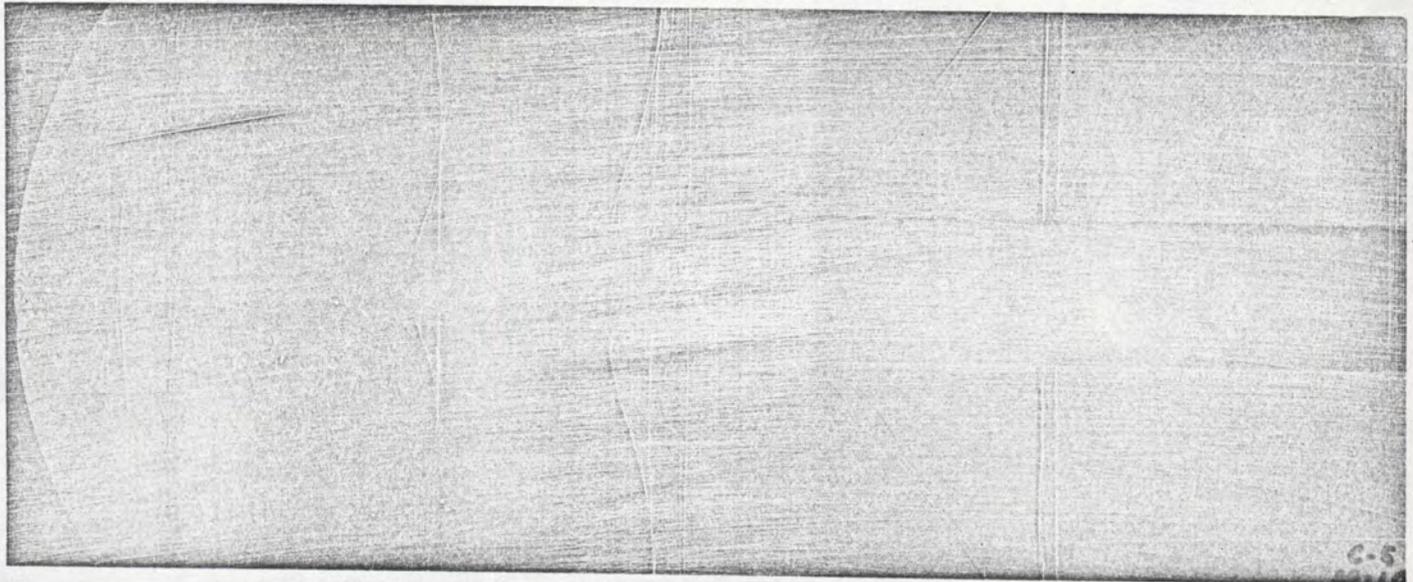
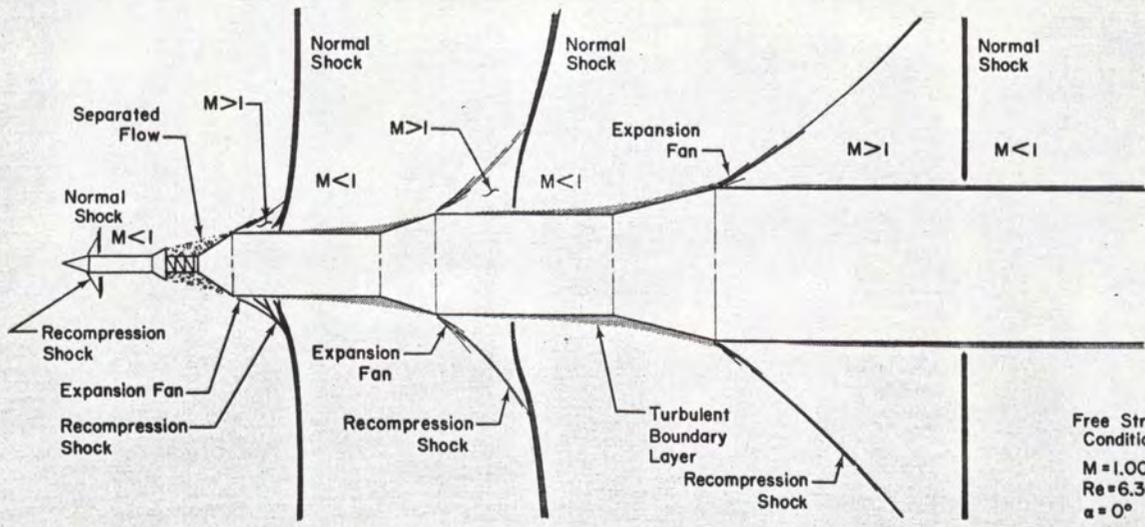
Cy:
Mr. Reed, M-AERO-7S

Please return these
2 pages to M-Aero-DIR.
Thank you.

*Willy
Musatek*

*Request
your
Comments
(next
Notes)*

B3/18



NOTES 3-18-63 GORMAN

1. SECURITY FOR FIRE PATROL FOR MTO: Our negotiators are ^{B2/18} in Mississippi today to negotiate an agreement with the Hancock County officials to provide certain "police" protection for the Government property, including the buffer zone. Apparently, Bill Fortune was not given the right information when he wrote his note of March 11 to you on this same subject. ✓

2. S-IVB STAGE TEST FACILITIES (SACRAMENTO): Bids were received on March 12, by the U. S. Army Engineer District, Sacramento, for the S-IVB Static Test Facilities. The contract will be awarded on March 18 to Paul Hardeman, Inc., whose low bid was \$9,747,000. The contract includes two static test stands, blockhouse, shop, cryogenic weigh stand, utilities, propellant storage and transfer system, and high pressure storage gas and transfer system. ✓

3. ADVANCED SATURN DYNAMIC TEST FACILITY: A low bid of \$3,345,836 was submitted on March 12, 1963, for construction of this facility by the Greenhut Construction Company, Pensacola, Florida. The Government estimate was \$3,565,163. Sufficient funds are available to award the contract. ✓

4. PRATT AND WHITNEY NEGOTIATIONS: Negotiations were completed with Pratt and Whitney on March 8, 1963, for increased costs due to stretch-out of engine deliveries under Contract NAS8-2690 (R&D and initial RL10-A-3 engine delivery) and \$1,984,409 costs, and \$115,000 fixed fee. ✓

5. JET FUEL TANK: The jet fuel tank at Redstone Airport has been placed on foundation, strapped down, and backfilled. Piping is in progress and concrete slab is being poured today (March 15). Unofficial cost estimates for the hanger at Redstone calls for expenditures of about \$200,000. Although there is a great deal of dirt fill involved, we think the cost is excessive, and we are looking into the possibility of having the hanger located at the Huntsville Airport; however, operations would still be out of Redstone. This will give us the cost advantage of using Government procured fuel. ✓

6. ADVANCED RECRUITMENT AUTHORITY: Washington has inquired as to whether we want Advance Recruitment Authority for July and August hires. We told them yes and would give them a definite figure for such recruitment by today (March 15) noon which is being coordinated with Central Planning Office and Management Services. It is hoped that this will alleviate the situation we usually find ourselves in at the first of the year when sometimes there is a personnel freeze or we have more commitments than interim allocations or ceiling. ✓

7. C of F FUNDING SHORTAGES: As you remember, you talked to Mr. Holmes early in February about a shortage in the C of F funding for FY 1963. It was agreed that these shortages would be covered by transfer of funds from R&D to C of F and by other actions, such as deferring the High Vacuum Test Facility. All necessary actions have been initiated and most are in Dr. Seaman's office for approval. In order to meet deadline dates, it has been necessary to advertise before the receipt of funds and to do local reprogramming. At this point, however, it appears that we will be able to meet all schedules, providing Headquarters meets its planned date of March 25 to complete reprogramming actions. ✓

→ hope they've learned from the strike troubles!
B
H.F.
Why's that cheaper?
B

B 3/18

1. SA-6 PRE-STATIC TESTING: The S-I stage was moved to the Performance Test area on March 8, 1963. Initial network tests have been completed and instrumentation checks are now underway. Pre-static tests are scheduled for completion the first week in April. ✓
2. GOVERNMENT INSPECTION AGENCY SUPPORT FOR NASA CONTRACTS: Problems relative to Government Inspection Agency support of NASA were discussed this week at NASA Headquarters. In addition to NASA personnel, the meeting was attended by representatives of the Office of the Secretary of Defense, and Departments of the Army, Navy and Air Force. Several sharp differences in operating philosophy exist between NASA and DOD. Air Force representatives would not agree to deviate from standard Air Force procedures even when performing in NASA's behalf. Some benefit was gained from the meeting in terms of pin-pointing differences; additional meetings will be scheduled. ✓
3. MICROMETEOROID PROGRAM: An introductory visit was made to Fairchild Stratos Corporation, Bladensburg and Hagerstown, Maryland by representatives of this Division, including Mr. Paul Davis, our Project Engineer. The visit was to make initial contact with key personnel, and to present and discuss our quality assurance methods and philosophies. A representative of this Division remained at Fairchild to assist the contractor in preparing his Quality Program Plan, as required by NPC 200-2. Expeditious treatment was considered necessary to support the very short time schedule. Air Force inspection personnel were also contacted during this introductory visit. As a result, the Air Force has been selected to perform quality assurance functions at the Hagerstown, Maryland plant. Quality functions at the Bladensburg, Maryland plant will be performed by Quality Assurance Division personnel. Action is being taken to plan and staff this operation. These actions have been coordinated with Research Projects Division. ✓
4. ADDITIONAL INFORMATION ON ITEM 2, TRIP TO MARTIN-BALTIMORE, NOTES 3-11-63: Under the Nova study contract, both Martin and GD/A were asked to devote some work to planning a quality assurance program. Included would be development of a hardware inspection plan, a vehicle test and checkout plan, a qualification test program and related documentation and data retrieval. A close look at early planning by Martin-Baltimore personnel should enable us to identify and resolve known pitfalls. Review of progress on the Nova quality program was the primary purpose of this visit. ✓

1 Enc:

NOTES 3-11-63 GRAU

* Jan 1. SA-4 Schedule: Checkout is completed up to and including the full overall systems test (OAT 3). Small problems still existing are solved in coordination with the other divisions affected. For the selected firing date, schedule interference with a Delta flight might develop, but will be solved in-house NASA. ✓

!! 2. SA-4 Quality: LVO systems engineers feel that a downward trend developed in the quality of the electrical systems in SA-4, compared to previous Saturns. M-QUAL was invited to form a team consisting of M-QUAL, M-ME, and M-P&VE personnel to come to the Cape for a discussion and observation. The group was at the Cape 13-14 March. ✓

3. Solid Propellants: LOC let a contract to Martin-Marietta, "Study of Solid Propellant Rocket Exhaust Effects and Methods of Attenuation." MSFC segments were represented at a Management Committee meeting when the contractor was directed in this study. ✓

4. Quality Assurance Procedures: Procedures for stage contractors at the Cape (meeting in your office March 15) state that the LVO technical stage coordinator (member of my technical staff) will keep a log on all ECO's (Change Orders) either waived before factory roll-out or originated at the Cape. So, Change Order control will be completely within LVO (Petroni's office concurs). ✓

1. COMPLEX SHIPPING PROCEDURES: A long-standing serious problem in making emergency shipments was emphasized several times during the recent ST-124 Platform Sled Tests at Holloman AFB. Shipping requirements originated by an M-ASTR branch must be processed through M-ASTR-PCS and Technical Materials Branch, M-SS, coordinated with P&C for contract authority, and then processed and shipped by Transportation Branch, M-SS. It is simply impossible to get through this maze of red tape as rapidly as we often must to avoid costly delays. Also, mistakes frequently result as instructions are transferred from document to document. Engineers responsible for the accomplishment of program objectives are left to choose between failure or the use of illegal means for shipment.

Say that again!

2. IMCC DISCUSSIONS: Reference question to item #4, notes of 3/11/63 (Enc. 1). Since no such mission has been assigned to MSFC, there was no discussion of our "future" requirements with MSC. ✓

Well, how about ^{with} ~~initial~~ checkout of STB? B

Harry G.

Suggest you look into this situation and streamline procedures. This gripe has a familiar ring (remembers that grievance case about the engineers terrorized by the bureaucrats!?) B

1 Enc:
Notes of 3/11/63

B 3/18

1. S-IV: Next firing tomorrow, by DAC, at SACTO. ✓
- * *gem* 2. FACILITIES (Re NOTES 3/4/63, Attachment 1): The 4-month delay in completion dates of the Blockhouse Instrumentation, Component Test Facilities, and the C-5 Swing Arm Facility will not necessarily affect launch schedule; but, if hardware difficulties arise, extensive overtime and reduced confidence could result. ✓
3. C-5/VLF-39 MODEL TEST STUDY: Buildup of VLF-39 model launch complex is in progress. Plans are to evaluate the pressure and temperature environment in the vehicle base region and also adjacent to the service tower under lift conditions. Investigation of deflector ridge materials is in progress utilizing a single 500-pound-thrust engine firing on model ridges of various materials. The object of these tests is to find a material capable of withstanding the direct impingement of high velocity rocket exhaust gases and also capable of being adapted to full-scale conditions. ✓
- * *gem* 4. GSE LAUNCHER ARMS, VLF-37: Because of cracks found during MSFC tests of spare arms, LOC conducted an extensive reinspection of the first set of launcher arms at the Cape. No cracks were found in any of these arms. ✓
5. TRANSPORTATION ACTIVITIES: SS POINT BARROW trials conducted at Seal Beach and Port Huneme, Calif., Tuesday, 3/12, were successful, and agreement has been reached with the Commandant of Seal Beach Facility for the location of our loading ramp. ✓

RE NOTES 2/25/63, ATTACHMENT 2: Detailed studies regarding the MSFC stage transportation system are near completion. Initial briefings including equipment recommendations, phasing, budgets, and responsibilities planned for the latter part of this week. Of immediate interest is the fact that MSFC Recommendations to NASA Headquarters regarding ocean vessel requirements must be made by the end of March in order to comply with minimum lead times for first S-II moves. Studies conclude that NASA either purchase and modify S/S NEW GRAND HAVEN at a cost of about \$1.8 million, or build special vessel at a cost of about \$5.1 million. All other courses of action have been proved unsuited for technical, economic, or facility reasons. Branch level persons at NASA Headquarters in both OMSF and Office of Administration are unofficially aware of this fact and await official recommendations of MSFC. ✓

* *gem* 6. MTF: Completion date of A-E Contract with S&P has been extended from 3/15 to 5/15, to permit sufficient time to complete criteria for six items of Support Facilities. ✓

RE NOTES 2/25/63, Attachment 2: Agree with your remark and will discuss details with you. ✓

7. S-1-5: A 142-second duration firing was conducted 3/13. Records are being reviewed to determine future action. ✓

ATTACHMENT 1: NOTES 3/4/63 Heimburg.

ATTACHMENT 2: NOTES 2/25/63 Heimburg.

- *1. *Jan* SLIDELL ANALOG COMPUTER INSTALLATION: Installation and checkout of the analog computers at Slidell has been completed. Some minor deficiencies still have to be corrected by the manufacturer, but the computers can now be used for problem solution by the Michoud contractors. ✓
2. EXTENDED FLIGHT SIMULATION LABORATORY: The support structure for the central bearing of the Celestial Body Motion Simulator has been installed in the Extended Flight Simulation Laboratory by Astrionics Division. ✓

B 3/18

1. REFERENCE NOTES 3-11-63 HUETER: A thorough analysis of Centaur as a possible third stage on Saturn 1B will be a requirement of the Office of Space Sciences. I feel that such analysis should be conducted under MSFC cognizance. Should this task be given to Lewis, I feel that Marshall would, in any event, wind up doing the majority of the work and the results would be biased. Consequently, I feel that we should retain over-all cognizance of the investigation.

HH, I agree 100%
B

2. LUNAR PAYLOADS: Mr. Taylor, of OMSF, met with concerned MSFC personnel in my office on Thursday, March 14, and discussed prior OMSF planning in the lunar payload area. Mr. Taylor was quite firm that management control of all payloads would be assigned to MSFC. He advised that he also understood Mr. Holmes and Dr. Shea were firm relative to such assignment. My office is in the process of researching available data relative to payloads and organizing ourselves to accomplish immediate requirements. We are to prepare a preliminary approach to the implementation of a payload development program during the next two weeks. Mr. Taylor then plans to come to MSFC and discuss this approach. He anticipates that after this discussion, we will be in a position to prepare preliminary development plans for payload developments. We will, in the immediate future, use guidelines furnished by Mr. Taylor as a basis for our efforts. With regard to the discussion during the Executive Meeting on March 16, I need some guidelines whether we really should proceed with this effort.

Yes! B
(Re total personnel needs for implemen-
tation I'd like to talk to you again!)

3. GENERAL: Currently there are 76 personnel assigned to the Special Assignments Office. Nineteen of these are on detail to various MSFC divisions. During the past week, approximately 10% (8 people) of those available at Special Assignments Office were working on material for various presentations, 5% were on leave, 25% were working on the C-1B/3rd stage study preparations and the remaining 60% were engaged in collecting data and orientation in the area of lunar logistics support.

B 3/18

1. HIGHLIGHT THIS WEEK

We have a three-day review this week on our Phase I NOVA studies (Tuesday through Thursday), the objective being to narrow down the large field of applicants to a manageable number (maybe 3 or 4). Presentations will be given by Martin, GD/A, STL, Douglas and by Martin/Denver on launch facilities. We have a summary meeting Thursday morning from 8:30 to 12:00 for top MSFC management and Headquarters representatives (P&VE first floor conference room). We plan to have our in-house evaluation completed about April 4, and should be ready with our recommendations on how to narrow down by April 10 or 11, at which time we would like to give a presentation to you and the board. If you agree, we might want to use the executive session of the board meeting on Friday 12 for this review. We then plan to go to Washington the following week to obtain Headquarters concurrence for the next phase of the program. ✓

If more than 1 hr I suggest a separate meeting!
B

→ how much time of ? B

2. NUCLEAR PULSE VEHICLE

Dr. Bisplinghoff has approved our proposed mission study on ORION and forwarded a request for project approval to Dr. Seamans. Therefore, no follow-up call to Bisplinghoff is required. ✓ Also, the DOD has reluctantly agreed to fund the ORION effort one more year, which gives NASA an honest chance to decide whether or not they want to pick up the project. ✓

3. FUTURE PROJECTS OFFICE REVIEW

We are now scheduled to give our office review to you and Dr. Rees on Monday, April 1 (no joke!). As we have no requirements for facilities and spaces, we hope to get a chance to explain our mode of operation in some detail. I sensed recently that there is plenty of misconception, either on what you think we are doing or on what we think we should be doing. This review gives us a chance to clarify the situation. I hope you will be able to attend (9:00 a.m. to 11:00 a.m.). ✓

Bounce List me!
B

yes

4. ORIENTATION MEETINGS

Last week we had three contractor orientation meetings on follow-on contracts:

- a. Operations Analysis of Advanced Lunar Transportation Systems (Vought).
- b. Reusable 10-Passenger Orbital Ferry Vehicle (Lockheed California Division).
- c. Systems Study on Advanced Orbital Operations (Vought).

If you want any detailed information on the status and objectives of these studies, please let me know.

Let's discuss a major tech review of FPO after 1 April! B

1. Saturn V, S-II Stage: Reference your comments to my Notes 3-4-63. There is nothing peculiar about the S-II apex gore segment. The only thing wrong was the tool design and the people at Rocketdyne responsible for manufacturing of these parts. The lower gore segments of the S-II have a deep pocket milled waffle pattern which must be milled first (because of thickness up to 2") and then be formed. But this is not a big problem. In order to avoid buckling of the ribs during explosive forming the pockets of the waffle pattern must be filled by a proper filler material. ✓

* 2. Saturn V, S-IVB Stage: The first S-IVB Manufacturing Engineering Working Group Meeting was held here in Huntsville on March 14 and 15. The complete tooling and manufacturing plan for the stage was presented and the basic fabrication concept discussed. A number of improvements as compared with the S-IV plan were noted, for example, replacement of lap welds on "T" and "L" rings of common bulkhead by butt welds and in other areas. DAC seems not to be very advanced in their weld techniques as compared with S&ID or us. They do not dare to make any vertical or horizontal welding but use only down position techniques. Bulkhead gores will be formed by hydraulic bulge forming technique. Here the experience from Boeing, Wichita, is being fully utilized. ✓

* 1. SATURN I: S-IB - In a telephone conversation between Dr. Rees and Dr. Shea on 3-15-63, Dr. Shea informed that \$2.5 to \$3.0 Mill GSE funds were available for SATURN 1B. He requested a gross breakdown of these funds; that will be provided on 3-18-63. It appears the entire \$3.0 Mill will be used to purchase hardware. ✓

S-I-5 - was static fired for 142 seconds on 3-13-63. Cutoff was in proper sequence. ✓

* S-IV Battleship - Replacement of engine #6 (due to leak in thrust chamber) and instrumentation hook up is in progress. Simultaneously, repair work on the balsa insulation in the hydrogen tank is being accomplished. Some small particles have been found in the screens and it is felt that this may have caused the abort of the last firing. In addition, some particles were found in the thrust control of engine #4. This has been cleaned out and a spare is available. DAC is analyzing the contamination which has occurred during previous firings and attempts. Next hot firing is scheduled for 3-19-63. ✓

S-IV-5 - should leave Santa Monica on 4-10-63. Static firing at SACTO is scheduled for 5-17-63. ✓

2. SATURN V: Re my Notes 3-11-63, Para. 2, (See attachment), Agreement was reached with Mr. Davis to amend Article XI of the Boeing Contract on March 12, 1963. The amended Article will contain the following language: "The MSFC SATURN Program Manager has the responsibility to manage and direct the S-IC Stage project of the SATURN Program." ✓

S-IC - M-QUAL requirements for additional support from Boeing has been implemented by the Contracting Officer. ✓

* Modification #1 to Contract NAS8-5608 was transmitted to Hdqtrs. by P&C. This action should significantly reduce the time required to finalize this contract modification after completion of cost negotiations. ✓

* Two F-1 engine hot firings (101 and 105 seconds, termed successful) were conducted for Congressional Committees at Edwards AFB during the past week. ✓

S-II - At MSFC's request, the contractor has discarded the guarded drape concept of the heat shield. This will cause some changes in the test program at Cornell Laboratories. This change has several advantages, including a significant weight reduction and design simplification.

The slosh and vortex facility has been completed at Downey and the tests were inaugurated this week. The construction of the cryogenic test facility is proceeding on schedule with anticipated completion on 4-3-63.

All components of the first bulkhead welder have been installed and assembled at the Seal Beach facility with the exception of a hydraulic and electrical control system. ✓

B 3/18

1. LIQUID HYDROGEN PLANT IN MISSISSIPPI - On my 3-4-63 NOTES (copy attached) you suggested that we give Brainerd Holmes some advance information on Air Products' maneuver to delay procurement/construction of the MTO LH₂ Plant. We have been in contact with Abe Bass, Propellants Manager for OMSF to determine what his recommendation to Holmes will be. As soon as this has been formulated, we will forward a letter to Mr. Holmes. ✓

2. FY 65 FLASH ESTIMATES, PART I, ON-GOING PROGRAMS - On February 20, 1963, MSFC submitted FY 65 Budget Estimates to OMSF for on-going programs. In this submission, we indicated a \$30.9 M shortage in FY 63 and \$91.2 M shortage in FY 64 funding. The table below shows a comparison of our submission to OMSF and the OMSF submission to Dr. Seamans on March 8, 1963.

	<u>OMSF/MSFC CONTROL CEILING</u>	<u>MSFC SUBMISSION</u>	<u>DIFFERENCE (SHORTAGE)</u>	<u>OMSF MAR 8 SUBMISSION</u>
FY 63	760.2	791.1	30.9	760.2
FY 64	1146.7	1237.9	91.2	1237.9
FY 65		1236.2		1392.3

OMSF did not go forward requesting the FY 63 \$30.9 M shortage, but they did request the \$91.2 M for FY 64. OMSF also increased the FY 65 Budget estimate by \$156.1 M as follows:

- 30.9 FY 63 shortage
- 91.2 FY 64 shortage
- 15.0 Systems, including Advance Studies
- 19.0 Contingency
- 156.1

According to our source of information in headquarters, Dr. Seamans is not aware that the \$91.2 M is included in both the FY 64 and FY 65 estimates. ✓

1 Enc:
Notes of 3-4-63

1. S-I-4: During control tests on S-I-4 at the Cape, a number of leaks appeared at the intersection of the high pressure actuator flexible hose and its connecting fittings. A partial explanation for these leaks may be that the guidance checks are being performed with actuators disconnected from the stage. Flexible hoses were not designed for this additional requirement. Another possibility is that, since the "B-nuts" were not torque-stripped, the connections may not have been torqued to the prescribed value while S-I-4 was at MSFC (George C. Marshall Space Flight Center). Testing is presently under way on this Division's hydraulic system simulator in an effort to determine and/or verify the cause of the leakage. ✓

2. RIFT BRIEFING: Dave Novik informs us that Harry Finger gave a briefing on the status of ROVER to Dr. Seaborg, two of the Atomic Energy Commission members, Dr. Seamans and Mr. Webb. Mr. Webb was mildly optimistic, directing many of his questions toward Finger's plans for program acceleration after a successful reactor test.

*3. S-VI FULL-SCALE MOCK-UP: Fabrication at MSFC is scheduled to be completed by mid-June. Jan

4. S-IV STAGE: Bracketry attached to the S-IV thrust cone is under-designed and cannot take the vibration environment mutually agreed upon by Douglas Aircraft Company and MSFC. Several brackets have to be re-designed and possibly portions of the thrust cone itself. This might delay S-I-5 launch date.

5. RIFT MISSION PRESENTATION: (Reference NOTES 3-11-63 MRAZEK, paragraph 4, copy attached.) See attachment #2.

*6. STATUS OF S-I/S-IVB INTERSTAGE DESIGN: The Aeroballistics Division has conducted a configuration study; the Structures Branch, this Division, has conducted a very preliminary design study. Jan

Requests have been made to review the Douglas Aircraft Company analysis of the various interstage configuration studies, which is to also include the design and weight of the retro-rocket system for each configuration (coke-bottle shape versus cylindrical shape). After reviewing the requested information above, a configuration and design decision can be made.

7. TRANSFER OF S-I DOCUMENTATION: Transfer of S-I-5 through S-I-10 documentation (except instrument unit) to the Chrysler Corporation for maintenance, in connection with Part I of the contract, is in progress. Approximately fifty percent of the requested documentation was transmitted to Chrysler-Huntsville. The remaining fifty percent will be processed through Technical Documentation Section's reproduction and Vehicle Engineering Branch for verification within two months.

Attachment #1: NOTES 3-11-63 MRAZEK

Attachment #2: Memo from M-P&VE-N

Mr. Mrazek / Mr. Weidner:
Please send us an original.
We cannot use these. Jm 3-19

NOTES 3-18-63 Rudolph

B₃/19

No Notes.



B 3/19

1. LUNAR LOGISTICS PAYLOADS: Members of RPD met with Mr. Hueter early last week to discuss the past and present work of RPD as related to LLS payloads. The meeting served as a basis for establishing which role RPD might play in the LLS payload program. RPD members also participated in the meeting chaired by Mr. Hueter last Thursday in which Bill Taylor of OMSF described the LLS Payload assignment to MSFC. ✓

2. ATTITUDE SENSOR FOR METEOROID FLIGHT CAPSULES: As a result of conferences among personnel from Astrionics Division, the Meteoroid Measurements Project Office, Fairchild, and Barnes Engineering Company, a subcontract between Fairchild and Barnes is being negotiated for the modification of a Barnes I.R. sensor system to meet the capsule requirements. We are now well assured of an operable attitude sensing system. ✓ The subcontract will be approved this week. ✓

3. METEOROID PROJECT PRESENTATION: In reply to your question on the NOTES of 3-11-63 (Attachment #1), we are preparing a budget request to OART, for submission to Mr. Ames on March 22, for additional FY '63 funds in the amount of about 2.8 million dollars. Indications by Milton were that funds would be made available through some reprogramming at OART. ✓

4. SUPPORTING RESEARCH AND TECHNOLOGY: Commitments have been made for approximately 73% of the Supporting Research and Technology Programs (OART, OMSF, OSS, Saturn) which are coordinated by RPD. The divisions are continuing to submit their contract requests; it appears likely that all funds will be committed by April 1. ✓

1. F-1 ENGINE: Two consecutive successful long-duration F-1 engine firings were held on engines 008 and 009 on 3-12-63--no instability, no hardware damage. ✓

The Teague Subcommittee of the Committee on Science and Astronautics, House of Representatives, visited Edwards Air Force Base last week and witnessed the above 109 seconds firing of engine 008 and the 151.6 seconds firing of engine 009. ✓

Engine 010 was gimballed successfully for the second time during a firing on 3-7-63. The gimbal angle was increased from one-half degree to one degree while the frequency remained at 1.25 cps. ✓

2. J-2 ENGINE: (Reference NOTES 3-11-63 WEIDNER, paragraph 2, copy attached.) "Cannister" is the can wherein engine is mounted for altitude simulation--same as Pratt and Whitney Aircraft test stands in Florida. ✓

H.W.
I thought J-2 tests are all done without steam ejectors. o.k. Forget it!
B

A successful five-second mainstage test was conducted on 3-12-63. No apparent damage to diffuser resulted. ✓

3. RL10 ENGINE: Testing of the S-IV Battleship vehicle is temporarily delayed while one engine is being replaced. Engine 1806 evidenced thrust chamber tube leak. It was anticipated that replacement would be completed and testing could resume late last week. ✓

4. H-1 ENGINE: Injector selection testing on the H-1 engine indicates that a promising dynamically stable injector pattern is forthcoming. ✓ In a test conducted on 3-11-63 the following results were obtained.

- a. Engine thrust level was approximately 215K during this test. !!
- b. The injector was bombed with a 50-grain charge, pulsed twice, and recovered to stable operation in all three cases. ✓

5. GENERAL: (Reference NOTES 3-11-63 WEIDNER, paragraph 4, copy attached.) Nobody around here knows him. ✓

6. CONSULTANTS: I feel that it is unfair that consultants like Dr. Luigi Crocco and Dave Harrje, who spend monthly at most a few days on our F-1 problems, have to be counted against our space voucher.

Harry G.
Can we do something about this situation?
B

7. PRINCETON COMBUSTION STABILITY WORK: At present the Princeton experimental work is limited to the very small size they can handle in their test set-ups. There is an urgent need in support of their theoretical work (NASA sponsored) to extend the scope of their experimental data to include larger sizes, say motors with 150,000 pounds of thrust. The suggestion is being promoted that MSFC, with its engineering staff and its facilities, actively participate in filling this need. We visualize a team effort between Princeton and MSFC where the local research institute in time could be brought to participate in a more prominent role. Contacts have been taken up and we find good interest with all parties involved.

(I can hardly imagine that Hy insists on such a silly interpretation. It discourages us from pulling in temporary consultants.

H.W. → Very good idea! Go right ahead!
B

Attachment #1: NOTES 3-11-63 WEIDNER

Besides, with same reasoning Heinberg would have to call Holt, Berman & Neuman, his noise consultant firm, against TEST spaces !!)

Doorman



April 3, 1963

Additional Information On "VEHICLE STRUCTURAL TECHNOLOGY LABORATORY"

REFERENCE: Comments to Weekly NOTES 3/25/63 KUERS

There was a misunderstanding about the re-instatement of this facility into the budget of FY-64. The fact is that NASA, Washington, has resubmitted this facility to the Bureau of Budget for FY-65 and is trying to get design money in FY-64. Mr. Trott was in Washington yesterday and discussed our justification for this building and our structural technology program again with Mr. Crone and his people. (See Weekly NOTES 4/1/63) Mr. Lovejoy participated and Mr. Smolensky later joined the discussion and asked to keep our material for possible use at congressional hearings. I believe, we have the full support of NASA. The reaction of the Bureau of Budget is not known at this time.

Copy to Rees + Doorman

B
3/51

1. Saturn V, S-II Stage: Explosive forming dies are presently being modified by Los Angeles Tool Division. With these modifications which were proposed by our people and with the new organizational set-up we are confident to obtain usable parts in about two weeks from now. As a back-up drupe forming on glassrock dies with different methods of quenching is under way. The aluminum mandrel concept is still in the experimental status with subscale tools. ✓
2. Saturn V, S-IC Stage: a. Our meridian weld station is not yet operational due to problems pertaining to the gore trimming and some other minor modifications connected with exact positioning of the vacuum chuck for different gage thicknesses. b. Gore segments for the lower bulkhead for the Fuel Test Container which are 1/2" thick and sculptured are now becoming critical. We had now to direct Boeing to form these segments unmachined and ship them to Ryan for chemical milling. Corrosion (pitting) has been resolved by improved etching procedures at Wichita. ✓
3. Proposed "Vehicle Structural Technology Laboratory": This is the new name for the former "Methods Evaluation Development Facility". We had another meeting with Mr. Crone and other personnel from NASA Headquarters discussing our plans for manufacturing methods and structural development plans including present and future utilization of existing facilities. We had prepared approximately 140 charts showing our contributions in the technology area, our present projects and future material to Mr. B. Holmes (in a condensed form) and hope that this facility will not only be reinstated in the FY-65 C of F Budget but that full recognition to our structural development programs will be achieved.
- * 4. Explosion in Heat Treat Facility, Building 4704: An explosion occurred on March 20th in this facility in an environmental control chamber just after quitting time at approximately 5:30. No personnel injuries were received, property damage amounts to approximately \$5,000. The causes and responsibility is being investigated by a committee. ✓

→ B.K.

What is that? I understood it has been approved under '64 COFF!!

(Please notify me at once on status. If some kowies got in, maybe we can still drive them out!)

B
TW
AH

NOTES 4-1-63 KUERS

1. Saturn V, S-IC Stage:

a. A critical area is showing up in the development program of Pressure Volume Compensators at Arrowhead Products. As it looks now there is a delay of 2 to 3 months in the program caused by late design changes and by a two conservative management approach in ordering material in advance, providing for sufficient spare parts, putting a sufficient number of people in purchasing and follow-up activities, etc. Immediately affected is the schedule for hardware for qualification testing and for components for single engine testing for Test Division needed by the end of this year. We had several meetings with the Vice President of Arrowhead and their key people and hope at least to avoid further slippage and possibly catch up some of the lost time.

b. As a back-up and product improvement program for the Boeing Y-Ring production using a conventional multi-pass welding process we have initiated a contract with Sciaky Brothers for design and fabrication of a split vacuum chamber and an electron beam gun programmed for the special application of Y-Ring welding. We have not pushed this program too much because Boeing has been quite successful in producing acceptable Y-Rings. Sciaky Brothers, however, have hit some critical problem areas in their E. B. Gun program. First it was found that for E. B. welding of 2219 aluminum alloy a 30 to 40% higher power level for the gun is needed than would be required for any other aluminum alloy. This fact was not known before and has not been explained yet by metallurgists. As a consequence of raising the power level of the E. B. gun to 30KW, (1 Amp, 30,000 volts) an arcing problem was encountered between the cathode and anode which results in unacceptable welds. Considerable improvements have been made today, but the problem is not yet solved. As a back-up we ordered a 80,000 volt gun which has a longer focus of beam and would allow to position the gun at a greater distance from the work piece reducing the interaction of vaporized metal and the gun.

2. Vehicle Structural Technology Laboratory: On Tuesday, April 2, we will present our methods development projects and experimental programs in a condensed form to Mr. Crone and his people in Washington in preparation for a final presentation to Mr. Smolensky.

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO See Distribution

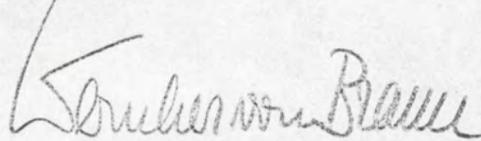
DATE April 1, 1963

FROM *Office of the Director*

SUBJECT Weekly NOTES

There is some evidence to indicate that, contrary to my instructions, copies of the complete package of Weekly NOTES are being made available to persons other than those listed on this distribution. This is to emphasize that I do not approve of this practice as it has the effect of restricting the information which goes into the NOTES as well as my handwritten comments in reply to this information.

Your cooperation in maintaining this system on a frank, informal, tightly restricted basis will be appreciated.



Wernher von Braun
Director

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Mr. Dorman

NOTES TO HOLMES - 3/27/63 - DEBUS

1. SA-4: Checkout operations on SA-4 are on schedule. The launch is scheduled for Thursday afternoon at 1:30 p. m. The launch operation began Tuesday with final Ordnance installations. Fuel will be loaded Wednesday. The terminal launch count is 600 minutes, beginning at 3:30 a. m. Thursday morning. An agreed cutoff time has been established with DELTA at 5:30 p. m. DELTA has a 9 p. m. to midnight launch window.

2. SA-5 Schedule: We have been informally notified by MSFC that the S-I stage for SA-5 will be delayed approximately three weeks. (From June 17 to approximately July 8.)

3. The G. E. Contract: As a result of our discussion on the G. E. support areas for LOC which took place yesterday in the Management Council, we have arranged a meeting with Sloan for this Friday at 4 o'clock to discuss the matter further.

4. Program Review Schedules: Meetings were held with the Schedules Office of NASA Headquarters on March 11 and 12 who returned with Captain Holcomb on March 18 and 19 to discuss various changes to the LOC submission for the Program Review. The meeting resulted in the following agreements:

a. Level B charts will be revised per LOC's recommendations to consolidate all like items on one chart and include major interfaces.

b. An attempt will be made to prepare a development chart by the April 1 submission date. This chart will, in essence, represent major dates reflecting what would normally be considered the "critical path."

c. The operating milestone for the Launch Complex 39 submission will continue to be SA 501, however, on the succeeding submission some plan will have to be developed whereby the total facility, as funded in both FY 63 and 64, will be reflected against a more complete operation or ready date.

5. Blount Brothers Appeal - Cosmodyne Settlement: In connection with the termination of the Blount Contract for default, Blount, on behalf of itself and its subcontractor Cosmodyne Corporation, submitted a claim for \$93,405 for alleged additional work and related cost for performance of work required by contract. Negotiations between Blount, Cosmodyne and the LOC Legal Office for the settlement of this



claim culminated in a settlement agreement (Modification No. 8 to Contract No. NAS6-3431) by and between all the parties concerned which, in pertinent part, provided for (1) the release of the Government from the claim in the amount of \$93,405 and any other claims growing out of that portion of the prime contract covered by the Cosmodyne subcontract; (2) reduction of the subcontractor's price under its contract with Blount by the amount of \$25,000, as a consideration flowing to the Government, resulting in (3) the reduction of the total contract amount under the Blount contract by \$25,000; and (4) the release of Blount and Cosmodyne from any further obligation relating to subject subcontract, except for latent defects. This agreement fully settles all rights and obligations of the parties under the prime and subject subcontract with respect to items or services covered by the subcontract and removes the total subject matter from further consideration in connection with the termination of Blount's contract for default, including the appeal therefrom.

6. Complex 37: Even though the number of discrepancies in the Complex 37 propellant and gas facilities were more than expected, it is still anticipated that the Complex 37B wet test will begin on April 18 as previously scheduled.

7. Support Buildings, Merritt Island Industrial Area: All facilities planned by AFMTC for MILA range support functions are being reviewed with the currently indicated LOC element responsible for the function under the Webb-McNamara Agreement to determine changes, if any, which may be necessary to accommodate the new concept.

8. BoB Visit: Representatives of the Bureau of Budget will visit LOC March 27 to 29, 1963. They will spend the 25th and 26th with AFMTC. They have requested presentations of the entire LOC plans, programs, and resources, at present, and projected in general terms.

3/31

1. COMPUTER OPERATIONS

The Analog Computers are 90% checked out and should be ready for use by the contractors on April 1, 1963. ✓

* 2. ETS HOKIN-GALVIN

gsm

On March 25, 1963, seventy-five electricians failed to report to work. The reasons are undetermined at this point and the matter is being investigated. The problem is being coordinated with Mr. Paul Styles. ✓

B3/31

- *1. CONTRACT SIGNED WITH HANCOCK COUNTY: MSFC representatives signed contract with Hancock County Board of Supervisors last Friday for one year's Security and Fire Patrol, commencing 1 April. Amount was \$41,100, considerably less than original estimate. Mr. Winterstein will be COR. He is to meet with the supervisors this a. m. to lay out the detailed patrol requirements, community relation aspects relative to use of side arms, report procedures, etc. ✓
2. PUB INFO VISITS TO MISSISSIPPI HIGH SCHOOLS: Ed Buckbe from MSFC PIO toured all the local white high schools around Mississippi Test Facility last week, with Mack Herring. They spoke to over thirty-four hundred students. Very good comments have been already received back. The colored trade school at Bogalusa has requested a similar talk, which Mr. Herring will probably provide. ✓
3. MICHLOUD INTEREST IN HELICOPTER SERVICE: Mr. N. G. Williams, who handles transportation for Michoud Operations, has inquired as to what we have learned about helicopter service, for possible consideration of speeding up travel to and from New Orleans Air Port, Michoud, Slidell, and MTF. We are sending him copies of correspondence on leasing helicopters which JPL gave us. ✓
4. INVITATION TO AGARD 13th GENERAL ASSEMBLY: Dr. Von Karman has extended an invitation to me to participate in the Agard 13th General Assembly to be held in Athens, Greece 10-12 July, 1963. Theme will be: "Problems in The Design, Construction and Operation of Missile Ranges". I should like very much to attend but hesitate to take the time. Is there anyone else in MSFC who will be there? (Have asked RPD)

B.F. ↓
 Why don't you go? I think
 you should. (Nothing being so
 urgent that it couldn't get
 more urgent!) 3

1. Saturn-Apollo Acoustic Environment: Re: your comments to item 3 of Notes - 3/18/63 - Geissler, Copy attached. P&VE personnel have been working closely with us on these wind-tunnel acoustic programs; they have attended all key meetings, observed wind tunnel tests, and have all preliminary data. Also this program is a joint venture with MSC, and they are aware of the possible shielding problem and other findings in the program to date. Astrionics has been informed of this work from the control system aspect. We don't want to cause unnecessary alarm on this subject of acoustic environment, however it is an area that warrants continued surveillance. ✓
2. OMSF Working Group for Apollo Ground Network Requirements: H. F. Kurtz attended the OMSF Working Group Meeting in Houston on March 21. Of special interest to MSFC was the discussion on incorporating the launch vehicle ground network requirements into the general Apollo/Saturn requirements presently generated by MSC. Definitive procedures were not yet agreed upon. MSC favors the coordination of all requirements through an MSFC-MSFC panel prior to submission to OMSF. ✓ So do I B
3. S-IC Base Heating Test Program: S-IC base heating tests at $M=0.6$ through 1.2 were run in the Cornell Aeronautical Lab.'s 8'X8' tunnel in February 63. Turbine exhaust of the F-1 engine was simulated by H_2 - discharge into nozzle. Afterburning of turbine exhaust raised convective heat flux from about 1 BTU/ft² sec. without turbine exhaust to about 10 to 11 BTU/ft² sec with turbine exhaust, at $M=0.6$ to 0.8; scoops cut this heat flux to 5 to 6 BTU/ft² sec. Model scale effects cut afterburning strongly at $M = 1$, as expected. Radiative heating was measured, but is strongly affected by model scale.* ✓

Additional S-IC base heating tests at $M=1.5$ through 3.5 are to be conducted at NASA Lewis Research Center. Due to interference from the Centaur program, these S-IC tests have slipped from mid-March 1963 to June 1, 1963. Therefore, the high altitude part of the test program, initially scheduled after the Lewis tests, is currently being run at Cornell. Further delays of the Lewis program may become serious. ✓

4. NASA Committee on Fluid Mechanics: In Notes 2/4/63 (Copy attached), I reported briefly on subject committee meeting held here on January 28 & 29, 1963. Minutes of this meeting are interesting and I've attached a copy with important items marked on pages 2, 5, 6, and 7. ✓

*Estimated heat fluxes were 2 BTU/ft² sec without turbine exhaust and 18 BTU/ft² sec with turbine exhaust and no scoops. (Aero Internal Note 6-62) ✓

B 3/31

1. MISSISSIPPI TEST OPERATIONS - A contract was signed with Southern Railroad on Friday, March 15, whereby the railroad will bring a spur line from their main line at Nicholson down into the fee area at a point below the warehouse at no cost to the Government. The Corps of Engineers has issued a right of entry for construction purposes to Southern Railroad, and upon completion of legal documentation will issue the railroad necessary right of ways. Construction of the railroad within the fee area began on March 19. Construction of the spur line is expected to be completed in June, 1963. ✓

The construction of a perimeter fence around the fee area was advertised by the Corps on March 13, 1963, with bid opening scheduled for April 2, 1963. ✓

Reviews of the preliminary designs on the canal bridge were on March 19, and on the Laboratory and Engineering Building on March 20. ✓

A Security Branch representative met with other MSFC representatives and Hancock County, Mississippi, officials last week to discuss and agree on contract arrangements for guard service (6 men) at MTO. A one year contract is to be effective March 25, 1963. ✓

2. MICHOUD OPERATIONS- Mason Rust will award a contract for the barge dock by March 22, 1963, to Boh Brothers, New Orleans. Bid price was \$546,940. Contract completion date is October 17, 1963. Scheduled completion date is November. ✓

Notice to proceed on design of the Engineering Building at Michoud was issued to August Perez, New Orleans, March 12, 1963. Contract completion date is 84 calendar days (June 4, 1963). ✓

3. FUNDING OF C of F SHORTAGES - On March 21, Dr. Seamans signed approval documents providing additional authority for the following projects: FY 1962: Project 3365-Liquid Hydrogen Facility, Increase - \$718,500. Project 3369-LOX Storage, Increase - \$176,500. FY 1963: Project 3474-F-1 Engine Test Stand (Huntsville), Increase - \$1,122,000. Project 3382-Facilities for F-1 Engine Program, Increase - \$2,443,000. Project 3506-Modifications to Michoud, Increase - \$1,416,000. These projects were included in the list of shortages presented to Mr. Holmes by you on February 7. ✓ Allotment of funds on the FY-62 projects is anticipated early this week. The FY-63 projects require apportionment of funds by the Bureau of the Budget. Headquarters optimistically anticipates apportionment early this week. The Bureau, however, is allowed 10 days to take action. The balance of the projects requiring additional funds will be submitted to Dr. Seamans for approval in a separate package. These reprogramming actions are the type requiring notification of the Congressional Committees. ✓

5. EXPLOSION - At approximately 6:30 p. m. on March 20, an explosion occurred in Building 4704, causing damage amounting to several thousand dollars. A committee has been appointed to investigate the explosion. ✓

6. COMPLEX SHIPPING PROCEDURES: (Reference Haeussermann's NOTES 3-18-63 attached). Mr. Foxworthy is looking into the matter of transportation that was raised by Dr. Haeussermann. Have you given any consideration to the bureaucrats who might be terrorized by the engineers? (Enc. 2) ✓

7. JET FUEL TANK: (Reference my NOTES 3-18-63). I will provide you a separate memorandum with the facts concerning the hangar for the Gulf Stream. ✓

(Enc. 2)

B 3/31

1. SA-6 PRE-STATIC CHECKOUT: Automated pre-static network testing is continuing according to schedule. ✓
2. AUTOMATIC DATA PROCESSING: The Quality Assurance Division initiated its data processing effort utilizing automated machines early in 1960 and it was used early in the Mercury Program. Tabulating equipment, operating personnel and other valuable assistance was supplied by the Computation Division. Systems developed to date are:
 - a. Saturn I mechanical systems checkout history reports.
 - b. Test procedures.
 - c. Measuring instrumentation test information.
 - d. Vehicle electrical component record and engineering order change status.
 - e. Facilities launch support status - including engineering order change status.
 - f. Vehicle component cycles and running time record.
 - g. Vendor code listing (vendors supplying parts or services).
 - h. Certification record (people certified to perform work to NASA standards).
 - i. Procurement review (record of contractual provisions reflecting quality assurance concern). ✓
3. PROJECT 60 LEAD TASK GROUP: Concerning your question on NOTES 3-4-63 GRAU (copy attached), the Project 60 Lead Task Group is a committee composed of a member of the Army, Navy, Air Force, Defense Supply Agency, NASA and chaired by a member from the Office of the Secretary of Defense. This Task Force is charged with planning, organizing, directing, coordinating and controlling accomplishment of Project 60. Project 60 is a joint DOD-NASA effort and its major purposes are to improve the effectiveness of field contract management, be more responsive to buying offices and systems project offices, assist NASA with its increasing contract management requirements with a minimum of additional personnel, and assure continued contract management efficiency in times of national emergency. ✓
4. CALIBRATION ACTIVITIES: Per your request on NOTES 3-4-63 GRAU (copy attached), delinquency rate is defined as a percentage and is the ratio of items not turned in for calibration by the scheduled time over the items requested, times 100. Calibration of gauges and instruments used by the Quality Assurance Division in support of its activities is mandatory, while for the other divisions, it is considered voluntary. ✓
5. IDENTIFICATION AND TRACEABILITY REQUIREMENTS: Concerning your question on NOTES 3-4-63 GRAU (copy attached), Traceability Requirements are in NPC 200-2, "Quality Program Provisions for Space System Contractors," which is a contractual requirement in all major MSFC contracts, except S-IV. Revision B is further amplification and clarification of these requirements. Its intent is that the contractor must be able to trace selected parts and components back to the supplier's test, process, fabrication, raw material, and inspection phase for the purposes of replacement of limited life items, performance of periodic maintenance, assuring rapid corrective action on succeeding parts, and maintaining interchangeability. ✓

1 Enc:

Attachment 1 (NOTES 3-4-63 GRAU)

1. SA-4 Launch: SA-4 is firmly scheduled with the Range for 28 March, 1330 EST with the count beginning on firing day at T-600 minutes. Simulated Flight Test is in progress. Five-day weather prediction is satisfactory. No technical difficulties at present. Cut-off time for launch proceedings on Thursday is 1730 EST on account of following DELTA launch. ✓

2. SA-5 Schedule: The delay of delivery of the S-1 stage for SA-5 makes a re-evaluation of the overlapping S-IV - S-1 schedule at AMR necessary which is at present in progress. ✓

* *gem* 3. S-H Operations at AMR: ^{what?} NAA gave a briefing last week about their operational plans at AMR. If details work out as they were presented in general, NAA operations would very well match LOC/LVO plans. NAA complained about some shortcomings in communications and the lack of a C-5 operational plan which is in preparation at the moment. ✓

B_{3/31}

NOTES-3/25/63 - HAEUSSERMANN

No submission for this week.

* 1. S-1-5: Decision, based on multitude of improper conditions, was made to refire. Schedule delay of approximately two weeks anticipated.

CONDITION

- a. Engine position 4, P_C out of spec.
- b. Pressure oscillations GOX system.
- c. Engine 1 hot gas leak.
- d. Leaks at all 8 turbine-to-gearbox seal.
- e. Leaks at 7 of 8 GOX check valves.
- f. LOX seal leak, engine 5.
- g. Internal, heat exchanger brackets broken, 2 engines.
- h. Upper, inboard exhaust ducts all deformed. ✓

ACTION

- Reorifice (of major concern)
- Being investigated (of major concern)
- Not clearly found (of major concern)
- Correct improper installation (Rocketdyne)
- Install new; investigate cause
- Replaced
- Replace heat exchangers
- Replace ✓

2. S-IV BATTLESHIP, DAC/SACTO: Two successful duration (470 second) firings, 3/21 and 3/23, completed after premature cutoff (0.5 second) on first attempt. Helium heater system (including step) performed satisfactorily on first duration firing; back-up system tested satisfactorily on second duration firing. Propellant utilization system satisfactory both firings. ✓

3. RL10A-3 ENGINE TESTING, MSFC: First firing of A-3 engine successfully completed Saturday, 3/23, for 40-second intended duration. ✓

4. MTF: Southern Railroad started work on railroad spur from Nicholson, Miss., into Fee Area, MTF, with completion scheduled 6/1/63. "No cost" contract awarded to Southern Railroad, on above, by P&C, 3/14. Mobile District C of E providing pertinent real estate data, etc. ✓

No decision has been received from NASA Headquarters regarding ownership of the telephone system at MTF. The following actions are all being delayed until decision is made:

- a. Acquisition by the Mobile District of present Bell System equipment in Fee and Buffer Areas.
- b. Contract negotiation for construction and installation of switchboard, lines, etc., to serve CE, MSFC, and construction contractors on interim basis.
- c. Decision as to extent of MTF Support Contractor effort required in telephone area.

At last report, letters of approval to proceed with government ownership for both MTF and LOC were on Mr. Holmes' desk awaiting his signature. ✓

B 3/31

NOTES 3-25-63 HOELZER

No report.

B 3/31

NOTES 3-25-63 HUETER

1. LUNAR LOGISTICS SUPPORT: Messrs. Scrivener and Johnson of Mr. Lilly's office were here on Wed. and Thurs., March 20 and 21, gathering background data for the "New Start Programs" nominated by the Office of Manned Space Flight. They discussed with us the lunar logistics payloads and the multiple mission module, primarily from a cost standpoint. They were scheduled to appear before members of Mr. Wyatt's office (NASA Hq) on Fri. When they left, they indicated that for the multiple mission module they would stick to the cost as previously derived for the presentation to Dr. Shea. As far as payloads are concerned, we were of little help and they will have to use figures included in their initial estimate. ✓

We have now organized groups from my office, LOC, and Research Projects Division to come up with an approach for implementation of the payload development program as described by Mr. Taylor. Captain Andrews, of Mr. Taylor's office, will be here during the early part of this week to discuss cost schedules as derived by their office. We hope to complete our effort during this week and be ready for discussion with Mr. Taylor on or about Tues., April 2. It is anticipated that during this discussion we will present an approach to a development program for lunar logistics payloads, indicate a feasible development and cost schedule and identify development areas in which FY 63 funding is required. If possible, I feel it would be good if you could sit in on at least a part of Mr. Taylor's discussion. ✓ *H.H. I'd love to B*

* *Jan* 2. MULTIPLE MISSION MODULE: We received authority to expend \$300,000 toward the study of a 3rd stage for OSS applications. ✓ Mr. Salmanson of OSS was here on Thurs., March 21, and gave his comments to the proposed scope of the study. It is now planned that the scope (PPPD) will be rewritten and submitted to OSS the latter part of this week. Inasmuch as Mr. Salmanson indicated that there might be a small amount of additional funds available for this effort, we plan a discussion with Division representatives today to determine how far they can go with the \$300,000 and what additionally they could do with extra funding. This will also be furnished to OSS. The study is supposed to cover the multiple mission module and a study of a possible applicability of the Centaur for the OSS missions. Work is currently underway on a full size mockup for the 3M stage. Cost of this mockup will be in the order of \$150,000. ✓

H.H.
Is that the new designation for the sausage? Reasoning? B

B 3/31

1. NOVA

a. The three days (Tuesday, Wednesday and Thursday) of NOVA meetings were completed and the comments which have been received to date have been favorable. The Thursday meeting, which was a summary held for the Division and Office Directors and Branch Chiefs, as well as Washington representatives, was well attended. ✓

b. Plans for the near future are as follows:

(1) During the next two weeks, those people primarily connected with the NOVA activities (basically the NOVA Management Team) will review the data again and establish a recommended set of NOVA concepts, and plan for the System Comparison Phase (Part II). This phase will involve a more detailed look and comparison of the selected 3 or 4 concepts and will run from April to September 1963.

(2) A tentative date has been set for the NOVA presentation to the MSFC Board (probably including other persons directly involved) for April 10, Director's Conference Room, 1:30 p.m. - 4:30 p.m. ✓ The purpose of this meeting will be to obtain concurrence of MSFC on the recommended NOVA concepts and plan for Part II of the study. A dry run of this presentation will be held for the NOVA Management Team on April 9 in the P&VE Conference Room, 8:30 a.m. - 12:30 p.m. ✓

(3) Pending MSFC approval, briefings have been tentatively set up for Headquarters on April 16 and 17 to obtain Headquarters concurrence, as well as to present in more detail the results of the study to date. The latter purpose is for those Headquarters personnel which were unable to attend the MSFC meetings last week.

c. Reference your comments on my 3-4-63 NOTES about the use of the \$185,000 of NOVA money for advanced propulsion technology - we had received Headquarters approval and the experiments would be directly aimed at NOVA. Also, as a result of your note and comments from Gorman and Hardeman regarding NOVA money to pay for Brown Engineering support - (1) The money was transferred to P&VE several weeks ago with their agreement that it should be spent for Advanced Propulsion Technology, and (2) There is no NOVA money left for Brown in FY 63. (All NOVA money has been obligated.) Plans are being made, however, for NOVA to "pay its way" in FY 64.

d. In regards to your comment on my 3-11-63 NOTES relating to your discussion with Mr. Holmes about "\$100M for NOVA advanced technology effort in FY 65," we are checking on it and will advise you when we have something to report. If MSFC can get the \$100M in FY 65 for NOVA, it is our opinion that it could be effectively and profitably spent.

H.H.K.
I'd like to discuss this with you. The sooner the better.
B

Will attend →
B

sure!
B

B
3/31

1. Saturn V, S-II Stage: Explosive forming dies are presently being modified by Los Angeles Tool Division. With these modifications which were proposed by our people and with the new organizational set-up we are confident to obtain usable parts in about two weeks from now. As a back-up drape forming on glassrock dies with different methods of quenching is under way. The aluminum mandrel concept is still in the experimental status with subscale tools. ✓
2. Saturn V, S-IC Stage: a. Our meridian weld station is not yet operational due to problems pertaining to the gore trimming and some other minor modifications connected with exact positioning of the vacuum chuck for different gage thicknesses. b. Gore segments for the lower bulkhead for the Fuel Test Container which are 1/2" thick and sculptured are now becoming critical. We had now to direct Boeing to form these segments unmachined and ship them to Ryan for chemical milling. Corrosion (pitting) has been resolved by improved etching procedures at Wichita. ✓
3. Proposed "Vehicle Structural Technology Laboratory": This is the new name for the former "Methods Evaluation Development Facility". We had another meeting with Mr. Crone and other personnel from NASA Headquarters discussing our plans for manufacturing methods and structural development plans including present and future utilization of existing facilities. We had prepared approximately 140 charts showing our contributions in the technology area, our present projects and future material to Mr. B. Holmes (in a condensed form) and hope that this facility will not only be reinstated in the FY-65 C of F Budget but that full recognition to our structural development programs will be achieved.
- * 4. Explosion in Heat Treat Facility, Building 4704: An explosion occurred on March 20th in this facility in an environmental control chamber just after quitting time at approximately 5:30. No personnel injuries were received, property damage amounts to approximately \$5,000. The causes and responsibility is being investigated by a committee.

→ W.K.

What is that? I understood it has been approved under '64 COF-F!!
 (Please notify me at once on status. If some kowtles got in, maybe we can still drive them out!) B

- * 1. SATURN I: S-IV Battleship - A successful propellant depletion firing of 467.5 secs. was conducted on 3-21-63. All systems operated successfully for the full duration. Helium heater operation was successful with the lowest operating temperature of approximately 900°. Step pressurization was utilized in the fuel tank. Cold helium bottle pressure was 560 psia at cutoff. Propellant utilization system operated satisfactorily.
- A successful lox depletion firing of 464 seconds was conducted 3-23-63. The primary objective for the firing was operation of the backup helium system utilizing both the ambient and cold helium bottles. The helium heater was operated for the full duration; however, it was by-passed in the lox-pressurization system. ✓✓
2. SATURN V: - S-IC - Proposal for Modification No. 1 to Contract NAS8-5608 is now scheduled to be submitted by Boeing on 3-27-63.
- Portions of Phase I submittals for the GSE design have been made by Boeing. MSFC is currently evaluating these designs for adequacy and overall compatibility.
- Boeing awarded the following C of F contracts during this reporting period: (1) equipment foundations in Rework and Modification Area, (2) special tool foundations for thrust structure and forward skirt, (3) cranes for the general plant.
- S-II - Informal information from P&VE indicates that the J-2 engine side loads will occur during main stage operation at MTO. The side load problem during main stage operation is not present at Santa Susana Test Facility due to the higher altitude.
- North American Aviation is still investigating means of accelerating the inauguration of the "All Systems" test program at Santa Susana. The contractor's recommendations should have been received by MSFC on 3-15-63. Follow-up action has been inaugurated. ✓
- * 3. APOLLO: On 3-12-63, Mr. Gautraud was briefed, at his request, on the EDS for SATURN I. While favorably impressed, he asked about the EDS ground testing and parts qualification and requested a briefing on this at a later date. ✓
- * 4. MISSION: Office of Applications (O.A.) was informed that MSFC is coordinating the PDP for the calibration sphere bonus payload for SA-7 with MSC and that O.A. will receive positive commitment when PDP and engineering study are completed. ✓ SA-7 plans will be discussed at MSFC with O.A., MIT, NRL, on 3-27 & 28-63. Mr. Jaffee (O.A.) expressed his interest in the experiment to Mr. Holmes, ^{Office} Colonel Warren (O.A., Communication Satellites) was concerned about the time available to MSFC to commit funds to be furnished for the experiment. - TWX from MSC (Frick) indicated that as result of 3-13-63 Systems Review Meeting, bonus payload was no longer of interest for SA-7. MSFC TWX to Mr. Frick (3-20-63) stated that a PDP and engineering studies would be completed. Coordination with MSC on scheduling, etc. is required. Upon completion of PDP and engineering study a decision as to go-ahead by MSFC and MSC can be arrived at. Minutes of meeting (3-13-63) will reflect decision to continue an engineering and management study. ✓

O.C.

Please
keep me
posted
B

Sure!

1. ADVANCED PERSONNEL SPACES REQUESTED - We forwarded a teletype to headquarters last Friday requesting advanced commitment authority for 150 spaces for May and 150 spaces for June. This authority would allow recruiting during the period when qualified applicants are most available. The new people would come on board in June, July, and August. ✓

2. NEW PROGRAM STARTS - Originally, it was expected that headquarters' decision would be received by April 5 on new program starts for the FY 65 budget submission. Meantime, MSFC has been requested to participate in task force efforts being organized by Abe Hyatt to evaluate future projects for Dr. Seamans. So far Mr. Hyatt has outlined three tasks:

Follow-on Communications Satellite
Earth Orbit Laboratory
Post Manned Lunar Landing

Undoubtedly, this will cause a delay in Dr. Seamans' decision on the new program starts. ✓

3. PERT

Assistance to Headquarters - At Walter Haase's request, we will make Ray Crouch of our PERT Office available to assist headquarters in preparation of a work statement for a contract with Management Systems Corporation. The contract is for development of a training program on a new technical management system for facility people. This system is a combination of NASA/PERT and CPM (Critical Path Method), the latter being generally accepted by the construction industry. ✓

* PERT-Micrometeoroid Experiment - M-RP personnel (the Project Manager and Senior Project Engineer) have been taking a very active part in the implementation of PERT on the Micrometeoroid project. With this enthusiastic interest, it appears that NASA/PERT & Companion Cost System on this project will be operational within 60 days from the date the contract was signed!! ✓

B 3/31

*1. PAYLOAD SATURN IB: (Reference NOTES 3-4-63 MRAZEK, paragraph 3, copy attached.) At a MSC Mechanical Systems Meeting, some members of the MSFC Mechanical Integration Panel were given as a handout some unofficial preliminary payload Lunar Excursion Module definitions. Before this information can be used by MSFC, it must be received as an official transmittal from MSC and up-dated as changes take place. If this definition is officially received by 4-1-63, we do not anticipate a design delay. After 4-1-63, this becomes a day-for-day slip in our design schedule.

W.M.
Think we should bring this to Shea's attention?
Sole way to get pressure up on MSC!
B

2. RELIABILITY OF TITAN IIIA: The Office of Space Sciences (OSS) has requested information regarding the reliability of TITAN IIIA for BIO-Science Missions. OSS says this is only a study at this time and actual details of the investigation were not divulged. The TITAN IIIA information requested was not available. ✓

See. r
admission shadow!
B

3. BRIEFING FOR DR. SEAMANS: Harry Finger has requested that the Nuclear Vehicles Project Office (NVPO) this Division, prepare a briefing for Dr. Seamans in order to accelerate NASA Headquarters' actions on RIFT. Mr. Novik will arrange this briefing after discussions at MSFC with NVPO personnel on 3-26-63. The date of Dr. Seamans' briefing will be established after Mr. Novik's visit. ✓

URGENT

*4. POTTING COMPOUNDS: Since becoming aware, for the first time, of a potting problem of the Astrionics Division indirectly on 3-7-63, this Division has been providing technical assistance in the qualification of another potting compound, and in the modification of procedures. Additionally, this Division is coordinating with the Astrionics Division the scope of work of a pending research contract on potting compounds so that the needs of that Division will be satisfied. ✓ ✓

5. RIFT MATERIALS WORKING GROUP MEETING: An exceptionally successful meeting of the RIFT Materials Working Group was held at MSFC on 3-19/20-63. As a result of this meeting, there developed a mutual appreciation of the required scope and depth of the RIFT Materials program between MSFC and contractor personnel. It was observed that the contractor has matured significantly since the inception of the RIFT contract, and that the Lockheed personnel can now speak with a degree of confidence and authority on the various technical subjects. ✓

6. GOX FLOW VALVE HOT COMPONENT TEST SETUP: Increasing the closing time of the GOX flow control valve from five to seven seconds has eliminated discharge pressure fluctuation of the heat exchangers. This valve modification will be incorporated for next S-I-5 static test on 3-27-63.

7. ANSWER TO NOTES 3-11-63 AND 3-18-63 GEISSLER: Will be forwarded under separate cover.

8. FY-63 PROCUREMENTS: This Division has approximately 160 procurement actions in process at this time. We foresee problems in getting all of these actions under contract this fiscal year due to the volume of work at the Procurement and Contracts Office.

↑ Harry G.
Please look into this
B

NOTES 3-25-63 Rudolph

B_{3/31}

No Notes.

B3/31

NOTES 3-25-63 Stuhlinger

NEGATIVE REPORT

1. S-IV BATTLESHIP TESTING STATUS: On 3-20-63 an attempt to run a full-duration hot firing was terminated 0.52 seconds after start. Loss of helium heater igniter talk-back signal gave cutoff.

On 3-21-63 a 467.5-second run with LOX depletion was made. The helium heater operated during the complete run. ✓ *Meantime too close!* B

2. J-2 ENGINE: Our two stage contractors will be informed that the presently quoted J-2 engine NPSH valves are valid for the very first engine deliveries, and that they, therefore, must strengthen their designs as applicable to meet these requirements. 3/31

LOX and hydrogen pumps with redesigned inducers allowing for reduced tank pressures again are planned to be available in mid-1964. This will possibly call for somewhat heavier early tank structures, etc.

*3. F-1 LATEST INJECTOR INFORMATION: "Wagon wheel" design injector dampened out upon bombing at 1400K (?) thrust level.

This is kind of a "first" and might be a valuable lead to a solution of our problem. ✓

*4. F-1 STABILITY STATUS: We are starting to pull back the first group of our people which we sent to Canoga Park to help out Rocketdyne on a temporary basis. Rocketdyne expressed gratification about our fast action in helping them. ✓

*5. F-1 PUMP IMPELLERS: (Per E. Rees' request.) In a further effort to decouple the combustion chamber from the feed system, we also plan to conduct testing with a number of impellers with different numbers of volutes.

Three different models of LOX impeller and three different models of fuel impeller were designed and ordered (to be available for testing by the end of March or April 1963). Three of these impellers (one eight-vaned model, for use with LOX, one six-full-vaned model for use with fuel, and one six-partial-vaned model for use with fuel) are to be available in full size for testing by the end of May 1963. ✓

*6. F-1 TURBINE: An investigation of the F-1 turbine blades has been initiated. The blades on the first disc have experienced cracking and erosion on the leading edge, which results in six to fifteen percent decrease in turbine efficiency. The fixes used so far have been (a) reduced inlet temperature and (b) grinding back the leading edge, neither of which have been completely effective in preventing further cracking. An entirely new turbine has been designed (optimized for the present F-1 conditions) with hopes of solving this blade cracking and some of the other nasty turbine problems, e. g. manufacturing, materials, choice, etc. Delivery date is programmed for 1965 (27th engine). ✓

OFFICE OF DIRECTOR

MSFC ROUTING SLIP				
	CODE	NAME	INIT.	<input type="checkbox"/> ACTION <input type="checkbox"/> INFORMATION
1	M-DEP-ADM			
2				
3				
4				

REMARKS

*For information only.
No action required.*

CODE M-OIR	NAME	DATE 4-4-63
---------------	------	----------------

3/29/63

Memorandum

TO Dr. von Braun, M-DIR

DATE MAR 26 1963

FROM Director, Propulsion & Vehicle
Engineering Division, M-P&VE-DIR

✓
B

SUBJECT Answer to NOTES 3-11-63 and 3-18-63 GEISSLER

REFERENCE: NOTES 3-25-63 MRAZEK

1. The Structures Branch, Propulsion and Vehicle Engineering Division, has for some time been well aware of the possibility of buffeting loads and aerodynamic noise existing over the vehicle structure during the boost phase. In fact, enclosure 1 shows that this branch recognized the problem and brought it to the attention of the Aeroballistics Division. Enclosure 2 shows that approximately ten weeks later Dr. Geissler took action to initiate a wind-tunnel test.

2. During, and after this time interval, members of the Structures Branch met several times with personnel from the Experimental Dynamics Branch of the Aeroballistics Division to discuss the test program, recommend instrumentation and discuss reduction of test data.

3. It was decided that due to a lack of funds for contractual coverage, and lack of capability of the Aeroballistics Division to adequately analyze and/or reduce the test data; the Structures Branch would analyze the data after raw data was reduced by the Computation Division to the power spectral density plots as required. This is shown by enclosure 3.

4. Due to machine analyzing problem areas in the Computation Division, they are just now starting to analyze the test data which was made available to them the last week of December 1962. It will take the Structures Branch several months to perform overall detailed analysis of these data. This data is required to determine whether or not there are any structural problems in the area of:

- a. Possible shielding for human occupancy.
- b. Sensors being excited.
- c. Fatigue failures.
- d. Panel Flutter.

L.M.

We are spending over 20 M this fiscal year on all kinds of things to advance technology with P&VE handling a major portion.

I fear to see why we "lack funds" for this vital task! B 9/9

SUBJECT: Answer to NOTES 3-11-63
3-18-63 GEISSLER

MAR 26 1963

5. The reason for our original request to the Aeroballistics Division was to obtain test data in the areas of vehicle protrusions, change of vehicle geometry, etc. Upon completion of evaluation of the final wind tunnel data, our acoustic and vibration specifications, loads, etc., will be modified to account for effects of aerodynamic noise.

6. The March 6, 1963 meeting, referred to by Dr. Geissler, was attended by two Structures Branch personnel after some difficulty. We were originally invited to attend with four spaces allotted to us, however, when the Aeroballistics Division was informed we were not in a position to present our power spectral density data, we were cut to three spaces and finally after discussions between the Structures Branch office and Mr. Holderer, we were given two spaces. The purpose of this meeting was to exchange first preliminary data among the various people running tests in this area. These were George C. Marshall Space Flight Center, Douglas Aircraft Company, North American Aviation, Inc., Langley Research Center, Lockheed Missiles and Space Company, and Ames Research Center. Douglas Aircraft Company personnel applied their data to the S-IV stage, in particular the blow-out panels, and found the present design to be adequate. This information was presented in handout form at the meeting and all attendees received copies. Studies by the Structures Branch, as mentioned above, will check these results.

7. The preliminary data as presented by Douglas Aircraft Company does seem to verify that high aerodynamic noise will occur at various stations on the vehicle. These data are considered routine verifying results of previous programs such as aerodynamic noise excitation measured in the MERCURY-REDSTONE instrument compartment and capsule adapter.

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8. This is a complex structural problem area; however, we feel that we have developed adequate techniques, and are further refining these techniques, to serve as engineering tools to handle the problems listed in paragraph 4a through 4d.

9. In addition, it should be noted that the Structures Branch was the initiator of the request for installation of microphones to be flown on the Block I and Block II vehicles to further study these problems and verify wind tunnel tests.

W. A. Mrazek

W. A. Mrazek

4 Enc:

1. Memo No. M-P&VE-SD-75-62
2. M-AERO-DIR Memo dtg May 10, 1962
3. Memo No. M-P&VE-SD-397-62
4. NOTES 3-18-63 GEISSLER

Copies to: See page 3

2

SUBJECT: Answer to NOTES 3-11-63 and
3-18-63 GEISSLER

MAR 26 1963

Copies to:

Dr. McCall, M-DIR (20 cys)
Dr. Rees, M-DEP-R&D
Mr. Burrows, M-P&VE-REL
Mr. Belew, M-P&VE-O
Col. Fellows, M-P&VE-N
Mr. Palaoro, M-P&VE-V
Mr. Goerner, M-P&VE-F
Mr. Schulze, M-P&VE-E
Mr. Kroll, M-P&VE-S
Mr. Paul, M-P&VE-P
Dr. Lucas, M-P&VE-M

Memorandum

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TO M-AERO-DIR

FROM M-P&VE-SD

N. Showers/539-0741
DATE February 23, 1962
M-P&VE-SD-75-62

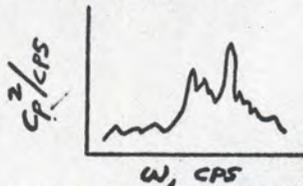
SUBJECT Buffeting Loads on Apollo Saturn

Reference M-AERO-A-4-62, Dated 16 January 1962, "Buffet Loads on Saturn Block II Vehicles"

1. The reference memo presents incremental buffet normal force coefficient distribution over the Block II Vehicle due to unsteady aerodynamics caused by the Apollo tower and blunt shape.

2. M-P&VE-SD is utilizing this information for determination of gross loads for the SA-5 configuration. However, in order to accurately define local effects of these buffeting pressures, such as individual panel fatigue characteristics, additional information is required.

3. Power spectral density plots of the pressure coefficient should be presented as indicated below (typical):



4. If available, this data should be presented for each pressure transducer, including variation with Mach No. over the trajectory range. Longitudinal and circumferential location of the transducers are required.

5. Similar data as mentioned above and in the referenced memo are required for the C-5 configurations.

W. A. Mrazek

W.A. Mrazek
Director

Propulsion and Vehicle Engineering Division

Copies to:

M-P&VE-DIR, Mr. Hellebrand

-SD

-SDC

M-AERO-DIR

-TS, Mr. Reed

-A, Mr. Linsley

MSFC - Form 488 (August 1960)

enc: 1

hmt

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO Mr. Ferguson, M-SAT

DATE May 10, 1962

FROM Chairman, Vehicle Dynamics and Control Working Group,
M-AERO-DIR

SUBJECT Scope of Intended Wind Tunnel Investigation of SA-5 Acoustical
and Static Pressure Environment

1. A need exists to determine the acoustical, dynamic and static pressure environment over the S-I and S-IV stage juncture of SATURN Block II vehicles. (See enclosure). The relative bluntness of the 45 degree transition frustum causes local pressure rises to where the flow becomes separated particularly at low and moderate supersonic speeds. Oblique shock waves emanate from these separated regions which intersect local normal shocks ahead of such protuberances as the S-I stage I-beams, retro-rockets, and recoverable camera packages. This phenomenon leads to unsteady flow conditions particularly over the S-IV "blow out" panels. At sufficient energy levels panel flutter is induced and components within the S-IV engine compartment may be damaged. Inasmuch as the extent of turbulent boundary layer separation is affected by Reynolds number as well as Mach number, it becomes necessary to conduct model tests in a facility capable of a rather wide stagnation pressure operating range. All circumstances considered, (familiarity with the problem, availability of a suitable facility, our present heavy workload in-house) it has been determined that the Douglas Corp. could handle the project most expeditiously. The Douglas 4-foot supersonic wind tunnel adapts well to this requirement. Douglas would design and fabricate the model incorporating all instrumentation for acoustical and pressure data to determine the sufficiency of the present design.

2. Funding to complete scale model wind tunnel tests in the Douglas 4-foot supersonic wind tunnel are approximated at \$135,000.00. This figure includes wind tunnel occupancy time, model fabrication and instrumentation, test conduction, and data reduction and analysis in the form of power spectral density. Your prompt attention will be appreciated.

E. D. Geissler
E. D. Geissler

Enc: Memo M-P&VE-SD-75-62

Copies to:

Mr. Dahm, M-AERO-A (w/o enc.)
Mr. Kroll, M-P&VE-S (w/o enc.)
Mr. Showers, M-P&VE-SD (w/o enc.)

Mr. May, M-AERO-E (w/o enc.)
Mr. Few, M-AERO-EE (w/o enc.)
Mr. Holderer, M-AERO-E (w/o enc.)

Enc: 2

L. Howell/539-0743

Mr. Jack Jones, M-COMP-RE

August 16, 1962

CEG

Chief, Structures Branch, M-P&VE-S

M-P&VE-SD-397-62

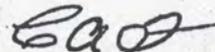
NS

**Reduction of Dynamic Pressure Measurement Data Obtained from
Wind Tunnel Model Testing.**

1. A 2.75 percent scale model wind tunnel testing program will be conducted by Douglas Aircraft Company. The testing is scheduled to begin September 25th and will be under the direction of Aeroballistics Division. During the testing program, dynamic pressure measurements will be taken for M-P&VE-SD, and it is anticipated that the data will be available for reduction about the middle of October.

2. There will be approximately 4000 samples of data over a frequency response of 300 cps to 90,000 cps for the scaled data as it is recorded during tests. This will be analyzed such that the final results will be applicable to full scale use. The full scale range for this data will be approximately 10 cps to 3000 cps.

3. All measurements will be analyzed for PSD vs frequency, and part of the measurements will be analyzed for auto and cross correlation. The approximate number of auto and cross correlation measurements will be furnished at a later date.


G. A. Kroll

Copies to:

Mr. Moore, M-COMP-R

Mr. Showers, M-P&VE-SD (2)

Mr. Johnston, M-P&VE-SDB

Mr. Cassaway, M-P&VE-SDE

Enc: 3

