

May 6, 1963

RECEIVED
MAY 10 1963
U.S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D.C.

Dr. von Braun

NOTES TO HOLMES - 5/9/63 - DEBUS
(Scheduled for 5/7/63)

1. Memo of Agreement, MSFC/LOC: Was signed by Dr. von Braun on May 6th. (Copy attached for your perusal.) The agreement is in full accord with our discussion and with the approved LOC organization signed by Dr. Dryden. Transfer of LVOD personnel to LOC was accomplished on May 5th.

2. Umbilical Carrier for Saturn S-IV Stage: On April 25, 1963, a decision was reached by representatives of Saturn Systems Office (MSFC), Test Division (MSFC), and LOC, to use the LOC designed umbilical carrier (containing the propellant couplers) of Swing Arm No. 2 for S-IV stage of Saturn SA-5 vehicle, in lieu of the Douglas Aircraft Company (DAC) designed umbilical carrier and propellant couplers. Saturn Systems Office will notify DAC regarding this decision and have DAC make the necessary changes to the S-IV stage. (For engineering reasons and details, see attached summary.)

3. LOC Council: The first meeting of the LOC Council was held May 2nd. The following items were on the agenda:

- (1) LOC Organization - LVO Relationships
- (2) Identity of MSC/MSFC on Buildings
- (3) Lead Center Idea for Quality Assurance
- (4) Flight Capsule for the Space Museum, MILA
- (5) GSFC Participation in LOC Advisory Council
- (6) Support Contractors
- (7) OMSF Management Council Report



Minutes of these meetings can be sent to you if you so desire. Please notify.

4. Complex 37B Wet Test: Progress on the wet test over the past week is as follows:

a. RP-1 components, simulated fill, and sequence malfunction tests have been completed satisfactorily.

b. S-I full pressure tests completed.

c. S-IV leak tests and connection of S-IV umbilicals are underway.

d. LH₂ heat leak test will be rerun to check line contamination encountered in previous tests. We have found evidence of contamination in the LH₂ transfer line on Complex 37B. This contamination was picked up on a filter during a hydrogen flow test performed to check the transfer line, vent line and burn pond. (Unfortunately the LH₂ transfer line was not designed with the capability of being cleaned. This deficiency was caught in time to incorporate a change on Complex 34, however.) The present plan is: Run another line-flow test to ascertain whether we have removed enough of the contamination so that we can flow into the S-IV tank. If we have to perform a modification on the LH₂ line to clean it prior to tanking the S-IV, our wet test schedule will be in jeopardy. As of today this does not as yet affect the SA-5 schedule.

e. A break in the water line caused a two-day delay in the hydrogen flow tests.

f. Because of deletion of requirement to perform umbilical eject tests and numerous schedule rearrangements, a revised overall wet test schedule will be published late this week. (11 May)

The S-1D is on schedule. The S-IV is approximately two days behind schedule, which will not delay completion of the wet test.

g. (NOTE: As of 9 May, an MSFC directed modification to the baffles in the S-1D lox tanks indicates a two week extension of the wet test schedule. This will not affect the SA-5 launch schedule. The revised wet test schedule will reflect this.)

5. Procurement of Launcher Umbilical Towers, Complex 39: Invitations for Bid were advertised on February 18. At that time, opening of bids was scheduled for May 10. Recent design changes by the architect-engineer make it necessary to delay the issuance of final drawings and specifications. Therefore, opening of bids has been rescheduled to May 20.

6. Florida Legislative Visit: As indicated in my notes last week, this group will visit AMR this Saturday. A joint presentation by AFMTC and LOC will be made to the group to further their understanding of the impact area and the need for establishment of an educational institute in the area. Davis and I will co-host.

2 Attachments

1. Engineering Summary
2. Memo of Agreement MSFC and LOC

SUMMARY

Cancellation of Douglas Designed Umbilical Carrier for Saturn S-IV Stage

As of April 25, 1963, a joint decision of MSFC/LOC cancelled the Douglas designed umbilical carrier (containing propellant couplers) of Swing Arm No. 2 for S-IV stage of the Saturn SA-5 vehicle. The decision was made to use the LOC designed system after extensive testing had proven that the DAC system was unsatisfactory.

Historically, DAC had been furnished design proposals by LOC in October 1960. However, DAC discarded the proposals and designed the umbilical system using hardware from Parker Aircraft which had not been used extensively. The equipment was delivered to MSFC Test Division in February 1962 for acceptance testing, and as of March 1963 had not completed a single test series without malfunction. In December 1962 DAC assigned an engineering team to improve the system. Considerable improvement was accomplished but the equipment is not yet reliable, as periodically reported to you. In view of this performance record, LOC began designing a replacement system in December 1962. Hardware was delivered and tests were begun in March 1963. Minor malfunctions were encountered during initial tests. These were corrected and since then operation has been completely satisfactory with no failures. Present plans are to utilize LOC hardware on all S-IV flight stages beginning with SA-5.

Added Information: Improvements made by LOC design:

- (a) Elimination of trapped liquids in propellant loading lines.
- (b) Added valves to prevent vapors or liquids in disconnected propellant loading lines escaping during lift-off to reduce fire hazard and keep line clean.
- (c) Added inert purge to electrical disconnects to prevent possible spark ignition of hydrogen vapors.
- (d) Added electrical ground as per MSFC specs.
- (e) Eliminated sliding surfaces at cryogenic temperatures.
- (f) DAC disconnect normally damaged the air conditioning duct with each operation. This was eliminated.

(g) Reduced installation time from 40 minutes for DAC to 15 minutes for LOC due to reduction of alignment requirements and disconnect weights.

(h) Reduced required pneumatic disconnect pressure from 1500 to 750 psi.



Grant

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9cm

1. VERTICAL ASSEMBLY BUILDING

A meeting was held at Michoud Operations on May 2 & 3, 1963, between Mr. Davis, Marshall P&C Office and Mr. Ward, Ross Corporation to discuss the Ross Corporation's claim for an additional \$1.2 million for the construction of the Vertical Assembly Building. The basis for the alleged increase was design changes in the special equipment foundation. The Ross Corporation is the construction contractor for Phase I of the Vertical Assembly Building. ✓

2. QUARTERLY REVIEW

The fourth quarter program review for S-1 will be held at Michoud Operations on May 14 & 15, 1963. ✓

*
9cm

3. BOEING INTERNATIONAL ASSOCIATION OF MACHINISTS

Boeing employees will vote on May 10, 1963 at 4:00 p. m. nation-wide to determine whether they will accept or reject the company's latest offer. ✓

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gem

Meeting with General Electric Company: Last Wednesday,

Tom Edwards, Henry Auter, Frank Connell, and Henry Williams met with Messrs. Moore, Tierney, O'Kane and Huffman from General Electric Company to discuss the Request for Quotation for support of Mississippi Test Operations. After a presentation on the location of MTO and the facilities to be constructed, two groups were formed; one to discuss Plant Support and one to discuss Test Support and to answer the various questions. General Electric personnel will return on May 20, 1963, with their submission. ✓

B 5/8

1. Acoustic Environment on Apollo Spacecraft: MSC's concern about the high acoustic energy level (168 DE) behind the spacecraft shoulder (comment by Dr. Gilruth in Management Council Meeting) has been discussed with MSC's cognizant expert. MSC is concerned about the excitation of shell or panel modes and this possibility is directly proportional to the spatial correlation of the pressure field. Some information on the spatial correlation can be obtained from further analysis of Saturn Block II W. T. data and other unpublished data at ARC. MSC is concentrating on getting environmental and response data from the SA-6 flight. Every effort should be made to obtain sufficient flight data on the complete vehicle during Block II flights in order that the acoustic environment can be evaluated. It should be possible to stabilize the boiler plate structure of Block II Spacecraft with the internal application of a damping material.

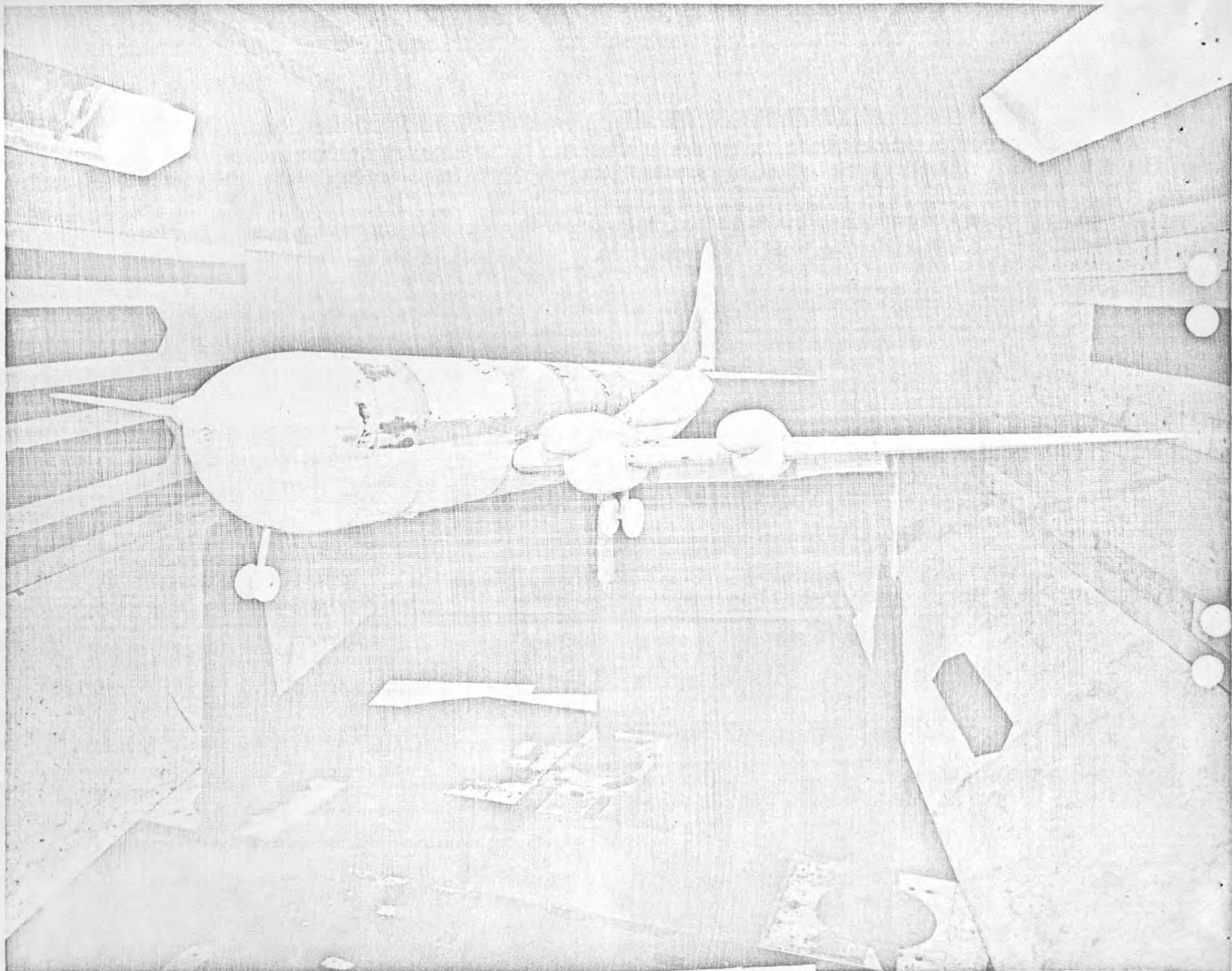
The possibility of an aerodynamic fix is remote, other than the much discussed shroud or a spacecraft configuration change. (See sketches in back-up material). A ring shroud at the shoulder might work at subsonic speeds but would probably choke at transonic and supersonic speeds. The primary source of the large oscillatory pressures is the unstable shock wave behind the shoulder and the only real solution is to reduce the expansion angle. The situation is complicated by the separated wake from the tower and various protuberances near the shoulder which would tend to nullify any localized "fix."

2. Saturn Dynamics and Control Working Group Meeting: At this meeting held May 1, 1963, it was agreed by DAC and MSFC (P&VE, ASTR and AERO) that the S-IV stage of SA-5 should employ depletion cut-off. The depletion cut-off method helps to guarantee an orbital lifetime of one day.

3. Guppy 2 Wind Tunnel Test: In the presence of engineers from Aeroballistics, Test and Northrop Corp., wind tunnel tests on the Guppy 2 (proposed air transporter for S-IVB stage) were completed at Boeing last week. The attached photographs show the "before and after" configurations of the KC-97 that were tested. Fantastic as the plane may look, a very cursory glance at the data suggests that the Guppy 2 might indeed become flight worthy even though the tested configurations showed some directional instability and pitch-up for landing conditions. Ventrals, end plates, or similar fixes may do the trick. Test data and stability analysis is now in progress and the final recommendation will be forthcoming by the middle of June.

4. Mission Control: Several MSFC personnel, including Dr. Speer, participated in Mercury flight simulations upon invitation by MSC. The launch simulations started at "X-15 min" and were only carried thru acquisition from Canary Island. Each of the runs contained several (perhaps too many) failures unknown to the simulation crew. Interestingly, the simulator exhibited several unprogrammed failures which, of course, are not typical for what may happen in a real flight. Astronauts participated actively.

Dr. Kvaltnes
 Is MSC still sucking the idea of any shroud? (see attached sketches) Now MSC is in trouble itself with this noise! Please explore this. Let's try to see how a shroud proposal on MSC, it's described in attached backup notes
 B

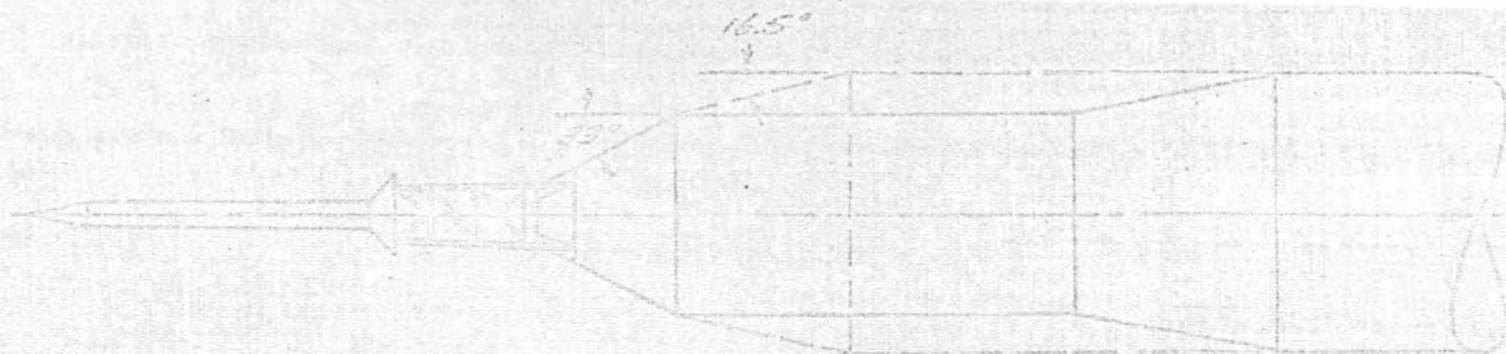


ORIGINAL KC-97 (WITH EXTENDED FUSELAGE)



2A75075-2

PROPOSED CONFIGURATION



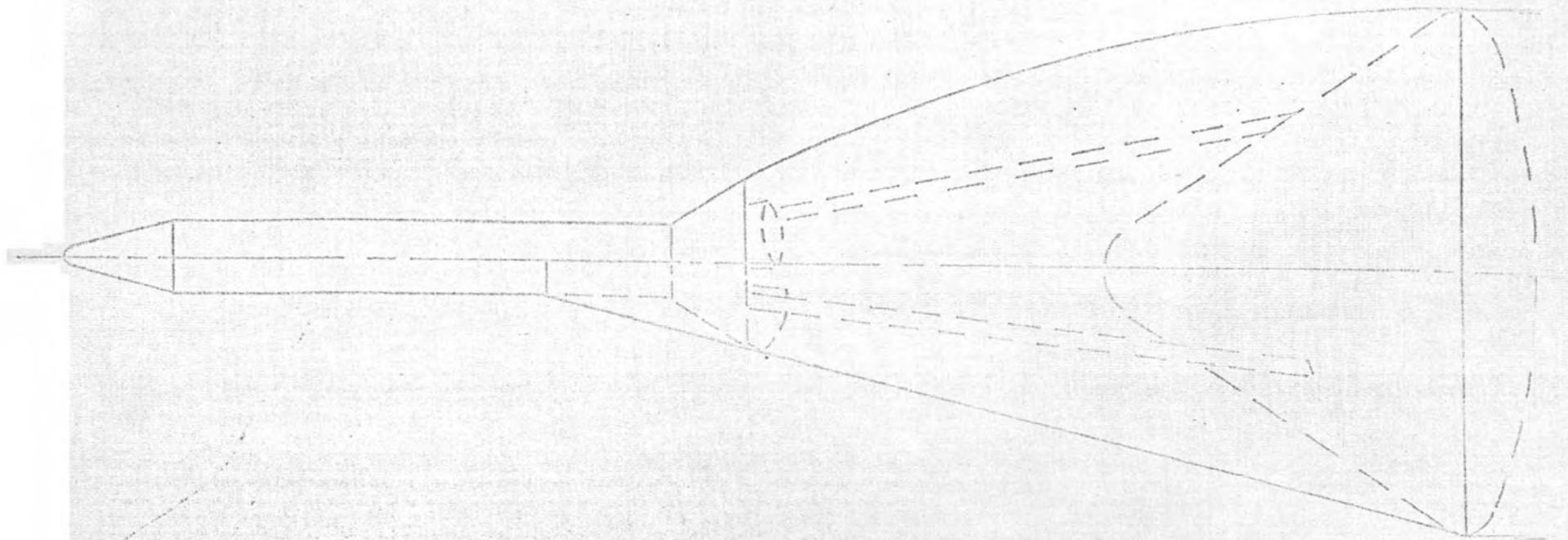
APOLLO SHAPE TO REDUCE BUFFETING

Proposed by A.L. Erickson
Ames Research Center

M-4830-AA 6 MAY 63

FIGURE 1

APOLLO
WITH CONICAL AND OGIVAL SHROUDS



M-AERO-AA, 3 MAY 1963

FIGURE 2.

Back Up Data for

Weekly Notes - M-AERO-A - May 3, 1963

Apollo Shroud

Due to the magnitude of the energy levels of unsteady aerodynamic pressures on the Apollo vehicle, a survey has been made of possible fixes.

In the past, various modifications have been proposed. A re-design of the service module as shown in fig. 1 reduced the transonic shock buffeting strength behind the shoulder but did nothing to reduce the flow separation and wake from the tower. A ring shroud around the shoulder of the command module, as proposed recently, would reduce subsonic flow detachment at the corner, but cannot suppress the transonic shock buffeting, which is the main source of pressure fluctuations.

A logical aerodynamic solution for solving all the buffeting problems remains the same as originally proposed in 1961. This was first, a full shroud which then evolved to a partial shroud as illustrated in fig. 2. Two shapes are shown, conical and ogive, each having slight advantages in some areas. MSC had always objected to a shroud. First, personnel escape from the capsule is hindered; an access door must be provided. Second, capsule-mounted antennae must have hard line connections to shroud-mounted antennae or the shroud must be transparent to RF. Finally, the requirement for abort stability required shroud ejection or porting of escape rockets along with stability augmentation. The short time sequence of escape generally precluded shroud ejection.

The present proposal is to utilize a partial shroud that is passive and frangible. This could possibly be obtained with a low density, foam type material that would inherently be transparent to RF. An aluminum

Dr.
Kuehner!
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shroud of this size will weigh about 500 lbs. Some relatively large thickness of plastic foam (6 to 12 inches) could be selected that could carry the same aerodynamic loads as the metallic shroud. This would depend on the density and strength characteristics of the plastic. Non-porous plastics are available that will retain structural integrity of the composition even as external pressure reduces rapidly to a vacuum value.

In an abort situation, the shroud performs as follows: The internal pressure rise due to ignition of the escape rockets would disintegrate the shroud whose density was selected partially on this basis. Another density criteria is that any chunk that is propelled toward the command module, would not penetrate, but would dissipate its kinetic energy in crushing of the foam. This process is passive and would remove the destabilizing effect of the shroud.

Under normal separation conditions, shortly after second stage ignition, the shroud would be either carried away or blown away by the normal removal of the escape rocket.

Since the shroud would be removed shortly after first stage cut-off, it represents a probable gain in performance as compared to any fix to the Apollo system that is carried throughout the flight. The weight addition of the shroud would also be partially compensated by the aerodynamic drag reduction and the structural saving on the service module due to the extreme reduction in buffeting loads.



NOTES 5-6-63 GORMAN

B5/8

Negative Report

1. S-I-5 POST-STATIC CHECKOUT: Post-Static Pressure and Functional Tests continue with significant progress being made. Completion of this phase is expected on May 7, 1963, and then the vehicle will be moved from the Bldg. 4705 pressure cell to the Bldg. 4708 WAAMAC area. ✓

2. SA-5 INSTRUMENT UNIT CHECKOUT: The performance testing of the SA-5 Instrument Unit is progressing on schedule in Bldg. 4708. Instrumentation and Guidance and Control Systems are presently undergoing checkout. ✓

* 3. S-IV-5 STAGE: The S-IV-5 Stage has been in rework at Sacramento, California during the past two weeks and is expected to remain in rework at least another week. On April 30 there were 116 Douglas Aircraft Company fabricated items and 50 vendor furnished items which were not available for installation. When the vehicle was received at Sacramento, 146 work orders were outstanding; however, 69 of these have been completed.

Quality Assurance Division representatives are at Douglas Aircraft Company this week in a splinter meeting of the Systems Checkout Working Group to make firm plans regarding S-IV-6 checkout in Santa Monica and S-IV-5 checkout at Sacramento. Immediate problem areas revolve around review and approval of test procedures, although a considerable amount of discussion will be devoted to improvement of testing techniques. ✓

4. AGREEMENT ON RF/TM/INSTRUMENTATION CHECKOUT EQUIPMENT: An agreement has been reached with the Astrionics Division that the Quality Assurance Division will represent MSFC to stage contractors for design of stage checkout equipment in the RF/TM/Instrumentation area. A presentation on this subject has been scheduled for you on May 22nd. ✓

5. PARTS PROGRAM: A memorandum of agreement regarding various facets of the Parts Program has been concurred in by Astrionics Division, Propulsion and Vehicle Engineering Division, and Quality Assurance Division, and has been forwarded to Dr. Rees for signature. The Parts Program provides for the qualification and standardization of parts used in flight components and ground support equipment. It is believed that this agreement has removed the last major obstacle to a coordinated parts program for MSFC. ✓✓

6. PLANT REPRESENTATIVE COURSE: The Quality Assurance Plant Representative Course began April 29, 1963, as scheduled, for in-house personnel. Participants are taking considerable interest in the course and their constructive comments will be very beneficial in preparing future presentations. ✓

* 7. QUALITY ASSURANCE INTERFACE MEETINGS: Per your request for suggestions on my NOTES of 4-15-63 (copy attached), I have written a letter to Mrs. Hock, NASA Headquarters, indicating this Division's concern and requested assistance from Headquarters in re-establishing such an interface with the Apollo program, but with proper participation by MSC. Further progress in this area is not known at this time. However, we are continuing contacts with quality assurance personnel in the Apollo Resident Project Office in Downey concerning mutual functions. ✓

1 Enc:

Attachment 1 (NOTES 4-15-63 GRAU)

NOTES 5-6-63 GRUENE

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1. SA-5D: Wet test operations are progressing on Complex 37B. RP-1 test conducted on Saturday, May 4, 1963 will be re-run on Monday, May 6, 1963 due to minor facility problems. ✓

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gm 2. Lox Slosh Baffle Panels: Dr. Mrazek decided Friday, May 3, 1963 that the Lox Slosh Baffle Panels in SA-5D will require reinforcement before lox tests are conducted. He agreed to a possible two weeks delay in the schedule. ✓

B5/8

NOTE-5/6/63-HAEUSSERMANN

Scott
Fellows

What
action do
you
recommend?

1. RIFT/NERVA REVISED INTERFACE ORGANIZATION: Organization proposed in December still has not been finalized. A danger exists that if operation of the revised organization is delayed much longer SNPO-C and Aerojet will not agree to any changes in the NERVA engine by claiming that they have progressed too far to incorporate them. SNPO-C still claims that the control actuator is part of the engine and this point needs to be settled. In addition, if the Lockheed 3-point engine trim concept is adopted, changes will be required in the engine mounting structure. Colonel Fellows seems to need your help by supporting our viewpoints.

B

2. STATUS OF PERSONNEL DETAILED FROM M-SPA: The three men on loan to Mr. Fichtner from Mr. Hueter's office are being released and returned to Mr. Hueter on his request, against our objections. Only two of the original seven are still with us.

W.H.
A deal
is a
deal!
B

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Jan

3. STATUS OF IBM CONTRACT: IBM proposal on Astrionics System Development and Integration efforts has been reviewed and initial contract negotiations are planned for this week. In there are no administrative or legal complications, it is anticipated the contract will be effective in May. IBM local facility is expected to be ready for occupancy by October 1963.

*
Jan

4. SATURN ALIGNMENT LOOPS: A suitable area at MSFC cannot be found to realistically check out the Saturn theodolite and azimuth alignment loops. The loops are now being breadboarded and tested under laboratory conditions. Building and personnel traffic vibration disturbances are making this a very difficult task. To prove out these design concepts, it has been proposed that suitable time be allotted at the LOC Pad 37B. Variables which must be considered are air shimmer noise that is introduced into optical loops and other electrical noise that is picked up operating under actual conditions. A test range of 300 to 500 feet is required with an altitude simulation for a 25 degree look angle at these ranges. This effort has been discussed with personnel at LVOD. W.H.

I think testing on the pad is the only realistic way of doing it. I fully support your proposal. Will this have the effect of an additional delay in the launch date of SA-5? Is it feasible (since the SIV stage is the obvious bottleneck) to run these tests with a dummy SIV prior to assembly of the real SIV onto the first stage? Please explore with Lindstrom & Greene.

B

NOTES 5/6/63 HEIMBURG

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5/8

1. MTF: AETRON to submit proposal on Phase I for Saturn V Technical Systems by 5/20/63. ✓

* Status of MTF cryogenics procurement plan (re NOTES 4/29, Attachment 1) as follows:

9cm a. Urgent Action TWX message signed by Dr. Rees, forwarded 4/23 (attachment 2)*.

b. Headquarters' TWX reply received 4/25, indicating additional information required as stated in Mr. Brackett's TWX dated 4/24, to Mr. Wilbur Davis (attachments 3 & 4)*.

c. Mr. Davis furnished Mr. Brackett information required via TWX dated 4/25 (attachment 5)*.

To date, approval of plan or reply to Mr. Davis' TWX not received. Action being initiated by MTF Working Group and coordinated with Future Projects Office for RFQ to Martin-Denver to cover engineering conceptual study of future large launch vehicle test and support facilities. Contract finalization anticipated late this month. ✓

2. MARINE ACTIVITIES: Two YFNB hulls were inspected 4/30, and are recommended for S-1C barge modifications. Arrangement made to transfer these barges to MSFC and preliminary design for modification is complete. Contract specifications and plans will be completed 7/63. ✓ *Kit. Request some details **

3. S-1-6: Propellant fill test scheduled today. Short duration firing scheduled 5/16; long duration scheduled 5/28. ✓

* 4. S-IV-DAC, SACTO:

9cm All-Systems Vehicle: Following first successful loading, the LN₂ tank was found to have 43 cracks in the Fiberglas sealer around the repaired areas.

A second loading and pressure cycle test is planned 5/7, after which the ASV will be removed and stand 2-B made ready for S-IV-5. ✓

Battleship: Four lox chilldown tests, simulating the pressure conditions occurring at S-1 engine burnout, were successfully conducted. There were no signs of oscillations or flash boiling in the suction line, indicating good conditions for engine start. ✓ *But how about acceleration effects?*

Two 10-second firings successfully conducted, 5/3. Fuel fill and drain valves continue to give difficulty by freezing in open or closed position. ✓ *B*

A 7-minute, 24-second duration firing successfully conducted on 5/4 with no He bubbling of lox and single igniter on He heater. The He heater survived the pressure step at 4 minutes 10 seconds. ✓ Thrust controller on No. 5 engine froze up indicating moisture. Cold gimbal test planned Wednesday, 5/8, after which the Battleship will be removed and stand modified for S-IV-6. ✓

S-IV-5 Status:

- Fifteen parts delivered, reducing the parts shortage to 136.
- He heater arrived at SACTO.
- Checkout procedure review location not settled (Santa Monica or SACTO).
- A-3 fuel discharge manifold change out to A-1 or weld spool fix, not settled. MSFC favors A-1 parts for S-IV-5.
- 140 component parts qualification tests remain to be completed. ✓

* Attached to Dr. von Braun's Copy Only.

ATTACHMENTS as stated.

B 5/2

NOTES 5-6-63 HOELZER

* 1. *gem*

JUMP MEMORIAL AWARD: William H. Fortenberry, Chief, ADPS Branch, was selected for the William A. Jump Memorial Award this week. This is quite an honor since this award is only made to one individual in the entire government each year. This year NASA was selected as the agency to receive the award and out of many NASA nominees Mr. Fortenberry was selected. We feel that this honor is significant enough to warrant personal congratulations from you. [The award will be made in Washington on May 17, probably by the Secretary of Agriculture. ✓

Bonnie
Please →
arrange
with Vic
and Barb
B

2.

MODERNIZATION OF COMPUTING EQUIPMENT: The last IBM 705 was moved out of Building 4491 on May 3. The 1410 is now our basic large computer in the commercial area and we expect another 1410 will be required by fall to handle the growing Data Center workload. The 1410 is more economical, faster, and more powerful than the 705.

(If my arithmetic is right : 2 x 705 = 1410 B)

H.H.
Has about
the
Nature of
contract?
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1. LUNAR SUPPORT PAYLOADS: The work statements covering the five planned areas of study effort are in P&C and requests for quotes are ready to be mailed. No funding has been authorized. The latest indications are that Wednesday, May 8, is the earliest date we can expect funding. The RFQ's will not be released prior to funding approval. Should the approval slip past May 8, OMSF will endeavor to get authority to hold these monies over; otherwise, the likelihood of contracting with FY 63 funding would appear impossible.

* 2. MULTIPLE MISSION MODULE/VOYAGER STUDY: Efforts are being made to contract for the Centaur portion of the requested Office of Space Sciences study. Initially it was thought that contracting this effort from STL would be most prudent. Because of STL's current effort in a Centaur evaluation for Lewis, some of the people within the Office of Space Sciences feel that such action may compromise the Lewis task. General Dynamics/Astronautics was considered but are not desired by Astrionics. Douglas has been suggested by P&VE as a possible source. The final selection of a contractor will be made after a Tuesday's discussion with Dr. Morrison, OSS. Currently the plan is for the selected contractor to perform Centaur studies only and the integration of this stage with Saturn will be accomplished by Marshall divisions.

Outcome?
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1. SATURN V PLANETARY CAPABILITIES

On the margin of last weeks NOTES you asked the question what is being done in the area of SATURN V manned planetary capabilities. Here is a short summary:

a. Lockheed is performing a study on minimum energy profiles for Venus and Mars flyby missions which can be performed with a few SATURN V flights and orbital operations. Dr. Shea originally did not like this study too much. I had to make an extra trip to Washington (in February) to convince him that this study is needed to fill a gap in our knowledge. P&C is now negotiating the next phase of this Lockheed contract.

b. We have a study with Chance Vought (\$350,000) entitled "Advanced Orbital Operations" in which we will identify and define individual development problems and packages, whereby the SATURN V refueling and docking operation will play a primary role.

c. We are presently trying to initiate a small in-house study (3 to 5 man years) which will attempt to describe such a manned SATURN V planetary mission in enough detail that we can evaluate its problems, timing and cost. We will base this study primarily on Joe DeFries' previous orbital mode study where very good material was developed. The planetary mission, however, will take place quite a few years later than the lunar mission studied by DeFries.

We believe that these studies will give us a pretty good feel for the problems involved and the attractiveness of such a mission. On the other hand, we will not make an all-out effort in this area at this time.

O.K.
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→ If you agree, we will increase our effort on this mission study early next fiscal year when new money becomes available.

H.H.K. These studies should include NERVA and electric propulsion for deep-space portion

2. ARTIFICIAL GRAVITY TEST

Following your suggestions, we have initiated an in-house study on a minimum space laboratory project which is an outgrowth of the APOLLO program. Our basic goals are:

of trip, of course, B

- a. Minimum hardware modification on SATURN and APOLLO,
- b. Possibility of spin-up on a minimum radius of 100 ft,
- c. Multi-Center team effort with industrial support,
- d. 1968 availability,
- e. Low cost,
- f. Six-month operating time.

It now looks like two SATURN I flights requiring one docking operation might meet all the goals stated above.

Don't forget that Sat I will be phased out and replaced by IB. There will be no Sat I's in 1968!! B

1. Saturn V, S-IC Stage: (a) Last week the eighth gore was assembled into the upper bulkhead of the fuel test container with a successful close out meridian weld. The next steps are to trim the base of the bulkhead, weld in the "Dollar Piece", then weld the "Y"-ring to the bulkhead. (b) Modifications are being made to the fixture for welding skin panels into cylinders. Due to the milled pattern next to the weld land, we are getting an uneven temperature gradient during welding which causes distortion in the skin. (c) We are starting to run weld test panels and test gore segments to certify our welding equipment for the thickness required on the next (lower-fuel test container) bulkhead. The weld thickness runs to .500 on the fittings in this bulkhead compared with .224 on the lower bulkhead. (d) We have finally frozen the design on the S-IC Forward Handling Tool. This tool serves as a rigid end support, maintaining the structural integrity and protecting the stage from damage, safely handling the booster during fabrication, test and transportation operations. ✓

* Jan 2. Saturn V, S-II Stage: In a meeting with NAA at L.A., arranged by Saturn Systems Office, the problems of the common bulkhead were discussed among other subjects. The following actions were agreed upon: (a) To start a back-up program for the forming of the apex gore segments by stretch forming using the stretch forming press at the Northrop plant. We are confident that NAA will produce apex segments for the lower face of the common bulkhead by explosive forming plus correction of the contour by artificial aging. The manufacturing plan for the upper face of the common bulkhead, however, does not allow to correct the contour of the gore segments by aging since aging will be used to size the completely welded upper face bulkhead to the correct contour prior to bonding. Hence, the explosively formed segments for this bulkhead must be produced to close tolerances by the initial forming process. NAA presented cost figures for the back-up program to the amount of \$109,000. (b) NAA recommended and MSFC agreed to start immediately the sub-scale (54") program for the Aluminum Sizing Mandrel. The tool design for this mandrel is complete. It was understood that NAA considers this to be within their scope of work. (c) Finally, the status of the back-up designs for the common bulkhead was presented by NAA including results of tests on bonded doublers for bridging the gores of the upper face. It was agreed that NAA would present a complete manufacturing plan at the next review of the back-up designs. ✓

3. Supporting Research and Technology: We have again been asked by Mr. Pilger and Mr. Crone to give a one-hour briefing in Washington on the 17th of May on our manufacturing development programs. It seems this is one area where they can see tangible results from their support. ✓

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K
1. SATURN I: - S-IV Battleship - After four cold flow runs on 5-2-63 and a 10-sec. hot firing on 5-3-63, a successful Lox depletion test for 444 secs. with one igniter disconnected was conducted on 5-4-63. Helium heater operation was successful, bubbling was not utilized. Step pressurization was utilized and Lox cooldown was 15 seconds. This firing completed the A-3 Hot firing program. ✓

Component Review - A group headed by Bergeler (P&VE) and Ferguson (M-SAT) will review at DAC 5-8-63, the qualification status of all S-IV propulsion, structural and mechanical components. ✓

S-IV SACTO Team - May 6: Messrs. Driscoll and Lindstrom, and Resident representatives from P&VE (2), TEST (3) and QUAL (3).
May 13: Messrs. Heimburg, Reinartz, Dr. Mrazek, plus Resident representatives. ✓

2. SATURN V: S-IC - The F-1 Engine Pump Flange/PVC Duct Flange Load problem is still being studied by Boeing, Rocketdyne, Arrowhead and MSFC. Preliminary load analysis indicated that the pump flange could not carry loads transferred by suction lines. ✓

Having formed one gore successfully, Boeing is following up on pre-sculptured forming. Chem milling is being pursued as a back-up, although some problems have developed in holding tolerances during the process. ✓

S-IC/F-1 Engine Peculiar GSE - An assembled F-1 Engine mock-up was delivered on the first F-1 Engine Airborne Handler to ME mock-up area on 5-2-63. ✓

✓
MTO S-IC Complex - Re Notes 4-29-63 Lange (Attachment 1). A meeting is set up in your office at 8:45 on 5-8-63 with Mr. Weidner, Mr. Heimburg and myself. ✓

S-II - The Stage Review at Downey on 4-30 and 5-2-63 reviewed the common bulkhead and gore forming. It was decided to adopt the 54" aluminum mandrel technique. ✓

Consolidated comments and re-directions for Phase I of the S-II electro-mechanical automatic checkout design concept were discussed in detail on 5-1-63 and will be forwarded through M-SAT to S&ID for incorporation into the GSE. ✓

In regard to the Meyer Committee report, an MSFC team investigated the facility program status at S&ID during four days. Final report will follow. ✓

S-IVB - DAC was directed to incorporate the results of the Phase I GSE Review, except the realignment of the Ground Equipment Test Set and the PAM/FM FM Ground Station. Schedule effect will be minor according to DAC. ✓

3. Apollo: Reorganization at MSC is underway. Details will be known at MSC on 5-7-63. ✓

A problem is coming up on an MSC request to use telemetered vehicle measurements on which to base operational abort decision for SATURN I. ✓

Specifications to a SATURN I EDS were completed and released for design. Parameters to be monitored are minimal. ✓

Dr. Lange: These NOTES are regressing toward the former manner of having too many tiny little abbreviated bits of information. Again, please, more on fewer subjects. Jim 5-6 ✓

B 5/8

1. PROGRAM STATUS BRIEFING - The next Program Status Review by Mr. Holmes will take place on May 23 and 24 in OMSF.

We have planned a meeting on May 16, 2:00 - 4:00 p.m. in which you, Dr. Rees, and Capt. Freitag will be briefed by the project managers of the changes indicated in the official schedule submission. ✓

The work volume involved with this monthly exercise is growing as a result of the latest revision of the procedure issued by George Low on April 24. We are now requested to submit the following (numbers in parentheses indicate due dates prior to day of briefing):

- a. TWX report to update the Level 1 schedules which are prepared and maintained by OMSF. (8 days)
- b. Schedule volumes to OMSF, MSC, LOC, and MSFC internal. (3 days) Note: we publish and distribute approximately 200 copies containing approximately 800 charts.
- c. Approximately 800 Vu Graphs containing the same information. (3 days)
- d. Change memorandum (3 days)
 Note: A separate memorandum is required for each chart which exhibits a change or a diamond. A change is defined as a movement of an arrow or the addition or deletion of a milestone.
- e. Backup data and special summaries to be used in the oral presentation.
- f. In case MSFC is requested to make the briefing to Mr. Holmes, 4 copies of an abbreviated submission, approximately 150 pages, which agrees with the oral presentation is requested.

We are preparing an estimate of the monthly effort involved in schedule updating. We will have to take this matter up with Capt. Freitag during his coming visit in an effort to find ways and means to simplify. ✓

H.M.

Am I expected to attend this? (I hear about this for the first time and are highly booked for both days). Also: what happened at Shea's Systems Review meeting on the 22nd?

Please clarify and notify me at once!!

B

NOTES 5-6-63 MRAZEK

B 518
W.M.
in the
non-
pressurized
portion
of the SIC?
Please be a
bit more
specific
as to
location.
B

1. S-IC PANEL FLUTTER TESTS: Analyses indicate that some panels on the S-IC have marginal flutter stability. A panel flutter test program is being set up to be conducted at Ames Research Center under the direction of this Division and The Boeing Company, with coordination of the Aeroballistics Division (M-AERO-E). ✓

2. SEAMANS' REVIEW OF RIFT: The agreements and actions following the Seamans' meeting will insure a reasonably stable RIFT Program for the next fifteen months. A memorandum from the Nuclear Vehicle Projects Office discussing actions from the Seamans' meeting will be forwarded to you under separate cover.

* S-IV QUALIFICATION TEST PROGRAM: (Reference NOTES 4-29-63 MRAZEK, paragraph 5, copy attached.) In a review meeting held in this Division on 5-3-63, it was decided to send a team of eight people from this Division to Douglas Aircraft Company. There will be six from the Propulsion and Mechanics Branch for all cryogenic and other hardware; one from the Structures Branch for structural vibration and testing; and one from the Vehicle Engineering Branch for review of testing of instrumentation and assembly. In addition, there will be one person from the Test Division, one from the Quality Division and one or two from the Saturn Systems Office.

They will report 5-7-63 at Douglas. They have the authority to accept test assignments and work in these areas for MSFC. ✓

W.M.

I saw Harry Finger on 3 May in Chicago. He told me he was concerned that Seamans hadn't o.k.'d his "minutes of the meeting" yet, and might have "second thoughts about the matter". He said it didn't affect the agreements with the Navy but possibly a few other things (with which Dr. S. had indicated agreement in our meeting with Ann).

Please keep me posted. B

(See attached report dated May 3 by Scott Fellows)

B5/2

NOTES 4-29-63 MRAZEK

1. SATURN V, S-IC STAGE MOCK-UP: The tail structure of this mock-up is essentially complete. The mock-up may be reviewed in the Mock-up Building immediately west of Building 4705. *Will visit it B*

2. GROUND ACOUSTIC PREDICTION: The trajectory on a MINUTEMAN flight test was sent to the Structures Branch, this Division, by Col. Lee, Bio-Astrionics, Patrick Air Force Base. This information will be used to check ground acoustic predictions for a rapidly receding vehicle. ✓

3. GIMBAL FREQUENCY: A review of the F-1 engine gimbal system analyses made by the Boeing Company and the Structures Branch revealed improper assumptions in the Boeing analysis. The minimum gimbal frequency of this engine is 6.7 cps rather than 8.7 cps as reported by the Boeing Company in the S-IC review meeting. This is being coordinated with Boeing. ✓

4. RL10 HELIUM HEATER: A vibration fatigue analysis was completed on the RL10 helium heater assembly which indicated fatigue failure will not occur due to vibration. ✓

*5. S-IV DESIGN INTEGRATION WORKING GROUP MEETING: Shock, vibration, and other environmental tests are not in accordance to MSFC internal procedures. To date, out of 165 components, only five final test reports have been released. From data reported by Douglas Aircraft Company, it is felt that in the propulsion area the Qualification Test Program of the S-IV Stage Components is inadequate.

*W.M.
Suggestion
B*

6. CONSPICUOUS RADAR TARGET, SA-4: There is still no plausible explanation. ✓

*Debus thinks it was a net balloon.
B*

Attachment #1

Memorandum

TO Dr. von Braun, M-DIR

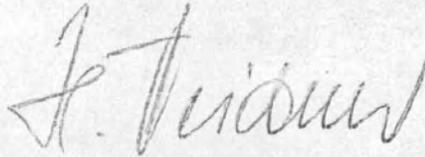
DATE May 6, 1963

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

SUBJECT Actions Resulting from Meeting with Dr. Seamans

REFERENCE NOTES 5-6-63 MRAZEK

Attached is a Nuclear Vehicle Projects Office memorandum which discusses the actions being taken as a result of the meeting held with Dr. Seamans on April 25, 1963.



W. A. Mrazek

1 Enc:
a/s

Copy to: Dr. Rees, M-DEP-R&D

Memorandum

TO Dr. W. A. Mrazek, M-P&VE-DIR DATE May 3, 1963

FROM Chief, Nuclear Vehicle Projects Office,
M-P&VE-N

SUBJECT Weekly Highlight Report

ACTIONS RESULTING FROM THE MEETING HELD WITH DR. SEAMANS ON APRIL 25:

1. NASA/Navy Agreement on Moffett Field Hangar:

Indications are that NASA Headquarters (Mr. Barber, Mr. Lewis, Mr. Novik) is actively negotiating with the Navy on this agreement. The agreement as written includes the possibility of using Navy land for Cold Flow Facility. Navy Headquarters desires to eliminate this portion of the agreement based on safety reasons. NASA is agreeable to its deletion since we propose to build this facility on Lockheed property.

2. Relocation Agreement:

Status indefinite since as of this date, Mr. Novik has been unable to locate, physically, the document. No problem is anticipated in bringing this agreement for signature.

3. FY-63 Construction of Facilities Funds:

Mr. Finger's office has initiated the paperwork to reprogram \$1.62 million for the Propellant Fabrication Research and Development Facility. Mr. Ulmer, as of this date, is verifying with Dr. Seamans the desirability of this reprogramming. No problem is anticipated according to Mr. Novik.

4. Cold Flow Facility:

The second draft revision of the lease agreement has been received from Lockheed and is currently undergoing review by M-LGL, Mr. diBuono.

5. Georgia Nuclear Laboratory:

No signs of action have been detected.

Enclosure 1

May 3, 1963

6. FY-64 Construction of Facilities:

Programming is proceeding on the basis of zero dollars or no funds allocated for RIFT Construction of Facilities in FY-64. The Lockheed Research and Development scope for FY-64 will be modified to include certain design criteria preparation.

7. Guidance for FY-65 and FY-66:

The Nuclear Vehicle Projects Office is preparing plans and schedules consistent with the guidelines approved by Dr. Seamans. The program will be based on limited funds in FY-64 and FY-65 with funding as required for the remainder of the project.

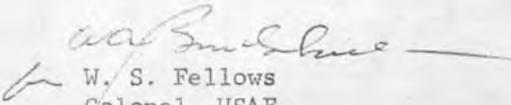
8. Guidance on NERVA and ROVER Schedules:

No activity by Mr. Finger in calling a contractor meeting.
It is interesting to note his comment in the recommendation from him to Dr. Seamans dated April 29, 1963, on the importance of such a meeting. You have been sent a copy of Mr. Finger's memorandum directly from OART.

Shall
I
write
him?
B

9. In Summary:

The agreements and actions following the Seamans' meeting will insure a reasonably stable RIFT Program for the next 15 months. We will continue to press for the government-industry conference in order to establish firm development schedules for ROVER.


W. S. Fellows
Colonel, USAF

B/sr

Apollo System Test Plan:

As indicated before, my office has been given the assignment to consolidate and compile the Apollo System Test Plan. The current approach for implementing this assignment is to develop an Apollo System Test Plan Document. The purpose of this document is to:

- a. Set forth minimum test requirements and test plan requirements to provide a basis for implementing the Apollo test program.
- b. Provide a single consolidated test plan document for analyzing and evaluating the test program to determine the potentiality of mission accomplishment.

The content will be as follows:

PART 1 - Apollo System Test Plan Requirements:

- a. Minimum test requirements for ground and flight tests
- b. Minimum test plan requirements for ground and flight tests

PART 2 - Apollo System Test Plan:

Compilation of test plans, either by inclusion or reference, which are

- (1) In existence, or
- (2) To be developed

The first draft of Part 1, Apollo System Test Plan Requirements, will be forwarded for Center review during the week of 13 May. This draft has been coordinated within OMSF and will be forwarded under the signature of Low. It is intended that the draft contain the minimum requirements necessary to establish confidence in the accomplishment of the Apollo mission.

Comments, in accordance with this intent, will be requested by 14 June 63. Any comments relating to impact on program (e.g., funds and schedules) will not be required by that time, but should be reserved for later discussion. ✓

B 5/8

1. FY-63 SUPPORTING RESEARCH PROGRAM: The status of the RPD-coordinated FY-63 Supporting Research Program is as follows:

	<u>AUTHORIZED</u>	<u>COMMITTED</u>	<u>BALANCE</u>
OART	\$6,509,500	\$6,387,000	\$122,500
OMSF	6,050,000	5,951,000	99,000
SATURN V	3,800,000	3,800,000	0
	<u>\$16,359,500</u>	<u>\$16,138,000</u>	<u>\$221,500</u>

There are many contracts still in the negotiation stage at P&C; therefore, the balances shown will be used to cover any underestimates that may yet develop. ✓

* [2. METEOROID MEASUREMENT PROJECT: The project is proceeding basically on schedule. A group consisting of representatives from LaRC, GSFC, JPL, MSFC, and Fairchild (FSC) is being formed to review the dynamic loads and characteristics of the MMC structure. The next project review of FSC effort will be held at FSC, Hagerstown, Maryland, on May 23, 1963. A memo has been distributed requesting agenda items and attendees. Mr. Jack Lee, Resident Manager, reported to the FSC Plant, Bladensburg, for duty on April 22. Johnson has been negotiating for a successor to Mr. Pace, and has discussed the situation with Col. James and Dr. Rees. ✓

Eberhard K.
Who will be named?
B

* [3. UNIVERSITY OF ALABAMA GRADUATE STUDY PROGRAM: The graduate study contract is expected to be finalized this coming Thursday, May 9. In the meantime, Dr. Shelton has assured Dr. Pow that he should waste no time in recruiting for the graduate program during these final stages of negotiations. In order to have Dr. Pow proceed, Dr. Shelton had to assure him that there would be no meddling in the University academic processes by government personnel; however, the UA could expect to be evaluated on its academic performance in Huntsville when contract renewal time comes around again. ✓

4. OFFICE OF APPLICATIONS: A difference of opinion exists between the Office of Technology Utilization and the Office of the Patent Counsel in Headquarters on the question of how to insure that NASA contractors comply with the Reporting of New Technology (RNT) clause in NASA contracts. Therefore, it was agreed that MSFC, as a pilot effort, should assign the responsibility for administering the RNT clause to our Industrial Applications Officer (Art Thompson). Mr. Thompson is being named as responsible for this clause in each Marshall contract as it is let or modified. The assignment of this task to an R&D group conforms with the recommendations in the President's Science Advisory Committee's report of January 10, 1963. ✓

5. APOLLO SHIELDING EVALUATION: At the request of OMSF through OART, an evaluation of the North American Apollo charged particle shielding calculations program will be made by RPD. Martin Burrell of RPD, together with two technical personnel from MSC, will visit North American next week to study the existing machine codes and make recommendations concerning future work in this area. ✓

* 1. J-2 ENGINE: Rocketdyne announced the special assignment of Norm C. Reuel to be responsible for "resolving schedule and technical details with MSFC and coordination within Rocketdyne of an effective J-2 Program leading to PFRT and delivery of preflight engines." This action is in line with our recommendation and Norm has our full confidence. ✓

The two stage contractors, North American Aviation and Douglas Aircraft Company, will be at MSFC on 5-7-63 to discuss the new delivery schedules for early ground test engines. ✓

We have reviewed our specification and technical requirements for PFRT and early engine deliveries and are suggesting some relief. We visualize a two-step PFRT, with Phase I covering the basic engine and a later (six to nine months) Phase II covering any further improvements plus accessories like heat exchanger, instrument package, connect lines, etc. Perfection of restart capability is also in Phase II. ✓

No engine system testing was accomplished during this period because of installation and checkout of new engines. ✓

2. F-1 ENGINE: Ten engine system tests were conducted this week. One test was terminated by rough combustion (no damage), (5U baffled with partial decoupling). Cause for this instability could not be determined. ✓ H.W.

3. CHAN HAMLIN'S VISIT: According to your suggestion, Chan Hamlin and Tom Dixon will be here 5-15-63, after our discussions in Washington with Ames. Visit has been coordinated with Koelle. ✓ I'll see them at 10:00 am

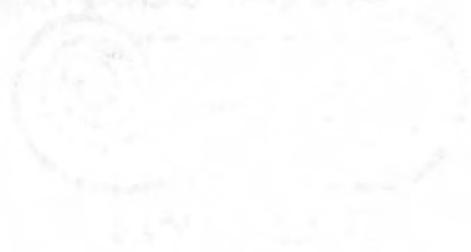
4. RL10 FLUORINE PROGRAM: I have called John Sloop and have informed him of our desire to participate. He did not voice any ready objections. Will arrange for Rod Stewart to see Sloop this week to work out details. Will then prepare position letter to B. Holmes. ✓ LG May B (with you, hope)

5. FY 1964 SUPPORTING RESEARCH AND TECHNOLOGY (CHEMICAL PROPULSION):

Program has been compiled and forwarded to Central Planning. The breakdown of the proposed program is:

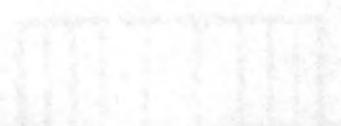
	No. Tasks	Funding
Office of Advanced Research & Technology		
Liquid Propulsion Technology	20	\$8,244,000
Solid Propulsion Technology	6	\$1,290,000
Office of Manned Space Flight		
Liquid Propulsion Technology	8	\$8,552,000
Solid Propulsion Technology	17	\$5,928,000
Total		\$24,014,000

The entire program is heavily oriented towards advanced concepts and NOVA. ✓



May 13, 1963

VOID HERE
325 DOLLAR



Mr. Johnson
PHH

NOTES TO HOLMES - 5/14/63 - DEBUS

1. Pad 37B Wet Test: Because of the MSFC requirement to strengthen the baffles in the SA-5D Lox tanks (modification resulted from collapsing of baffles during LO₂ loading of SA-5 at MSFC) completion of the wet test will be delayed one week to 24 June. The necessity of accomplishing helium bubbling tests for the S-IV stage engine Lox lines is still under discussion. Because appreciable delay in completion of wet test would be required to accomplish these bubbling tests, they will probably not be included. The problem with the contaminated LH₂ lines has not yet been resolved. We are attempting to determine from MSFC what cleanliness specifications apply for delivery of LH₂ to the DAC GSE interface. The problems referred to still do not affect the SA-5 schedule.

2. Spacecraft Destruct System Policy: An exploratory meeting with MSC, LOC and AMR Range Safety was held on May 1st. The meeting revealed that MSC desires elimination of all destruct systems from the translunar vehicle configuration. This configuration includes S-IVB. The Range desires a destruct system of some kind on the entire configuration (Spacecraft plus S-IVB). Principle MSC objections are (a) inadvertant destruct and (b) the presence of explosives throughout the flight which is especially hazardous during docking operations. The meeting was called by an emissary of Walt Williams who is convinced that higher management level action will be required. I plan immediate steps to establish a position and clarify the matter.

3. Complex 39: Funds were transmitted to the Jacksonville District, Corps of Engineers for the following projects:

VAB, high and low bay structural steel procurement and erection	\$44, 900, 000
Construction of VAB high and low bay foundations	14, 552, 000
Construction of Launcher Umbilical Erection Areas and the Materials Unloading Area for LC 39	2, 071, 520
	<hr/>
	\$61, 523, 520



The scheduled dates for advertising and award of the above three major construction projects is as follows:

VAB steel erection	Advertise: June 1
	Award: July 3

VAB foundations

Advertise: June 10

Award: July 5

LUT erection areas

Advertise: May 9

Award: June 10

4. ARINC Research Corporation SA-5 Study support from Reliability Office was arranged to provide assistance in monitoring daily LC 37 activation proceedings. Collection and analysis of Unsatisfactory Condition Reports and Douglas failure reports is underway.

5. Appeal of Blount Brothers Construction Company - Contract No. NAS8-3431 - NASA BCA No. 41: After five weeks of conferences, LOC Trial Counsel and Counsel for the contractor have agreed upon a proposed settlement of the default action and all money claims under the contract except for three minor items to be separately negotiated. Trial Counsel has strongly recommended approval to the Contracting Officer.

6. Metric vs English System of Measurements: I have considered it an encouraging sign for the eventual success of the metric system in this country that ABMA and later MSFC provided their trajectory data and required their tracking data in the metric system. This procedure has also been used thus far in the Saturn program. However, a problem which may be more serious than it appears at first glance, has arisen recently. MSC requirements on "MSC Apollo Boilerplate Saturn Block II Program Requirements" make a request for position, velocity and acceleration data, etc., to be expressed in the English system. There is also a discrepancy in the reference coordinate systems as well as in the reference ellipsoid. While an attempt is being made by Dr. Shea's office (Dr. Leo Werner) to specify reference systems and environmental data for common use in the Apollo program, we cannot afford to wait until such efforts might meet with success. The fact is that, at the present time, the Range has been requested to provide tracking data for Apollo launches in both the metric and English systems. Perhaps Dr. Shea could expedite some guidance in this matter as to what NASA expects to do in the future so we may base our actions accordingly. Perhaps you may wish to add this problem to the agenda for the next Management Council Meeting as a discussion point.

7. MA-9: Press Information Center opened at Carriage House Motel, Cocoa Beach, Friday, May 10. All LOC PIO support for MA-9 mission in effect. LOC PIO will participate in pre-launch briefings and run all operations at the press site.



B 5/13

NOTES 5/13/63 CONSTAN

* 1. INTERNATIONAL ASSOCIATION OF MACHINISTS - BOEING

The ballots as to whether to accept or reject the proposal are being counted in Washington today, however, the talley will not be made known until late this afternoon. ✓

1. Navy Bombing and Rocket Range at MTF: Over a year ago in a real estate directive to the Mobile District Office, Corps of Engineers, we asked the Navy leases be terminated as soon as practicable. Then last summer alternate sites in the Buffer Zone were offered to Naval Air Station, New Orleans if the rights could be acquired. On January 16, 1963 the Navy requested information from the Mobile District Office as to the status of the NASA Test Site relative to the ownership of the land and any restrictions which may have been imposed. They also proposed to renew their lease for FY 64, stating that funds had been committed for the purpose. Having received no reply, they again wrote the Mobile District Office on April 18, this letter being passed after the fact, so to speak, on May 7 to us for action. The Corps sure dropped the ball on this one. Naval Air Station, New Orleans states that by this inter-departmental delay they don't have adequate time to arrange other facilities. If the reserves can't train in gunnery, rocket firing and bombing, their whole program will be negated. International Paper Company, who is still fighting our fires, strongly insists that we not let the Navy use the range this coming week end as requested unless we have had sufficient rain to preclude a dangerous holocaust. We concur and will do this. Meanwhile, our Office of Chief Counsel is looking into what can be done legally and we have suggested that Naval Air Station, New Orleans look into using Eglin Air Force Base ranges. ✓

2. MTO Rail Service: The last rail was laid on the afternoon of May 9 connecting MTO and the main line at Nicholson, Mississippi. Switches, etc. were installed Friday on the run around track at "Gorman" Terminal (I would like to call it this but since such honorary naming is normally exercised posthumously, we will call it Gainesville Terminal). First train came in Saturday afternoon. ✓

3. Ground Breaking and Dedication Ceremonies in July: Mack Herring has suggested that we consider tying in our ceremonies with Gulfport's Deep Sea Fishing Rodeo, 4-7 July. It is one of the biggest events of the year on the coast, over 200,000 having participated last year. It is covered by national television and press. The organization, which is sponsored by all the communities on the coast, want to dedicate this year to NASA and would let us prepare the dedication to be printed in some of our booklets to be given to visitors. A NASA exhibit has been requested, with as much space to be provided as we desire. After talking this over with Bart Slattery, we are checking to make sure we won't have too many attendees to accommodate. Then we will contact Bonnie on your schedule, plus Mr. Webb's and Senator Stennis' offices. Two advantages accrue from July date. First, General Electric should be on board and their personnel have offered to help in the event. Secondly, we should have better telephone service by then. Right now we are using mobile radio to communicate between our information center and Rouchon Headquarters. The information center, of course, cannot call out or be contacted except by this means. ✓

B.F.
See report
my records
on
bombing
5-13
notes.

B

*
9/20

*
9/20

- * 1. System of Measuring Units: Although English units are requested in all important data exchanges with OMSF, some progress has been made internally within MSFC as well as in OSS toward adopting the metric system wherever practical. Since the MSFC meeting concerning units (May 11, 1962), it has become increasingly clear that the International System of Units (SI) is now being universally accepted as the metric system. (Enclosure 1 provides details of SI). Therefore, in reversal of my position in above meeting, I am now also in favor of adopting the SI as MSFC preferred system. I am in agreement with Haeussermann, Mrazek and Stublinger and propose to revise the policy you had signed as result of above meeting. A proposed revision is attached. If you agree, a statement will be prepared for your signature with the concurrence of all divisions primarily involved (enclosure 2). An attempt to make OMSF follow suit and endorse the new system should be considered (Management Council).
2. Project LIEF: Dr. Debus phoned Dr. Speer on May 8 about the planned LOC-MSFC data link. He referred to results of the last Space Council Meeting and to discussions in our joint study group. He appears to be uneasy about the potential this data link would have for MSFC operations, real time evaluation, etc. He has appointed Sandler and Col. Clark to work out principal guidelines (probably mainly constraints) with Dr. Speer for the operation and type of use of the link. Efforts of the study group are being continued with good response from the divisions involved. ✓
3. S-1C Base Heating Tests: Saturn S-1C base heating tests at Lewis Research Center have again been delayed in favor of various Centaur test programs. Earlier, the tests were delayed from mid-March 1963 to June 1963. The latest delay shifts the beginning of Saturn S-1C tests to August 1, 1963. This delay is not desirable; however, it is not a critical problem at this time. ✓

INTERNATIONAL SYSTEM OF UNITS.

RESOLUTION No. 12

Translation of "Système International d'Unités. Résolution 12."
Comptes Rendus des Séances de la Onzième Conférence Générale
des Poids et Mesures, Paris, 11-20 octobre 1960. p. 87 - 88.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON February 1963

End 1

RECORDS OF MEETINGS
OF THE
ELEVENTH GENERAL CONFERENCE
ON WEIGHTS AND MEASURES

Paris, October 11-20, 1960

INTERNATIONAL SYSTEM OF UNITS

RESOLUTION NO. 12

The Eleventh General Conference on Weights and Measures, Considering:

Resolution No. 6 of the Tenth General Conference on Weights and Measures by which six units have been adopted which are intended to serve as a practical base for a system of measures for international relations:

Length	meter	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	degrees Kelvin	°K
Light intensity	candle	cd

Resolution No. 3 adopted by the International Committee on Weights and Measures in 1956.

The recommendations adopted by the International Committee on Weights and Measures in 1958 concerning the symbols and prefixes to be used in this system for the formation of multiples and submultiples of the units.

DECIDES:

- 1) The system based on the six basic units above mentioned is referred to as the International System of Units;
- 2) The international abbreviation of the name of this system is: SI;
- 3) The names of multiples and submultiples of the units are formed with the following prefixes:

Factor by which the unit is multiplied	Pre-fix	Sym-bol	Factor by which the unit is multiplied	Pre-fix	Sym-bol
1,000 000 000 000 = 10^{12}	tera	T	0.1 = 10^{-1}	deci	d
1,000 000 000 = 10^9	giga	G	0.01 = 10^{-2}	centi	c
1,000 000 = 10^6	mega	M	0.001 = 10^{-3}	milli	m
1,000 = 10^3	kilo	k	0.000 001 = 10^{-6}	micro	μ
100 = 10^2	hecto	h	0.000 000 001 = 10^{-9}	nano	n
10 = 10^1	deca	da	0.000 000 000 001 = 10^{-12}	pico	p

4) The units shown below will be used in this system, without prejudice to other units which could be added in the future.

ADDITIONAL UNITS

Plane angle	radian	rad
Solid angle	steradian	sr

SECONDARY UNITS

Area	square meter	m^2
Volume	cubic meter	m^3
Frequency	hertz	H_z 1/s
Density	kilograms per cubic meter	kg/m^3
Velocity	meter per sec.	m/s
Angular velocity	radians per sec.	rad/s
Acceleration	meters per sec. squared	m/s^2
Angular acceleration	radian per sec. squared	rad/s^2
Force	newton	N $kg \cdot m/s^2$
Pressure (mechanical tension)	newton per sq. meter	N/m^2
Kinematic viscosity	Sq. meter per second	m^2/s
Dynamic viscosity	newton-second per sq. meter	$N \cdot s/m^2$
Work, energy, quantity of heat	joule	J (N·m)
Power	watt	W J/s
Electric charge	coulomb	C A·s
Voltage, potential difference, electromotive force	volt	V W/A
Electric field intensity	volt per meter	V/m
Electric resistance	ohm	Ω V/A

Electric capacitance	farad	F	$A \cdot s/V$
Magnetic flux	weber	Wb	$V \cdot s$
Inductance	henry	H	$V \cdot s/A$
Magnetic field	tesla	T	Wb/m^2
Magnetic field intensity	amperes per meter	A/m	
Magnetomotive force	ampere	A	
Flux of light	lumen	lm	cd · sr
Luminance	candle per sq. meter	cd/m ²	
Illumination	lux	lx	lm/m ²

CUBIC DECIMETER AND LITER

RESOLUTION No. 13

The Eleventh General Conference on Weights and Measures, Considering:

That a cubic decimeter and a liter are not equal but differ by about 28 millionths (0.000028).

That the determination of physical dimensions involving measures of volumes are becoming more and more accurate, which makes the consequences of a possible confusion between the cubic decimeter and the liter worse.

INVITES:

The International Committee on Weights and Measures to study this problem and to present its conclusion at the Twelfth General Conference.

RESOLUTION No. 14

Eleventh General Conference on Weights and Measures, Considering:

That all countries benefit from the successful results of the work of the International Committee and of the International Office of Weights and Measures, particularly as illustrated by the report of its President on the activities of this Committee during the period from 1954-1960.

That the development of modern science and technology will be promoted by extending the Metric System through the entire world,

ORIGINAL

REVISED

TO : Distribution May 14, 1962

FROM : Director, Marshall Space Flight Center,
M-DIR

SUBJECT: Policy Concerning the Use of Measuring
Units in MSFC

TO : Same New Date

FROM : Same

SUBJECT: Policy Concerning the Use of Measuring
Units in MSFC (First Revision)

Purpose

It is the purpose of this policy to define within MSFC a system of preferred measuring units to be used in all technical reports of an R&D nature. It is the ultimate intent of this policy to promote the general acceptance of the metric measuring system as the primary system for space technology.

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It is the purpose of this policy to define within MSFC a system of preferred measuring units to be used in all technical reports of an R&D nature. It is the ultimate intent of this policy to promote the general acceptance of the International System of Units (SI) as the primary system for space flight technology.

Policy

The metric gravitational system shall be used in all technical reports of an R&D nature in preference to any other system if character and purpose of the report permit such option.

Policy

The SI as defined in Resolution No. 12 of the Eleventh General Conference on Weights and Measures (Paris, Oct. 11-20, 1960) shall be used in all technical reports of an R&D nature in preference to any other system if character and purpose of the report permit such option.

The International Practical Temperature Scale which was adopted by the Eleventh General Conference on Weights and Measures in 1960 shall be the corresponding preferred temperature unit.

This policy supersedes the one issued previously, on May 14, 1962.

This policy establishes as preferred basic units the length (meter), the force (kilopond), the time (second), and the temperature (degree Celsius).

The SI is defined by the following six basic units:

Length	meter	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	degree Kelvin	°K
Light intensity	candle	Cd

Encl. 2

SUBJECT: Policy Concerning the Use of Measuring Units in MSFC (Cont')

If, for any reasons, this choice of units appears impractical for a specific R&D report, then the most practical alternate units should be added as second units.

If character and purpose of the communication make the utilization of the metric system totally impractical in special cases, the metric units may be omitted.

Limitations

This policy shall be restricted to technical reports and technical communications published within MSFC for R&D purposes.

Facility data and patent applications shall not be affected by this policy.

Units of mechanical measurements required for launch facilities and launch operations shall be specified by the responsible launch organization and coordinated with MSFC through established channels.

SUBJECT: Policy Concerning the Use of Measuring Units in MSFC (First Revision) (Cont')

Thrust, weight and other forces shall be expressed in the derived unit

$$\text{newton, } N = \text{kg}\cdot\text{m}/\text{s}^2$$

The International Practical Temperature Scale (degree Celsius, °C) may be used alternately to °K.

Same

If character and purpose of the communication make the utilization of the SI totally impractical in special cases, the metric units may be omitted.

Same

Same

Same

Same

SUBJECT: Policy Concerning the Use of Measuring Units in MSFC (Cont')

Implementation

This policy becomes effective immediately. It will be implemented by the divisions and offices of this Center.

Saturn Systems Office and Light and Medium Vehicles Office will recommend to MSFC's major contractors the acceptance of a corresponding similar policy in the interest of most efficient communication.

Future major MSFC contracts will fully consider this policy.

All prefixes may be applied to the metric units.

Wernher von Braun

Distribution

A (Through Section Level)

SUBJECT: Policy Concerning the Use of Measuring Units in MSFC (First Revision) (Cont')

Same

Same

Saturn Systems Office and all other applicable MSFC segments will recommend to MSFC's major contractors the acceptance of a corresponding similar policy in the interest of most efficient communication.

Same

Prefixes may be applied in accordance with Resolution No. 12 of the Eleventh General Conference on Weights and Measures.

Wernher von Braun

Distribution

A (Through Section Level)

NOTES 5-13-63 GORMAN

B5/14

Negative

B5/14

*
gsm 1. SA-5 INSTRUMENT UNIT CHECKOUT: Checkout of the SA-5 instrument unit is progressing but checkout is being hampered by equipment failures and late arrival of components. Problems include overheating of the static inverter, horizon sensors have not been mounted, cooling valve maladjustment, and late receipt of some Electrical Support Equipment Panels. [To date this has not affected the scheduled completion of the checkout.] ✓

*
gsm 2. SA-5 FINAL CHECKOUT: Post-static pressure and functional testing of the S-I-5 stage is continuing, however major modifications and required rework is delaying progress and the schedule will definitely be affected. Major problems include leakage of the hydrogen chill duct flanges, modification to the Lox and fuel pre-valves and Lox and fuel fill and drain valves, anti-slosh baffle modification inside the propellant containers, and unavailability of Lox and fuel step pressure switches. ✓

D.S.
provided
SIV is on
line, which
it isn't.
B

3. ENGINE SKIRT ASSEMBLIES: A problem has arisen as to the interchangeability of skirt and shroud assemblies since the master gages used to check the skirt and shroud assembly fixtures required rework after being damaged at Hayes International, Birmingham, Alabama. Several recommendations have been submitted to alleviate doubt of questionable assembly of the skirts to the shrouds, as follows:

- a. Ship the four skirts for SA-6 to MSFC for fitting to the shroud.
- b. Assemble one skirt to SA-5 prior to shipment to AMR.
- c. Design and fabricate intermediate gages to check the assembly location points.
- d. Re-design and rework the present tooling to act as a gage. ✓

4. CENTRAL TIMING FACILITY: At a recent meeting in the Saturn Systems Office prompted by an action item from the last Systems Checkout Working Group meeting, it was agreed that a central timing facility would be housed in the Electronic Instrumentation and Measuring (EI&M) Building at the Mississippi Test Facility. A timing signal will be provided on a multiplexed RF carrier using the approved codes for Saturn V. ✓

5. THIRD ANNUAL INSPECTION DIVISION WORKSHOP: A member of this Division participated in the Third Annual Inspection Division Workshop held in Los Angeles, California on May 4, 1963. A talk was given on the NASA Training Program at MSFC as part of a days program under the auspices of NASA Headquarters. Mr. Dan Negola of NASA Headquarters was chairman of the NASA session. Other NASA speakers were Mr. Lyle Curran, Chief, Quality Assurance, NASA-O, Downey, California; Mr. Frank Crichton, Pre-Flight Operations, AMR; and Mr. James Koppenhaver, Director, Office of Reliability and Quality Assurance, NASA Headquarters, who was the luncheon speaker. The meeting was attended by approximately 500 persons and the NASA presentations were well attended. Several persons from Quality Assurance Division who are stationed in the Los Angeles area also attended this meeting. ✓

NOTES 5-13-63 GRUENE

B514

Wet Test VLF-37B Using SA-D5

- a. RP-1 fueling loading test, replenish test, adjust level test, and draining were begun and completed satisfactorily on May 14. ✓
- b. Reinforcement of slosh baffles in the lox tanks is in progress and will be completed on May 14. Partial lox loading and 100% lox loading will be performed the week of May 13. ✓
- c. LH₂ flow test will be performed on May 13 in order to clean and flush the LH₂ transfer line. The LH₂ filter will be transferred to P&VE for analysis of contaminants. ✓
- d. Due to slosh baffle reinforcement SA-D5 will be removed from the launcher 4 or 5 days later than originally scheduled. ✓

Please note that I do not mark items on these NOTES for Holmes' TWX because I assume this information is provided by Debus to Holmes.

JFrus-13 ✓

NOTES-5/13/63-HAEUSSERMANN

B 5/19

1. FUEL CELL DEVELOPMENT AT ALLIS-CHALMERS: The NASA Administrator, James E. Webb, visited Allis-Chalmers, Milwaukee, recently and got a briefing on the fuel cell development under our contract NAS8-2696. Of special interest was the fact that a by-product of the cell is drinkable water (see photos). We have a brief informal (1 1/2 page text, 3 charts) development report which we can send you if desired. ✓

2 Enc
Photos (Dr von Braun's copy only)

B 5/14

NOTES 5/13/63 HEIMBURG

- 1. S-I-6: Lox system leak and pressure test, and gimbal system dry run and interference check scheduled for today, 5/13. Short duration firing (30 sec) now planned, Wednesday, 5/15, at 4:40 p.m. ✓
- 2. S-I-5/S-IV-5: Test Division recommends that the All-Systems Stage be removed from the test stand immediately and that the S-IV-5 stage be installed as soon as possible. Modification, repair, and completion of assembly can be accomplished on the stand to expedite start of S-IV-5 static firing program. ✓

* MTF: Qualified approval of MTF cryogenics procurement plan (signed George M. Low) received by MSFC, 5/6. OMSF handcarried plan to Procurement Review for expeditious processing, 5/6. ✓ *K.H. Estimate out? B*

Mobile District Corps of Engineers awarded harbor dredging contract to T.L. James, Ruston, Louisiana, 5/6. Harders Construction Company, Panama City, Florida, apparent low bidder for construction of Construction Dock and Road E. ✓

K.H. this problem recognized long ago? why were we unaware of this fact only by bombs? Request B also Bill Fortuna's comments)

Navy lease with International Paper Company for Hancock Bombing Range was not revoked when Corps of Engineers acquired real estate in fee simple. Problem is aggravated by Navy insistence that their lease is still valid and that if lease is revoked NASA is obligated to assist in relocating the range at a new site. Assistance means money. Meeting was held at Naval Air Station, New Orleans, 5/8, to resolve the problem. Meeting was not successful. Further discussions and a plan of action will be formulated this week for termination of the Bombing Range lease. Present restricted air reservation over the test site is for the Bombing Range. When Range is moved, NASA will have to request from FAA permission to continue air space restrictions.

4. MARINE ACTIVITIES: Barge PROMISE enroute from New Orleans to MSFC. ETA, 5/15.

A review was made by Test Division, Support Services Office, and Saturn Systems Office of a preliminary proposal on a high-speed vessel for inter-coastal transportation of Saturn stages.

B 5/14

NOTES 5-13-63 HOELZER

Negative report.

B 5/14

NOTES 5-13-63 HUETER

1. LLS PAYLOADS: Mr. Taylor, OMSF, advises that his office has exerted all of its influence relative to lunar payload approvals. The total matter is now being handled by Mr. Holmes and Dr. Shea, of OMSF, with Dr. Seamans, Dr. Dryden and Mr. Webb. It is not known when monies will be approved. Apparently there is no question about the use of 1963 funds but rather the total funding picture, as well as the assessment of the need for the LLS program, and when, is the concern of our higher management. Mr. Taylor will keep us constantly advised of project status within NASA Headquarters. It may be desirable that you contact Mr. Holmes directly to ascertain the current status and any anticipated difficulties.

H.H.
I had a
very
helpful
discussion
with Seamans
on this
subject. B

Will
do.
B

The Marshall P&C Office has RFQ's covering the proposed study effort ready to mail to prospective suppliers and has advised that if funding is available during the week of May 13, it would still be possible to have this effort under contract within this fiscal year. The above package of RFQ's includes a single source procurement of engineering services from Northrop. This particular effort has been discussed with Office of Manned Space Flight, who indorse procurement of these services from Northrop. ✓

2. SPACE VEHICLE PANEL MEETING: The Space Vehicle Panel (Dr. Horning, Dr. Golovin) called a meeting at Lewis Research Center on May 10 on the status of Centaur and NASA's planning in the field of follow-on boosters for unmanned space flight.

Centaur efforts for increased payloads seemed to be limited to 2,400 pounds. Dr. Silverstein was very confident that the present schedule could be maintained based on a very thorough ground testing program.

Lewis has a study going with Martin for a Titan II/Centaur combination.

Mr. Neighbors gave a presentation on the C-1B/MMM project and showed how it compared performance-wise with Titan III.

Dr. Morrison made a pitch for high energy propellants (Flourine/H₂) in all stages showing considerable decrease for payload weight in orbit (when the stage is available). ??

I felt that the meeting was called to keep the panel up-to-date with the development without following any particular direction this time. ✓

3. MULTIPLE MISSION MODULE: Procurement action has been initiated to procure a Centaur study portion of the OSS sponsored Saturn third stage Voyager mission study with STL. ✓

B 5/14

1. NOVA

Last week we gave four presentations in Washington on the status of the NOVA studies:

- a. To OMSF (Captain Freitag attending)
- b. To National Aeronautics and Space Council (Dr. Sheldon, Max Hunter, Tom Dolan)
- c. To OART (Milt Ames and Center representatives)
- d. To Air Force Systems Command

Milt Ames made a strong plea that other Centers join in on the NOVA problem and help seek new solutions. He will give them a little time to think about the problem and then call on them again. They will probably accept your invitation and come to Huntsville in about two months to discuss the subject matter. We have not yet given the presentation to Mr. Holmes and Dr. Seamans. No date has been set. ✓

2. FUTURE PROJECTS WEEK

How would you like the idea of a Future Projects Week later this year when the auditorium will be available? Our office could give a state-of-the-art report on advanced space transportation systems in about six half-day sessions. This would be a summary of the highlights of our in-house studies, contractor studies and the open literature. We could invite the engineering staff of all divisions and they could come and go as they pleased. You could also consider this as a seminar on advanced systems. We feel that we have a communications problem with the engineering personnel in the divisions, and this seminar would probably go a long way. Do you endorse the idea? *Sounded good to me - jcm 5-13*

H.H.K. Agree. Suggest you clarify the "proprietary information" aspects first. Meeting could get "stale" if companies withhold their most promising ideas!! (Just as an example: the orbital chamber).

B

35/15

1. Saturn V, S-IC Stage:

a. The upper bulkhead for the fuel test container has been trimmed on the lower edge and moved to the dollar weld fixture. The meridian welder is presently being used too for try-out for welding the thick gores for the lower bulkhead. ✓

b. Mr. Deen Stowell, Vice President for Manufacturing and Mr. Charles Williams, Manufacturing Manager, of the Boeing Company from Seattle visited us. I explained to them our jointly developed manufacturing plan, showed the bulkhead manufacturing film, and went through the shops. (We changed now the sentence in this film that MSFC is building one or more flight vehicles.) I think this visit was an informal review and audit of the Boeing top management on the activities and progress of the Saturn Booster Branch in the area of manufacturing. For this reason I emphasized our good relationship with the Boeing manufacturing group and the joint effort in this area. ✓

W.A.
What do you mean?
B

c. Boeing reported a delay of delivery of the forged outlet fittings for the bulkheads for S-IC-T. This delay of approximately 40 days is due to a change of specification of the forgings. ✓

2. Saturn V, S-II Stage: The manufacturing plan for this stage provides for planishing of weld beads for improvement of weld quality and reducing of warpage. We started an in-house planishing test program to determine the characteristics of micro cracks during the planishing operation. This is a point of contention on the S-II program. ✓

* 3. Saturn I, S-IV Stage: Mr. Maurer, Chairman of the ME Working Group, participated last week in the MSFC Saturn S-IV/5 Task Group at Sacramento. I assume that the leakage problem of the common bulkhead of the ASV will, or has been, reported to you by P&VE or Test Division. ✓ Besides the well known component shortage problem that is still existing on the S-IV/5 stage Mr. Maurer observed that there is still a high number of engineering changes being incorporated. 93 Changes have been accomplished at the field hanger, 65 more changes have been added during last week and 20 more have not been released yet by DAC Design. ✓

Notes 5-13-63 Lange

B5/15

1. SATURN I/IB: S-IV All Systems Vehicle - The propellant loading test originally scheduled for 5-8-63, was delayed due to a common bulkhead leak. The test is now rescheduled for 5-15-63. On 5-16-63 the vehicle will be removed to make the test stand available for S-IV-5. ✓

DAC Facilities (S-IVB) - M-SAT as Team Leader, with FEO, P&C, and Legal Office is investigating DAC facilities plans, especially Huntington Beach move, to develop facts for further action. Results will be available next week. Additional investigations of other programs may be required. ✓

* | 2. SATURN V: S-II - On 5-6-63, NAA/S&ID agreed to implement a stretch forming backup program to fabricate thin gore segments for the S-II Stage common bulkhead. The contractor agreed to inaugurate this backup program within the existing scope of contract NAS7-200 and the estimated cost to fabricate 12 gore segments by this technique is \$125,000. ✓

* | The MSFC/AF/LOC spill test program has not yet been inaugurated. Progress is being held in abeyance pending DOD approval of the proposed effort. ✓

NOTES 5-13-63 MAUS

B 5/15

*1. *from* CRYOGENIC PLANT FOR MTO - The procurement plan for the MTO LH₂ plant is in Walter Lingle's office in NASA headquarters. Last week Chris Andressen discussed status of the Procurement Plan with Capt. Freitag and Jack Young; both agreed to help expedite the plan. We reached agreement with OMSF on all technical points. Remaining points of disagreement were of a procurement nature and although we do not completely agree, we have acceded to these points.

Chris Andressen and Bill Davis will meet with Walter Lingle, tomorrow, May 14. ✓

2. MANPOWER - As arranged by Dr. Rees at the last Management Council meeting, the presentation on MSFC manpower requirements was given to Mr. Holmes last week. Mr. Holmes did not question our request for an additional 1142 spaces, or a total of 9157. He indicated that after he obtains the requests from LOC and MSC, he will take the matter up with Dr. Seamans. ✓

At Mr. Holmes' request, the presentation was also given to Mr. Redfield in Mr. Wyatt's office. While in Mr. Redfield's office we discovered that Office of Programs was recommending only 8190 for MSFC for FY 1965. An Urgent Action TWX was sent to Holmes to get this increased before it was cast in concrete. ✓ *shown to 5-15-63 from*

3. FY-64 ADVANCED AND SUPPORTING RESEARCH AND TECHNOLOGY
We must forward to headquarters this week the MSFC research and technology requirements for FY 64. Following is preliminary summary. M-RP is reworking some of the detail task descriptions so some changes in this summary may result. Figures in Guidelines column were received from various program offices

Funding Source	No. of Tasks	Funding in Thousands Dollars			
		In-house	Contract	Total	Guidelines
Total	568	8,418	71,895	80,313	51,025
OA	7	0	685	685	525
OMSF	212	5,526	30,329	35,855	27,000
OART	288	2,472	31,659	34,131	17,000
OSS	29	370	2,700	3,070	2,500
OTDA	32	50	6,522	6,572	4,000

B 5/15

1. FOURTH APOLLO MECHANICAL INTEGRATION PANEL MEETING: The fourth meeting of the APOLLO Mechanical Integration Panel was held 5-8/9-63.

The most important results are:

* a. The Lunar Excursion Module configuration will not be finalized until 6-1-63, therefore, we must base our loads and designs on present best available preliminary data, which may change considerably by 6-1-63. This will have to be impacted, when changes are identified.

b. There is still interest by MSC in a heavier payload of approximately 48,000 pounds, this time on SATURN IB. We will perform a load analysis and only if this is favorable will MSC propose a possible mission.

W.M.
Please elaborate next Notes
B

2. S-IV STAGE FOR SA-5: Mr. W. Schulze, who has just returned from Sacramento, has given me a report on the activities there. A copy of this report is being forwarded to you under separate cover.

3. RIFT: Latest status of action items from Seamans' meeting is being forwarded under separate cover.

W.M.

4. PERSONNEL: The new Classification Act grade allocation policy of MSFC which has tightened up on allocation of positions to the GS-13 level and above is greatly hampering morale and recruiting:

These are guidelines for the entire Federal Govt., which came out together with the salary raise plan
B

a. Unit Chiefs, who formerly could go to GS-14, now generally are limited to the GS-13 level; this also depresses opportunity for subordinates.

b. The austerity is not applied to line and staff organizations uniformly, thereby resulting in greater opportunity in staff organizations and consequent proselyting.

c. Excessive delay occurs in recruiting due to the need to negotiate grades before interviewing.

d. It is difficult to justify recruitment of key personnel at higher grades and even when possible they cannot be hired without depressing the grade possibilities of other employees, e.g. this Division needs acoustics specialists urgently and has an applicant available; this applicant cannot be hired at the GS-14 level and assigned to the section level without resulting in the depression of the grade of the Unit Chief whose organization specializes in acoustics.

e. The new policy offsets for many employees the salary increases effective in October 1962, and for January 1964; within the frame of reference of employees the increases will be negated by denial of anticipated grades.

f. The problems caused by the new policy will become increasingly more serious in the future, especially for predominantly professional divisions. I feel this matter requires all our immediate attention.

Agree
B

* 5. BLAST HAZARDS PROGRAM: A Government Order (GO H61465) was issued to White Sands Missile Range for a study of blast hazards; however, they were unable to accept the order without concurrence at the Department of Defense, Washington - NASA Headquarters level. On or about 4-10-63, we understood that B. Holmes wrote to Dr. Kavanau, Special Assistant (Space), ODDR&E, Department of Defense, requesting approval for White Sands Missile Range to proceed. White Sands Missile Range has not received this "go-ahead." Since this is a long-lead time program, delay in starting the work affects important decisions such as increasing the firing time of the S-II stage at Santa Susana.

I agree with Mrazek. A good look (to action) should be taken of whole program structure at MSFC, MSC, OMSF, etc.

Vic
Sincerely
Request
Comment
B
What
can we
do to
alleviate
difficulties?

Mac
Please
clarify
with
OMSF
B

Memorandum

TO Dr. von Braun, M-DIR

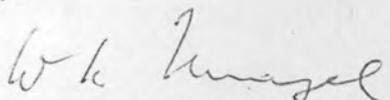
DATE MAY 13 1963

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

SUBJECT Additional Information, Paragraphs 2 and 3, NOTES 5-13-63 MRAZEK

1. Attached as enclosure 1 is a copy of Highlight Report S-IV Stage for SA-5 (S-IV All Systems Vehicle) prepared by Mr. W. A. Schulze, Chief of the Vehicle Engineering Branch, this Division.

2. The status of action items resulting from the meeting with Dr. Seamans on April 25, 1963, is given in enclosure 2 (memorandum from the Nuclear Vehicle Projects Office).



W. A. Mrazek

2 Enc:
a/s

Copies to: Dr. Rees, M-DEP-R&D
Mr. Schulze, M-P&VE-E (w/o enc)
Col. Fellows, M-P&VE-N (w/o enc)

MAY 13 1963

Dr. von Braun, M-DIR

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

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Original Signed by W. A. Mrazek

W. A. Mrazek

2 Enc:
a/s

Copies to: Dr. Rees, M-DEP-R&D
Mr. Schulze, M-P&VE-E (w/o enc)
Col. Fellows, M-P&VE-N (w/o enc)

May 10, 1963

HIGHLIGHT REPORT S-IV STAGE FOR SA-5

1. During the propellant loading test with the S-IV All Systems Vehicle (that means 'flight hardware') and cold flow helium bubbling tests as well as static firings with S-IV battleship vehicle at Sacramento, California, ~~and~~^a number of components failed, such as:

- a. PU probe did not yield signals between 15 and 90% level.
- b. LO₂ tank vent valve open and close indicator did not work properly.
- c. Liquid Hydrogen Fill and Drain valve did not close after fueling.
- d. The hydrogen level sensor in helium pre-cooler (GSE) did not function.
- e. The cold helium supply vent valve functioned erratically (GSE).
- f. The lox fill and drain valve did not completely open for draining.
- g. Temperature measurements did not function properly.

However, it was possible to overcome most of these failures and to get the tests going of course, with delays.

These tests were witnessed by:

MSFC Personnel

C. Heimburg	}	Test Division
*D. Driscoll		
W. Johnson		
J. Poteet	}	Quality Division
Minz		
W. Schulze	}	P&VE Division
T. Winstead		
G. Stoops		
Schlosser	}	Saturn Sys. Office
E. Weaver		

DAC Personnel

* Bromberg	}	Santa Monica Office
T. Smith		
T. Gorden		
Wilson	}	Sacramento Office
J. Goodman		
D. Brinks		
C. Tiedeman		

* Part time participation

Enclosure 1

The evaluation of these component failures revealed that many of these items have not been exposed to the same extensive qualification testing as applied at MSFC for our in-house developed stages and previous vehicles.

Example 1: Vendor item which meets according to purchase order the required specifications is installed in the vehicle without being requalified by Douglas.

Example 2: The lox vent valve from the Thor vehicle is used without being requalified for the new environment of the S-IV stage.

NOTE: For both examples MSFC policy requires retesting in the presence of MSFC inspectors. Too often we have experienced that the item just does not meet the specifications as outlined by the vendor.

Example 3: Vibration tests on components are performed without the brackets.

NOTE: For example 3 MSFC policy is to include vibration testing of components with the bracket.

2. Douglas representatives realized our concern, they are very helpful and cooperative and established a "Qualification Test Task Force" consisting of approximately 50 people headed by Mr. W. E. Kavash located in Santa Monica, California.

MSFC representatives are helping to establish the present development status of components including brackets, fasteners, etc. and including the installation into the S-IV stage. They are working in Santa Monica, California, under the direction of Mr. Ferguson, from the Saturn Systems Office and Mr. Bergeler, Propulsion and Vehicle Engineering Division.

Team members for the next 2 to 4 weeks are:

J. H. Burson, M-P&VE-PI	F. W. Brandner, M-ASTR-TSJ
C. B. Cannon, M-P&VE-EA	W. C. Bunn, M-QUAL-Q
J. C. Genter, M-P&VE-EA	M. H. Camomilli, M-QUAL-FW
J. R. Holmes, M-P&VE-PE	R. L. Merrell, M-QUAL-MC
G. D. Johnston, M-P&VE-ST	C. A. Seaver, M-QUAL-MC
D. L. McClearen, M-P&VE-PM	E. E. Seiler, M-QUAL-S
T. W. Myers, M-P&VE-PM	
H. O. Schnelle, M-P&VE-PM	
W. L. Swanson, M-P&VE-ST	

In daily meetings with Douglas representatives evaluated items are discussed and actions required initiated. See attached memorandum from first day's meeting, May 7, 1963.

Within two weeks most of the major components will be covered. It is recommended that approximately two weeks from now high level representatives from MSFC join the evaluation team and agree with Douglas management which changes are considered mandatory for S-IV-5.

W. A. Schulze
W. A. Schulze

2 Enc:

1. Memorandum
2. Evaluation Sheet

M E M O R A N D U M

TO: T. J. Gordon, A2-860 DATE: 5-7-63
A2-860-K233-142

FROM: S. Greene, A2-860

SUBJECT: MINUTES OF DE/Q REVIEW MEETING WITH MSFC ON 7 MAY 1963

COPIES TO: T. E. Abraham, A. J. German, A. P. O'Neal, T. D. Smith, A2-860;
W. E. Kavasch, A-923; List of Attendees; File

REFERENCE: Memorandum A2-860-K232-141, dated 6 May 1963

A meeting was held on Tuesday, 7 May 1963 (see referenced memorandum) to formulate a schedule of events and lay the ground rules for the balance of the MSFC review, which is planned to extend to approximately 17 May 1963.

The list of attendees at this meeting is attached.

The purpose of the MSFC review is to discuss in detail the DE/Q testing of certain flight components. This will be accomplished through a series of separate discussions between the Douglas and MSFC design area counterparts. These groups are broadly divided as follows:

1. Propulsion
2. Astrionics
3. Structures and Dynamics

Initial meetings within these areas were established for 10:30 am, Tuesday 7 May 1963, for the following components:

1. LH₂ and LOX Fill and Drain Valves
MSFC - Myers and Bergeler
Douglas - Scully and Moen
2. Cold He Bottle Assembly
MSFC - Cannon, Genter, and Johnston
Douglas - McClymonds, Soldat, and Stephens
3. P.U. Installation
MSFC - Burson
Douglas - Gann
4. LOX Vent and Relief Valve
MSFC - Schnelle and Holmes
(Review data prior to DAC participation)
5. Specifications
MSFC - McNair and Bunn
Douglas - Giffen

The objective of these meetings will be to discuss components from the standpoint of the DE/Q testing effort by reviewing drawings,

specifications, test plans, test data, and schedules in order to arrive at a mutual agreement that the test program for the component is adequate. It is expected that these groups will, where desired, observe test set-ups and witness test operations of the component being discussed.

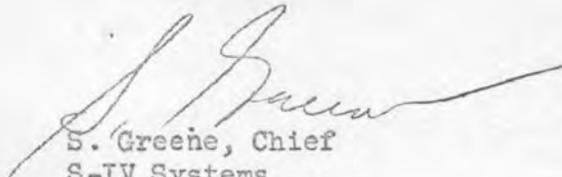
A daily meeting will be held every morning at 9:00 am, in the NASA/DAC conference room. Attendance at these meetings by conferees will be required only if a problem area arises which cannot be resolved at the individual meetings.

An action item log has been established which will be reviewed at the general morning meetings for the purpose of handling critical problems only.

The initial action item log is attached. This log will be re-published daily following the general review meeting.

Scheduling of activities for the balance of the review period will be undertaken at the first general meeting on May 8, 1963.

A tour of the test laboratories was scheduled for Wednesday, 8 May 1963 at 1:30 pm, for those MSFC representatives who desire a broad tour of all test facilities.


S. Greene, Chief
S-IV Systems
Saturn Engineering

RVF/jw

Attachment - Noted

ATTENDANCE LIST DE/Q REVIEW MEETING

DAC Attendees

G. E. Eggleston, A2-860	Veh. Des. Br.
R. V. Forman, A2-860	Rel. and Test Br.
C. W. Gann, A2-860	Astrionics Br.
S. Greene, A2-860	S-IV Sys. Engr'g.
J. Hilman, A2-860	S-IV Relia. Anal.
H. R. Linderfelt, A2-860	Veh. Des. Br.
J. C. McClymonds, A2-860	Acoustics and Struct. Dyn.
L. S. Mull, A2-860	Vehicle Devel.
W. S. O'Hare, A2-860	Saturn Propulsion
A. W. Rebard, A2-860	Astrionics Br.
E. J. Scully, A2-860	S-IV Propulsion
C. O. Stephens, A2-860	Saturn Strength Sect.
R. H. Diamond, A2-855	RS/QC
V. E. Moore, A2-855	RS/QC

MSFC Attendees

- H. R. Bergeler	M-P&VE-PE ✕
- F. W. Brandner ✓	M-ASTR-TSJ
- W. C. Bunn ✓	M-QUAL-Q
- J. H. Burson ✓	M-P&VE-PI ✕
- M. H. Camomilli ✓	M-QUAL-FW
- C. B. Cannon ✓	M-P&VE-EA ✕
W. A. Ferguson	M-SAT
- J. C. Genter ✓	M-P&VE-EA ✕
- J. R. Holmes ✓	M-P&VE-PE ✕
- G. D. Johnston ✓	M-P&VE-ST ✕
- D. L. McClearen ✓	M-P&VE-PM ✕
- R. L. Merrell ✓	M-QUAL-MC
C. J. Mezo	M-P&VE/DAC Res. Rep. ✕
- T. W. Myers ✓	M-P&VE-PM ✕
C. S. Pierce	M-QUAL/DAC Res. Rep.
F. E. Rowden	M-SAT/DAC Res. Rep.
- H. O. Schneller ✓	M-P&VE-PM ✕
W. A. Schulze	M-P&VE-E ✕
- C. A. Seaver ✓	M-QUAL-MC
- E. E. Seiler ✓	M-QUAL-S
G. J. Stoops	M-SAT/DAC Res. Rep.
M. B. Sundstrom	M-P&C-SSD
- W. L. Swanson ✓	M-P&VE-ST ✕
E. A. Weaver	S-IV Res. Mgr.

STATUS OF ACTION ITEMS FOR DAILY DE/Q DAC/MSFC MEETING

April 30, 1963

ITEM NO.	ACTION ITEM & DESCRIPTION	RESPONSIBILITY	DATE ADDED	TARGET DATE	COMPLETION DATE
1.	Review MSFC P&VE S-62-7, dated 25 May 1962 and discuss DAC position on program impact.	DAC/MSFC	7 May 63	8 May 63	
2.	Review and discuss proposed planning for testing by MSFC of specific qual test components and discuss types of MSFC personnel desired by DAC to support current qual test program.	DAC/MSFC	7 May 63	9 May 63	
	Review Huntington Beach Test Facility planning.	DAC	7 May 63	10 May 63	
4.	Prepare detailed status review of GSE qual test program.	DAC	7 May 63	21 May 63	

COMPONENT PFC, QUALIFICATION & RELIABILITY TEST PLAN NO. 1

1. VEHICLE: STAGE: 2. SYSTEM: SUBSYSTEM: 3. PROCUREMENT SPEC/DWS NO: 7051806-1

4. ITEM NAME: #2 FILL & DRAIN VALVE 5. SUPPLIER: M. H. HADLEY

6. LINE ITEM CODE NO: 7. SUPPLIER P/N: 8. TEST SPEC. NO: A 280-T-60-266

9. CRITICALITY RANKING: 10. TEST REPORT NO(S): FROM MEMORANDUM, DSR-MS-4945

11. TEST SPECIMEN (LIST SAMPLE NOS. FOR EACH TEST) PFC/QUAL: 1 REL: 12. TEST AGENCY: LOCATION: SANTA ANA CA (A PLANT)

13. TEST STATUS	START DATE EST.	START DATE ACT.	% COMPLETE & DATE	14. RELIABILITY STATUS	GOAL ACHIEVED	DATE
PFC / QUAL				RELIABILITY		
RELIABILITY				CONFIDENCE LEVEL %		

15. TYPE OF TEST	APPLICABILITY (BY S/N)		RESULT (BY S/N)		DATE COMPLETE	REMARKS
	PFC/QUAL	REL.	INDEX	FAIL		
(1) PRETEST INSP						
(2) PROOF PRESS						
(3) LEAKAGE						
(4) FUNCTIONAL						
(5) HIGH TEMP						
(6) LOW TEMP						
(7) TEMP SHOCK						
(8) ALTITUDE						
(9) ACCELERATION						
(10) FLOW (CF)						
(11) PRESS SURGE						
(12) VOL. EXPANSION						
(13) LIFE CYCLE						
(14) VIBRATION						
(15) SHOCK (MECH)						
(16) HUMIDITY						
(17) SALT SPRAY						
(18) SAND & DUST						
(19) FUNGUS						
(20) DIELECTRIC STR.						
(21) EXP. PROOF						
(22) STORAGE						
(23) BURST						
(24) OTHER						

16. COMMENTS: THIS COMMENT IS PERTAINING TO THE TEST PLAN FOR THE PROOF PRESSURE TEST WITH PD. CURRENT LISTING OF SWITCHES SHOULD INCLUDE THE SWITCHES - HAVE BEEN IDENTIFIED, IDENTIFIED THE SWITCHES - NOT THE SWITCHES BUT IDENTIFIED OR NOT IDENTIFIED, SINCE THIS VALVE IS A DESIGN-SIMPLE ONE HAVE SHEET OF REQUESTED TESTS WHICH THE NEW VALVE SHOULD BE SUBJECT TO.

SIGNATURE: [Signature] DATE: 11/24/69

REV (A) 11/69

COMPONENT PFC, QUALIFICATION & RELIABILITY TEST PLAN NO. 21

1. VEHICLE STAGE: _____ 2. SYSTEM / SUBSYSTEM: _____ 3. PROCUREMENT SPEC/DWG NO: 755186 G-501

4. ITEM NAME: LOX FILL & REPAIR ISSUE 5. SUPPLIER: B. H. HANLEY

6. LINE ITEM CODE NO: _____ 7. SUPPLIER P/N: _____ 8. TEST SPEC. NO: A 200-T-CM-277

9. CRITICALITY RANKING: _____ 10. TEST REPORT NO(S): REPAIR MEMORANDUM A200-T-CM-277-22950

11. TEST SPECIMEN (LIST SAMPLE NOS. FOR EACH) PFC/QJAL: _____ REL: _____ 12. TEST LOCATION: SMITH MEMORANDUM (A 1212)

12. TEST STATUS	START DATE EST.	START DATE ACT.	% COMPLETE	14. RELIABILITY STATUS	GOAL ACHIEVED	DATE
PFC / QJAL				RELIABILITY		
RELIABILITY				CONFIDENCE LEVEL %		

15. TYPE OF TEST	APPLICABILITY (BY P/N)		RESULT (BY UN)		DATE COMPLETE	REMARKS
	PFC / QJAL	REL.	PASSED	FAILED		
(1) PRETEST INSP						
(2) PROOF PRESS						
(3) LEAKAGE						
(4) FUNCTIONAL						
(5) HIGH TEMP						
(6) LOW TEMP						
(7) TEMP SHOCK						
(8) ALTITUDE						
(9) ACCELERATION						
(10) FLOW (AP)						
(11) PULS SURGE						
(12) VOL. EXPANSION						
(13) LIFE CYCLE						
(14) VIBRATION						
(15) SHOCK (MECH)						
(16) HUMIDITY						
(17) SALT SPRAY						
(18) SAND & DUST						
(19) FUNGUS						
(20) DIELECTRIC STR.						
(21) EXP. PROOF						
(22) STORAGE						
(23) BURST						
(24) OTHER						

16. COMMENTS: (SAME) SEE #2 ISSUE

SIGNATURE: _____ DATE: 7 14 47 63

REV 1

COMPONENT PFC, QUALIFICATION & RELIABILITY TEST PLAN NO. 2

1. VEHICLE: STAGE: SIV-5 2. SYSTEM: SUBSYSTEM: 3. PROCUREMENT SPEC/DWG NO: REDESIGN

4. ITEM NAME: H₂ FILL & DRAIN VALVE 5. SUPPLIER: B. H. HARLEY (REDESIGNED)
LOC FILL & DRAIN VALVE

6. LINE ITEM CODE NO: 7. SOURCE: 8. TEST SPEC. NO:

9. CRITICALITY RANKING: 10. TEST REPORT NO(S):

11. TEST PROGRAM (LIST SAMPLE NO. OR ENTIRE): 12. TEST LOCATION: 13. TEST STATUS

START DATE EST.	START DATE ACT.	% COMPLETE & DATE	RELIABILITY STATUS	GOAL ACHIEVED	DATE
			RELIABILITY CONFIDENCE LEVEL %		

5. TYPE OF TEST	APPLICABILITY (BY WA)		RESULT (BY WA)		DATE	REMARKS
	PFC/QUAL	REL.	PASSED	FAILED		
(1) PROTECT INSP	/					
(2) PROOF PRESS	/					
(3) LEAKAGE	/					
(4) FUNCTIONAL	/					
(5) HIGH TEMP	/					+125°F
(6) LOW TEMP	/					-125°F
(7) TEMP SHOCK	/					+125°F to -125°F
(8) ALTITUDE						
(9) ACCELERATION						
(10) FLOW (G.P.)						
(11) PRESS SURGE	/					
(12) VOL. EXPANSION						
(13) LIFE CYCLE	/					
(14) VIBRATION	/					
(15) SHOCK (MECH)	/					
(16) HUMIDITY	/					
(17) SALT SPRAY						
(18) SAND & DUST						
(19) FUNGUS						
(20) DIELECTRIC STR.	/					
(21) CAP. PROOF	/					
(22) STORAGE						
(23) BURST	/					
(24) OTHER						

16. COMMENTS: See PFC Form 115 (Rev. 1-64) for instructions on how to complete this form. This form is to be filled out by the test engineer or test technician.
Section 16 should be completed.
All test procedures should be approved prior to testing. All test procedures should be approved prior to testing. All test procedures should be approved prior to testing.
The number of test procedures should be approved prior to testing. All test procedures should be approved prior to testing.
Please refer to PFC Form 115 (Rev. 1-64) for instructions on how to complete this form.

Memorandum

TO Dr. W. A. Mrazek, M-P&VE-DIR DATE May 10, 1963

FROM Chief, Nuclear Vehicle Projects Office,
M-P&VE-N

SUBJECT Weekly Highlights Report

STATUS OF ACTIONS RESULTING FROM THE MEETING HELD WITH DR. SEAMANS ON APRIL 25

Reference: Notes of last week (5-6-63 Mrazek with attached memo from
NVPO dated 5-3-63)

1. NASA/NAVY Agreement on Moffett Field Hangar

No favorable action. Apparently in stalemate due to problems
in other items listed below requiring decision.

2. Relocation Agreement

Mr. Ulmer (Hdqs. NASA Facilities) has taken the position that the
\$541,000 presently in R&D for transfer to the Navy cannot be transferred
as we planned. He maintains reprogramming authority is required from
Congress for Navy use of this money.

3. FY 63 C of F Funds

In order for Hdqs. NASA to make the \$1.6 million available for
modifying the PTF (Hangar #1 at Moffett) the Congress apparently must
be notified. We are informed Dr. Seamans does not wish to do this until
the current Hearings are over.

4. Cold Flow Facility

Lease agreement negotiations with Lockheed proceeding satisfact-
orily so far.

5. Georgia Nuclear Laboratory (GNL)

The status continues in stalemate. We have no indication that
Harry Finger has done anything to re-affirm to AEC that GNL is needed
for RIFT.

6. FY 64 C of F

Planning based on zero dollars as directed.

7. Guidance for FY 65 and FY 66

Planning based on \$18 million R&D and \$9 million C of F for FY 65 with major hardware fabrication and facilities slipped into FY 66 on "assume success" basis.

8. Guidance on NERVA and ROVER Schedules

Nothing has been done by Harry Finger to call a conference of industry-government people to (1) review NERVA performance requirements for RIFT Flight Testing with objective of relaxing operational design requirements and (2) develop and establish hard schedule upon which RIFT can program. In fact, we are informed that he has directed Space Nuclear Propulsion Office, Cleveland to delete all engine test dates in the Aerojet schedule immediately upon conclusion of the current FY 63 negotiations now in process.

9. Summary

The NASA/NAVY Agreement on the hangar, the Relocation Agreement and the \$1.6 million FY 63 C of F funds were discussed in detail between Drs. Seamans and Bisplinghoff on Friday the 10th, and resulted in the decision to immediately refer these items to Mr. Webb for resolution, according to Mr. Dave Miller who works for Harry Finger.



W. S. Fellows
Colonel, USAF

NOTES 5/13/63 Rudolph

B 5/ke

No Notes



B 5116

NOTES 5-13-63 Stuhlinger

1. METEOROID MEASUREMENT PROJECT: ^{Good?} Mr. George Wallace from P&VE Division is joining the project office as Mr. Pace's replacement on May 20. Mr. Pace will leave the project during the week of May 26. Mr. Gene Cagle from Astrionics Division is joining the project as engineer for electrical systems and electrical systems integration. This will very much relieve the workload on current personnel. Mr. Cagle will report as soon as possible after May 15. ✓

2. MOVE TO BLDG. 4484: Facilities Engineering Office has advised that RPD will be moved to Bldg. 4484 during the latter part of June. This will provide temporary housing for the division until the renovation of Bldg. 4481 is completed in September. ✓

3. UNIVERSITY OF ALABAMA ADMISSION PROBLEM: Mr. McGlathery feels that his legal action to obtain admission to the University of Alabama will be ruled upon by all courts involved before June 10, registration date at the University Center. He expects to have a court order to enable him to register for courses by that time. ✓

*We should report this to Holman - 9 Cong - 13
Electrical Gorman*

4. APOLLO CHARGED PARTICLE SHIELDING: M. O. Burrell of our Nuclear and Ion Physics Branch and two representatives from MSC spent two days at North American discussing with them and representatives from Atomics International the Apollo charged particle shielding code. It was concluded that the code is adequate for computing primary doses if proper definition of module geometry is made. In a test problem, the point detection dose at the center of the Command Module agrees reasonably well with those obtained by simpler techniques. ✓

Yes, by all means B

5. TRIP TO AF RESEARCH CENTERS: As a follow-up on our visit to Tullahoma on May 6, RPD and Captain Hensley are organizing a trip to the AF research centers at Cambridge, Wright-Patterson Field, and possibly Brooks Air Force Base. Participants will be from all divisions and offices interested in research work. We will take the position which we normally take when visiting a potential contractor. The trip is tentatively planned for the middle of June.



6. PRESENTATION ON METEOROID PHYSICS: We would like to give you and interested members of MSFC a two-hour presentation on our present knowledge of meteoroid physics (not including meteoroid protection). Speakers will be from RPD, P&VE, Aeroballistics, and possibly Astrionics. Proposed time will be early June. If you agree, we will organize the presentation with the other divisions, and with Bonnie. ACTION REQUIRED. ✓

Dr. von Braun said to "lay it on" 13th 5/17

E.S. URGENT

We appointed Capt. Bollinger as the contact man to Tullahoma. Since Tullahoma has been set up by the AF as "lead center" for the entire MSFC/AF co-op effort, we shouldn't do anything that he hasn't coordinated thru his Tullahoma counterpart. This is what we agreed upon w/ Gen. Rogers!! B

B 5/16

NOTES 3-13-63 WEIDNER

1. H-1 ENGINE: The first furnace-brazed stainless steel thrust chamber has been subjected to seven engine tests for a total of 880 seconds. ✓

2. RL10 ENGINE: RL10A-3-1 (Final S-IV stage version, SA-111) substantiation tests now total 351 firings for 50,364 seconds. Ninety-five hydrogen pre-chill runs have been made to date. Eleven helium pre-chill runs totaling 79 seconds have also been conducted (CENTAUR requirement). ✓

*
gen { 3. J-2 ENGINE: The pace of engine testing is temporarily picking up. Six tests for a duration of 200 seconds each were included in a total of fifteen tests; however, it is doubtful whether our meager hardware supply basis will allow support of this pace. ✓

A meeting was held at MSFC on 5-7-63 with the representatives from Douglas Aircraft Company and S&ID, North American Aviation, Inc. to discuss engine delivery schedules. The purpose of the meeting was to determine if the initial engine deliveries for vehicle battleship and all systems ground testing can be delayed to make the engine delivery schedule more compatible with the engine R&D program, and not affect the stage contractor's test schedules. It was determined that a delay of several months can be effected without any change to the present S-II and S-IVB assembly and firing schedules. The stage contractors' schedules will be reviewed again in mid-September relative to engine requirements. No change in delivery of flight engines is anticipated. ✓

Hydrogen Pump Test Cell CTL-5 was damaged by an explosion and will be out of operation for two weeks. Five people were injured. Work in this cell is particularly important now with regard to improved Net Positive Suction Head inducer. ✓

*
gen 4. F-1 ENGINE: Consultation has continued with Dr. Crocco. Paul Castenholz expressed the thought that this is of considerable value to their analytical effort and wished that Crocco could spend more time with them. Unfortunately we will lose Dr. Crocco's services from 7-1-63 through 11-63 as this is when he is taking his sabbatical and will leave for Europe. Engine testing is proceeding with good test frequency. Nozzle extension skirt had two short runs. No change in "stable injector" outlook. ✓

5. RL10 FLUORINE PROGRAM: Our efforts with John Sloop to have the program transferred to MSFC have not been successful. He will now contract with Pratt and Whitney Aircraft directly from headquarters and will retain technical supervision himself. We succeeded at least so far as not to have Lewis Research Center charged with this responsibility. John obviously found himself between two fires and did not dare make a decision. ✓

*Hermann
Harry Hall
R.
Hermann
group
might get
into some
theoretical
aspects of
this -
Could you
see Hermann
gen*

↑
Good idea
B

May 20, 1963



Downon

NOTES TO HOLMES - 5-21-63 - DEBUS

1. Visit of Congressman Teague: At the direction of Congressman Miller, Teague visited LOC on Saturday to look into alleged reports that cost plus fixed-fee contracts were being used in the construction of Complex 39. Facts were reviewed and Teague was satisfied that this was not the case.
2. Complex 39 Contract Status:
 - a. Construction of LUT and Crawler Assembly advertised May 9, 1963. Award planned for about June 1.
 - b. Construction of VAB foundations, waterfront unloading area and materials storage areas will be advertised June 10.
 - c. Structural steel fabrication and erection will be advertised May 31.
 - d. VAB 69 kva Substation will be advertised May 23.
3. SA-5: The first bar graph organization of the SA-5 launch has been prepared. The countdown must be broken into a split operation which still could require ten hours for the second day. I am working on a further evaluation of this time.
4. Presentation on Complex 39: Presentation was given to Marshall (ASTR, P&VE and M-QUAL) on the Saturn V general checkout plan at Complex 39 with emphasis on vehicle and GSE design requirements for performing overall systems tests in the VAB and at the launch pad. There are some problems in achieving what we consider optimum checkout capabilities in these areas. By establishing the checkout plans and requirements early in the program, we do anticipate these problems can be resolved without complicating the design of the stages or GSE or unduly compromising the checkout capability.
5. G. E. Company Support: Task orders (scope of work) for General Electric support in engineering and design of the Complex 39 instrumentation GSE have been submitted. These include measuring, RF, and telemetry checkout systems engineering, design, criteria development and "make" or "buy" decisions required for systems development. Tentative reporting date of G. E. people is June 1.

6. LH₂ Line Contamination: A verbal acceptance of the contamination level of the LH₂ line on Complex 37B has been received from P&VE. A written acceptance will follow. This applies only for wet testing of SAD-5.

7. Pad 37B Wet Test: The S-I lox tank baffle modification has been completed and the manual 15% lox load test conducted. Several leaks and valve problems were encountered but will not delay the overall wet test schedule. The baffle modification will delay wet test completion by only three days instead of the seven days reported last week. The S-IV full pressure tests and subsequent loading tests have been delayed until the integral bulkhead pressure monitor system has been installed. A third hydrogen flow test of the ground system was conducted and a contamination reading was obtained. The contaminated filter was examined by P&VE and a waiver granted for the wet test. DAC has begun connecting their hydrogen line to the LOC hydrogen line on the umbilical tower. Presently scheduled dates for loading lox in S-IV stage is week of May 20 and LH₂ in S-IV stage is week of June 3.

8. Fair Employment Practices: Temporary Negro employment has been committed as follows: (a) GS-3, male, clerk-typist for 90 days to give clerical support to MSFC Quality Assurance group at the Cape; (b) two Negro science students have been employed as summer students -- one to be assigned to the Launch Support Equipment Engineering Division (Cape) and one to the Assistant Director for Instrumentation.

9. JetStar Lease: A tentative date of May 17, 1963 has been established for the issuance of Requests for Proposals for the operation and maintenance of the JetStar. The term of performance will be for one year effective July 1, 1963 with renewal options for two additional years.

10. Status Report of Florida Legislature on University for Central East Coast: The House Appropriations Committee (Florida) moved 17 to one in favor of a new university in this area.



*1. QUARTERLY REVIEW

gan

The fourth in a series of quarterly reviews of Chrysler-Michoud activities was held May 14 and 15. Chrysler operations are proceeding smoothly and the SA-8 assembly activities are slightly ahead of schedule. ✓

2. BOEING OPERATIONS

a. CONTRACT STATUS - Negotiations to incorporate Plan V into Boeing Contract NAS8-5608 were recessed this past week (May 13 - 17) for evaluation. It is planned to present the government's offer on May 20 and 21, after which negotiations will resume. ✓

b. INSPECTION PROCEDURES - The dye penetrate inspection requirements are still unresolved in reference to the S-IC program. In view of the slow progress being made in the development of new inspection methods, a decision should be reached very soon as to the exact procedure to be followed for this type inspection to meet the requirements of large vehicle components to be manufactured and assembled at Michoud. We highly recommend that capability for the large dye penetrate requirements be approved and installed at Michoud as soon as possible.

D. Gau

Please
settle
this

B

c. MANUFACTURING DOCUMENTATION - In view of the S-IC contractor's policies relative to procedures and operational techniques, we recommend that the contractor be authorized to place processed specifications on their drawings. If this is approved, it will avoid duplicate paperwork and the individual worker in the plant would be well informed as to the manufacturing specifications and requirements.

K. Hrazek

F.Y.I.
B*3. ADDITIONAL OFFICE SPACE

gan

We are preparing a project approval request for the construction of approximately 70,000 sq. ft. of temporary office space to fill the gap until the new office building is completed. We propose to use the mezzanine at the back of the plant for this and later will convert it to enclosed laboratories. ✓

1. Navy Bombing and Rocket Range: Full report on why we awoke by rocket's red glare to find the Navy still there will be prepared, in cooperation with Karl Heimburg. In advance of this, please note I called Captain Egbert's office last Thursday, after Lt. Commander Krause from Naval Air Station New Orleans visited MTO that morning to ask permission for use of the range for the weekend. Egbert was not in. I had his secretary take down Ed Guilian's opinion that the Navy has no further rights in the Fee area; that because they apparently hadn't been told this in time to arrange for another site, we might consider letting them use the range on occasion if certain precautionary measures were met, but because of the current dry, highly incendiary conditions, they could not use it at this time. I suggested Egbert call me for further explanation. MTF Working Group is preparing letter to MDO, Corps of Engineers, on subject. ✓

2. MTO Participation in MTF Working Group: Your question Friday on this was not completely answered. I have a fine young engineer, Myrb Sanders, formerly with our Centaur program, who is working with Henry Auter and Tom Edwards daily. However, he should be going to Mississippi in June. I feel I should be on board, down there, myself, about July 1. I will ask Heimburg to set up periodic Planning Board meetings to keep in touch with Working Group operations, which I will come back to attend. Shepherd and I both feel we should have more of these with the tempo of design decisions increasing and construction starting. We also believe more and more of the Working Group will have to move to Mississippi to keep on top of all the construction problems, change orders, etc., as building progresses. G. E. can help here, too. ✓

*
 3. Housing for Personnel Employed at MTO: Some of the contractors in the MTO area have reported that they cannot get FHA commitments on houses that they want to build to accommodate the people moving into the area. It seems that the FHA office at Jackson, Mississippi has taken the position that our activity is temporary and will eventually phase out. We are going to contact Mr. McLelland Ratchford, Administrator, Southeastern Region of Housing and Home Finance Agency about this.

B.F. Suggest you take some slides along to convince him that those facilities aren't "temporary". B

1. Operation of Aeroballistics Division's Facilities: As a result of the desire of our Experimental Aerodynamics Branch to contract for the operation of the major facilities of the division (e. g. 14 inch Trisonic Wind Tunnel, 24 inch Hypersonic Shock Tunnel, Impulse Base Heating Facility), a memo is being prepared and will be forwarded to Financial Management Office requesting an additional \$450,000 in the FY-64 Institutional Support Budget for approximately 30 contractor personnel for operation of the facilities. ✓

*
pm { 2. FY-65 Fluid Mechanics Facility: We have been notified verbally by NASA Headquarters that our Fluid Mechanics Facility has been cut out of the FY-65 budget by Mr. Seaman's office. This is, of course, of serious concern to Aeroballistics Division. The Saturn V development is sure to suffer if this decision is final. Captain Freitag's office intends to reclama this facility along with several others. Mr. May will go to Washington on Monday, May 20, to assist Mr. Norman Crone from Freitag's office in formulating sufficient justification for the reclama. Complete support by Marshall's Facilities Review Board will be necessary to insure maximum consideration by Seaman's office. ✓

3. Apollo-PIRD: A draft of the MSFC contribution to the Saturn I-Apollo Program Instrumentation Requirements Document (PIRD) has been prepared by AERO-F together with ASTR-I and was forwarded to MSC for comments. ✓

4. Conference on Astronomical and Geodetic Constants: A conference was held at GSFC on May 16, 1963, to attempt to establish standard NASA astronomical and geodetic constants, (earth and lunar models). The following were agreed to by all attendees (MSFC, MSC, GSFC, JPL, etc.):

1. The astronomical and geodetic constants as documented in "Natural Environment and Physical Standards for Project Apollo" with the exception that the ratio of the mass of the earth to that of the moon was changed from 81.35 to 81.3015, and the radius of the earth was decreased by 1 meter for consistency. *I go along with this! B*
2. The geometric model will be the "World Geodetic System" (Irene Fischer 1960)
3. The ephemerides will be published this summer by JPL under the title "Ephemeris Library System" (EPHEM).

Major results of the conference will be included in memorandum "Conference on Astronomical and Geodetic Constants" to be distributed within three days. Detailed documentation of the proceedings will be published as a NASA technical report at a later date. ✓

NOTES 5-20-63 GORMAN

B 5/22

1. PREGNANT GUPPY - The Pregnant Guppy was flown from Van Nuys, California, to Edwards Air Force Base, by Mr. Conroy on May 16, 1963. FAA personnel stated the Pregnant Guppy made a normal flight with no incidents. FAA tests will begin after Mr. Conroy completes 18 hours of flying in the aircraft. Mr. Conroy will be at MSFC on May 24 to reopen contract negotiations.

L A T E

B 5/22

1. SA-5 POST-STATIC CHECKOUT: Alignment tests were completed in the WAAMAC area of Building 4708, and the vehicle was moved to checkout station B for performance testing. It is anticipated that a large portion of the checkout will be accomplished in the automatic mode. ✓

*
Pen 2. SA-5 INSTRUMENT UNIT CHECKOUT: Telemetry calibration tests are continuing, however, missing components and discrepancies have resulted in a six day increase in checkout time. No slippage in the shipping date is anticipated at this time. ✓

3. GOVERNMENT INSPECTION AGENCY REQUIREMENTS: The Quality Assurance Division has compiled the Government Inspection Agency manpower requirements for present effort and for anticipated effort by the end of FY-64 on all MSFC contracts and sub-contracts. Presently, we have 248 GIA personnel and anticipate that this will rise to 745 by the end of FY-64. ✓

D.F.
Please explain background of this number.
B

4. AIR FORCE REQUIREMENTS AT ROCKETDYNE: A study report by the Air Force at Rocketdyne, Canoga Park, to determine the number of Government Inspectors required to support the F-1 and J-2 Programs now and during FY-64 was received and discloses that their estimated required strength would increase from 31 to 82. ✓

NOTES 5-20-63 GRUENE

B 5/22

Wet Test Schedule: S-I lox tank baffle modifications have been completed and the initial lox transfer test conducted. The S-I lox tank inspection following the 100% lox loading test revealed that there was damage to the lower two rows of baffles in lox tanks 1 and 3. P&VE is investigating this problem. The overall wet test schedule has been revised to reflect the baffle modification time and the removal of the S-IV cold disconnect tests. The termination of the wet test schedule has increased a few days (June 20, 1963), and present operations are essentially on this established schedule. ✓

H.F. ↓

Which S-I is that? For SA-5?

B

B 5/22

NOTES-5/20/63-HAEUSSERMANN

1. PROJECT LIEF (LAUNCH INFORMATION EXCHANGE FACILITY): Astrionics Division has been working with other MSFC divisions in conjunction with Dr. Speer in formulating a plan to implement LIEF. This project is the result of Dr. Debus' recommendation on 4/19 that a high speed data link be installed between LOC and MSFC to support launch vehicle development. (See attached abstract for further details.) On 6/4 Dr. Speer will coordinate a presentation to you describing MSFC's proposed implementation of LIEF. ✓

2. COMPONENT PACKAGING AND MOUNTING FOR SATURN V: It has been decided that the guidance computer, the data adaptor, and the platform electronics will be packaged for internal cooling rather than cooling by conduction to the cold plates. Internal cooling of these components will offer advantages in reducing mounting space and in lower temperature of heat producing elements. All fluid systems characteristics established by P&VE appear to be compatible with proposed internal cooling designs. *W.H. How much remains for cold plate cooling? B*

* 3. SATURN ALIGNMENT LOOPS: (Reference your comments to item 4, notes of 5/6.)* *gan* The azimuth alignment tests can be carried out by mounting on-board equipment on top of the tower. No direct need exists to use the vehicle itself; thus no delay in launch date of SA-5 will result. It will be sufficient to make additional and final tests on SA-5 during LOC checkout period. Dr. Gruene has been contacted. ✓

4. BENEFICIAL DISPOSITION OF OBSOLETE SMALL ITEMS: On 5/14, 18 students and two instructors from the Tennessee Valley State Vocational Technical School Decatur and Huntsville Branches, spent a day in Astrionics separating and disassembling components from breadboards, chassis, and panels that are no longer of use to the government. The components consisted of items such as transistors, diodes, resistors, and capacitors which can be very effectively used in the school's training program. From all indications it appears that this activity will develop into a very successful and beneficial program. ✓

W.H.
I hope you have made sure that we're not violating any legalities!
B

- 2 Enc:
1. Astrionics Division Support of Project LIEF
* 2. Notes of 5/6 (Provided only for M-DIR copies)



ASTRIONICS DIVISION SUPPORT OF LIEF

Astrionics Division has been working with other MSFC divisions in conjunction with Dr. Speer in formulating a plan to implement Project LIEF (Launch Information Exchange Facility). This project is the result of Dr. Debus' recommendation on April 19 that a high speed data link be installed between LOC and MSFC to support launch vehicle development.

Astrionics Division proposes to support Project LIEF during the relatively short launch phases (approximately 12-24 hours each) by sending all necessary personnel to the Operation Support Center (the room that is proposed to be located in Bldg 4663) to assist in formulating appropriate MSFC recommendations to be forwarded to LOC and to participate in operations support control (within MSFC). These personnel will be supported by Astrionics Division personnel and equipment located in Bldg. 4487. This support will consist of monitoring and analyzing data at the request of LOC and performing any supporting launch vehicle simulation.

Further, Astrionics Division proposes to support Project LIEF during the day-to-day checkout and pre-launch operations that take place over an extended period of time (probably at least eight weeks in duration) prior to launch day. Typical of this support is the simulation of a large number of pre-launch operations on automation breadboards. Computer routines will be generated using these breadboards as verification tools, wherever possible. These programs will be transferred to LOC for use in the actual launch vehicle and ground support equipment. Results and discrepancies will be provided to Astrionics Division to incorporate resulting changes into the programs for the present and the ensuing vehicles. Another typical area of support consists of MSFC design engineers' reviewing (at the request of the operating engineers at LOC) output voltage waveforms, etc., during any one of the numerous day-to-day tests which takes place at LOC. Complicated schematic and wiring diagram changes will be reviewed via television or facsimile displays that otherwise would have required time-consuming actual exchange of documentation to avoid errors. To provide this foregoing support, Astrionics Division proposes to utilize the personnel, documentation, and equipment located in Building 4487.

The following data and equipment are required to provide the foregoing support:

a. The entire Digital Data Acquisition System (DDAS) data stream, which the MSFC Operations Support Center will receive (in real time) from LOC over the proposed data link between MSFC and LOC, is required at Astrionics Division so that appropriate personnel and equipment can follow, support, and participate in the pre-launch and launch operations. This is imperative, for appropriate personnel must continually be intimately aware of the prelaunch situation. Only in this way can these personnel make timely and knowledgeable recommendations to the MSFC

Emel

Operations Support Center personnel when problems (or potential problems) arise. To anticipate these problems is impossible. To be able to cope with any problem that might arise on launch day would require a prohibitive number of Astrionics Division personnel located at the Operations Support Center, equipped with a large quantity of documentation (such as schematics). This undesirable situation would be relieved by providing the DDAS data to Astrionics Division over the existing microwave link between the Computation Division (MSFC Operations Support Center location) and Astrionics Division via Green Mountain. Further, Astrionics Division would then be able to select the data needed for a particular situation, using existing Astrionics Division DDAS equipment.

b. A tape station will be required to transfer operational computer programs to LOC after they have been generated in Astrionics Division. The tape station also will receive selected post-test data that has been recorded on tape for post-test analysis: In most cases this data will be analyzed before launch. Installation of a tape transport link between LOC and MSFC will be completed in approximately mid-June 1963: The terminal will be located in Building 4663. Again, the existing microwave link between the MSFC Operations Support Center and Astrionics Division via Green Mountain would be used to transport this data. This data, which will be in RCA-110 format, can then tie the breadboard facility to LOC and be used to verify the program routines. (A second terminal will be installed at a later date in Building 4487.)

c. A facsimile facility will be required in Astrionics Division to provide LOC with immediate dynamic simulation support, such as simulating vehicle flights under adverse wind conditions. The link carrying this facsimile data from LOC to MSFC would provide Astrionics Division with current simulation inputs and would return pictorial displays to LOC to substantiate recommendations made as the result of these simulations. Additionally, the facsimile would be used to provide schematics as pictorial aids in interpreting other data or voice conversations. It also would be used to transmit new modifications rapidly. The facsimile data would be transmitted directly from the MSFC terminal to Astrionics Division via the Green Mountain microwave link.

d. Approximately five direct telephone lines between LOC and Astrionics Division will be used to complement the above three data links. Since three of these direct lines already exist, only two additional lines will be required.

e. If a television link is installed between LOC and the MSFC Evaluation Center, a television facility should be located in Astrionics Division to allow frequent conferences to take place to discuss day-to-day pre-launch problems with LOC personnel and, of course, to provide close contact between Operations Support

Center personnel and appropriate Astrionics Division personnel on launch dates. It also would provide a means of rapidly exchanging data, such as recorded charts, etc., between Astrionics Division, the Operations Support Center, and LOC. Again, the existing MSFC microwave link would transmit this television data.

It is pointed out that, with the exception of two direct telephone lines and the facsimile and television facilities within Astrionics Division, the equipment required to receive and use this data in support of Project LIEF is already available or is needed to meet other requirements. The above material is intended to show how thoroughly Astrionics Division intends to support Project LIEF without diluting the MSFC Operations Support Center personnel's centralized decision ability: Rather, it will enhance that capability by making the bulk of Astrionics Division's resources available in a timely manner. Further, this plan provides for the utmost use of the LIEF link and facilities throughout the entire lengthy period during which the launch vehicle is readied for launch (rather than just during the few days of launch operations).

Dr. Speer (AERO)

This makes a lot of sense to me

B 5/23

B
5/23*1. S-1-6:

Jcm

Short (35 sec) duration firing conducted 5/15; however, at cutoff the main lox valve of engine 8 failed to close properly causing severe damage to the thrust chamber. Cause not yet determined. Engine replaced with spare and autopsy of damaged engine underway. Baffle damage in lox tanks occurred some time during firing, but cameras on tanks failed to yield any clues as to when. Full duration firing scheduled, 5/28. ✓

2. S-IV-DAC, SACTO:

(Re comment in NOTES 5/6, ATTACHMENT 1). Rapid venting of tanks was to simulate acceleration decay. ✓

BATTLESHIP - Tankage is being removed and will be shipped to MSFC. ✓

ALL-SYSTEMS - Tank fill and cycling (7 pressure and vent) test was satisfactorily performed, 5/14. It was proved once again that the common bulkhead does in fact have minor leakage of hydrogen into the space between fuel and lox tanks. Condition of insulation was personally inspected after this test, and nothing unusual was noted other than minor "crazing." ✓

* Jcm S-IV-5 - Will be installed on test stand 2B this week. Parts and documentation still not complete. Present DAC estimate for first firing, 6/28.7. Might be possible, now that detracting factors (Battleship & All-systems) have been taken away from designers. Effort must continue to be directed as though S-IV-5 is "All-Systems" test. Will not know where we stand launch-wise until this stage is filled and fired. ✓

3. MARINE ACTIVITIES:

(Re request in NOTES 5/6, ATTACHMENT 1). Preliminary S-1C barge concept will be conversion of Navy hull identical to hull used for PROMISE. Artist's conception of S-1C barge enclosed as ATTACHMENT 2*. Proposed cargo compartment: length 210 feet; width 44 feet; height 46 feet. Tow rope horsepower required to make 8 knots in open sea, 1600 shaft horsepower. Modification cost estimate = \$400,000.00, excluding instrumentation. Bare hull replacement cost per Navy estimate = \$300,000.00. Modifications scheduled to start 9/63, with delivery to MSFC complete, 1/64. ✓

4. MTF

* Jcm Final approval of MTF Cryogenics Procurement Plan still not received. A 6-week schedule slippage for cryogenics plant activation has already been incurred with a further slippage contingent on date plan is received. (Re query in NOTES 5/13, ATTACHMENT 3). We understand Headquarters assumed position that plant may be at any location provided Flywheel storage facilities are maintained within a 50-mile radius of MTF. This would include Baton Rouge. However, MSFC continues to support the 50-mile limitation for both plant and storage. ✓

Navy lease at MTF was recognized prior to start of land acquisition. Blame for failure to revoke lease must be jointly assumed by MSFC & Mobile District Engineers since we advised the engineers by phone 10/29/62, that the Navy could continue to use the range through construction. The Corps should have requested written verification of this position so this error would have had a chance to be caught. ✓

ATTACHMENTS 1, 2, & 3* (ATTACHMENT 2 on Dr. von Braun's copy only)

NOTES 5-20-63 HOELZER

B 5/23

1. DATA CENTER: The first part of the Data Center Study (IBM team) has been completed. IBM presented a general concept which should be thoroughly studied and discussed by CPO, COMP, and the representatives of the ADPS Working Group before we proceed. At the present time IBM studies the impact of the proposed new system on the ADPS work we are doing now. On Thursday, May 23, 9:30, we plan to brief you and your staff. ✓

B 5/23

1. LLS PAYLOADS: Funding for the LLS payload pre-development studies has still not been approved. As mentioned previously, our OMSF contact, Mr. Taylor, has been asked to leave the further negotiations relative to this matter up to Dr. Shea, Mr. Holmes, and Dr. Seamans. As per our discussions, you had indicated you would contact Mr. Holmes today to ascertain the latest status. As a further reminder, you might relate your discussion with Dr. Seamans wherein he indicated unfamiliarity with the payload schedule and unavailability of a group at MSFC available for this payload assignment. ✓

Will do
B

*2. OSS SATURN/3RD STAGE CONFIGURATION STUDY: After the formal JPL presentation on Voyager on Thursday, May 16, additional discussions were held between responsible MSFC and JPL personnel wherein working relationships were discussed. Apparently the total JPL/MSFC discussions were quite informative and cordial. ✓

Requests for quotes to STL for the Centaur study portion have been mailed and STL responses are expected by May 27. ✓

B 5/23

1. AIR-AUGMENTED ROCKET STUDY

Eleven (11) air-augmented rocket study proposals (P-064) were evaluated this week by a team representing Headquarters, Lewis, Langley, and Edwards AFB Rocket Research Laboratories. Selected as best was Boeing, followed by Aerojet and Rocketdyne, in that order. The results of this analytical study, coupled with those from the concurrent Edwards/Martin-Denver test program at AEDC, should do much to place the augmented rocket concept on solid ground. As you may know, Marshall (P&VE Division, with some NOVA money) is participating in this Tullahoma program via furnishing the multirocket (12) model cluster for the augmentation tests. The Boeing contract is \$85,000. Do you want a presentation on the selection procedures and results or do you go along with our selection of Boeing?

H.H.K.

No
B

Yes B

2. UNFAVORABLE MARS MISSION STUDY

We received 10 proposals on the contract P-175, "1975/85 Mars Mission Opportunities." In this contract, it is planned to obtain a proper assessment of the difficulties imposed during the "bad time period" and of the best ways to alleviate them. The evaluation was completed on May 15. The technical supervisor is Mr. J. Smith (FPO); Dr. Ruppe and Mr. V. Gradecak are members of the panel. Pending your approval, we advised P&C to start negotiations with General Dynamics/Forth Worth (proposal was strong in the area of operational analysis) and Douglas or Martin/Baltimore. We plan to buy two studies, totaling \$175,000. Both of these proposals were strongly mission-oriented of about equal quality. (For background information, Douglas has one of the Post NOVA contracts and Martin one of the NOVA study contracts.)

O.K.
with me
B

B5/23

1. Saturn V, S-IC Stage:

a. A heavy warpage problem on the 54" close-out of the bulkhead, created by welding of a manhole ring into the dollar piece, delayed last week the progress on the fabrication of the upper bulkhead for the fuel test container. We were able to overcome this problem by setting up a planishing operation in the machine shop. The dollar piece was welded in the bulkhead last Friday night. ✓

*
gen { b. Representatives of this Division at the request of Dr. Constan accompanied the Saturn Systems Office to The Boeing Company's Wichita Plant for the purpose of determining the effort being expended by Boeing on tool fabrication which has not been authorized according to the terms of the contract. In general, the contract stipulates that (1) The Boeing Company will be furnished by the Contracting Officer authorized Government Designs for tools that are common by location to both Boeing and MSFC and (2) that the Contracting Officer will approve tool requirements for tooling unique by location to The Boeing Company. The review made at Wichita revealed that around 30 tools in the common category and 60 tool in the peculiar category have been released for fabrication by Boeing which do not meet contractual requirements. Fabrication of this tooling can have an effect on the contract cost as well as the schedule and this Division is currently reviewing this area of tooling and shall make a recommendation to the Saturn Systems Office as to what course of action should be followed.

2. Vehicle Structure Technology Program: Last Wednesday we repeated our presentations on Manufacturing Methods Development and Experimental Structures in Washington. Captain Freitag, Dr. Harvey Hall, Messrs. F. L. Crone, Carl Pilger, W. L. Lovejoy, M. G. Rosche and many others participated in the meeting. This meeting was held on request of Mr. Crone with the intention of familiarizing more people with the manufacturing technology program at MSFC. Captain Freitag asked whether we also analyze manufacturing problems in the Apollo Program. I replied negative because it was my understanding that this is not in the mission of MSFC and we do not want to interfere with responsibilities of MSC. He might take this topic up with you. In the afternoon we discussed our experimental structures program with a group of people in OART with a pitch of asking funding support from this office for our projects. Mr. Preston Read from CPO and Mr. Thomas Kinser from RPD participated in the meetings. ✓

→ M-SAT (Dr. Lange)

Stones was quite concerned about this trip. I promised him to look into the matter and write him about our concern, reasons for trip, and findings. Please prepare a suitable dear George letter B

- * 1. SATURN I/IB: S-IV Battleship was removed from the stand on 5-16-63. Modification to stand for acceptance firing is under way.

Spec

S-IV-5 is scheduled to go on the stand week of May 20.

All Systems Stage was removed from the stand on 5-17-63. An overall review of the S-IV test program will be conducted during the week to determine suitability of all systems stage for continued use in the all systems testing and to determine the minimum impact on the S-IV program in the event another stage has to be diverted for all systems use.

SACTO Team - May 20: Messrs. Driscoll, Ferguson, Godfrey and Resident representatives from P&VE (2), TEST (3), and QUAL (3) May 27: Messrs. Weidner, Heimburg, Lindstrom and Resident representatives from P&VE (2), TEST (3), and QUAL (3). ✓

2. SATURN V: S-II - Contractual action has been inaugurated to incorporate a forward flow recirculation propellant conditioning system in all S-II flight and ground test vehicles. The estimated cost is \$3.6 million.

Contractual action has been inaugurated to incorporate a 13 sq. inch piston hydraulic actuator system to gimbal the J-2 engines installed in the S-II vehicle. Additionally, the change directs the contractor to incorporate a mechanical feedback system on the actuator to monitor the position of the gimballed engines. ✓

Guidance Computer Contract for SATURN V and SATURN IB is at Headquarters for signature. ✓

3. APOLLO: EDS - After the SATURN I EDS criteria have gone out, a preliminary schedule for SATURN IB and V EDS criteria is being established and looks very tight already. Two phase efforts are necessary: preliminary failure mode approach, followed by a final failure effect approach for verification. ✓

A Sub-Panel meeting at the Cape defined "over-the-pad" emergencies. Optical coverage appears unsatisfactory. ✓

Awareness Program for manned flight has been finalized and will be submitted to you. ✓

B 5/23

1. BOARDS, COMMITTEES AND WORKING GROUPS - We have published and are now distributing copies of an updated Directory of MSFC Boards, Committees and Working Groups. This document shows title, organizational relationship, purpose, authority for establishment, and listing of membership. ✓
2. FACILITIES FOR FY-65 - Dr. Seamans deleted the following MSFC proposed facilities from the NASA FY-65 preliminary budget submission to Bureau of Budget:

* AERO Engineering Building	\$ 2.480M
* Special Fluid Mechanics Laboratory	2.845
* ASTR Office Building	1.900
Special Power Source Laboratory	.500
* Component & Model Test Facility	12.500
Systems Management Engineering Building	5.500
Addition to Utilities for Institutional Facilities	1.000

OMSF plans to make a reclama to Dr. Seamans on the projects marked *. ✓ In addition, we understand Dr. Seamans deleted all facilities for the new program starts.

3. APOLLO LAUNCH SCHEDULE - We have learned from Houston that the MSC schedule submission to OMSF this month will show spacecraft deliveries at three month intervals for manned flights (Saturn I, IB, and V). This has no impact on Saturn I, minor impact on Saturn IB, but a major impact on Saturn V. The official OMSF schedule for Saturn V manned launches now shows two month intervals.

We understand the concensus at MSC is that they cannot handle launching on two month intervals for operational reasons (not hardware delivery problems, as NAA can handle 1 per month delivery rate). Operating considerations concern astronaut availability, training, flight support facilities, and time required for data reduction and analysis after each launch, and accomplishing of changes resulting from previous launch.

Obviously, the MSC proposal would affect the date of the manned lunar landing attempt and would reduce the Saturn V launch rate to 8/year.

H.M.
 Shouldn't we bring this up in Man Council?
 Please provide backup notice for me
 B

B 5/23

NOTES 5-20-63 MRAZEK

W.M.
This is in direct conflict
with the official
OMSF
flight
mission
schedule.
B

1. SATURN IB: (Reference NOTES 5-13-63 MRAZEK, paragraph 1b, copy attached.) MSC did not elaborate other than to mention (a) Increase propellant loading for docking maneuvers with the Lunar Excursion Module. (b) Increase propellant in the Service Module to make maximum number of restarts. (c) Command Module reentry missions. (d) From previous discussion, we found that MSC also plans eventually to use Service Module propellants to burn into orbit (in this case without Lunar Excursion Module).

* 2. WEIGHT CONTROL: Rigorous weight control is a "must" on our SATURN IB and SATURN V vehicles. At this early stage of development, we are already approaching the maximum allowable weight limits or, as in the SATURN IB program, probably have already exceeded these allowables. All scope and design changes must be coordinated for weight and performance impact purposes prior to direction of contractors. This concerns divisions and working groups. ✓

3. ACOUSTIC TESTS FOR COMPONENTS FOR ATLAS-MERCURY, MA-9: Four components were tested for MSC at the Wyle Laboratories Acoustic Test Facility. The purpose of these tests was to insure the reliability of the components for the MA-9 space flight. Items tested were a 9-pound coolant tank, a 39-pound coolant tank, electro-encephalographic signal conditioner and its associated tape recorder, and a condensate trap. All components functioned satisfactorily throughout the tests. ✓

4. S-I STAGE, BLOCK II SLOSH BAFFLE DAMAGE: (a) The SA-6 vehicle completed propellant loading tests on 5-7-63 without experiencing damage to slosh baffles as experienced on SA-5. A cautious fill procedure consisting of slow precool of LOX transfer lines and LOX tanks was used. (b) SA-6 and subsequent have a 45° slanted-hole pattern of the perforation, thus a greater strength is achieved in the "bent up" flanges of the baffles. (c) Nevertheless, breakage of aluminum baffles in LOX is unacceptable and we will reinforce the baffle flanges. ✓

5. S-IC PANEL FLUTTER TESTS: (Reference NOTES 5-6-63 MRAZEK, paragraph 1, copy attached.) S-IC areas marginal for flutter stability are in both pressurized and unpressurized stiffened cylindrical shell areas.

a. The unpressurized areas include the hat-section stiffened thrust structure shell, the intertank corrugated shell, and the forward interstage hat-stiffened shell. Flutter critical local areas are the top caps of the hat stiffeners and the corrugations. These elements are extremely long unsupported panels, with stiffeners on the outside of the skin and ring frames inside, and must be tested for flutter.

b. The pressurized areas include the longer longitudinal skin panels in the fuel and LOX tank shell between integrally milled stiffeners. Ring frames in the tanks are attached only to the longitudinal stiffener, not to the skin panels (see attached sketch).

6. GENERAL: I wish you would clarify whether Special Projects Office is a "Line Division" with "do-it-yourself" capabilities (if so, we need a delineation) or an office to which policy statement #1 is applicable.

- Attachment #1: NOTES 5-13-63 MRAZEK
- Attachment #2: NOTES 5-6-63 MRAZEK
- Attachment #3: Sketch

W.M.
What's that? Do you mean
Special Assignments Office.
(Hueber)? B

NOTES 5-20-63 Rudolph

B 5/23

No Notes.

BE/23

1. METEOROID MEASUREMENT PROJECT: Dr. Johnson and Mr. Pace of the Project Office and Mr. Massey of the Saturn Systems Office met last week with Mr. R. P. Smith and other members of the MSC-APOLLO Project Integration Office staff to begin formalizing the responsibilities of MSFC and MSC with regard to the APOLLO Boilerplate Spacecrafts on SA-8 and SA-9. The first meeting was very profitable. No difficulties in reaching a working agreement are anticipated. ✓

2. FY-64 SUPPORTING RESEARCH PROGRAM: The official submission of the FY-64 Research Program for which RPD has cognizance was forwarded to M-CPO on May 14, for inclusion in the Marshall official submission to Headquarters. Approximately \$43,000,000 in research tasks was submitted to Research Projects Division for inclusion in the FY-64 research programs. This compares with the following budget guidelines which have been specified by the Headquarters Program Offices:

Office of Manned Space Flight	\$15,000,000
Office of Space Sciences	2,500,000
Office of Advanced Research and Technology	9,487,000
	\$26,987,000

The present MSFC submission consists of two parts. One listing is a submission in compliance with the above budget guidelines. The other includes those tasks which represent requirements in excess of budget guidelines. It should be emphasized that the present submission still represents early planning, and that the tasks under consideration are subject to further negotiations between MSFC and various segments of Headquarters. In the process of this negotiation, some of these tasks which are presently categorized as being in excess of budget guidelines may find funding. RPD has notified the various divisions of the placement of their tasks within the official MSFC submission. ✓

3. LLS PROJECT: Hans Hueter and I further discussed the areas and modes of close cooperation between SAO and RPD in the LLS Payload Project. A memo of agreement is being written (a copy will be sent to you). Joint occupancy of Bldg. 4481 is easily possible. ✓

4. LUNAR PHYSICS SEMINAR: Following your earlier suggestion, RPD made plans for a seminar on lunar physics. Lecture sessions will last one and one-half to two hours, including discussions. There will be about 8 sessions, beginning in August. Would you like us to plan the lecture times so that you can attend them (i.e., on a floating basis)? ✓

ACTION REQUIRED.

LATE

✓
Res. B

B 5/23

1. J-2 ENGINE: Eight engine tests, including four tests of 200 seconds or more, were conducted for a total time of 1053 seconds. ✓

On 5-9-63 a liquid hydrogen line ruptured on the Rocketdyne facility Component Test Laboratory 5, injuring one man and causing extensive damage to the J-2 hydrogen pump test facility. Reasons for the line rupture are still under investigation by Rocketdyne. Estimated "down time" for the J-2 hydrogen pump facility is four weeks. This facility had recently been modified and two hydrogen pump tests had been conducted without incident. Four men were on the roof of the building conducting a pre-test checkout when the line ruptured igniting escaping hydrogen. The four men were examined at the first aid station and one required medical treatment for minor burns. All four returned to duty during the same shift. ✓

A meeting was held at MSFC on 5-10-63 among Rocketdyne, OMSF Propulsion, and MSFC personnel to discuss the proposed realigned development program and engine delivery schedule. Agreements on the desirability of a two-phase PFRT program and a delayed qualification program were reached. ✓

2. RL10 ENGINE: The turbine discharge manifold on production engines shows consistent cracking of weld at an instrument measuring boss. This failure is thought to be due to local vibration and fatigue. Reinforced lines (heavier walls and boss removed) have to be retrofitted into engines in the field. No schedule effects on S-IV-5 are anticipated. ✓

3. F-1 ENGINE: Five engine system tests were run this period.

Test No. 315 used the six-shingle 16:1 nozzle skirt extension. The test duration was as scheduled. Post firing inspection revealed that the internal structure of the skirt was gutted 20° on each side of the exhaust stack. This failure was a structural failure rather than a thermal failure. ✓

Twelve injector tests were run on Stand 2A with two injector configurations. ✓

Two ten-hour classes have been completed by approximately 40 Test Division people on the F-1 engine operations. These classes were conducted by a Rocketdyne instructor. Additional classes have been scheduled. ✓

During the critical period prior to PFRT, a closer technical contact with Rocketdyne in the areas of J-2 and F-1 has been provided by our establishment of one- to two-week tours of duty for Propulsion and Vehicle Engineering Division personnel. I think that this added burden is well worth the effort. ✓

4. S-II STAGE: The S-II sump and center engine suction line have been evaluated analytically and experimentally. All evidence indicates the extreme curvature of the center suction line will result in cavitation of the liquid oxygen. Discussions are in progress with S&ID for resolution of this problem. ✓

* 5. S-I-6 STATIC TEST: At cutoff there was a LOX leak on position 8, either because of a seal failure or mechanical valve malfunction. Continued burning resulted in damage to the thrust chamber interior. Further information on hardware damage and cause will be available upon disassembly. The engine will be replaced with the spare for this position. ✓

* 6. S-IVB BATTLESHIP TEST STAND: Douglas is recommending equipping the stand with a diffuser in order to allow full mixture ratio excursion, etc., without nozzle separation. This Division is recommending approval. ✓

7. JOHN SLOOP VISIT: John Sloop and staff paid us a two-day "get acquainted" visit last week. We gave them a good cross-section of our capabilities in the propulsion field. ✓

8. I will be on Annual Leave for two weeks beginning today. ✓

H.W.
Makes sense!
B

May 27, 1963

VOIDED
RECEIVED

1963



1963

NOTES

5/27/63

CONSTAN

B5/29

Negative Report

B 5/29

NOTES MAY 27, 1963 DAVIS

* Negotiation on PREGNANT GUPPY: Mr. Conroy, Operator of
"Pregnant Guppy", is in critical financial distress. He seeks
immediate aid (say \$50,000) to meet three-week operating expenses
incident to FAA certification. His prior fixed-price offer of \$8.86
per mile with guaranteed minimums now exceeds \$10.66 a mile on
new offer to lease and operate. Considering maximum profit for
high risk venture, the Conroy proposals are not within range of
acceptance. Negotiations are continuing, looking to sixty-day
contract if enough cargo traffic can be scheduled. ✓

D. von Braun:

I have agreed with Mr. Gorman
that his NOTES will be replaced
by NOTES from Davis and Sheppard.

↑ O.K. B

Jan 5-27

B 5/29

- *
Jan 1. GE at MTO: Mr. Matthiesen visited MTO May 24 in reference to immediate requirements for support of: facilities, custodial service, maintenance, security, medical, PIO, personnel, etc. He indicated it was GE's intention to have a limited number of people on board at MTO about June 15, if negotiations proceed satisfactorily at Huntsville. ✓
- *
Jan 2. Increasing reactions by Property Owners in Buffer Zone against land acquisition procedures: For some weeks we have heard rumblings of property owners meetings, and growing complaints against Corps of Engineers bargaining methods. Bart Slattery brought back more word on this from Mack Herring; B. U. Jones has also written me twice recently about it. Bart says he understood Senator Stennis had addressed a letter to Colonel Raymond regarding the complaints. In general, these reputedly relate to the apparent callous, hard-nosed, "take it or leave it" attitude of the Corps appraisers, whose primary concern appears to be to acquire the easement for the least amount of money, with no concern about fair price, relocation difficulties, etc. Political aspirants are likely to seize on this, so Jones feels that acquisition should be expedited in every way possible. Better public relations could help, too, I feel. I mentioned this to Colonel Roberts about ten days ago, but he said Colonel Raymond was not worried, a certain amount of dissatisfaction being normal and in this case no greater than experienced on similar reservoir purchases. I'll talk with Raymond, personally, in view of the renewed warnings. ✓
3. FAA Study of MTO Air Transport Needs: MSFC letter to NASA Headquarters on subject has born fruit. McCollum has arranged with FAA to look into our needs as they did for LOC in Florida. ✓
4. Visit of HHFA Regional Administrator to MSFC: Mr. Ratchford, Head of Housing and Home Finance Agency in Atlanta, will visit us Tuesday, May 28. We will give him presentation of MTO's place in space, bring out local problems including the FHA commitments, and offer desk, clerical and transportation support if he can assign a representative to Gainesville. ✓

B5/29

NOTES 5/27/63 GEISSLER

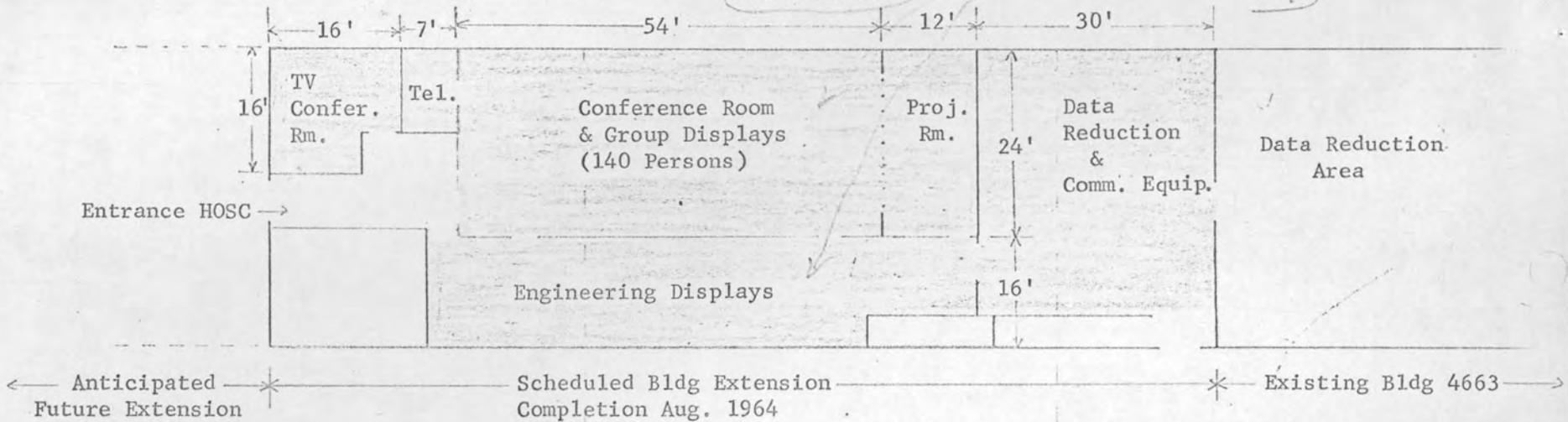
1. Saturn IB, 3 Stage: Schedule for Saturn IB/S-VI Voyager mission study has been made. Your presentation, tentatively September 26; presentation to OSS, October 3; final report approval, October 31. These should fit in satisfactorily with Dr. Seamans' decision around October 15. Five report volumes will be I Summary, II Launch Vehicle Design Definition, III Flight Path and Performance, IV Astrionics Aspects, V Cost and Ground Facilities. ✓
2. Flight Mechanics, Dynamics, and Control Coordination Panel: Fifth meeting was held here May 22. Action items are: (a) MSC will define their mission needs for SA-10 and SA-111. Orbital versus ballistic reentry still needs to be settled. ✓ (b) MSFC and MSC will study further two methods of reentry for Saturn 504 and 505. ✓ Agreements are: (a) LES jettison times, for Saturn I after S-IV ignition, ✓ Saturn IB after S-IVB ignition ✓ and Saturn V after S-II ignition, ✓ were decided upon. (b) MSC agreed that Saturn IB earth orbit attitude control requirements were same as those for Saturn V LOR mission. ✓ (c) MSC has no separate needs for alpha measurements on Saturn I, IB and V. ✓ (d) MSC does not require S-I, S-IB, S-IV and S-IC and S-II stages to have engine out capability with respect to abort. ✓
3. Project LIEF: Fifth study group met here May 21. Agreements were reached on recommendations to be made to you and Dr. Debus on June 4. Total data link bandwidth should be increased from present 45 kc to 630 kc to permit full MSFC support to LOC and a modest real time data display in Huntsville. TV link appears controversial. Proposals vary from 4 hour one way coverage per launch to 8 hours a day year around. Dr. Speer will present a compromise proposal. Two modes of launch information exchange appear evident, namely: (1) prelaunch ✓ and (2) launch day operations. ✓ Central facility in Comp. Div. to be used primarily for latter mode and also for post flight evaluation (facility sketch and meeting minutes enclosed per your request, enc 1). MSFC share of project estimated at \$450,000 annually with capital investment of \$350,000 depending on TV coverage chosen.
4. Vibration Characteristics of Block II Saturn I: The theoretical representation of vibrational characteristics of Block II Saturn I has not as yet matched SA-D5 experimental results. The theoretical difficulties arise from clustering of the booster tanks. The lack of good theoretical bending mode data has caused some difficulties in filter design; however, the filters for SA-5 were designed using experimental SA-5D results. Final stability analysis can be made with the same experimental data, but could be accomplished easier with good theoretical data. An extensive effort is being made to correct the discrepancies in the theoretical data and it is hoped that the discrepancies can be resolved in the near future. ✓
5. S-IVB Vehicle Dynamics & Control Working Group Meeting, Held May 14, 1963: Above meeting was held at Douglas and the main participants were MSFC and DAC, however, Bellcom, NAA and Boeing were represented. This was the second S-IVB working group meeting. A list of action items is enclosed as enclosure 2. ✓

22
B
Let's discuss this June 4

MARTIN ROAD

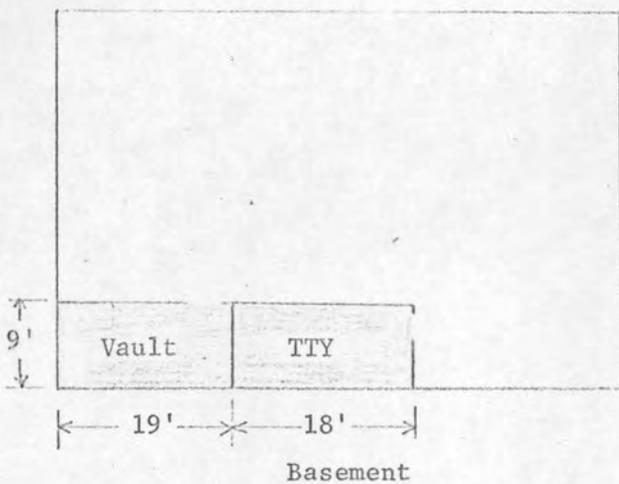
Do Specs What are the ceiling heights? *B*

First Floor



Primarily LIEF

Primarily for Postflight Evaluation



HUNTSVILLE OPERATIONS SUPPORT CENTER
"A" WING, BLDG. 4663

B
5/29

Memorandum

Mr. Nathan/876-3677

TO Distribution

DATE May 24, 1963

FROM Chief, Flight Evaluation Branch, M-AERO-F

SUBJECT Minutes of Fourth Meeting of the Project LIEF Study Group

1. The fourth meeting of the Project LIEF (Launch Information Exchange Facility) Study Group was held in the Saturn Flight Evaluation Room, Building 4663, at 9:00 a.m., on May 17, 1963.

2. Since the main purpose of the meeting was to discuss the MSFC Operations Support Center, attendance was limited to MSFC study group representation as follows:

M-AERO-F, Dr. F. Speer	M-COMP-DIR, Mr. C. Prince
M-AERO-F, Mr. E. Nathan	M-COMP-E, Mr. J. Felder
M-AERO-F, Mr. T. Rankin	M-COMP-E, Mr. L. Hamilton
M-AERO-G, Mr. O. Smith	M-COMP-E, Mr. E. Mitchell
M-AERO-S, Mr. W. Powers	M-COMP-PCA, Mr. C. Overton
M-ASTR-EA, Mr. J. Stroud	M-COMP-R, Mr. R. Cochran
M-ASTR-EA, Mr. W. Shields	M-COMP-TS, Dr. H. Krenn
M-ASTR-ES, Mr. E. Baggs	M-MS-A, Mr. E. Hildreth
M-ASTR-ES, Mr. G. Barr	M-P&VE-E, Mr. R. Barnes
M-ASTR-S, Maj. S. Seltzer	M-P&VE-E, Mr. W. Kistler
M-ASTR-S, Mr. F. Hammers	M-QUAL-QE, Mr. S. Peck

3. The following project items were discussed:

a. Huntsville Operations Support Center (HOSC) Layout Mitchell,
M-COMP-E

A proposed floor layout for the MSFC Operations Support Center was presented and discussed. The Main Conference Room configuration was analyzed with respect to display-viewing and multi-purpose use of the room. It was recommended that the center's finished floor be dropped to the sub-floor level and the ceiling be raised to realize an increased room height for better main display ability. Rear projection for the Main Conference Room display was selected. Mr. Felder commented that the display software costs would be essentially covered in the Logistics Data Center development.

SUBJECT: Minutes of Fourth Meeting of the Project LIEF
Study Group (Cont')

May 24, 1963

The attached sketch of the proposed floor layout of the HOSC, differentiating between that area required for postflight evaluation and that for Project LIEF, represents the agreement reached at the meeting.

b. Displays

It was determined that with existing DDAS equipment, the Astrionics Division, Building 4487, has sufficient capacity of 64 simultaneous displays of various types. The output of the PCM ground station of the Computation Division, Building 4663, via the Burroughs B-5000 computer and a digital buffer, can support 75 simultaneous displays of various types.

Mr. Felder emphasized that console-type displays should be standardized and modularized to effect cost savings and easier maintainability.

c. MSFC pre-launch and launch day Project LIEF Operations:

It was agreed that:

- (1) During the extensive pre-launch periods, design engineers in their respective divisions will support LOC via telephone and facsimile circuits; and that ✓
- (2) on launch day, all necessary design engineers in the Huntsville Operations Support Center with backup from the main design engineering forces in the divisions will support LOC as required. ✓

4. Decision made:

Don't understand this

a. It was decided to implement action to delete the suspended floor in the proposed main Operations Support Center area of Building 4663 expansion from the design which is almost 90 per cent complete. At the same time it was also agreed to have the design in the same area changed to effect a high ceiling. This action is necessary to obtain a reasonable main display area and will not affect the use of the area for other purposes than the Operations Support Center.

Speer
Fridtjof Speer

Enc:
HOSC Floor Plan

SUBJECT: Minutes of Fourth Meeting of the Project LIEF
Study Group (Cont')

May 24, 1963

Distribution:

Attendees

M-DIR, Dr. W. von Braun
M-DEP-R&D, Dr. E. Rees
M-AERO-DIR, Dr. E. Geissler
M-AERO-F, Mr. F. Kurtz
M-AERO-G, Mr. W. Vaughan
M-AERO-PS, Mr. O. C. Jean
M-AERO-S, Mr. P. J. DeFries
M-ASTR-DIR, Dr. W. Haeussermann
M-ASTR-A, Mr. F. Digesu
M-ASTR-ES, Mr. R. Aden
M-ASTR-IR, Mr. T. Barr
M-ASTR-IT, Mr. J. Rorex
M-ASTR-N, Mr. F. Wojtalik
M-ASTR-S, Mr. L. Richard
M-COMP-DIR, Dr. H. Hoelzer
M-LVO-DIR, Dr. H. Gruene
M-LVO-E, Mr. G. Williams
M-P&VE-DIR, Dr. W. Mrazek
M-P&VE-F, Mr. J. Russell
M-P&VE-PI, Mr. R. Edwards
M-QUAL-DIR, Mr. R. Godfrey
M-SAT-DIR, Dr. O. Lange
M-SAT-I, Mr. R. Lindstrom
M-SAT-SS, Mr. T. McLard
M-SAT-V, Mr. J. Bramlet
M-TEST-DIR, Mr. B. Tessman
M-TEST-M, Dr. W. Sieber
LO-DIR, Dr. K. Debus
LO-ID, Dr. R. Bruns

35/29

Saturn IB & V

The second Vehicle Dynamics and Control Working Group meeting was held on May 14, 1963. The following action items resulted from the meeting:

1. The S-IVB actuator specification should include provisions for a by-pass to relieve side loads problem during ground test of J-2 engines. ✓
2. M-ASTR expressed concern that the diffuser might possibly prevent cold gimbaling of flight vehicles. DAC will take steps to insure that diffuser design will not compromise cold gimbaling. ✓
3. Concerning side loads and hot gimbaling tests: Snatch and grab type mechanisms are considered to be still a direction to DAC as far as the VDCWG is concerned and any DAC decision to eliminate them or to decide to go another way must be coordinated with MSFC. ✓
4. MSFC recommends that DAC use the criteria presented in enclosure 3 for sizing the Auxiliary Propulsion System (APS) tanks for the Saturn IB. ✓
5. DAC will study the impact of sizing the APS tanks for 60 pounds of usable propellant per module to provide for a 4½ hour earth orbit coast for Saturn IB. DAC will provide preliminary payload penalty information due to designing the stage for the 4½ hour earth orbit coast by May 21, 1963. ✓
6. MSFC will furnish firm direction and design criteria for the stage design to incorporate the necessary modifications to provide for the 4½ hour earth orbit coast by June 1, 1963. ✓
7. DAC will evaluate the 3 percent damping requirement for first stage stability on Saturn IB. MSFC will provide slosh amplitudes associated with the 3 percent damping requirement. ✓
8. Any changes to the hydraulic actuator on the S-IVB stage deemed necessary by DAC must be coordinated with MSFC and agreed upon prior to announcement of vendor selection. ✓
9. MSFC will furnish DAC by June 15 with preliminary flight amplifier characteristics. ✓
10. The S-IVB actuator shall be designed such that capability of reducing the stroke to some smaller angle is possible if at a later time it is determined a necessary requirement. This should be a simple and inexpensive change. ✓
11. DAC will review all protuberances on Saturn V in conjunction with S&ID and the Boeing Company (TBC) to establish specific wind tunnel test requirements for all stages. Based on this survey, general classes of protuberances will be defined for testing in the general protuberance wind tunnel tests. The general protuberance wind tunnel program will be documented by DAC and presented to MSFC for review and concurrence. ✓

Enc 2

12. Tentative approval was given to the rounded sides of the APS module. Firm direction will be given at a later date by MSFC. ✓

A preliminary answer has been received from DAC on action item 5. To design the $4\frac{1}{2}$ hour earth orbit coast into the Saturn IB/S-IVB stage would cost 187 lb over the present design. Out of this, 147 lb are recoverable if the mission does not require any coast time in orbit.

Preliminary weight estimates (M-P&VE-S) on the redesigned fins for Saturn IB indicate that a weight saving of 1800 lb can be achieved over the old 8 stub fin version. This is approximately 3800 lb saving over the 4 stub 4 large fin version presently being used on the S-I booster for Block II vehicles. ✓

O. C. Jean
O. C. Jean

→ Plus the required attitude control propellants for the $4\frac{1}{2}$ hr coast. Right?
(How much is that?)

B
5/29

- *1. S-I-5 FINAL CHECKOUT: Performance testing at Quality Assurance Division is progressing with no major outstanding problems. ✓
- *2. SA-5 INSTRUMENT UNIT CHECKOUT: Cooling system test ST-124 calibration and R. F. compatibility testing was completed during the past week. Outstanding problems include horizon sensor mechanical and electrical incompatibilities, unavailability of the flight control accelerometers and gas bearing regulator, and demodulator failure in the GSP-24.
3. S-I-6 DISCREPANCIES: Discrepancies noted after the short firing of S-I-6 on May 15, 1963 were as follows:
- Three bent baffles in the first two rows of LOX tanks #2 and #3. The baffle stiffener modification is presently expected to be incorporated after static firing is complete.
 - Several slosh measuring tube support clips cracked in LOX tank #2. Investigation is continuing in other tanks for this discrepancy.
 - All turbine exhaust duct bellows were inspected for distortion. The upper duct bellows at engine positions #5 and #8 were severely distorted. Replacement of these two ducts is being considered if extra ducts are found available.
 - Results of the leak test performed on the hydrogen vent line connections, during the static firing, were good with the report that no leakage occurred. ✓
- *4. S-IV-6 CHECKOUT AT SANTA MONICA: Testing of the S-IV-6 at the Santa Monica Plant of DAC is continuing. Continuity and electrical power checks have been completed with the exception of missing components. Checkout progress is erratic due to missing components, however, S-IV-6 is in better shape in this area than S-IV-5 was at this stage of the checkout. ✓
5. GOVERNMENT INSPECTION AGENCY REQUIREMENTS: Per your request for nomenclature clarification of Government Inspection Agency (GIA) requirements on my Notes of 5-20-63 (copy attached), we have been delegating responsibility for inspection and quality assurance function to the existing cognizant government inspection agency in the various contractors, subcontractors and vendors facilities. The GIA's are the Army, Navy and Air Force inspection organizations such as Corps of Engineers, Inspector of Naval Materials, U. S. Army Signal Supply Agency, Bureau of Naval Weapons, etc. ✓
- 1 Enc:
Attachment 1 (NOTES 5-20-63 GRAU)

*I thought this was a
new Agency. Happy
to hear it is not.*

B

NOTES 5-27-63 GRUENE

B 5/29

1. Wet Test - VLF-37B: Minor problems on lox loading and damaged lox fill pipe in S-IV-5D will cause a delay in the combined filling test of SA-D5 and S-IV-5D from May 25 to May 27 or possibly May 28. ✓

2. Regarding your question on Notes 5-20-63 Gruene (copy attached), the wet test vehicles in use on VLF-37B are designated as follows:

1st Stage - SA-D5 ✓

2nd Stage - S-IV-5D ✓

1 Enc

Notes 5-20-63 Gruene

*
gm

1. STATUS OF IBM CONTRACT: Negotiations have not proceeded due to the disallowance of relocation costs policy recently implemented by NASA Headquarters. Resolution must be made by Headquarters since MSC and GS FC also have the same situation. P&C is optimistic for a quick answer in getting a contract authorization in a short time. Requirements for IBM personnel for Cape operations are being firmed up. Furnishing trained personnel per our commitments to LOV appears to be a problem at this time. Several methods of training are being explored jointly by MSFC/LVO counterpart groups. ✓

2. LOCATION OF CONTROL ACCELEROMETER AND CONTROL RATE GYRO ON SA-5: Firm locations for these items have been established: Control accelerometer will be in the IU; control rate gyro will be out-board on Spider No. II. ✓

3. REFINEMENT IN AB-5 AND AMAB-3 GYROS: AB-5 and AMAB-3 gas bearing end plates, supplied with air from the bearing sleeve, were tested and evaluated. The two AB-5 versions with different widths of the toroidal groove meet the expected requirements very well at 10 psi supply pressure. Working Paper M-ASTR-G-WP-25-63 contains the data of an extensive test program. The AMAB-3 also meets these requirements at 10 psi supply pressure. Working Paper M-ASTR-G-WP-32-63 gives performance data from this preliminary design. The following tabulation compares the new air consumption per unit with that required for the original Pershing components:

	AB-5	AMAB-3
Pershing	→ Approx 28,000 std cm ³ /min.	Approx. 28,000 std cm ³ /min.
Units with no-feed end plates	→ 1200 std cm ³ /min.	900 std cm ³ /min. ✓

Remarkable gain! B

4. 56 VOLT MOTOR-DRIVEN PUMP FOR PROPELLANT RECIRCULATION: Decision has been made to use a 56 volt AC motor-driven pump for propellant recirculation on the S-II and S-IVB stages. DAC's study revealed a weight and reliability advantage by using a simple AC static inverter with a battery instead of a DC system consisting of a battery and DC motor. ✓

5. LOG BOOKS FOR MAJOR ASTRIONICS FLIGHT COMPONENTS: A policy requiring log books for our active flight type components has been distributed. This policy has been coordinated with divisions and offices involved (LVO, ME, QUAL, REL, and SAT). For SA-9 a complete set of log books should be available at launch. ✓

6. INQUIRY FROM DR. MAGNUS: Dr. Magnus received a letter from a Mr. Karl-Heinz Ritter who claims to have received Dr. Magnus' address from correspondence with you. Could you identify him? Dr. Magnus does not remember him.

WH ↓

→ No

May well be.
Have mountains of correspondence B

Neither do I
Dr. Haussermann,
Ask Ruth von Sauma,
876-2928, she has the
foreign correspondence
file. Bonnie
6/10/63

B 5/29

*1. MTF:
fm

Plant activation schedule slippage continues proportionately as we still await receipt of approved MTF Cryogenics Procurement Plan. ✓

Effective at once, the Navy is relinquishing all claims to the Bombing Range at MTF. On investigation by the Navy Safety Office, the Range was found to be considerably below safety standards regarding size and approaches. ✓

Negotiations with Aetron on Phase I, Saturn V Technical Systems scheduled to start this week. Target date for contract finalization is June 15. ✓

Action initiated by MTF Working Group for Southern Bell to provide interim communications system. This service to begin mid-June. ✓

2. S-1-6:

Engine No. 8 that was damaged during short duration firing due to LOX valve malfunction has been replaced and full duration firing is scheduled Tuesday, 5/28. LOX valve from failed engine has been submitted to all types of checkout (cryogenic) without failure being reproduced. Valve will be dis-assembled today to see if anything is wrong. Consensus of opinion is that failure cannot be system (engine or stage), but component failure. Disassembly and inspection of the valve revealed that the cylinder wall of the actuating piston (which is opened by pneumatic pressure and closed by spring action) was galled causing the valve to S-IV DAC/SACTO: hang partly open. ✓

*3. 9am

All Systems:

Four leaks were found on hydrogen side of common bulkhead using "old-fashioned" soap bubble leak detection technique. Cracks were at random locations on the radial panel welds, and not at the outer edge, as expected. In all cases, the cracks ran across (perpendicular to) the panel welds. Cause not determined to date. ✓

S-IV-5:

Installed on stand 5/21. Very optimistic DAC estimated date of first firing 6/28. ✓

Battleship:

Enroute to MSFC for hydrogen slosh tests on Dynamic Test Stand. ✓

4. MARINE ACTIVITIES:

"USNS TAURUS" (ex "CARRIBIAN QUEEN," ex LSD) was examined for possible use for S-IC transportation. MSTS estimate to modify vessel, excluding cover, door end section, reinforcing, etc., was \$530,000.00. Cost to prepare vessel to receive flight stages estimated to exceed \$1,000,000.00. Because of vessel's high roll tendency (normal 25°), it will require stabilization. ✓

slosh -
tank

B. 5/29

NOTES 5-27-63 HOELZER

No report. ✓

1. LUNAR LOGISTICS PAYLOAD: In-house studies and pre-development planning are continuing. Dr. Shea's general consent to expedite funding for the Northrop engineering support contract will be followed up with Headquarters this week. ✓

* 2. OSS SATURN THIRD STAGE STUDY: Representatives of STL will be at MSFC on May 28 to discuss STL's response to the request for quotation. Negotiations will probably follow in about a week.

A status meeting was held on May 22 and milestones were established for the S-VI portion of the study. ✓

B 5/29

*1. LAUNCH VEHICLE SYSTEM COST MODEL
9cm

Six proposals were received on our Launch Vehicle System Cost Model Study. Two outstanding proposals were submitted by General Dynamics/Fort Worth and the Lockheed California Company. We plan to initiate contract negotiations with both of these companies and expect to have contracts underway by mid June, unless you have objections. These two studies will give us parallel effort in the important area of vehicle costing. We will be glad to give you a short briefing on the objectives of this study and the related work we are doing in the cost area, if you would like. ✓

HHK Let's combine this with next tech briefing

1 don't
B

2. NASA MANNED PLANETARY MISSION TECHNOLOGY CONFERENCE

The above conference, held at Lewis Research Center on May 21 - 23, 1963, was well represented by Center personnel. In general, the papers given by the Center personnel were good to outstanding and the comments which were received are all favorable. ✓

B 5/29

1. RIFT Project: The second Manufacturing Engineering Working Group meeting was held with Lockheed (LMSC) at Sunnyvale. With permission of LMSC we had participation of manufacturing engineering of NAA and DAC during the two day main sessions and tours while the following splinter group meetings were held with LOC and MSFC personnel only. The basic manufacturing plan and proposed tooling program were reviewed. We have requested a study by LMSC to determine which of the basic tooling used for S-IC could be used for the RIFT fabrication. ✓
A second action item to be initiated will be a study for comparison of a permanent overhead crane installation in the Moffet Hanger versus usage of movable hoisting devices similar to our S-IC vertilifts. My personal impression is that LMSC has very competent manufacturing and tool engineers; that the spirit is cooperative. It was, however, evident and acknowledged by LMSC that their welding techniques require substantial development for production of the RIFT stage. Lockheed has developed a Beryllium-Aluminum alloy (approximately 60% Be, 40% Al) with good forming and welding properties. ✓
2. Saturn I, S-I Stage: The assembly of SA-7 booster has been completed and the vehicle transferred to Quality Assurance Division for check-out prior to static firing. Also the I.U. structure for SA-7 has been completed and put into storage. Assembly operations are scheduled to start on August 12. ✓
3. Saturn V, S-IC Stage: The Y-ring has been welded to the bulkhead. The continuous weld was made in 2 hours and 51 minutes. The first evaluation indicated porosity on the upper side of the weld bead. Necessary repairs are in process. This weld was made using local strap clamps for alignment and without any back-up bars (soft tooling). A Lockheed welding engineer observed this welding operation in our shop. ✓

1. SATURN I/IB: - Negotiations are in progress at Michoud for the major modification of Chrysler contract. The Technical Work Statement phase of negotiations is proceeding satisfactorily. The contract modification provides for a weight saving re-design of the S-I stage to an S-IB configuration, reduces the deliverable S-I stages to 8, and provides for delivery of 12 S-IB stages. ✓

* *Jan* 2. SATURN V: S-II - After a thorough evaluation, NAA/S&ID (Vice President Raynor) was advised by MSFC on 5-17-63 that no tangible advantage can be seen to move the S-II Stage Project from Downey to the Seal Beach area. Therefore, a negative reply was submitted. Of prime concern was a potential 4 months schedule slippage, if the "Electro-Mechanical Mock-up" was moved to Seal Beach. ✓

On 5-24-63, Mr. Wickham advised that there will be a 6 months schedule slippage in the Electro-mechanical mock-up test program and a 2 months schedule slippage in the All Systems Vehicle Test Program as a result of problems encountered in S-II Stage GSE. Corrective actions will be discussed with Mr. Parker at MSFC on 5-31-63. ✓

* *Jan* S-IVB - Assembly/Checkout Tower Complex, Huntington Beach - M-SAT, FEO, P&C, and Legal Office are working together to develop all facts concerning the Douglas tower complex at Huntington Beach resulting from combining these onto one foundation under a common shelter appears to make this complex a facility. Efforts are continuing to determine exactly what portion should be called facility vs. tooling, and to determine whether all of facility portion is required for S-IVB. ✓

Representatives of the Douglas AFPR Office and WOO will meet with MSFC group at MSFC on 5-27-63. In the afternoon, a full MSFC meeting will be held to determine position and course of action. Meeting will be held with John Sigrist, DAC, and Douglas' legal, contracting and tooling people Tuesday to attempt to resolve problem. Douglas' position, communicated by teletype last week, is that combination into single complex does not alter fact that this is tooling. ✓

O.L. memo to Chris, 6-10-63, 3:20pm

Request short (written?) briefing on this before we see S&ID on 14 June B

NOTES 5-27-63 MAUS

B 5/29

1. MTO LH₂ PROPELLANT PLANT - The procurement plan has finally reached Dr. Seamans and we anticipate his conditional approval this week. The conditions, as discussed and agreed upon by Brainerd Holmes and Walter Lingle May 22 are:

- a. The RFQ will provide for alternate quotation on: (1) 20 ton/day plant expandable to 30 tons per day, and (2) 30 ton/day plant. ✓
- b. Require the storage only of LOX, LN₂ and LH₂ to be on waterway within 50 miles. ✓
- c. Requirements for LOX & LN₂ will be advertised separately. ✓

MICHOUD GASEOUS NITROGEN REQUIREMENTS - Chris Andressen met with representatives of Boeing and Michoud Operations on May 23 and it was decided that Boeing will send out RFQ's to subcontractors for the supply of gaseous nitrogen. The cost data will be used to determine merits of gaseous nitrogen versus a combination of missile grade air and gaseous nitrogen for use by Boeing in cleaning, testing, drying, and purging of SIC LOX and fuel components and systems. ✓

2. MANPOWER - In connection with our request to Mr Holmes for additional manpower ceiling, we have been asked to furnish to Office of Programs a breakout of permanent personnel for FY 62, 63 and 64 by organizational element, and by R&D projects, and indirect personnel within these elements. In addition we are to furnish the MSFC in-house mission support contractor personnel by year, by organizational element. ✓

The FY 64 ceiling for permanent employees furnished to us for the exercise is 699 spaces below our most recent "minimum requirement submission." ✓ !!

We expect to phone this info to headquarters tomorrow (Tuesday). ✓

B 5/29

1. USE OF SANDIA REACTOR FOR RIFT: Detailed discussions have been held between Nuclear Vehicle Projects Office and senior technical representatives at Sandia Corporation concerning the utilization of the Sandia reactor for RIFT. It appears that the Sandia Corporation is interested in limited joint-effort areas, but not in the total radiation testing area. ✓
2. KIWI B-2 REVIEW: The Propulsion and Vehicle Engineering Division has been invited by Los Alamos Scientific Laboratory to participate in the design review of the KIWI B-2 reactor (hot end fuel support) on 6-4/7-63. ✓
3. SEAMANS MEETING RIFT ACTION ITEMS: Recent information indicates that the status is unchanged. ✓
- *4. S-I DOCUMENTATION TRANSFER STATUS: Approximately 98% of all eligible ^{from} (S-I Stage peculiar) Propulsion and Vehicle Engineering Division drawings have been transferred to, or requested by, the Chrysler Corporation Space Division either as reproducibles or originals. ✓
5. S-IVB AUXILIARY PROPULSION SYSTEM: The Marquardt 1750-pound thrust ullage engine, with hard throat insert, has been tested successfully. This engine utilizes the Marquardt-designed hard throat insert. Four previous tests resulted in extensive cracking of the inserts. This test was conducted with sea level hardware at about 1200 pounds thrust and is the first test that did not damage the insert. ✓
- *6. BLAST HAZARDS TEST PROGRAM: We learned on 5-24-63 that Captain Freitag sent a copy of our Request for Quotations on blast hazards to Edwards Air Force Base and expects to receive a proposal by 5-29-63. We understand he will evaluate the proposal. Prior to our selecting White Sands to do the job, we investigated the interest of Edwards in this task and found that they could not accept the job. We still have no program. To our knowledge, Edwards has no recognized capability in the blast hazards and explosives field. Edwards participation in other blast hazards programs has been only in furnishing land. Mr. John Marshall of Edwards, when contacted last October about this program, stated that Edwards could furnish a site and some technical help, but not a project engineer.

^{WM}
DOD has been pushing NASA to accept a joint program at Edwards.

Please keep me posted and let me know if there are further delays

B

B 5/29

NOTES 5/27/63 Rudolph

No Notes

NOTES 5-27-63 SHEPHERD

B5/29

*
Jan 1. F-I: A jurisdictional strike occurred on May 20, at 8:00 a. m. at Edwards Air Force Base. Fuel Engineering Company, sub-contractor to SSS Joint Venture, using UMW labor began site fabrication of RP-I tanks on May 18. AFL/CIO steel workers of Consolidated Western Steel observed the activity over the week-end and put up picket lines on all gates to the site on Monday morning, May 20. A series of meetings, attempting to resolve the situation, have been held between all parties. The Legal Counsel of the Corps of Engineers has asked Los Angeles District Engineers to withhold any injunction request pending decision by DOD since such injunctions are contrary to DOD policy. Paul Styles is working with DOD. As of 8:00, May 27, the following situation exist at the site, approximately 280 workers are on the job out of a normal crew of 325. No AFL/CIO Boiler Makers are on the job (LOX tank only). To date, one week has been lost at the Edwards construction site due to this strike. Steve Shulman, Under Secretary of Defense, has scheduled a meeting in San Francisco on May 28 with union representatives to go into matter. Mr. Styles is aware of meeting. If boiler makers do not return to job, Corps of Engineers will request injunction. ✓

2. FY-65 Budget: We have been informally advised by Mr. Lilly's office that the Huntsville total of the CofF budget is \$31.140 M. Mr. Holmes is to indicate this in a letter this week and give Marshall the right to juggle the program within the \$31 M ceiling.

Request occasional briefing on what we can & should re-arrange
JS
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Jan 3. S-IVB: Douglas Aircraft Company is constructing at Huntington Beach a "Tooling Tower Complex" which consist of a 6 position Vertical Assembly, Hydrostatic and Cleaning Facility, approximately 140' X 126' X 117' with a lean to 50' X 126' X 33'. The A-E is Holmes and Narver. The design is approximately 65% complete. The estimated cost of the facility is \$3.3M. The total job is presently funded by R&D funds in the basic S-IVB contract. Douglas' position is that this facility is a special tool and therefore is properly funded R&D. NASA regulations are such that the conclusion is that this is an Industrial Facility. A review of the design indicates that 1.9 M can be reasonably attributed to Special Tooling leaving a requirement of \$1.4M for facility funding. The MSFC position as established on May 20, is that Douglas should fund those items classified as a facility. If this is not done then Marshall is required to notify Headquarters as to the expenditure of R&D funds for facility items without prior approval. It will be necessary for Mr. Webb to make a determination that the facility is necessary and on this basis notify Congress of the intent to expend R&D funds for the construction of this facility. This undoubtly will delay what is now the key pacing facility of the S-IVB program. This delay could be in the order of several months. Douglas people are due at Marshall on May 28 to discuss and attempt to resolve this problem. In the meantime work is progressing at Huntington Beach. ✓

B 5/29

NOTES 5-27-63 Stuhlinger

1. SATELLITE RADIATION ANALYSIS: A request has been received from Propulsion and Vehicle Engineering Division for a satellite radiation analysis. The problem concerns a manned vehicle in a 480 km circular orbit for six months. A preliminary calculation is being performed using the best available trapped radiation profiles, fission beta spectrum data and range-energy relations. Rough early figures indicate that a careful further analysis should be undertaken. For this, it is planned to utilize the Goddard trajectory code, which transforms geographic-altitude coordinates into B-L (magnetic field-distance from earth) coordinates, provides for factoring in the proper electron flux data, and integrates over the satellite orbit to obtain total impinging electron density. This work will be coupled with a more detailed in-house electron transmission study by RPD. ✓

2. LUNAR SURFACE CHARACTERISTICS CONFERENCE: Mr. Heller and two other members of RPD attended a conference on lunar surface characteristics, May 21, 22 and 23. It was organized by A. D. Little (one of our contractors) and Air Force Cambridge. It was an "invitation only" conference restricted to about 100 participants. Other NASA centers, OART and OMSF participated. Results will be utilized in the planned Lunar Physics lecture series by RPD. Considerable advances have been reported in the definition of an optical and thermal model of the moon. ✓

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Jm 1. F-1 INJECTOR TESTS: One test was terminated by an explosion in the LOX dome or LOX suction duct area. This malfunction occurred approximately 300 milliseconds after the main LOX valve left the close position and before the main fuel valve opened. Igniter fuel was applied. Bombing was scheduled on this test; however, it did not ignite and was removed after the test. Extensive damage was experienced by the engine hardware and supporting test stand hardware. It is estimated that two weeks will be required to repair Test Stand 2A. ✓

Contractual authorization is being forwarded to Rocketdyne to proceed with the combustion stability effort recently proposed. Subsequent negotiations will determine which portions of Rocketdyne's supplemental cost proposal constitute "new effort." Captain Freitag and Mr. Tischler concurred in this approach during their recent visit to MSFC. ✓

The authority for \$1,050,000 for a support services building for the F-1 engine at Edwards Air Force Base has been approved by the Bureau of the Budget. ✓

On 5-20-63 Fluid Engineering Company delivered a sectioned large fuel tank to Edwards Air Force Base (for the new F-1 engine test stands) to be assembled and installed by their employees who are members of the United Mine Workers Union. Members of the local Boilermakers Union felt that this work should be performed by their union and immediately set up picket lines. The United Mine Workers honored the picket lines and all construction came to a standstill. ✓

Mr. Haglund, a commissioner of the Federal Mediation Board, called a meeting between the disputing parties; however, no settlement was reached.

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Jm On 5-22-63 Mr. Cruzman of the President's Strike Committee dispatched a telegram to Mr. Lackey, the International AFL-CIO Business Manager in Bakersville, California, essentially asking the union to remove the picket line and return to work. The picket line was removed late in the afternoon on 5-22-63 with the understanding that all personnel would return to work on 5-23-63. As of this morning, 5-27-63, they have not returned to work. ✓

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Jm 3. J-2 ENGINE: A team has been formed by Rocketdyne to investigate the liquid hydrogen line rupture on CTL-5. Estimated down time for the J-2 engine liquid hydrogen pump test facility is now six weeks minimum (four weeks reported last week). Rocketdyne will replace the old hydrogen supply header ducting with a redesigned and improved system.

Eight engine system tests were conducted this reporting period to evaluate the engine operation and performance at extended run durations. ✓

4. Mr. Weidner is on Annual Leave this week. ✓