

~~SHOW DIRECTOR~~ 654
7/10

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

B 10/1

Memorandum

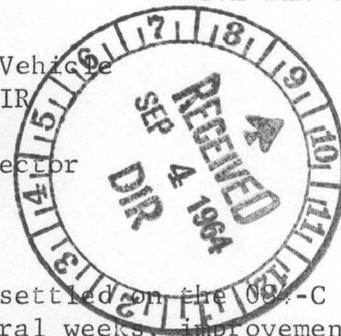
THRU Mr. Weidner, R-DIR
TO Dr. von Braun, DIR

DATE SEP 2 1964
R-P&VE-DIR-64-83

FROM Acting Director, Propulsion and Vehicle
Engineering Laboratory, R-P&VE-DIR

SUBJECT F-1 Flight Rating Test (FRT) Injector

REFERENCE NOTES 8-3-64 CLINE, paragraph 2



file

1. F-1 FRT Injector: Rocketdyne has settled on the 084-C type of injector for the F-1 FRT. In the past several weeks, improvements in performance and chamber compatibility have been made so that the 084-C meets minimum model specification requirements. Five bomb tests conducted on 084-C injector prior to the latest report of self-induced instability had occurred on two occasions with two units of injector type 084-C. All tests damped within the required 100 milliseconds.

a. The latest case of reported self-triggered instability has now been determined to be caused by the bomb detonation. Rocketdyne plans two modifications to the 084-C type of injector to eliminate possible causes of self triggering.

(1) The outer fuel ring will be welded rather than brazed to eliminate cracks in the ring to land braze. Experience on the H-1 Engine has shown that minute cracks in this area have a tendency to sustain instability.

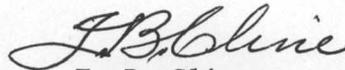
(2) The LOX orifice splitter vanes will be stiffened to prevent possible pressure fluctuations due to vibration of these vanes.

b. The latest series of testing on August 15 and 16, 1964, incorporated the above modifications, plus a change in the hole diameter of the LOX holes nearest the baffles. This change was incorporated to cant the LOX fan away from the baffle and give a more uniform spray pattern. In three bomb tests on engine 020, the bomb induced instability damped in one cycle. This injector configuration can be derived by re-working the present 084-C injector.

2. F-1 Nozzle Extension: Mr. Boettcher of the Propulsion Division, this Laboratory, visited Rocketdyne on August 11 through 14, 1964, to discuss the extension. Tests with FRT injector (084-C) have resulted in failure of nozzle extensions. Extension unit 008 had some erosions at the inner wall expansion joints. Unit 009 failed at the center of an

SUBJECT: F-1 Flight Rating Test (FRT) Injector

inner wall section. This failure was apparently the result of a support bracket in the distribution manifold which blocked gas flow to this area of the nozzle extension. There was also some erosion of the inner wall expansion joints. Rocketdyne has several proposals to eliminate the erosion of the expansion joint. Figures 1 and 2 show two modifications which will be tested on unit 009. In addition, slots are being closed at the rear end of skirt to redistribute gas generator coolant flow. Slots in the middle of the extension (slots number 7 and 8) are being increased. Front-end modification by adding a large section is also contemplated. Test of these methods indicates that closing the slots reduces the erosion problem. The large first section apparently did not aid flow distribution. Data is unavailable on remaining changes. It is believed that Rocketdyne is moving in the proper direction to solve the F-1 extension problems. Pressure variations in the existing manifold are resulting in mal-distribution of coolant flow to the extension. Rocketdyne has redesigned the manifold to eliminate this problem. This redesign should eliminate problem anticipated for reduced gas generator flow rates. It is possible that using a coating (ZrO_2) could aid in eliminating erosion. Rocketdyne will supply data on extensions tested with the above modifications.


F. B. Cline

2 Enc:

1. Figures 1 and 2
2. NOTES 8-3-64 CLINE

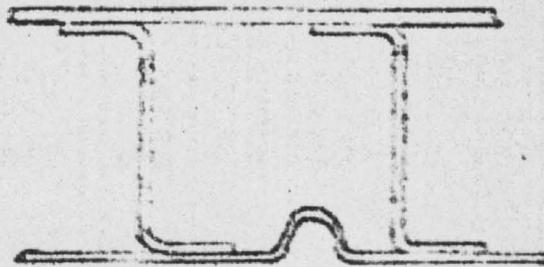


FIGURE 1. OMEGA EXPANSION JOINT FOR LONGITUDINAL EXPANSION OF INNER EXTENSION WALL.

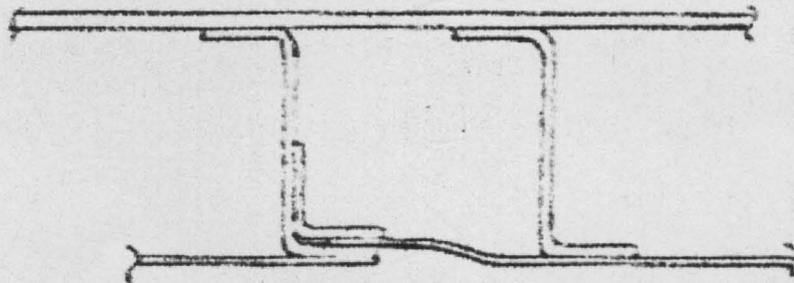


FIGURE 2. PROPOSED JOINT FOR LONGITUDINAL EXPANSION OF INNER EXTENSION WALL.

Reiger

Aug 13

B 2/4

NOTES 8-3-64 CLINE

Oswald
Lange
Exactly
what
specific
POGO test
program we
are planning
with the
H1 and F1?
B
*fw

1. POGO TESTING: Late delivery of the 200K H-1 turbopump, F-1 turbopump development problems, and delays during procurement of the propellant line pulser will delay F-1 and H-1 bobtail engine testing in support of POGO analysis for Saturn IB and Saturn V approximately two to three months.

2. F-1 FLIGHT RATING TEST (FRT) INJECTOR HAS SELF-INDUCED INSTABILITY WITH SUCCESSFUL DAMPING CHARACTERISTICS: In addition to one bomb-induced instability, self-induced instability was shown by the F-1 FRT injector on Engine 020. The injector successfully damped after 6 milliseconds (ms); 45 ms, and 26 ms at 1.0 sec., 1.66 sec., and 2.06 sec., respectively into mainstage. This injector meets performance stability, and chamber capability requirements, but causes nozzle extension erosion. No explanation could be found for the self-induced instability.

F.C.
That
action
is
con-
templated.
B

3. FLUORINE ENGINE FIRINGS: Four engine system firings were performed on the fluorine research program by Pratt and Whitney Aircraft. Two were aborted and two were successful. This series of runs concludes the engine demonstration task. A few more system runs with modified injectors are planned for this week. The facility will then be converted back to pressure-fed operation for the high mixture ratio performed work. ✓

4. VEHICLE MECHANICAL DESIGN INTEGRATION WORKING GROUP: This group held its seventh S-II meeting here at MSFC. Action items were forwarded to Industrial Operations. ✓

5. EIGHTH SATURN/APOLLO MECHANICAL INTEGRATION PANEL MEETING: This meeting was held at MSC, 7-29-64. Action items will be distributed this week. ✓

XERO COPY

XERO COPY

XERO COPY

fw
8/3

3 2/4

NOTES 8-3-64 BELEW

*fw F-1 ENGINE

Rocketdyne has discovered that the vendor for the turbopump struts and gimbal outriggers has been using incorrect weld wire in manufacture. Consequently, many struts and outriggers manufactured to date have soft welds (hardness of Rc 20 as compared to required Rc 34) and these struts are being replaced on all engines in build. The R&D engines at Edwards and the engines at MSFC can be operated safely at reduced gimbal accelerations (10/rad/sec² compared to 30/rad/sec²). Rocketdyne has changed and tightened the drawing callout plus quality control and inspection procedures to prevent recurrence. There is no schedule impact connected with this problem. ✓

*fw H-1 ENGINE

Six S-I-9 engines have been retrofitted with new LOX domes and static fired at Rocketdyne, Neosho. These engines are scheduled to begin arriving at MSFC August 1, 1964. S-I-10 engine will begin retrofit the week of August 2-8, 1964. No major difficulties have been encountered during the retrofit. Two R&D rerouted inboard engine turbine exhaust systems are currently in engine test. Test results are satisfactory. ✓

J-2 ENGINE

Simulated altitude testing is continuing on test stand VTS-3A to acquire start transient and thrust chamber pressure profile data. This series of tests should be completed next week. ✓

An R&D engine was removed from test stand VTS-2 for replacement of the LH₂ turbopump. The replacement pump will have a leaded-bronze rub-ring. This will leave only one active R&D engine with carbon rub-rings in the LH₂ pump. ✓

Production engine 2004 is being installed on test stand Delta-2 for acceptance testing. ✓

The third engine (2006) will be delivered to DAC on August 3 for use in their spring-rate testing. Engine 2002 is scheduled for delivery to S&ID this week. ✓

MSFC's procurement plan for additional engines to complete the approved Saturn IB and V programs has been in the Associate Administrator's Office for final approval since July 22. ✓

RL10 ENGINE

It is our understanding that Dr. Mueller has recommended a change in our recommended percentage support of the RL10 R&D budget. The approximate two-thirds vs one-third split for MSF vs OSSA in FY '65 would remain as previously planned. MSF would support 13% in FY '66 versus our recommendation that MSF support 60% of the costs.

An experimental engine modified with a carbon throat and a 2.5 inch nozzle add-on to simulate the 57:1 expansion ratio "reduced throat" engine has accomplished 21 firings totaling 83 seconds. These were short duration firings to investigate diffuser capabilities with the 57:1 expansion ratio during the start transient. The results indicate that an increase of 3.5% in diffuser cross-sectional area will be required for off mixture ratio starts. A specific impulse of approximately 444 seconds was obtained. ✓

Tw
8/3

NOTES 8/3/64 CONSTAN

B
8/4

Negative Report

7/4/3

Notes 8-3-64 DANNENBERG

B 8/4

KD
Yes, I
am B

1. Repository - Interface Control Documentation from the inter-Center panels is flowing into the Repository. If you are interested, we will give you a copy of our newest Repository Log, (8-10-64). A progress report will be made to next Panel Review Board meeting. ✓

2. GSE - Gen. Phillips has requested a two-day briefing at the Cape on 9-16/17-64 on Saturn IB GSE. He is prepared to go deeply into this subject from a program and technical standpoint. KSC/MSFC/MSC will participate. We do not plan to provide this briefing prior to your forthcoming review of the status of the automation activity. ✓

K.D.
I might attend 1st day if SA-7 doesn't slip. B

H. Fiddner
fyi
and
comment
B

NAA (S-II) visited recently and expressed concern that their \$50,000,000 outlay for stage checkout equipment does not have more application to vehicle checkout. You will be briefed on the specific reasons in September. Also, they expressed concern that if we have to demate the vehicle and change an engine, we may not have the equipment available in low bay.

3. Mechanical Integration Panel Meeting - was held at MSC on 7-29-64. There is a Saturn V structural load discrepancy between MSFC and MSC/NAA. The reason for this is a difference in the MSFC and MSC/NAA aerodynamics input data to the structural loads. The Flight Mechanics Panel was asked to clarify the situation. ✓

4. MSC Direct Lunar Injection Study - MSC has forwarded to MSFC a request for launch vehicle information to use in their STL study of direct lunar injection tradeoffs. ✓

7/28/64

NOTES 8/3/64 FORTUNE

B 8/4

1. Boeing Briefing: Monday afternoon, Henry Auter and I briefed Dick Nelson, Saturn Manager, Boeing Company; Art Phillips, Booster Test Manager, Boeing Company; and John Cully, Booster Test Deputy, MTF, Boeing Company on our current status of construction, plans for activating the facility and general operating philosophies. Mr. Young and Matt Urlaub had planned to be with us and were unable to make it. Mr. Cully in turn described his proposed manpower build-up, his organizational structure, training programs and utilization of quality control personnel. Dr. Constan joined us for a portion of the latter. Results of our discussions have been reported to Mr. Young and Mr. Urlaub. ✓

2. MTF Managers' Meeting: Tuesday, Auter and I met with John Cully of Boeing, Harry Cox of North American, and Messrs Pilkey and McGregor representing Bill Eaton of General Electric. Again we discussed construction progress, activation planning, facility availability dates, then listened to Fred Tyvoll describe current labor relations between the construction contractors and building trades. Tyvoll mentioned that the operating unions are considering organizing General Electric and North American personnel sometime in the future. Marion Kent then told us of developments in the Civil Rights area, FHA housing and proposed plan for Progress Council. ✓

3. Civil Rights Directive From White House: Wednesday, Marion Kent met with some of the members of the Regional Planning Council to talk of planning developments and how we can work in this area without violating the recent White House memo regarding segregated groups. This will help reduce any resentment that might occur in turning down speaking engagements that might be sponsored by the council. In the afternoon, he met with representatives of other government agencies of the Gulf Coast. The Veterans Administration wanted to put out a common release on the subject, being faced in the near future with having to refuse three previously accepted engagements. We had hoped that a proposed release might be drafted which we can bring to Slattery for his concurrence; however, Bart tells me he has some ground rules laid down which will help us greatly if approved by NASA Headquarters.

Bart S.
What are those rules?

B
Have seen them in the meantime.
BW

fw 8/3

B 8/4

NOTES 8/3/64 GEISLER

1. Advanced Meteoroid Satellite: A preliminary performance study has been made for placing a cislunar micrometeoroid detection satellite into a 300 n. mile by 180,000 n. mile elliptical orbit by a Saturn IB-Centaur vehicle. A payload of 12,000 lbs. can be placed into this orbit using suborbital start technique, while 9,000 lbs. can be orbited using an orbital start of the Centaur. The request for this study came from Langley Field. At a meeting with Langley representatives, the suborbital Centaur performance was discussed. Interest by Langley centered more around the launch vehicle being the two stage IB. However, it was pointed out that the size of the payload into the orbit class desired was beyond the two stage IB capability. ✓

2. SA-203 Possible Experiment: A performance study is being made to determine how much liquid hydrogen can be placed into orbit as a possible experimental mission for Saturn IB vehicle SA-203. The orbital altitude requirement for this mission has been lowered to 100 n. miles. A guarantee of 3 orbits is also required. A control study will also be made prior to presenting the total results to Dr. Mrazek on August 10, 1964.

3. Guidance and Performance Sub-Panel: The Third Meeting of the Guidance and Performance Sub-Panel was held at MSFC on July 29, 1964. Attendees included MSFC, MSC and Bellcomm. Action Items and Agreements will be available soon. ✓

E.F.
 If that is enough!!
 We may want to fly several different allage control modes.
 B

7/28/64

B 8/4

NOTES 8-3-64 GRAU

1. S-I-9 POST-STATIC CHECKOUT: Limited Electro Magnetic Compatibility testing has been accomplished on the S-I-9 stage since engine removal; DDAS hard-wire calibration is being performed and evaluated. At the request of Astrionics Laboratory, measuring supplies have been removed and are being adjusted. In general, testing continues on a very limited basis pending reinstallation of engines. ✓
- * 2. S-IU-9 INSTRUMENT UNIT CHECKOUT: The S-IU-9 Instrument Unit was released to this Laboratory for checkout on July 30. Several EO's remain to be incorporated in the distributors prior to start of electrical systems checkout. ✓
3. S-I FORWARD ANTENNA PANELS: As a result of shearing during static firing of 30 screws securing the S-I-8 Stage forward antenna panels, investigations of these screws were conducted on S-I-7 at KSC and S-I-9. Although no screws were found sheared, inspection revealed that excessive shearing forces had been exerted on the screws. The lox tanks of S-I-8 were reported to have been filled to a higher level than on previous stages. This would result in greater contraction of the S-I-8 tanks and account for the differences in the condition of the screws between stages. It was decided to slot the holes in the antenna panels of S-I-7 to prevent further shearing action. Corrective action for other stages has not yet been finalized. ✓
4. S-IC PROGRAM: Sixteen flexible ducts of the S-IC fuel pressurization system were returned to Solar for rework to the latest design configuration. This rework consists of changing the mounting bracket-to-tube weld joint configuration due to failure in the qualification test program. ✓
5. NASA-O QUALITY ASSURANCE MANPOWER SURVEY: Results of the Quality Assurance Manpower Survey of NASA-O conducted by NASA Headquarters at Downey, California, during May, 1964, have been reviewed by personnel of this Laboratory. Deficiencies noted in the Saturn S-II Stage Quality Assurance Branch are believed to be directly related to the need for additional personnel. In this connection the survey team recommended NASA-O personnel be increased by 35, of which the Saturn S-II Stage Quality Assurance Branch would be allocated 15 spaces. We were advised 7-22-64 by Mr. Negola of Reliability and Quality Assurance, NASA Headquarters, that DOD has just authorized departments of Air Force, Army and Navy 295 overstrength positions for support of NASA and that 35 to 40 of the Air Force positions will go toward supporting NASA-O. The other deficiencies mentioned in the survey report have been acknowledged by NASA-O and adequate corrective measures are being taken. ✓

fw
8/13

NOTES 8-3-64 GRUENE

B
8/4

SA-7 Status:

*fw

a. During re-installation and hydraulic checkout of the S-I engines, a few hydraulic lines showed excessive leakage. Replacement lines were provided by Manufacturing Engineering Laboratory and the hydraulic checkout has been satisfactorily completed on the S-I. Overall functional checkout of the S-I engines is 90% complete. ✓

*fw

b. S-I stage antenna panels have been re-installed and the antennas have been satisfactorily checked out. ✓

7/8/3

B 2/4

NOTES 8/3/64 HAEUSSERMANN

1. MMC DATA AND POWER SYSTEMS: Personnel from the Electrical Systems Integration Division (R-ASTR-E) visited Fairchild to review the design and testing of the Micrometeoroid Measurement Capsule (MMC) data and power systems. A considerable number of problems were uncovered during this review and the following action is deemed necessary to correct these problems:

Lee James
I hope you are aware of this. Your comments on next NOTES are invited
B

- a. Reduce size and complexity of wire harness wherever possible.
- b. Study entire capsule electrical load profile to determine if primary power supply modifications are required.
- c. Redesign power system test box to add two meters and use rotary switches in lieu of phone plugs.
- d. The power supply group of R-ASTR-E is designing and breadboarding a data power distribution system which will use two regulators. One will power the +50V, +6V and -6V converter. The other will power the earth aspect sensor. The converters frequency will be higher than the Fairchild design thereby reducing toroid size. More compact filter capacitors will be used where possible. This will allow packaging in a smaller box, or at least allow the addition of a regulator within the same box which should result in greater efficiency and increase the capability of handling the earth aspect sensor step load without affecting the converter loads. ✓

2. IBM IU CONTRACT SCOPE OF WORK: The modification to the scope Dr. McCall discussed with you last week to cover Type B support requirements has been reviewed with I.O. and definitized for inclusion in their contract negotiations taking place this week. The manner in which this change will be implemented is to be established during the negotiations. Details should be finalized this week and will be described in my 8/10 Notes. ✓

7/28/3

NOTES 8/3/64 HEIMBURG

B 8/4

* Jw

1. F-1 ENGINE:

Test TWF-029 was successfully conducted on 7/29, at the Static Test Tower West for a mainstage duration of 122.84 seconds. Cutoff was due to lox depletion. ✓

A review of the F-1 test data indicates that the F-1 engine is very sensitive to the size of the orifice in the gas generator. This fact was verified in test TWF-030 (7/30) when a very minor change in the orifice size resulted in the lox and fuel pump outlet pressures exceeding the redline values. The F-1 engine sensitivity will be further investigated. ✓

* Jw

2. S-1 STAGE:

S-1-10 was received and installed in the Static Test Tower East on Friday, 7/31. The vehicle was aligned and preparation started for engine removal. The first two engines, positions 4 and 8, will be shipped to Neosho on 8/5. ✓

Agreement has been reached between R-TEST, R-QUAL, and Michoud-Quality with regard to the division of monitoring responsibility for the S-1 stage. R-TEST will be responsible for monitoring the test operations as conducted by Chrysler. Michoud-Quality will be responsible for the implementation of changes as required by means of engineering orders and drawing revisions, R-QUAL will provide personnel as required to assure implementation of these changes while the stage is at MSFC. ✓

3. EAST AREA INSTRUMENTATION SYSTEM:

Negotiations are presently underway with Lear-Siegler on fixed price contracts for the following work:

- a. Installation and checkout of instrumentation for the J-2 stand, blockhouse, and West Side of tower (FY 1962 and FY 1963 funds).
- b. Expansion and modification of instrumentation control systems in the East Area (FY 1964 funds).
- c. Installation of instrumentation in the Components Test Area (FY 1962 and FY 1963 funds).
- d. Installation of instrumentation in the Saturn V Swingarm Area (FY 1962 and FY 1963 funds).

These negotiations are presently held up due to the high prices asked by Lear-Siegler. The procurement plan for the FY 1964 expansion of the Components Test Facility (also is fixed price action, sole source to Lear-Siegler) will be held up until the above negotiations are resolved. ✓

NOTES 8-3-64 HOELZER

B 5/4

fw
8/3

1. DATA CENTER PRESENTATION: A presentation on the status of MSFC's Data Center was given to Mr. Andressen and members of the Executive Staff last week. During the presentation the subject of configuration management was discussed and possible assistance in this field by the Data Center was suggested. Mr. Stein, Chief, Data Center Branch, is discussing the Boeing Company's data center needs this week based upon guidance from Dr. McCall that portions of the Data Center, where possible, should be given to prime contractors. ✓

2. COMPUTATION LABORATORY SUPPORT FOR KSC COMPUTER: In a meeting on July 31 in Computation Laboratory, attended by Dr. Debus and Mr. Sandler, a plan was developed whereby the scientific computer operation at KSC can become administratively independent during FY'65. This action was thought necessary in light of certain administrative difficulties which have been encountered in Computation Laboratory's supplying KSC with computing equipment and with contractor personnel. Discussions with Dr. McCall, Mr. Gorman and Mr. Newby have indicated that this was the proper course of action to take at this time. This plan, which will be evolved, will make certain that technical lines remain open and that a constant communication can take place between the computation effort at KSC and at MSFC. ✓ A draft copy of the plan for this administrative separation is attached. (See Attachment 1). ✓

3. SLIDELL COMPUTER BOARD: The Slidell Computer Board had its quarterly meeting in Slidell on July 29, 1964. This board is chaired by Mr. Bradshaw and consists of members from Michoud and all the contractors using the facilities at Slidell. The major problem at the present is to keep enough computing capability to meet the expanding requirements of Boeing and Chrysler. As further task assignments are given to these contractors, the computing effort increases sharply. Each of the users was asked to make certain that management within their companies assures that only justifiable applications are brought to the computer. A follow-up on this will take place. ✓

D R A F T

KSC - COMPUTATION LABORATORY AGREEMENT
ON COMPUTER SUPPORT AT KSC

Target I

The MSFC contract with GE should be used to continue the support of Computation Branch, KSC, through June 30, 1965. The expected build-up in personnel would call for a total of 35 computer operator type personnel and 4 programmers. These personnel are to be paid for by KSC with a sub-allotment to MSFC. This is to be considered as exactly the procedure under which we are presently operating, and is interim to establishing the final solution for personnel at KSC. Mr. Bradshaw assured the group that MSFC could undertake this build-up with GE and that this was agreeable from the administrative standpoint.

Target II

The present GE contract with Computation Laboratory is to be studied by personnel of KSC to determine if that segment which supports KSC can be transferred to KSC, or that KSC can be given secondary contract administration in contract #NAS8-11029. Mr. Al Siepert is to take action on this item.

Target III

Check the Federal Electric Company contract which has recently been let to support the Central Instrumentation Facility to determine if a logical extension of this contract can be let to handle the operation of the Computer Center. Action - Mr. Siepert.

D R A F T

Target IV

KSC should issue a RFQ for a new contract for the operation of the Computer Center. This contract should be in effect by March 1, 1965, and should be able to completely take over the computer operation by July 1, 1965. The Computation Laboratory offers to give assistance in the formulation of the RFQ and the evaluation of the bids. This effort could involve 2 or 3 people from the Computation Laboratory for a period of 3 months on an intermittent basis.

✓
B 8/4

B 8/4

NOTES 8/3/64 JAMES

PEGASUS: Dr. Stuhlinger has accepted membership on the Detector Panel Verification Committee which is being set up by Dr. Bisplinghoff and Milt Ames. Dr. Stuhlinger will now contact Ames directly for data pertinent to the operation of the committee. Bob Young and I will leave early tomorrow morning to meet George Mueller at Fairchild. We will visit both the Bladensburg and Hagerstown plants. ✓

MSE MISSION: Chrysler has been issued a task order to cover the MSE effort until a mission contract can be incorporated into Contract NAS8-4016. P&VE's draft of the scope of work for the MSE mission was reviewed during a meeting July 28, 1964. The draft scope of work is presently being revised by P&VE to incorporate comments made during the meeting. ✓

BP-9: The request for a program plan on the necessary rework of BP-9 to be formulated by R&DO has resulted in R-P&VE being designed as the lead laboratory in this effort and a target date of August 17, 1964 for finalizing the plan. ✓

* Feb

S-IVB: The S-IVB Quarterly Review has been scheduled for September 2 and 3, 1964, in the Center Conference Room, MSFC. ✓

S-IV-7 STAGE (At KSC): Installation of the non-propulsive vent system is progressing ahead of schedule. Holes have been cut through the forward interstage wall and solenoid valves have been installed. ✓

I. U.: The negotiation panel with IBM (Launch Vehicle Digital Computer and Launch Vehicle Data Adapter, 30 units each) have tentatively reached an agreement on the terms for a contract. Still to be resolved is the question as to whether or not to marry the production contract with the prototype contract. For simplicity of reports, engineering changes, modifications, etc., it would be advantageous to marry the two contracts. However, as the incentive structure is different between the contracts, the method for joining the two and still maintaining an easily defined incentive plan presents a problem. ✓

We are trying to get Hyd's together on their assumptions

BUDGET: We are working simultaneously on cost problems for the Titan III exercise, the Centaur, the POP, and various other long-range programs. One problem which results from this is a heavy workload at this time on our budget group. Another problem, resulting from the different ground rules for each exercise, is that we are floating quite a number of cost proposals which describe different costs per vehicle and, hence, different runout costs. Headquarters tends to forget the ground rule difference and only remember the convenient figures out of some one proposal. ✓

7/28/3

NOTES 8-3-64 Koelle

B 2/4

1. LONG RANGE PLANNING: We have completed a study of six of the alternative space programs reported to you in the NOTES of 6-1-64. They are alternatives A, B, F, G, I, and J, and are illustrative of programs ranging from modest to very ambitious activity. These data were prepared in our own interest and to back up MSF in their efforts to answer the President's letter. As you know, NASA's response to the President has been written and contains no specific program numbers. Perhaps you would like to bring to Dr. Mueller's attention that this type of back-up data does exist for some typical program alternatives.

Wednesday
pms
1 hr

We are prepared to offer you a brief presentation (20 charts) of some of our results at your convenience, and have already approached Frank Williams about this. ✓

On Thursday of this week, a presentation of our alternative programs will be made to Ed Gray in Washington at his request. ✓

Capsule results are as follows:

Bigger spacecraft
needed for
Sat I B and
Sat V
should
easily
take up
the
slack!!
B

- a. Every alternative shows a funding decrease in the 1966 - 1968 period.
- b. Every alternative seems within reason from the average annual funding standpoint.
- c. Every alternative has funding peaks which should be smoothed by adjusting new vehicle starts.
- d. Several new launch vehicle starts appear feasible within budget constraints.
- e. Alternatives B, F, and J appear to be the most desirable.

✓

fw
8/3

B
8/4

NOTES 8-3-64 KUERS

~~omit~~
omit
from text

1. S-II Common Bulkhead: The bonding of the first common bulkhead was completed at Seal Beach last Thursday. Although the ultrasonic inspection has not been accomplished it is felt that, based on the excellent fit-up as evidenced by the impression check, the bonding operation has been really successful. ✓

*fw

2. Tube Flaring and Inspection Conference, August 5-6, 1964, Morris Auditorium, Building 4200: We are sponsoring a conference in promotion of the "Leakage Problem" related to Saturn V requirements and Marshall Specification MC-146. The main purpose of the conference is to (1) review the results of a survey made by Marshall personnel on the capability of all Saturn stage contractors and MSFC to produce flares to subject specification, (2) review a revised MC-146 specification, and (3) exchange tube flaring and inspection knowledge. Dr. Mrazek will present the opening welcome. Max Nowak coordinated and prepared the conference with the pertinent organizations at Marshall and with the prime contractors. (MSC and Grumman will also be represented). ✓

7/4/63

B 879

NOTES 8-3-64 MAUS

- 1. SATURN IB-TITAN III C COMPARISON STUDY - We have received an official request from Dr. Mueller for a detailed cost estimate for the present Saturn IB program and for two follow-on programs, each with high and low options. ✓

The cost data must be furnished in a cost breakdown system developed by Dr. Seamans' staff. ✓

Data to be supplied on Saturn IB must be in MSF by August 31. Dr. Seamans has delayed the submission to Aeronautics and Astronautics Coordinating Board (who will perform actual evaluation) to Sept. 15. ✓

- 2. PROJECT FORECAST - A briefing on the Air Force Project FORECAST is scheduled to be given here for MSFC top management on August 13. It covers the results of a study conducted by Air Force and contractors to determine the direction of R&D in the Air Force, between now and 1970.

Ray Kline

These briefings are being given at NASA centers at request of Mr. Webb.

Yes, please arrange

Since you will not be here for the briefings on August 13, the team is agreeable to return to MSFC at a later date suitable to your calendar. Ray Kline is Project Officer for this exercise. ✓

B

- 3. POP 64-3 - The MSF POP 64-3 was not released on August 1 as anticipated. It is being held by Dr. Rees at the direction of Dr. Mueller. Investigations are being made whether to reduce the FY66 Saturn V requirements to that reflected in the May submission.

The C of F submission is being forwarded tomorrow, August 4. The R&D submission will be held until after the review with Dr. Mueller's staff, at MSFC on August 6 and 7. ✓

- 4. CONFIGURATION MANAGEMENT - Arrangements have been made with representatives of Space Technology Labs, Northrop, General Dynamics/Astronautics, and Autonetics Division of NAA, to give briefings at MSFC August 4, 5, 10, 11. The representatives of these firms are lecturers for the UCLA course on Configuration Management and are coming to Huntsville without cost to MSFC. The briefings will be held in the University Center. Approximately 50 MSFC people are scheduled to attend. ✓

NOTES 8-3-64 McCartney

B 8/4

fw 8/13

1. R&D OPERATIONS' ADMINISTRATIVE GROUP: The R&D Operations' Administrative Group, formerly a part of the Resources Management Office, has been established as a separate group reporting to the Director, R&D Operations. This transfer allows a more direct and personal administrative control by the R&D Operations' Director's Office. ✓

2. SHORT FORM PROCUREMENT PLAN: Short Form Procurement Plans continue to be processed at a reasonable rate. Through July, 1964, 27 Short Form Procurement Plans have been received from the laboratories, with a total dollar value of \$74,882,000. Some minor administrative details remain to be worked out regarding routing and processing; however, no significant problems have arisen thus far. These procurement plans are submitted only for those individual actions which are \$100,000 or more. ✓

3. R&D OPERATIONS MANPOWER AUDIT: On July 31, a summary of the R&D Operations' manpower audit was reviewed by the R&D Operations Director. On August 7, Dr. McCall will present to you a summary of the intensive R&D Operations manpower investigations performed during 1964, with emphasis on results of the current, detailed laboratory audits. ✓

4. SOURCE EVALUATION BOARD, SINGLE SUPPORT CONTRACTORS: On August 1, the Test Laboratory Request for Proposal was issued, on schedule. The Pre-proposal conference is to be held on August 13. The Board has completed review and approved RFP issuance for both the Facilities and Design Office and the Quality and Reliability Assurance Laboratory; the RFP's are scheduled for release on August 8 and 10, respectively. The Board is scheduled to review the draft RFP's for Technical Services Office and Management Services Office on August 4 and 5, respectively. ✓

NOTES 8/3/64 RUDOLPH

B 8/4

July 13

1. Saturn V Weight Savings Policy Directive - A Saturn V Policy Directive has been issued to furnish guidelines on future weight savings action considerations. ✓

2. S-IC Stage:

RCA 110A Computer Delivery - A meeting between RCA, Boeing, and MSFC has been scheduled for August 12, 1964, to determine if the RCA 110A Computer delivery problem can be alleviated. ✓

Plan VII negotiations between MSFC and The Boeing Company started at Michoud on July 27, 1964. ✓

3. S-II Stage:

Battleship GSE - Steps have been taken to relieve the existing Battleship GSE schedule slippage caused primarily by NAA manufacturing quality control release problems. These problems are mainly concerned with updating documentation to include engineering changes, equipment markings, process specification approval, etc., which do not affect equipment operation. ✓

*fw Common Bulkhead Status - Cleaning and priming of the forward facing plate, followed by adhesive lay-up, was completed July 27, 1964. The bonding cycle was started July 28, 1964 and completed on July 30, 1964.

Preliminary evaluation by visual inspection and "coin tapping" indicates a usable common bulkhead. ✓ After complete visual (underside of aft facing plate) complete surface ultrasonic inspection, localized cleaning and chem-filming, the bulkhead will be delivered to the vertical assembly building. These remaining operations are presently estimated to take four to seven days, giving an estimated completion of August 3-6, 1964. ✓

4. S-IVB Stage:

S-IVB Quarterly Review has been scheduled for September 2 and 3, 1964. ✓

Configuration Management - A change control sub board will be established for the S-IVB Stage. This board will be part of the overall configuration management system. ✓

5. Instrument Unit Mission Contract - On July 24, 1964, Mr. Newby sent a TWX to Mr. Gorman, Deputy Associate Administrator for Administration asking for assistance in securing the required contractual coverage with IBM from August 4, 1964, until such time as the new mission contract can be executed. ✓

*fw 6. Vehicle GSE Review - The GSE Quarterly Review originally scheduled for August 20, 1964, has been cancelled since the Fichtner presentation to you in mid-September should provide a general status. ✓

July 8/73

B 8/4

NOTES-8-3-64-SHEPHERD

Mr. Webb's Visit to Michoud: (Reference Notes 7-13-64 SHEPHERD, copy attached). The University of Southern Mississippi report on the economic impact in the MTF area was completed September 1963. This report was satisfactory, but based on the early planning data for the MTF and included the so-called ultimate development, that is \$500M construction program. Marion Kent has been assigned the action of pulling together the reports on the economic impact on Michoud and Mississippi. In keeping with Mr. Webb's statements, Kent plans to utilize the services of the state institutions of Mississippi and Louisiana, who normally perform the function of state economic outlook and forecasting. This will probably mean that Dr. Boyer, Louisiana State University, would do the study for the Michoud area and Dr. Fwellyn, Mississippi State University, for MTF.

NAA Proposal for Office Building at Downey: NAA submitted a proposal to MSF for an office building (160,000 sq. ft. for \$2.7M). A decision was made between Drs. Mueller, Seamans and Mr. Hilburn that the Government would fund this facility and construct on government land. Prior to submitting to Congress for project approval, MSF decided to revalidate the need in light of the 2,500 man reduction at Downey. This investigation disclosed that S&ID had a plan to release all of their trailers and part of their presently leased space by the end of the year. This had not been disclosed before. As a result, Stan Smithson, NAA Corporate, requested MSF to take no further action on the proposal until NAA reviewed its total requirements. It appears that S&ID is not keeping the NAA Corporate Office nor NASA fully informed, and the need for the building is questionable.

Shep
They also
propose
to relocate
the entire
FEM-77
project
("Hound Dog")
with
300 people to
Tulsa
B

FLOXED Atlas Test Stands: The Corps of Engineers (CofE), Los Angeles District, is constructing for the Air Force a Thrust Research Facility at Haystack Butte, Edwards, scheduled for completion June 1965. We had previously advised Lewis that if they built at Haystack Butte for the FLOX program that they utilize the CofE in the same manner that MSFC did for the design and construction of the F-I complex. Col. Peacock, CofE, gave the following status report on the FLOX Test Stand: (a) Lewis talked to the CofE in terms of the CofE doing design and construction supervision, (b) The CofE obtained site approval from the Air Force. (c) Lewis then decided that they would employ their own A-E and not use the CofE for construction. (d) The Air Force withdrew permission for the siting of the facility last week. (e) Mr. Webb contacted the Secretary of the Air Force and the site approval was reinstated. Col. Peacock considers the Lewis approach as being "amateurish" and that he is considering discussing the matter with his friends on the Teague Committee. The Corps considers that the FLOX Stand would not be completed until January 1966 to July 1966. If Lewis goes their present route to construct the test stands and if these test stands are required prior to flight testing, the 1967 launch date is extremely optimistic.

Downey
S&ID
Donnie
Suggest you
re-type
this
as a
separate
enclosure
to a
short
cover
letter to
FEM,
saying
that
this
excerpt
from Shep's
8-3-64
NOTES
should
be of
interest
to him.
"Confidential", a
sensitive.
B

B 7/30

NOTES-7-13-64-SHEPHERD

Work Stoppage at Sacramento: On the morning of July 1, electrical construction workers failed to report for work on our S-IVB test facilities which are under construction. The previous union contract expired on June 30 and negotiations for a new contract had not been completed due to a union demand for a 7 1/2 hour work day. The work stoppage appears illegal as the expired contract contains a provision that work will continue during the negotiation of a new contract. Through efforts by NASA Labor Relations and the Corps of Engineers, the International Brotherhood of Electrical Workers directed the locals, on July 9, to abide by their contract or have their charters revoked. Work resumed on July 10. The only serious impact (12 days) is on completion of Complex Gamma (Attitude Control Motor Test Site). Electrical work is the pacing item for its completion and its early availability is most important to S-IVB development. Work remaining prior to release of the facility to Douglas is estimated to require 12 days or until July 23. We cannot expect to shorten this period significantly since the construction contractor was already working two 10 hour shifts, 6 days per week at the time of the work stoppage. ✓

Mr. Webb's Visit to Michoud: As you probably know, Mr. Webb visited Michoud for a briefing on Michoud and MTF on Saturday, July 11. He was accompanied by Gen. Phillipps, Gen. Hall, Mr. Kerr, Mr. Drotning and Mr. Smolensky. As it has been approximately two years since Mr. Webb's last trip to Michoud he noted considerable change. His reaction to the presentation and tour appeared to be satisfactory. Unfortunately, he did not take the time to tour MTF. During the course of Bill Fortune's presentation on MTF, Mr. Webb made the NASA position concerning the Civil Rights Bill very clear. He stated that he had signed an order on July 10, prohibiting NASA employees from participating in segregated meetings. He further amplified President Johnson's feelings on the Civil Rights issues by stating that States and Communities that did not comply with the new law will not receive Federal funds for community development, housing development and schools. Mr. Webb was keenly interested in the economic impact that the MSFC work has had on New Orleans and Mississippi. He requested that further efforts be made to increase our knowledge in this area.

FY-65 Coff Budget: A joint House-Senate conference has agreed upon a NASA budget including a 5% reduction in the Coff Budget for each location (Huntsville, MTF, Michoud and Various). No specific project was disapproved. ✓

Shep
Did we
not let
an impact
survey
contract
to
MSU?
What's
the status?
B



July 13

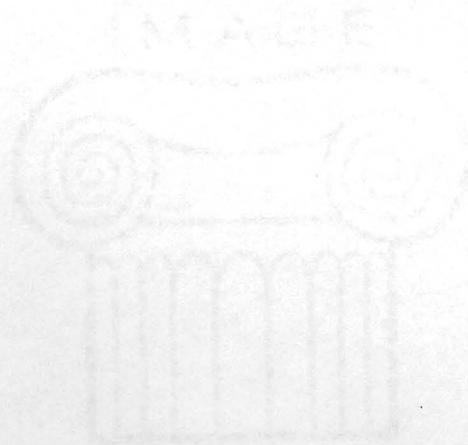
B 8/9

NOTES 8-3-64 Stuhlinger

1. SRT PROGRAM STATUS: The current status of the FY-64 ART/SRT Program under the cognizance of this Laboratory is, as of 7/31/64, as follows:

	<u>ANNUAL PLAN</u>	<u>AUTHORIZED</u>	<u>PROCESSED TO FMO</u>	<u>OBLIGATED</u>	<u>CHANGE IN OBLIGATIONS SINCE 7/24/64</u>
OART	10,514,311	10,514,311	10,500,311	9,148,208	159,098
OMSF	14,133,000	14,133,000	14,010,609	13,506,722	800,000
OSSA	<u>680,000</u>	<u>680,000</u>	<u>666,928</u>	<u>665,450</u>	<u>79,989</u>
	25,327,311	25,327,311	25,177,848	23,320,380 ✓	1,039,087 ✓

August 10, 1964



ELITE
28% COTTON
FACIETTE

B 8/15

H-1 ENGINE

During a recent engine test, a heat exchanger coil ruptured and caused severe damage to Unit No. 2 of the new inboard engine exhaust duct. The new duct is not suspected to have contributed to the failure of the heat exchanger and no schedule delay in the duct qualification is anticipated. This heat exchanger was a 188K unit reworked to the 200K configuration and had accumulated 2300 seconds in 37 starts. This is the first incident of this nature and is not considered a major problem since the heat exchanger had surpassed qualification life. ✓

*7 J-2 ENGINE

During a fuel turbopump test at CTL III, Cell 45, a detonation occurred in the gas generator and pump turbine area. Preliminary investigation indicated that a faulty pyrotechnic igniter caused an ignition delay of approximately 1.3 seconds, allowing time for an accumulation of propellants, with the resultant detonation. The gas generator and turbopump were a total loss. It is estimated that six days of double shift operation will be required to put the test cell back in operation. A detailed incident report will be issued when the investigation is completed. ✓

Production engine J2006 has been delivered to DAC for use in their spring-rate test program. ✓

RL10 ENGINE

The official Centaur flight schedule has been altered by rescheduling the AC-4 flight 6 weeks downstream, removing the launch of AC-8 and AC-11, and by stretching the schedule to allow 2 to 3 month periods between launch rather than the 1 to 2 month periods originally scheduled. |||

The static firing of S-IV-9 was aborted after approximately 6 minutes, 38 seconds run time due to loss of two water pumps that supply water coolant to the flame deflector and diffuser. The engines shutdown normally; however, a weld in a re-designed test stand hydrogen vent cracked during the shutdown. Preliminary investigations indicate that the crack was caused by flexing rather than over pressurization. The six RL10 engines operated satisfactorily. The LOX seal cavity pressure on engine 1836 ran very close to red line and at one point the pressure exceeded the redline by .4 psi. The LOX seal cavity vent line is being checked for blockage and the data from acceptance firing of the engine at FRDC is being reviewed. ✓

F-1 ENGINE

As a part of the proposed realigned qualification program, tentative agreement has been reached with Rocketdyne to change the Model Specification nominal thrust of the F-1 engine to 1522K. This change makes the nominal thrust level consistent with the value used for payload determination and committed to Headquarters earlier this year. ✓

As a result of the recent decision to eliminate leakage measurement during flight, Rocketdyne has been requested to place greater emphasis on the Static Seal Leakage Elimination Program, particularly in view of the greater hazard which leakage under the "cocoon" thermal insulation would pose. ✓

GENERAL

Friday evening B. Young, J. Shea, E. Neubert and I met with Dr. Mueller in LA preparatory to his talk with NAA, Atwood, on Saturday. Data similar to that used in our briefing to you was reviewed and left with him. Suggest you get a feed back from Dr. Mueller on his discussion with Atwood, prior to our meeting with Rocketdyne this Friday. ✓ |||

fwg/10

B 8/15

NOTES 8-10-64 CLINE

1. SATURN V, S-IVB STAGE: (Reference NOTES 7-27-64 CLINE, para. 1.) A report on the S-IVB Auxiliary Propulsion System will be prepared and presented to you in the near future. ✓

2. FLUORINE-HYDROGEN ENGINE TESTS: (Reference NOTES 7-27-64 CLINE, para. 4.) LeRC has published a report, "Analysis of Capability of Using Fluorine for Centaur." Their report, TM X 995, was released approximately two weeks ago, and we are in process of obtaining a copy. ✓

General Dynamics/Astronautics has also looked at using Fluorine in the Centaur. They have studied vehicle compatibility and performance with Fluorine. We are also trying to obtain a copy of the study results. ✓

No in-house payload gain studies have been performed considering the use of Fluorine in the Centaur as a third stage of Saturn IB. A future endeavor to study the use of Fluorine will be made. ✓

Specific impulse figures obtained in tests are classified and have been forwarded under separate cover. ✓

*fw

3. C-TANK TEST: The Boeing Company started the C-tank test 8-3-64. The tank was filled with water and pressurized to 3 psig ullage pressure. Pressure could not be properly monitored and the ullage pressure was released by opening the vent valve in order to check the system. A long overflow pipe is connected to the vent. When the vent valve was opened, a syphoning action created a negative pressure of approximately 2 psig in the tank before the valve could be closed. This negative pressure caused the upper bulkhead to buckle over the polar region. The tank was repressurized to restore the bulkhead to its original contour and inspection revealed that the bulkhead had sustained some permanent set. The test was stopped and the paint was removed from the welds to facilitate checking for cracks with dye penetrant. This check indicated some existing surface cracks. These areas were polished and X-rayed. The X-rays did not reveal any cracks through the material. The Boeing Company reports that approximately 40% of the internal strain gages are not functioning because water leakage is shorting out the wiring. Further investigation is required for this problem. The vent system has been redesigned to prevent any syphon when the tank is full of water and the vent valve is in the open position. ✓

0.017 from TWX

4. SATURN V, S-IC STAGE: (Reference NOTES 7-20-64 KUERS, para. 1.) Difficulties arose during the S-IC-T assembly when an interference necessitated a modification to the exclusion riser cover. This modification seriously weakened the adhesive bond between the riser cover and the lower bulkhead, and debonding of the cover occurred during hydrostatic testing. Corrective action has been taken which eliminated the problem. There has been no further hydrostatic testing of the S-IC-T fuel tank. A calibration test of the tank has been completed successfully. Some minor staining of the bulkhead has occurred and has been positively defined as residue from the adhesive used in the initial bond operation of the exclusion riser. No evidence of corrosion has been uncovered in the fuel tank. There is no cause for alarm in either the design or technology of the exclusion riser concept, and, as experience is gained in manufacturing techniques, no serious problems are foreseen in future assembly operations. ✓✓

Attachment #1: NOTES 7-27-64 CLINE

Attachment #2: Paragraph 1, NOTES 7-20-64 KUERS

NOTES 8/10/64 CONSTAN

B 8/15

Aug
10

1. Status of S-I-10 - Vehicle at MSFC for static test. ✓
2. Status of S-IB-I - Clustering of tanks has been completed and the following operations are in progress:
 - a. 60° shrouds are in process of being fitted.
 - b. Installation of components on spider beam is in process.
 - c. GOX lines are being fitted on tail section.
 - d. Installing tubing and brackets in 105'' tank.
 - e. Installing measuring rack and brackets in tanks. ✓

fw 8/10

B 2/15

NOTES 8-10-64 Dannenberg

1. GSE - Panel Review Board Secretariat in cooperation with Panel Chairmen of three Centers cleared up handling of GSE in panels as follows: S/C oriented and L/V oriented GSE interface will be handled in Electrical and Mechanical Interface Panels, while S/C oriented and L/V oriented GSE to launch complex interface will be handled in Launch Operations Panel. Next PRB meeting is scheduled for 8-17-64. ✓

2. Crew Safety Panel Meeting, 8-4-64 - Panel agreed on EDS design criteria for Saturn V. Difference to Saturn IB is the addition of S-II and S-IVB tank pressure analogs and S-II engine thrust monitors for manual abort. Alternate missions vs. abort are now being discussed. ✓

Aug 10

B 8/15

NOTES 8/10/64 FORTUNE

1. Mississippi Game and Fish Commission Visit - Tuesday, officials of the State Game and Fish Commission, International Paper Company, The Hancock County Board of Supervisors Attorney, and MTO personnel met to consider establishing a Game Management Area in the north portion of our fee area, well clear of any construction sites. St. Regis Paper Company was also to have been represented, but could not be there. Coveys of quail and wild turkeys have been noted around us, and some deer. It was agreed that we could close the fee area to normal hunting, controlled shooting to be conducted in season at our discretion. ✓ The desirability of restricting shooting to shotgun only in Hancock County was stressed. ✓ The paper companies, who own large holdings surrounding us, would be pleased if no shooting at all were permitted in their areas. This would suit us, as well, reducing the possibility of anyone trying to put a high-powered rifle bullet into our test stands which will be seen for several miles across the flat terrain. ✓ Game and Fish Commission personnel have promised to work out game management considerations with the Corps Engineers now preparing our land management program. ✓

2. Labor Relations Channels Clarified - Thursday a.m., Julius Kuczma, Exec. Secretary, President's Missile Sites Labor Committee; Ed Scott, Dep Dir, Federal Mediation Council; Dick Taylor, our local Federal Mediator; Col. Sollohub, Office of Construction, and Jerry Hlass, MSF NASA Headquarters, eight top personnel from the Corps of Engineers, Paul Styles, Jim Shepherd and myself met to establish a government position on labor relations at MTF. Our record to date has been outstanding among NASA construction sites, only 1406 man days being lost of 151, 126 man days worked, less than 1%. However, a recent misunderstanding, which Paul Styles can explain, and the growing possibility of industrial unions moving in to organize GE and NAA on the site prompted the get-together. Need was recognized for the Corps Labor Relations man, Montague, to move out at the first indication of trouble between a contractor and a union, to get these two together and attempt an understanding, simultaneously alerting our Fred Tyvoll and Dick Taylor, all three to keep in better touch. ✓ Taylor will now spend at least three days a week here on the site, and Montague, who also wears a safety hat, is to give greater emphasis to the labor side. I suggested that all three should sit together in the same office, the Corps not going along with this for the time being. ✓

3. MTF Planning Board Meeting 6 August - Heimburg, Tessman, Shepherd and myself met at MTF Thursday and Friday reviewing construction progress, possible problem areas, policy decisions, etc. Col. Marshall, other MDO personnel and Jerry Hlass sat in. We went over each building site afterwards. In general, things look good and we do not see at this time any necessity for expending additional funds to advance construction beyond the present effort levels. ✓

Aug 8/10

B 8/15

NOTES 8/10/64 GEISSLER

URGENT

Don't ask
8/17
Bonnie
Please give
me a
copy for
discussion
with Dr.
Mueller
on
August 19
B

1. Saturn IB/Centaur/Surveyor: The initial contacts with JPL working people, which were encouraging to us, have been interrupted brusquely after contacting JPL Project Management. I should emphasize again that Mr. Fero, OMSF, got clearance from Mr. McGolrick, OSSA, for us making an approach to JPL. Mr. Beilock, Assistant Project Manager for Surveyor Block II, however, when asked to set up a date for MSFC personnel to visit there, responded that they were too busy for discussions, and besides that he had been told by OSS to concentrate on Floxed Atlas/Centaur. He suggested that we deal directly with headquarters or pick up with him in September. Other contacts with Mr. Blomeyer of JPL had similar results; he claimed that 2 Surveyors with one flight would have tremendous impact on the flight operations and ground facilities and could only be assessed by a careful study of several months. Apparently a delay tactic is on which makes good sense from the other point of view. Obviously, Mr. McGolrick at OSSA goofed when agreeing to Mr. Fero's proposal and was reversed by his higher management. We had two days of discussions with Les Fero this week (Monday and Tuesday) and continue to feed him detailed data for his fight in Washington. I am afraid that Dr. Seamans' request of OSS (Mr. Johnson) to make the study of Saturn IB/Centaur impact on Surveyor, etc., will only result in OSS underlining the decisions already made, i. e., no Saturn IB/Centaur/Surveyor.

2. Saturn IB/Transtage Performance Capability: From a flight mechanics point of view, the one significant advantage which the Titan III-C has over the Saturn IB/Centaur is the capability of the Transtage to do multiple starts in combination with long coast times in orbit. The Saturn IB/Centaur is limited in this respect by Centaur boiloff, re-pressurization requirements, instrumentation qualification, etc. Whereas the Transtage may display some of these same problem areas to a greater or lesser extent, it is interesting to note that the Saturn IB/Transtage performance exceeds that of the Titan III-C/Transtage for both orbital transfers and hyperbolic trajectories. For example, the escape payloads of the two configurations are:

Titan III-C (4 stage vehicle)	5000 lb	
Saturn IB/Transtage (3 stage vehicle)	8000 lb	✓

B. 8/15

fw 8/10

- 1. S-I-9 POST-STATIC CHECKOUT: Installation of engines on the S-I-9 stage began August 6, 1964, and is now scheduled for completion August 12, 1964. Completion of Post-Static checkout is scheduled for August 30, 1964. ✓
- 2. S-IU-9 INSTRUMENT UNIT CHECKOUT: Electrical hook-up and networks functional tests began August 6, 1964, on the S-IU-9 Instrument Unit. Checkout completion is now scheduled for September 12, 1964. ✓
- 3. S-IV PROGRAM: The S-IV-8 stage was shipped to Sacramento August 7, 1964. Approximately 1000 manhours of manufacturing are being transferred to Sacramento to be accomplished on the test stand. S-IV-10 is in the Santa Monica check-out area being prepared for checkout. The stage presently has approximately 200 missing components. S-IV-9 was static fired August 6, 1964, for 6 minutes, 40 seconds. ✓ Early cutoff occurred due to failure of facility water pumps which supplied water to the deflector plates. ✓

Dr. Stuhlinger
FYI
B
Looks anything but rosy !!!

- 4. MMC PROGRAM: Electro Magnetic Interference problems continue within the Data Subsystem of the MMC. It appears from test results to date that serious design problems exist within this subsystem and that logical test precautions are not being applied by Fairchild. With the assistance of Astrionics Laboratory, Fairchild has initiated a re-design of the Power Subsystem. The present prototype model of the MMC is being "downgraded" to an Engineering Test Model, another prototype model to be fabricated from "qualified" hardware.

The in-house qualification test program is not progressing satisfactorily at Fairchild. To date, attempts have been made to qualify six (6) (of approximately 15) items, all of which have failed. It should be noted that these failures are primarily design failures.

Lee James
I am really getting worried about all this!
You still seem to be pretty optimistic
Your NOTES 8-10-64
How come?
B

- 5. NAA/S&ID TRACEABILITY PROGRAM REVIEW: A review was made of the NAA/S&ID Traceability Program in effect on the S-II Stage. The assignment of the traceability requirement on any part is accomplished only after an engineering evaluation has been made to determine the effect failure of the part would have on accomplishment of the stage mission. It is the opinion of the personnel who reviewed the systems that the NAA/S&ID basis traceability system should not be changed. ✓

- 6. NAA/S&ID, TULSA, QUALITY PROGRAM EVALUATION SURVEY: A survey of the quality activities at NAA/S&ID, Tulsa, Oklahoma, was conducted and deficiencies noted primarily in staffing with sufficient quality personnel, document review and control, identification of material to laboratory samples and corrective action on discrepant materials. Corrective action has been taken by NAA/S&ID in the deficient areas. ✓

- 7. ROCKETDYNE/NEOSHO QUALITY PROGRAM EVALUATION SURVEY: A recent Quality Program Evaluation Survey of Rocketdyne/Neosho revealed their system was basically satisfactory. ✓ The two most significantly deficient areas were calibration control and inadequate Quality Control Operating Procedures. ✓

128/10

NOTES 8-10-64 GRUENE

B 27/15

SA-7 Status

- a. The thrust chamber leakage tests and overall functional checkout of S-I stage engines have been satisfactorily completed. ✓
- b. The spacecraft and launch vehicle have been mated electrically and preparations for the sequence malfunction test, scheduled for this week, are in progress. ✓

20
8/10

NOTES 8/10/64 HAEUSSERMANN

B 8/15

No submission this week.

fw 8/10

NOTES 8/10/64 HEIMBURG

B 8/15

1. S-1 STAGE:

All eight engines of S-1-10 have been removed from the stage and prepared for shipment to Neosho. Six of these engines have been shipped and the remaining two will be shipped today, 8/10. ✓

During removal of the wraparound lines galling occurred on the lox pump inlet adapters on engine H-2026 and H02034R, positions No. 6 and 5, respectively. Improperly manufactured screens, installed at Michoud for the lox loading test, caused the galling by forcing the conical screen ring too far into the pump inlet adapter thereby widening the protruding adapter lip. The damaged wraparound lines will be replaced while the engines are at Neosho. Properly manufactured screens will be installed in the stage by Chrysler. ✓

Mechanical, electrical, and instrumentation hookup was accomplished and partial electrical checkout was started. Holding fixtures for the wraparound lines were installed in preparation for the first loading test. ✓

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

Reference NOTES 8/3/64 HEIMBURG (copy attached). Test TWF-030 (7/30) was cut off when a minor orifice change in the GG lox system resulted in pump outlets exceeding the redlines. Closer examination of the GG lox orifice revealed that the entrance leading edge was slightly rounded. A new orifice was installed and test TWF-031 was run Tuesday, 8/4, for 16.07 seconds mainstage. It is concluded that these discrepancies caused the high performance on test TWF-023 and TWF-030. Test TWF-032 will be run Tuesday, 8/11, for a full duration. ✓

3. INCIDENT AT SOUND SUPPRESSION STAND:

On Thursday, 8/6, an old Redstone hydrogen peroxide tank, which was being used as an H-1 turbopump flush reservoir, ruptured. The tank was being operated at 750 p.s.i. (design working pressure of 800 p.s.i.). The tank had been previously hydro tested at 1200 p.s.i. There were no injuries and damage to the stand was minor (fiberglass GN₂ spheres shredded by shrapnel and control lines cut). This damage has been repaired and the stand is back in operation. Dr. Lucas' people are presently looking at the tank parts to determine the cause of failure. Indications are that the tank had fatigued after numerous pressurization cycles. We are presently checking into use of old missile hardware on our other test stands and consideration will be given to the use of ASME approved tanks for these applications. ✓

ATTACHMENT: NOTES 8/3/64 HEIMBURG (attached to Dr. von Braun's copy only)

7/28/60

B 2/15

NOTES 8-10-64 HOELZER

1. AIR CONDITIONING BUILDING 4663: The single air conditioning system in Building 4663 has been a problem since occupancy of this building in 1958. The problem is that there is no back-up system when this single system is inoperative. Computation Laboratory has been unable to have a duplicate system installed. The new addition presently under construction will have a separate air conditioning facility and will serve as a back-up for the presently installed system. This addition, when completed this fall, should practically solve the annual air conditioning problem. ✓
Almost all the computing work requested of Computation Laboratory was done at the Army, Slidell, or at the Boeing Center downtown. The one application mentioned by Astrionics unfortunately required special devices existing only on Computation Laboratory equipment. ✓
2. INCENTIVE FEE AWARD TO GE: A dry run for the mechanics involved in awarding an incentive fee to the Computation Laboratory support contractor (GE) is planned for August 10, 1964. Dr. McCall is chairman of the Board which will do the evaluation and it is understood that this is the first contract to be evaluated under the incentive award fee concept. The first six months period of evaluation for this contract will end in October, and October 8th is scheduled for the first Evaluation Board Meeting. ✓
3. COMPUTER PURCHASE PLAN: The plan for purchase of digital computers in FY'65 is not yet finalized. Headquarters is gathering additional information in order to properly plan this program. This laboratory is keeping in close touch with Headquarters and with the NASA Inter-Center Committee on ADP relative to this subject. ✓

fw
8/10

B 8/15

NOTES 8/10/64 JAMES

*fw SA-7: The launch vehicle electrical mate was successfully completed on August 7 on schedule. ✓

S-I-9: Reinstallation of engines is proceeding and three engines were installed last week. All engines are expected to be reinstalled by August 13 and post static checkout will begin August 14. Stage will be shipped to KSC on schedule. ✓

*fw S-IV-9: Acceptance firing was delayed from July 31 to August 3 due to hardwire instrumentation checkout. Firing was attempted August 3, but was aborted after LOX fill due to excessive noise on low level T/M System No. 1. Static firing was conducted on Thursday, August 6, for duration of 400 seconds, at which time a redline cutoff was initiated. Two water pumps which supply the deflector plate failed. Preliminary review indicated all vehicle systems operated satisfactorily. At cutoff, 17 percent of the propellants remained in the tanks. Based on preliminary results, it appears that an additional static firing will not be required. ✓

Lee
James
see
Frau
NOTES
8-10-64
B

*fw PEGASUS Schedules: Deliveries of capsules in time to meet currently established launch dates appear to be possible even though the prototype electronic system is approximately a week behind schedule in going into thermal vacuum test at Bladensburg. Fairchild has been assured of availability of a second vacuum chamber at GE in order that the prototype and first flight capsules can be tested simultaneously. ✓

*fw S-IVB Quarterly Review: The S-IVB Quarterly Review previously scheduled for September 2 and 3 has been rescheduled for September 9 and 10 in the Center Conference Room at MSFC. ✓

*fw S-IVB Battleship: The schedule for firing the S-IVB Battleship at DAC has incurred additional slippage. DAC estimates that the most probable date for the chilldown program to begin is now September 21 with the most probable date for a short duration firing (20 seconds) now being the week of October 26. Dr. Rees, Dr. Mrazek, Mr. Young, myself and others of MSFC will be at DAC tomorrow for a complete review of the S-IVB Battleship program. I will furnish results of this review and program impact next week. ✓

Saturn I/IB Program Costs: On August 6, a review of POP 64-3 was held with Headquarters personnel. Saturn I runout costs were decreased by 4.8M dollars and Saturn IB runout costs remained the same as in POP 64-2. ✓

B 8/15

7/28/10

1. REUSABLE ORBITAL TRANSPORT: Admiral Boone met with General Ritland and other Air Force people on August 3 to explore coordinated NASA/Air Force efforts in the area of reusable launch vehicles. We understand that, as a result of this meeting, a small NASA/Air Force coordinating panel is to be established, possibly as an element of the Aeronautics and Astronautics Coordinating Board (AACB), with MSFC representation on the panel. Admiral Boone has action for NASA. ✓

HHK
You?
You!
B

One of the events preceding this meeting was a conversation between Dr. Sherwin of DDR&E (DOD) and Mr. Webb, in which Dr. Sherwin reportedly advocated development of aerospaceplane-type reusable boosters, and, secondly, suggested that DOD and NASA agree that DOD should develop the reusable booster, and NASA should support the ORION project.

oh! is that confirmed? B

We will keep close contact in this area, and will keep you posted. ✓

2. EXPLANATION ON NOTES 7-27-64:

a. Headquarter's Contractor Orientation - Hohmann Mars Mission:

Mr. Rollin Gillespie joined Headquarters (Ed Gray's planetary group) about a year ago. One of his pet ideas was a manned Mars Hohmann mission, all-chemical propulsion, which he calls "Conjunction Class Mission," in contrast to fast flights, which he calls "Opposition Class Mission."

His pushing resulted in a study on this subject run directly by Headquarters. The study was won by Douglas Aircraft Company and Mr. Jerry Smith of this office is our representative.

As far as I can tell, the study is a "warmover" of your old "Mars Project," updating it by including cryogenic chemical propulsion. ✓

Since Mr. Lord is somewhat skeptical of Mr. Gillespie's bias, the technical supervisor is not Gillespie, but Bill Hamon, who is also a member of Ed Gray's planetary group. ✓

b. Manned Interplanetary System Studies:

Those are studies performed during FY 65, but funded by FY 64 money. As you know, our studies just got under way. ✓

c. PSAC Presentation:

Mr. H. Finger was the senior NASA representative in charge of escorting the PSAC group, and coordinating the meeting at JPL. The PSAC senior member was N. Golovin.

Why Finger, and no other man? I do not know. After all, the briefing was about the unmanned and manned planetary NASA programs. ✓

Aug 10

Bg/15

NOTES 8-10-64 KUERS

1. S-IC-1: The upper bulkhead for the lox tank, which is supplied by Boeing, has been rejected due to excessive peaking and offset. We have sent 3 of our most experienced people to Michoud over the weekend at the urgent request of Boeing, (along with some of our recently developed tooling, which we found necessary for successful thin gage gore welding). ✓

*fw 2. S-II Stage Common Bulkhead: The ultrasonic inspection of the first common bulkhead, which started August 3, is not producing a clear visible read-out yet. Modifications of the test fixture are underway and tentative completion schedule of inspection is Saturday night, August 15. ✓

*fw 3. Tube Flaring and Inspection Conference, August 5-6, 1964: Presentations and demonstrations of tube-flaring improvements by all four stage Prime Contractors and MSFC, showed that an all out effort is now underway in order to live up to the high standards and reliability requirements for space vehicle tube connections. Grumman and McDonnell requested the drawings of the ME-developed orbital flaring tool with electronically controlled flaring cycle. (The stage Prime Contractors have been informed for some time.) The papers were published in an MSFC report and distributed. ✓

1. CONFIGURATION MANAGEMENT - The Configuration Management Committee has met three times. The Committee has developed a detailed schedule of activities and has assigned responsibility for each activity to an appropriate Committee member. Contact elements have been identified in IO and R&DO. Charters and functions are being developed. Configuration Management Offices have been unofficially established since no official charters have been issued. ✓

R&DO is investigating current practices in Configuration Management. They are investigating systems specifications, as prepared by Glover, to determine adequacy under NPC 500-1, and to determine what is needed for accuracy. ✓

Arrangements have been made for two sessions of training and lectures on Configuration Management. ✓ The first session was conducted the 4th and 5th of August at the University Center by Messrs. Bennett of Northrop and Kapernaros of STC. Approximately 70 personnel who are directly involved with Configuration Management attended this session. The second session is being conducted today and tomorrow. Messrs. Acker of Autonetics and Ruark of GDA are conducting this session. Both groups of lecturers were members of the staff which conducted the Configuration Management course at UCLA. These sessions are at no cost to MSFC. ✓

2. DATA MANAGEMENT - The MSFC Documentation Survey resulted in 9,000 entries. This figure has been reduced, through repeated reviews by MSFC elements, to approximately 6,000 entries representing documents used by MSFC for Apollo management. This number will be further reduced by the current review, by Management Category, which will be completed August 17, 1964. Results will be incorporated in the preliminary Headquarters Apollo Documentation Index (NASA-wide documents used for Apollo Management) August 25, 1964. MSFC preliminary Center Apollo Documentation Index (NASA-wide and MSFC internal documents used for Apollo Management) will be available September 15, 1964. MSFC Data Management Manual will be available approximately August 26, 1964. ✓

MSFC Data Managers have not yet been officially designated; however, charters have been developed and are presently being coordinated. The Technical Documentation repository is being reviewed for procedural improvement - this repository is the MSFC control point for receipt and distribution of all technical documentation. MSFC has assisted KSC by processing their Apollo Documentation Survey results. ✓

NOTES 8-10-64 McCartney

B 8/15

1. COST VS OBLIGATION DATA: This office is developing information to permit more effective management of costs vs obligations for R&D Operations' Saturn Program contracts.

From the beginning of this fiscal year to contract expiration, cost/obligation data will be secured for each contract having an anticipated cost of \$500,000 or more. These data will allow running analysis of cost/obligation status and will aid in preventing excessive backlogging of obligations at the year's end. ✓

2. SOURCE EVALUATION BOARD, SINGLE-SUPPORT CONTRACTORS: On August 4 and 5, the Board finalized the Requests for Proposal (RFP) for the Technical Services Office and the Management Services Office, respectively; these RFP's are scheduled for release on August 15. The Board will meet August 10 to review the consolidated mission support requirements for the Aero-Astrodynamic Laboratory, with a tentative date of August 22 for issuance of the RFP. ✓

3. AUTOCLAVE FOR ME LABORATORY: R&D Operations has given approval for the release of a procurement plan for a 13-1/2' x 30' autoclave required by ME. The autoclave will be used in development of large honeycomb structures, particularly for Saturn V applications, and will be paid for with Saturn V funds. ✓
The autoclave will be located adjacent to ME's existing honeycomb facility. No additional auxiliary facilities will be required.

As far as is known, there are only two autoclaves of this size, or larger, in industry: one at the Rohr Corp., Riverside, California, and one at NAA, Tulsa; at both locations, the equipment is fully utilized. ✓

7w 8/10

Arthur R.

URGENT

B 8/15

NOTES 8/10/64 RUDOLPH

I'd like to talk to you about this scope of work, I have something to add, that I consider quite essential B

Bonnie
Preferably on Monday 17 AUG, B

1. Saturn V Systems Engineering Support - The Boeing proposal on the Saturn V Systems Engineering Support effort was received on Friday, July 31, 1964. The responsible laboratories and offices are expected to complete their evaluation of the proposal by August 14, 1964. Pre-negotiation meetings with the responsible laboratory or office, Michoud personnel and Industrial Operations are tentatively scheduled to be conducted August 12 through August 15, 1964. Contract negotiations with The Boeing Company are tentatively scheduled to begin on August 17, 1964.

2. Saturn V Operations Displays - The procurement plan for Saturn V operation displays was approved by Dr. Mueller with certain exceptions which will be incorporated if possible. The most controversial is the requirement for the inclusion of NPC-500-1, the Apollo Configuration Management Manual. This requirement is being evaluated and a response is required before RFQ can be issued. The Source Evaluation Board has convened and is currently working the problem associated with the submission of RFQ.

~~omit~~
omit from TWX
It would have been a miracle had this not happened! B

3. S-IC Stage Hydrostatic Testing - Hydrostatic testing of the "C" Test Fuel Tank started on August 4, 1964 and subsequently failed: While filling the tanks with water, an attempt was made to hold a constant ullage pressure. This pressure was exceeded and a decision was then made to release the pressure by draining water from the tank. As water was being drained from the tank, a negative pressure was created at the top of the tank causing a partial collapse of the top bulkhead. Representatives of MSFC and The Boeing Company are assessing the damage to the tank and its effects on the "C" tank test program.

4. S-IVB Stage:

S-IVB/V A.P.S. - A committee was formed on June 17, 1964 to survey industry to determine if existing expulsion systems were available that would satisfy the requirements of the S-IVB/V A.P.S. Expulsion systems were found that are being qualified, which will meet the requirements of the S-IVB/V stage A.P.S. A decision was reached August 6, 1964 to use the LEM oxidizer tank and teflon bladder as the S-IVB/V A.P.S. expulsion system.

~~omit~~
omit from TWX

S-IV-B
Quarterly Review - The Quarterly Review which had been scheduled for September 2 and 3, 1964, has been rescheduled to September 9 and 10, 1964.

108/110

B 8/15

NOTES 8-10-64 Stuhlinger

1. PROJECT PEGASUS: Present plans for the Pegasus Verification Board, established by Drs. Mueller and Bisplinghoff, are as follows:

- Herbert Wilson, Langley (Chairman)
- Alec Bond, MSC
- Dan Magure, GSFC
- Ernst Stuhlinger, MSFC

Our first meeting is planned for this week. ✓

2. ASSIGNMENT OF ALSS SCIENTIFIC MISSION RESPONSIBILITY: Col. Tom Evans, MSF, last week encouraged us to intensify our direct contacts and cooperation with Dr. Shoemaker's group in the United States Geological Survey (Flagstaff, Arizona) in connection with our ALSS scientific program planning. Several of my associates (Heller, Downey, Hale, Weber) and I will visit Dr. Shoemaker this week to discuss his "simulated lunar geological field investigations," and also latest Ranger results. Joe De Fries will join us in this visit. We were also informed that MSF plans to transfer the ALSS scientific mission responsibilities from Headquarters to us. ✓ Previously, this responsibility had been handled jointly by OSSA and OMSF. I am very pleased by this prospect because it indicates that RPL's effort during past years in lunar scientific mission planning has given Headquarters enough confidence to entrust us with this part of the program. ✓ In the past, MSFC had been directly responsible only for ALSS payloads less scientific equipment; however, Jim Downey's group has been vigorously supporting Headquarters' work in the scientific mission area for a considerable time. Our work will continue to be coordinated very closely with Joe De Fries.

3. SRT PROGRAM STATUS: The status of the portion of the FY-64 ART/SRT Program under the cognizance of RPL is, as of August 7, as follows:

	<u>ANNUAL PLAN</u>	<u>AUTHORIZED</u>	<u>PROCESSED TO FMO</u>	<u>OBLIGATED</u>	<u>CHANGE IN OBLIGATIONS SINCE 7/31/64</u>
OART	10,514,311	10,514,311	10,514,248	9,148,208	0
OMSF	14,133,000	14,133,000	14,010,959	13,506,722	0
OSSA	680,000	680,000	666,928	665,450	0
	<u>25,327,311</u>	<u>25,327,311</u>	<u>25,192,135</u>	<u>23,320,380</u>	<u>0</u>

4. PROSPECTS OF ELECTRIC PROPULSION: FPO asked RPL for a presentation on our present activities in electric propulsion development, and on our thoughts on the prospects of electric propulsion for unmanned and manned spacecraft. We are very happy to do this, and we would like to invite you and key personnel of the Center to this presentation. May we determine an opportune time with Bonnie?

E.S.
 My schedule is awfully crowded. Suggest you set it up with FPO on a date open on my calendar (Bonnie!) But don't cancel it should something interfere.
 Fine
 B

25% COTTON
ACID FREE

August 17, 1964

MADE



MADE

Send copy of
Fortune item 2 to
Fopworthy + Kent
Hauserman item 3
to Sanderson
Did so

DAW

NOTES 8/17/64
WITH COMMENTS

Mr. Newby's Copy

J-2 ENGINE

A 30-second test on Wednesday ended engine testing on altitude test stand VTS-3A until after test stand modification. Modernization of this test stand will start immediately with activation expected near the end of November 1964. ✓

An initial checkout firing on engine J003-2 was attempted August 8 with a GG overtemperature cutoff. Investigation revealed that the gas generator LOX poppet had not been installed. The fuel turbopump and exhaust ducting and gas generator control valve have been replaced and the engine is in final checkout prior to firing. ✓

The fuel turbopump test facility CTL III, Cell 45, has been repaired and is ready for operation. The facility suffered an explosion August 6, 1964. It has been determined that the burn-off stack igniter caused ignition of the propellants in the turbine area when the slave gas generator pyrotechnic igniter failed. ✓

RL10 ENGINE

Investigations into the high LOX seal cavity pressure on engine 1836 on S-IV-9 static firing indicate that the seal is in satisfactory condition. A flow check of the seal following the static firing was normal and agreed with previous flow checks on the seal at FRDC and at DAC. ✓

A total of 13 firings, totaling 558.2 seconds, has been completed on a completely integrated, pump-fed, fluorine/hydrogen RL10 engine in the RL10 fluorine demonstration program. ✓

F-1 ENGINE

Acceptance of test stand 1E with environmental capability is predicted for the last week in August. The approximate 1 month slippage was caused by late deliveries of materials. No impact is expected on the R&D program, since first environmental tests are not expected till early 1965. Engine F-021 is being installed to check out test stand 1C. ✓

H-1 ENGINE

It appears that the configuration selection of the improved performance injector will occur in early September 1964. Two types are currently being considered, the 5582 and the 5588. The basic difference between these two types and the current production configuration is: (1) decreased film coolant, (2) different orifice sizes and patterns and (3) thicker baffles. Both improved injectors provide the desired four second increase in specific impulse. ✓

Engines for S-I-10 are currently being retrofitted with new LOX domes and all are expected to be returned to MSFC two days ahead of schedule (August 29, 1964). ✓

B 8/25

NOTES 8-17-64 CLINE

1. PARTIAL ASPIRATOR TESTS SUCCESSFUL (SATURN I AND IB): Two partial aspirators were tested. On one, 17 tests were performed for 2,345 seconds total; 37 tests for 1,376 seconds total were run on the other one. The only damage noticed was a slight bulge at the center of each duct. No remedial action is considered necessary. ✓

2. S-IB STAGE MODEL SPECIFICATIONS: Information has been received from Industrial Operations that the implementation of a Chrysler Corporation mission support for specification preparation will not be enforced. Industrial Operations believes that the S-IB Stage Model Specifications are not required. No further action will be taken until the smoke clears and NPC 500-1 implementation plan has been accepted. ✓

3. S-II SPECIFICATIONS: A total of 114 North American Aviation (NAA) specification reviews were scheduled for conferences from 8-3-64 through 8-17-64. Forty-five of these specifications have been reviewed so far and dispositions concurred in by NAA and MSFC laboratory personnel. Twenty-two of these specifications were rescheduled due to expedient disposal and the absence of responsible NAA personnel. Nine of the scheduled NAA specifications were deleted due to being under revision within NAA. ✓

NOTES 8/17/64 CONSTAN

B 8/25

Negative Report

1. Flight Operations Meeting - was held under Gen. Phillips chairmanship at the Cape on 8-12-64. Among the highlights was a request for better documented mission rules for Saturn I flights. The group showed interest in the SA-5 onboard T.V., demonstrated on an actual T.V. screen and requested the Crew Safety Panel to look into the operational use for ground monitoring of critical systems such as engine compartment. ✓

2. S-II Qualification Program Meeting at Downey on 8-13/14-64. S&ID agreed after listening to an MSFC presentation that they would: (a) Revamp their Qualification and Reliability Program to conform to the definition presented by MSFC. (b) Incorporate the provisions of IN-P&VE-63-2 (vibration, shock and acoustic spec) in their specifications for their component qualification program. (c) Use or simulate the effect of bracketry on all component qualification testing. (d) Include random vibration level considerations in their qualification specifications. (e) Provide for all components of the stage a list indicating method of qualification (i. e., similarity, test qualified, with or without bracketry, etc.). ✓

3. Boeing Saturn V Systems Engineering and Integration Proposal After a R-SA presentation to R&D Operations on questionable points in the Boeing proposal, progress is being made with Industrial Operations in negotiating changes to the proposal. These discussions resulted in changes satisfactory to both R&D Operations and IO. ✓ One remaining section (6.0 Program Management Controls) requires an interpretation from MSFC management on the policy for utilizing contractor personnel in program management systems. ✓

4. Configuration Management - R&D Operations inputs to the S-II Interim CCSB are proceeding very well. It is hoped that this successful experience will form the pattern for the other configuration management requirements spelled out in N. P. C. 500-1. It is apparent that the specific N. P. C. 500-1 requirements will have to be modified to agree with the existing procedures and contractual requirements to minimize impact on the program. A detailed study of these requirements is underway in R&D Operations and will require considerable effort to determine the most orderly transition. ✓

5. GSE Hard- and Software Presentation - Mr. Fichtner's presentation is scheduled in the 10th Floor Conference Room on 9-9-64 at 9:00 a.m. ✓

NOTES 8/17/64 FORTUNE

B 8/25

1. Meeting With State Highway Department Officials: Wednesday, August 12, Tom Edwards and Jim Leslie from MTF Working Group, Joe Wardlaw, MDO Corps of Engineers, B. U. Jones and myself attended meeting with John Smith, Commissioner, Southern Region State Highways, his departmental engineers and Walter Phillips, Hancock County representative to the state legislature, in Hattiesburg to discuss proposed access roads to the fee area, schedules for improvement for existing roads and maintenance of both. It was agreed that NASA would provide government funds for a 24' wide, 7 miles long improved highway from our north gate to the I-59 interchange at Nicholson. Also we would provide two 24' lanes 2.2 miles in length from the south gate to I-10 interchange. These were in the FY-65 budget. The state agreed to proceed, when request is received from the Corps of Engineers, to engineer and construct these roads. They indicated they would maintain these for us, on contract, which NASA legal department advised can be done so long as we hold title. The state intends to four-lane Highway 90 from Bay St. Louis to the truck weighing scales thence to intersection on Highway 43, both jobs starting March 1965. It is their intention to four-lane from there to the I-10 interchange as soon as they can get additional money which is not anticipated until July 1966. We offered to brief the governor on our road plans and enlist his support to include this support when he calls a special session of the legislature next month. Edwards will keep members of the Planning Board in Huntsville advised of progress.

2. Picayune Airport: Thursday, Jim Sanders, Architect-Engineer, showed us proposed plans for a new 6,000' runway to be built in the north-west corner of our buffer zone with buildings to be built just outside. Reduced cost in acquisition and high, firm, unobstructive land dictated use of that section. He will submit letter to MSFC requesting approval of this and if possible some projections of anticipated air cargo and passenger needs. Jim Leslie will coordinate Planning Board reply after touching base with Bill Morrow in Transportation.

3. Greater New Orleans Chamber of Commerce Personnel Visit: Mr. Jos. Simons, Jr., Executive Vice President, Walter B. Hoover, Public Relations Director, C. B. Raborn, member (Adm. Red Raborn's brother) came over to see the test site as guests of Bill Eaton. Apparently, to correct memory of several weeks ago when a completely erroneous presentation of GE management role at MTF was given to the Greater New Orleans C of C, Eaton brought them over to my office for a briefing and accompanied us when Dusty Rhodes and I showed them around the building sites.

Dave Newby
let's encourage this project without assuming a legal liability
B

B 8/25

1. Joint Operations Meeting: A Joint Operations Meeting under Gen. Phillips was held on 8/12 at KSC. (1) MSF presented their plans for Saturn V vehicle readiness assessment which will include as a new element a Program Director's Review before the vehicle leaves the VAB. MSF is working on standard criteria for these assessments to be issued to the Centers soon. Gen. Phillips pointed out that the Operations Director will assume control of the scheduling of all launch preparations at a relatively early time. (2) The implementation of the MSFC requested Radar station (FPQ-6) on Bermuda is proceeding satisfactorily. (3) Mission rules for launching are required for all Saturn flights starting with SA-7. (Note: R&DO needs to establish procedures to generate MSFC's input to KSC) (4) An Ad hoc group representing four panels will investigate the RF communication problems due to folding back of the LEM adapter panels after CSM separation. (5) Kraft (MSC) made a strong request for unified S-band capability on Canary Island. This station is of importance for first orbit and orbits 11, 12, 13 (northern azimuth) cost: 8 million dollars. No decision was made.
2. S-IV Step Mixture Ratio: The procedure for implementing the mixture ratio step in the S-IVB stage of Saturn IB must be known to the guidance scheme. Presently, Douglas Aircraft Corporation, is considering offloading rich in lox so that the PU system commands the lox valve hard open until a balance is reached. It is necessary that the guidance computer know that the step mixture ratio has been accomplished within certain tolerances, since it will not occur at a fixed time. A meeting has been set up with Douglas near the end of August to answer this and similar questions.
3. MOLAB: (a) An attempt is being made to fund the MOLAB cabin separately and under Apollo due to its triple use potential (lunar surface, lunar orbit w/CM-SM, and earth orbit w/CM-SM). (b) As a result of trying to balance the books after the 2 billion addition to the Apollo program and retain a selling point for MOLAB, as suggested by Bill Taylor's office, we have reduced, on paper, the MOLAB development cost from our original 382.1M\$ to 251.1 M\$. ✓
4. Saturn IB/Centaur: Mr. Fero, OMSF, called August 14, and asked that we give a presentation on the Saturn IB/Centaur based on SA 206 firing date to Dr. Mueller and Dr. Seamans during their visit here on the week of August 24th. E. Z. Gray will give the objectives portion of the presentation. We are presently preparing the presentation and will check it with E. Z. Gray before delivery. The project proposal was submitted by OMSF to Dr. Seamans on August 7th. All reference to Surveyor was taken out by E. Z. Gray's people. ✓

Jack
Balsh
Part
of
RFQ
to
KSC!
B

is this
near
Monday
the
14th
week?
B

1. S-I-9 POST-STATIC CHECKOUT: Engine reinstallation on the S-I-9 stage was completed August 12, 1964. Mechanical systems reverification was performed August 13-14, 1964, and measurements systems reverification is scheduled to begin today. ✓
2. S-IU-9 INSTRUMENT UNIT CHECKOUT: Networks Functional Test has been satisfactorily completed on the S-IU-9 Instrument Unit using test procedures in the ATOLL (Acceptance, Test, or Launch Language) format. The ATOLL system, which permits operation at fixed intervals or at maximum operational speed, has demonstrated that it is a powerful aid in locating errors in the stage or GSE. The Laboratory considers the ATOLL System for the Saturn I Instrument Unit a significant step toward a single, flexible test and checkout language, giving greater confidence in Automatic Checkout. ✓
3. S-IC-T LOX TANK HYDROSTATIC TEST: The S-IC-T Lox tank was hydrostatically pressurized to 60 psig on the upper bulkhead and held for three (3) minutes. Several leaks were noted and defect reports were issued against the same. ✓
4. S-IVB INTERMEDIATE RELIABILITY PROGRAM PLAN (IRPP): A meeting was held August 6-7, 1964, to coordinate the S-IVB IRPP with Douglas Aircraft Company. It was agreed that the IRPP would be implemented by change order, and that changes would be included in the formal Reliability Program Plan. The formal Reliability Program Plan is to be submitted to MSFC 60 days after the implementation of the IRPP. The change order to implement the IRPP is being prepared by the S-IVB Project Office. ✓
5. DAC (SANTA MONICA) PRODUCT SURVEY: A product survey has been conducted during the past few months at DAC on the S-IV inverter/converter. The survey team consisted of one (1) member each from this Laboratory, from DAC and from Air Force Quality at DAC. The purpose of the survey was to determine the sources of the many discrepancies reported against this item, and at the same time, indicate to DAC the advantages of a company effort of this type. Significant findings were as follows: 13 procedural and reporting discrepancies resulting in 15 action items, 1 suggested design change, and 1 recommendation for change to test methods. ✓
6. MSFC PARTS PROGRAM: Representatives of Propulsion and Vehicle Engineering, Astrionics and this Laboratory met to prepare a presentation on the MSFC Parts Program. This presentation will be made to the AD HOC Group for Preferred Electronic Parts, chaired by Dr. Lange, August 20, 1964. It covers the objectives of the MSFC Parts Program, the responsibilities, the recommended organization for accomplishing these responsibilities and an estimate of the manpower required to do the job. ✓

D.F.

think
Brooks
Moore still
thinks it is
adequate
for guidance
checkout

B

NOTES 8-17-64 GRUENE

B_{8/25}

SA-7 Status

The Sequence Malfunction Test was satisfactorily performed on Thursday, August 13. The spacecraft's Launch Escape System has been installed and checked out and preparations for the All Systems Overall Test, scheduled this week, are in progress. Due to Range interference, this test will be attempted one day before the published schedule date. ✓

B 8/25

1. SATURN I SYSTEMS DEVELOPMENT BREADBOARD FACILITY OPERATIONS ON SA-7 PROGRAMING: The debugging and qualifying of the Subroutines, and Monitoring and Control (MAC) Programs for SA-7 qualified a list of procedures in the Breadboard Facility.

- a. Flight Computer Pre-Installation and Installation Procedure
- b. Computer Systems Launch Pad Manual and Automatic Test Procedure
- c. Computer System DDAS and Telemetry Test Procedure
- d. Computer System, ST-124 and Control Computer Test Procedure
- e. Computer System and Digital Command System Test Procedure
- f. Computer Overall Test and Simulated Flight Test Procedure
- g. Computer System Launch Procedure

The above procedures covered both manual and automatic mode of operation.

On 7/27/64 LVO requested that we make 21 significant changes to the subroutines such as propellant loading, simulated flight and flight sequencer timing control, etc. ✓

2. HONEYWELL GYROS: Honeywell has delivered the first of the two gyros under contract NAS8-5386 (OART funded). These are AB5 size gyros with closed gas cycle suspension. We have decided, based upon manpower and facilities availability, to extend contract NAS8-5386 to include test and evaluation of the gyros. The extension will require approximately \$34,000 and a period of six months. ✓

3. POLICY CLARIFICATION REGARDING HIRING OF ALIEN SCIENTISTS: About 1 1/2 years ago you met Mr. Martin, an electronic engineer, from Germany; later he and his wife applied for employment in R-ASTR. Both are, in my opinion, highly qualified. Hiring was requested thru NASA Headquarters and Mr. and Mrs. Martin were informed of the procedure. Also, both were contacted last year by Mr. Kroeger, who got an excellent impression. No action has ever been taken by NASA Headquarters because it is believed that we can find applicants here; neither do we find any nor can a decision be obtained from NASA Headquarters. I feel obligated to several applicants who had been given hope for employment and are now left stranded. (Mr. Martin called me by phone from Germany last week!) Could any clear attitude be obtained from NASA, in particular from Dr. Dryden who created this status of uncertainty?

Frank L.
Please see me →
on this
B

NOTES 8/17/64 HEIMBURG

B8/25

1. S-1 STAGE:

All eight engines of S-1-10 have been removed and shipped to Neosho. The first four engines are scheduled for return from Neosho on 8/19 and 8/21. A loading test is scheduled for 8/18. ✓

Reference NOTES 8/10/64 HEIMBURG (copy attached). Under S-1 Stage, in the second paragraph, the third sentence should read as follows: The pump adapter flanges will be reworked as required at Neosho. ✓

2. F-1 ENGINE:

Test TWF-032 was conducted at the Static Test Tower West Facility, 8/11, with F-1 engine 1002, for a mainstage duration of 126.30 seconds. The main purpose of the test was to simulate flight lox pump inlet pressures for 80 sec. of the test. The engine operated satisfactorily. The next test will be conducted Tuesday, 8/25/64. ✓

4. MARINE TRANSPORTATION:

On 8/11, NASA Headquarters personnel from -BL and OMSF were briefed on the canal and barging concepts for MTF. ✓

5. MTF WORKING GROUP:

Representatives of the MTF Working Group and Capt. W. C. Fortune met with officials of the Mississippi State Highway Department on 8/12. The conference concerned external access roads to the MTF Fee Area. Agreement was reached concerning the access roads to be planned for construction by NASA and to be planned for construction by the State of Mississippi.

NOTES 8/10/64 HEIMBURG

1. S-1 STAGE:

All eight engines of S-1-10 have been removed from the stage and prepared for shipment to Neosho. Six of these engines have been shipped and the remaining two will be shipped today, 8/10.

During removal of the wraparound lines galling occurred on the lox pump inlet adapters on engine H-2026 and H02034R, positions No. 6 and 5, respectively. Improperly manufactured screens, installed at Michoud for the lox loading test, caused the galling by forcing the conical screen ring too far into the pump inlet adapter thereby widening the protruding adapter lip. The damaged wraparound lines will be replaced while the engines are at Neosho. Properly manufactured screens will be installed in the stage by Chrysler. Error

Mechanical, electrical, and instrumentation hookup was accomplished and partial electrical checkout was started. Holding fixtures for the wraparound lines were installed in preparation for the first loading test.

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

Reference NOTES 8/3/64 HEIMBURG (copy attached). Test TWF-030 (7/30) was cut off when a minor orifice change in the GG lox system resulted in pump outlets exceeding the redlines. Closer examination of the GG lox orifice revealed that the entrance leading edge was slightly rounded. A new orifice was installed and test TWF-031 was run Tuesday, 8/4, for 16.07 seconds mainstage. It is concluded that these discrepancies caused the high performance on test TWF-023 and TWF-030. Test TWF-032 will be run Tuesday, 8/11, for a full duration.

3. INCIDENT AT SOUND SUPPRESSION STAND:

On Thursday, 8/6, an old Redstone hydrogen peroxide tank, which was being used as an H-1 turbopump flush reservoir, ruptured. The tank was being operated at 750 p.s.i. (design working pressure of 800 p.s.i.). The tank had been previously hydro tested at 1200 p.s.i. There were no injuries and damage to the stand was minor (fiberglass GN₂ spheres shredded by shrapnel and control lines cut). This damage has been repaired and the stand is back in operation. Dr. Lucas' people are presently looking at the tank parts to determine the cause of failure. Indications are that the tank had fatigued after numerous pressurization cycles. We are presently checking into use of old missile hardware on our other test stands and consideration will be given to the use of ASME approved tanks for these applications.

ATTACHMENT: NOTES 8/3/64 HEIMBURG (attached to Dr. von Braun's copy only)

1. MSFC DATA CENTER: On Thursday, August 13, the MSFC Data Center technical briefing was presented to the Apollo Documentation Ad Hoc Committee, committee chairman, Mr. R. L. Goldston. The purpose of the briefing was twofold: (1) to acquaint committee members with the operation of the Data Center, including data elements planned to be included in the master files inputs and outputs of systems and (2) to determine if the MSFC Data Center could be of assistance in the operation of MSFC's Document Repository. The Committee's response to the briefing was enthusiastic, and it appeared to be the consensus of the group that the Data Center would definitely assist the MSFC Document Repository operation. Discussion included the possibility of installing a remote inquiry station in the Repository that would be linked to the Data Center computer. ✓

2. ATTENDANCE AT UAIDE MEETING: Mr. Lamar Bannister of Data Reduction Branch attended the annual meeting of UAIDE, Users Association for Information Display Equipment, San Diego, California. At this meeting Mr. Bannister showed a film produced on the SC-4020 microfilm printer-plotter. The film shows graphically, in motion picture action, the Earth-Moon-Satellite trajectory transfer scheme worked out by Dr. Arenstorf of Computation Laboratory, and is available for showing to interested parties.

3. EAM HARDWARE REMOVAL: The EAM operation located in Building 4471, consisting of six machines with a monthly rental of \$1900 per month, is being eliminated effective August 31, 1964. The workload on this equipment is being transferred to the centralized EAM operation in Building 4491 without any additional equipment. ✓

4. LEASE VERSUS PURCHASE OF COMPUTING EQUIPMENT: The discussions with regard to lease versus purchase within NASA, and more specifically Marshall Space Flight Center, have been in progress some six months at the present time. Several submissions have been made to NASA Headquarters with regard to what should be leased and what should be purchased by the Computation Laboratory. The Laboratory continues to take the stand that purchasing a major portion of computation equipment at this particular time would not be in the best interest of MSFC from the standpoint of economy nor equipment to satisfy Marshall's needs. In July a submission was made to NASA Headquarters stating those items that Marshall could purchase and additional information was requested to be submitted not later than August 13, 1964. The last submission included a maximum purchase and a minimum purchase and again it related MSFC's stand. Probably, the final answer for Marshall should be out sometime in September as to funds allocated for purchase. ✓

H.H.
Please advise me when you are ready for a demonstration
B

B 8/25

SA-7: The All Systems overall test is scheduled for August 19. Installation of non-propulsive vent on S-IV Stage is proceeding on schedule. SA-7 Pre-launch Review originally scheduled for September 2 will be rescheduled at a later date. A memo will be published when the date is established. ✓

S-I-9: Engine reinstallation was completed on August 12, 4 days earlier than scheduled. Post static checkout was resumed on August 13. ✓

S-IV-9: Analysis of the acceptance firing on August 6 indicates no problems serious enough to warrant another firing. The common bulkhead inspection revealed 2 cracks on the LH₂ side which have been ground out and on which a doubler will be bonded. The LOX side has 3 cracks, one of which leaks and will be plugged. Bonding is scheduled to start today and requires 72 hour cure cycle. All possible modification work and checkout operations are being accomplished during this period. The off-stand date has slipped to August 29. Every effort is being made to meet the September 17 shipping date, however this date is becoming extremely tight.

PEGASUS: Reference your comments to Dr. Haeussermann's notes of August 3. All activities performed by ASTR and all of R&DO in support of the project are well coordinated with the project office. The items identified in referenced notes were the result of a detailed review to considerable depth held after Fairchild continued to experience trouble in subsystem testing. More specific comments to each item mentioned: a. Wire Harness - ASTR is now re-evaluating the present harness. It appears that the number and size of conductors, and number of shielded conductors, can be reduced. ASTR study is to be complete today; b. Power Profile - A measured profile will be made by Fairchild to support those calculated; c. Power System Test Box - Fairchild has been requested to redesign the power system test box to incorporate the 2 meters and rotary switches; d. Power Distribution Unit - This was redesigned by ASTR to eliminate transients, provide more efficiency, and reduce power required. The old unit was a source of trouble in subsystem testing at Fairchild. ✓

PEGASUS SCHEDULE: The thermal-vacuum test on the prototype canister cannot start at Bladensburg until approximately August 24, which is 2 weeks late on the master schedule. This does not effect delivery date of Pegasus A to the Cape. ✓

S-IVB BATTLESHIP AND ALL SYSTEMS: Start of chilldown testing has slipped to week of September 21 and the first short duration firing has slipped to November 5. Immediate impact of this slippage resulted in a decision to continue battleship testing beyond original January 1, 1965, date to the middle of March, 1965. ✓ This will provide time for problems expected in activating the new facility and for additional chilldown testing. All Systems Stage test program is being revised to show a late delivery to SACTO and to provide only propellant loading test prior to removing the stage to permit the first flight stage to enter Beta 3 stand on schedule. This propellant loading test is considered a prerequisite to hot firing the first flight stage. The above mentioned schedule readjustments are not expected to cause a delay in the scheduled testing of S-IVB for 201. A meeting is scheduled with DAC on August 18-19 to resolve the impact of mandatory changes on S-IVB first flight stage to attempt to prevent any delay caused by additional change orders. ✓

NOTES 8/3/64 HAEUSSERMANN

B 2/4

1. MMC DATA AND POWER SYSTEMS: Personnel from the Electrical Systems Integration Division (R-ASTR-E) visited Fairchild to review the design and testing of the Micrometeoroid Measurement Capsule (MMC) data and power systems. A considerable number of problems were uncovered during this review and the following action is deemed necessary to correct these problems:

- a. Reduce size and complexity of wire harness wherever possible.
- b. Study entire capsule electrical load profile to determine if primary power supply modifications are required.
- c. Redesign power system test box to add two meters and use rotary switches in lieu of phone plugs.
- d. The power supply group of R-ASTR-E is designing and breadboarding a data power distribution system which will use two regulators. One will power the +50V, +6V and -6V converter. The other will power the earth aspect sensor. The converters frequency will be higher than the Fairchild design thereby reducing toroid size. More compact filter capacitors will be used where possible. This will allow packaging in a smaller box, or at least allow the addition of a regulator within the same box which should result in greater efficiency and increase the capability of handling the earth aspect sensor step load without affecting the converter loads. ✓

2. IBM IU CONTRACT SCOPE OF WORK: The modification to the scope Dr. McCall discussed with you last week to cover Type B support requirements has been reviewed with I.O. and definitized for inclusion in their contract negotiations taking place this week. The manner in which this change will be implemented is to be established during the negotiations. Details should be finalized this week and will be described in my 8/10 Notes. ✓

Lee James
I hope you are aware of this. Your comments on next NOTES are invited
B

XERO COPY

XERO COPY

XERO COPY

38/25

1. SENATE RECOMMENDATIONS: It is noteworthy to point out that the Senate in its Appropriations Bill (H.R. 11296, Calendar No. 1206, Report No. 1269, page 19) made only three recommendations to NASA. All of them are of interest to MSFC.

a. NASA is urged to strengthen its aeronautical research programs. "The committee does not believe that, in the brief 60-year history of aviation, all the problems of safety, economics, and technology have been solved." I take this as an encouragement not to drop considerations of boost-glide systems for global transport. ✓

b. NASA and DOD should work very close in the area of integration of the national space booster program. ✓

c. "The committee wishes to encourage NASA to continue and improve their work on methods of recovery of the booster portions of the various types of space vehicles and feels that such efforts could lead to great potential savings in the space program." This should help our efforts on the reusable orbital transport. ✓

B #125

NOTES 8-17-64 KUERS

1. Saturn I, SA-9: Reinstallation of all eight engines, after exchange of LOX domes, was completed on August 14, four days ahead of schedule. ✓

2. Saturn V, S-IC-T: Hydrostatic test of the LOX tank was completed on August 9. The leading bottleneck for -T is still the tail structure assembly. Hardware shortage caused by CAM's will shift considerable work over the horizontal position after tank assembly. Total E.O.'s received stands now at 32,368, not including major changes of 238 CAM's. ✓

NOTES 8-17-64 LANGE

B 8725

1. POGO ANALYSIS: Your request in comments to 8-3-64 notes. Test requirements have been placed for the H-1, F-1 and J-2 engine systems. In all cases, the main objective is to determine the engine inlet compressibility caused by vapor generation upstream of the pump inducers and its effect on the propellant line resonant frequencies.

a. F-1 ENGINE: Test planned at MSFC F-1 turbopump facility. Line resonant frequencies to be measured by pulsing the flow rate in the propellant line. This will be done by a pulser which changes downstream of the pump the propellant bleed off for frequencies 0-15 cps and for 0-5% of the total flow. (See attached sketch which is somewhat typical for the experiments on all three engines). ✓

b. H-1 ENGINE: Tests will be performed on the reactivated H-1 bobtail engine facility. They are similar to those on the F-1 facility except that vehicle simulation is closer. Detailed measurement program agreed upon. ✓

c. J-2 ENGINE: A requirement has been placed on Rocketdyne to give MSFC a rough order magnitude proposal for J-2 testing. (Sketch attached). I have not had time to establish the complete facts on this MSFC contractor interface. It is, hopefully, better than in the S-IVB/S-II Pogostick participation by S&ID and DAC. A detailed status on all aspects of the Pogo stick analysis and intended tests will be available to you on September 8. ✓

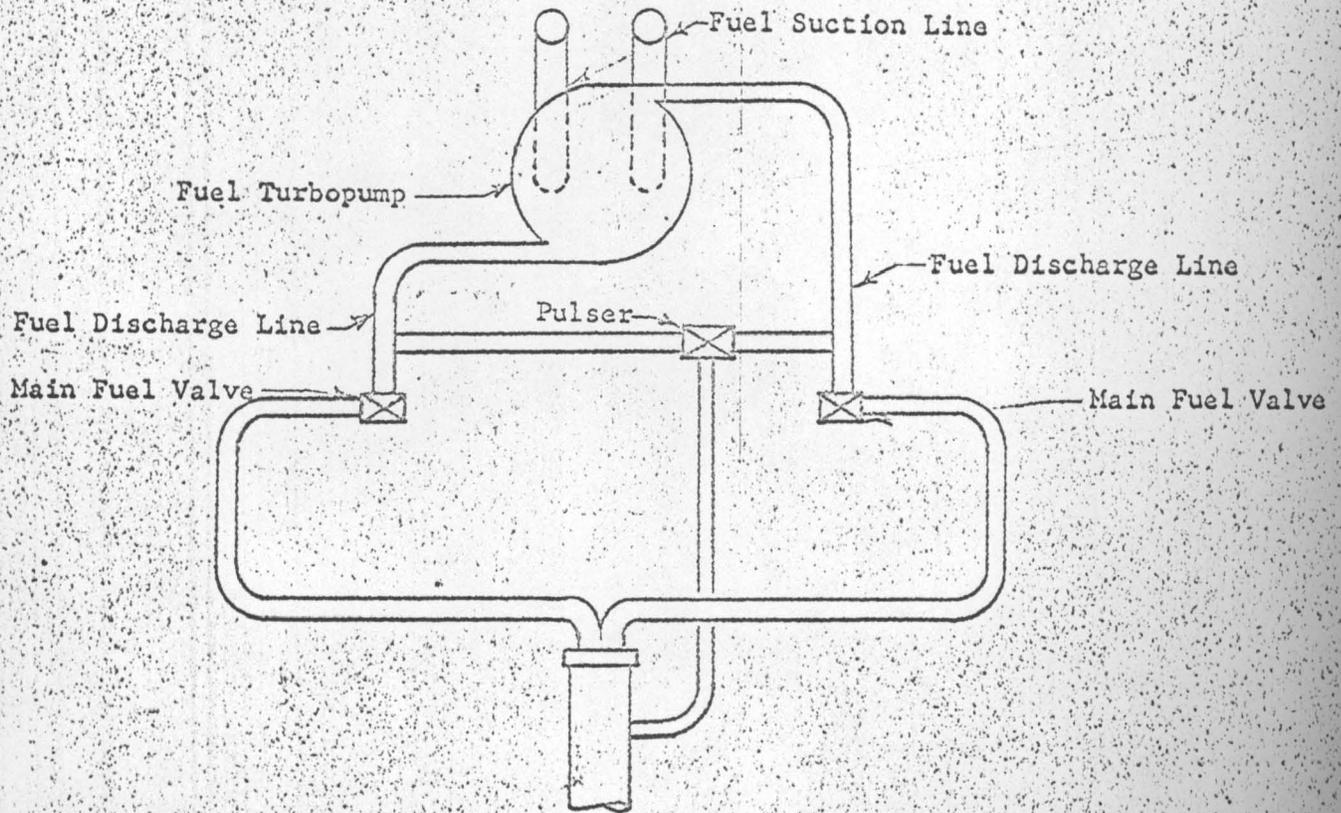
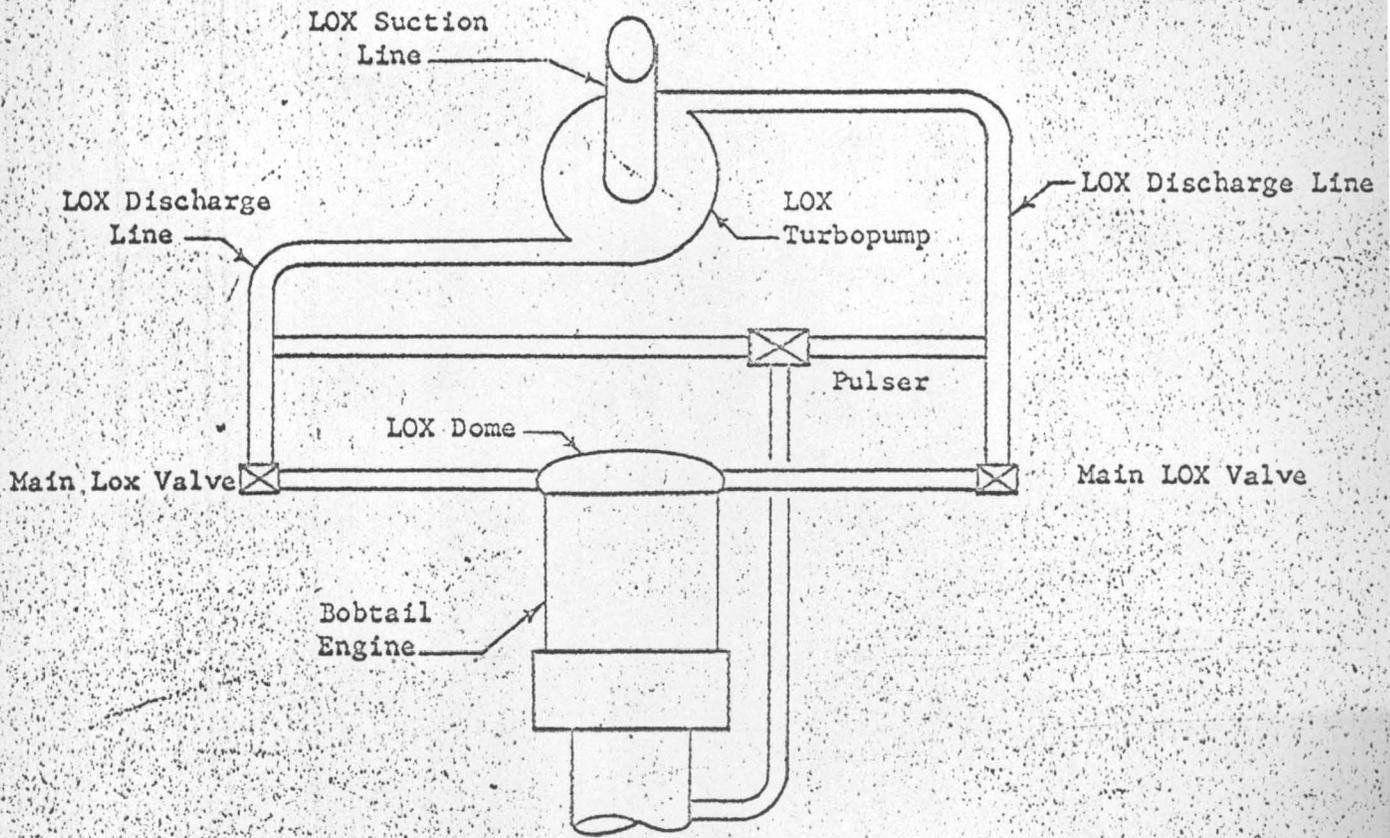
5. TECHNOLOGY UTILIZATION: The University of Alabama has submitted a draft of proposal for a state utilization and dissemination program. They share with Auburn this way: UA will perform the information retrieval phase and both will 50/50 perform in the dissemination and applications engineering phases. ✓

The activity will be centralized at Tuscaloosa. Funding will be from NASA Headquarters (Dr. Simpson) and the Alabama State Planning and Industrial Board (Leonard Beard). ✓

Presently Mr. Wiggins' office works on 1,300 contracts which have the Technology Utilization clause incorporated. ✓

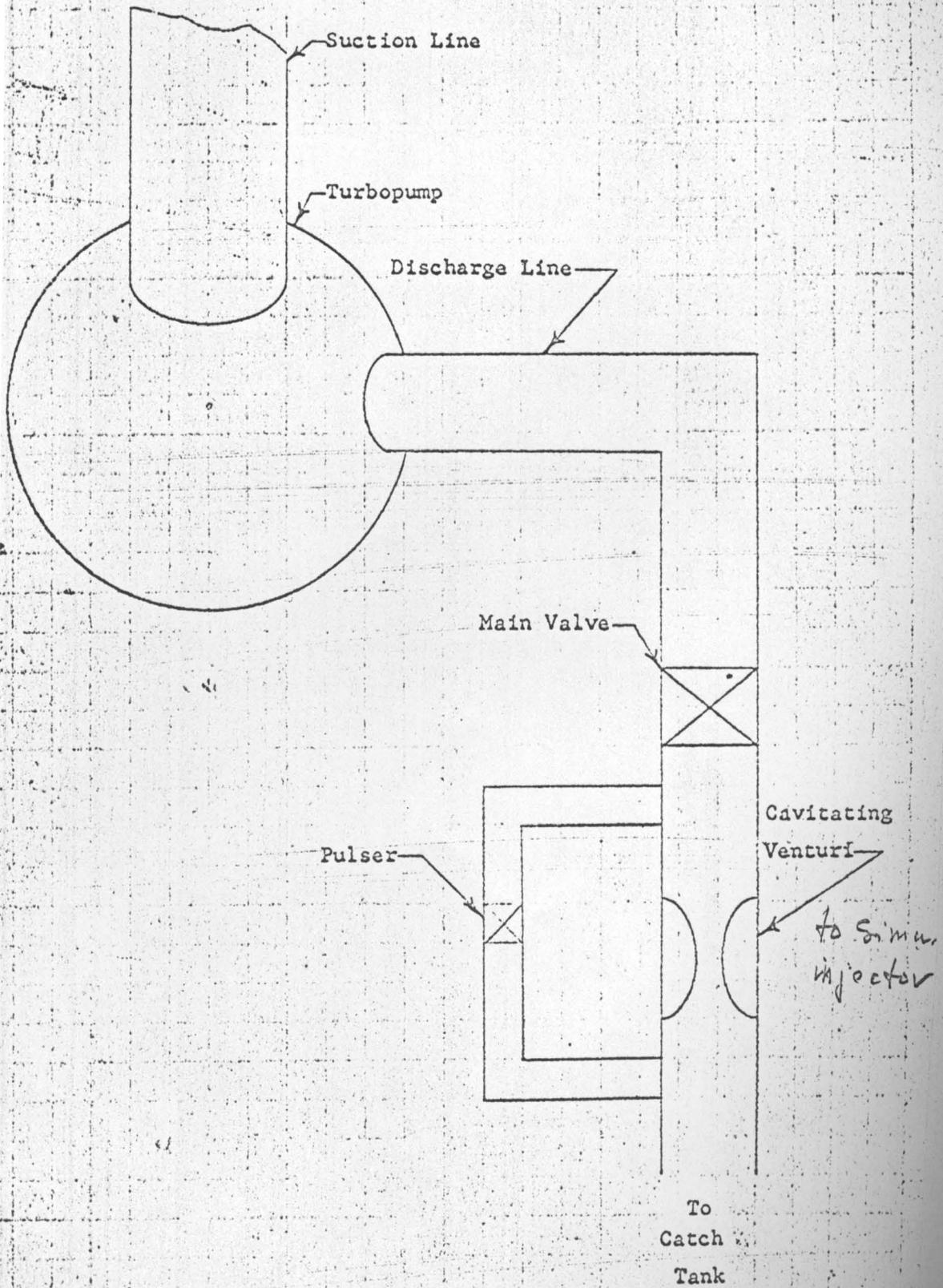
Bonnie
see note
in my
sketch
B
This will
be a
written
report
from Lange.

F-1 *



J-2

*



B 8/25

1. SEAMANS-MUELLER VISIT - We are preparing for the visit of Dr. Seamans and Dr. Mueller on August 25 and 26. Briefing guidelines have been distributed for all participants at MSFC, Michoud, and MTO. A dry run is set for Monday morning, August 24. The party of eight will arrive Monday evening. They have requested a social event for Tuesday evening to hash over the MSFC briefings. Ray Kline is making final arrangements with Paul Cotton. ✓
2. ENGINEERING TECHNOLOGY SATELLITE - OART has obtained Dr. Seamans' approval for a New Start, an Engineering Technology Satellite, to begin in FY66. It will consist of a number of experiments for advancing state-of-the-art in fields of prime interest to the Space Program, examples: advanced horizon scanning experiments, animal experiments zero "g" LH₂ experiments.

This project was included at \$4.3M in MSFC's funding guidelines from OART for POP 64-3; this tentative assignment to MSFC keeps the money out of the Headquarters reserve fund which is more vulnerable to budget cuts. Project Management responsibility has not been officially assigned; OART will request proposals from the NASA Centers, including MSFC.
3. SATURN IB-TITAN III C COMPARISON STUDY - NASA has reached a firm agreement with DOD and AF on this study which is expected to be finished by Sept. 1. We have now received certain data which had been requested from the Air Force, and will make maximum use of this information in the short time remaining. ✓
4. BUREAU OF BUDGET - Representatives of Bureau of Budget recently made a visit to KSC and I have been alerted by NASA headquarters that they will probably come to Marshall in early September. Although this visit does not have the urgency of such other exercises as the Saturn IB-Titan III C Comparison and the Apollo Assessment, it is very important and must receive careful attention. We will issue a memo shortly to furnish guidelines for preliminary preparations, and to alert the people primarily concerned. ✓
5. NEW NASA EXECUTIVE OFFICER - Col. Lawrence Vogel, who is Rip Young's replacement as Executive Officer to Mr. Webb, was here on August 14 for tours and briefings. Ray Kline served as Project Officer. ✓

Killy Wazek
FYI
B

1. PREPROPOSAL CONFERENCE, SINGLE SUPPORT CONTRACT FOR TEST LABORATORY: A Preproposal Conference was held in the Auditorium, Building 4200, August 13, with representatives from all industries interested in bidding on the Test Laboratory Support Contract. The Request for Proposal was discussed in detail by Division Chiefs of the Test Laboratory. The conference attracted approximately 70 interested personnel, representing some 25 industrial firms from all over the United States. This is an indication of the intense interest shown and will probably generate a large number of responses for consideration by the Source Evaluation Board. ✓

2. WAREHOUSE AREA 7200: Mr. Huth recently informed us of an Army complaint regarding appearance in outside storage at Warehouse Area 7200, leased from the Army (Army Igloo Area off Redstone Road). In response to Mr. Huth's request for improvement, action has been taken by concerned laboratories to correct this condition. Storage of material in Warehouse Area 7200 is required as backup support to available shop supply facilities present in each laboratory. ✓

3. R&D OPERATIONS FY-65 PROGRAM: The following table compares the planned submission of Procurement Requests for the 1st Quarter of FY-65, versus actual submittals for the month of July. Future Projects is not included in the following table because no FY-65 Program Authority was received for 1st Quarter and none was planned for this Quarter. FY-64 effort is still being carried over.

<u>ORGANIZATION</u>	<u>PLANNED 1st QTR. INITIATION</u>	<u>JULY 1964 INITIATIONS</u>	<u>PERCENT OF INITIATIONS</u>
RP	\$ 4,620	\$ 2,245	49%
ME	16,998	6,885	41%
ASTR	28,933	8,206	28%
P&VE	33,647	8,372	25%
QUAL	7,051	2,745	39%
COMP	4,521	2,534	56%
AERO	5,040	1,670	33%
TEST	<u>18,549</u>	<u>8,630</u>	<u>47%</u>
TOTAL	\$119,359	\$41,287	35%

B 8/25

NOTES 8/17/64 RUDOLPH

1. Apollo Instrumentation Aircraft - Reference Dr. Geissler's notes to you on July 27, 1964. We have received information from Capt. Holcomb's office, (Apollo Flight Operations), that reviews of the trade-off studies which have been conducted on alternate methods of providing coverage for telemetry record and voice relay during injection burn have been made and a report submitted to Dr. Mueller. The reviews conclude that instrumentation aircraft is the optimum means of supporting the telemetry and voice coverage requirement. Dr. Mueller supported the requirement. ✓ The findings and recommendations were presented at the AA Program Review of August 5, 1964. A go-ahead for twelve C-135 aircraft was received. ✓

2. S-IC Stage:

Strap-on Study Program - The Boeing Company will make a status presentation on the Minuteman Strap-on Study Program on Tuesday, August 18, 1964. This study authorized Boeing to make a preliminary design of an S-IC thrust augmentation system utilizing a maximum of four Minuteman solid propellant motors. ✓

S-IC-T - Hydrostatic testing of the S-IC-T LOX Tank has been completed. Removal of the S-IC-T Fuel Tank suction fittings in preparation for the bolt-on fittings is progressing satisfactorily with all fittings expected to be installed by August 22, 1964. ✓

3. S-II-S Common Bulkhead Status - The Common Bulkhead has completed and passed Ultrasonic inspection. ✓✓

4. Instrument Unit (S-IU-200V) Test Schedule - Cannot be maintained because of late documentation and the requirement to "beef-up" the IU structure. Action is being taken to determine the earliest possible schedule for this test program but it now appears that S-IU-200V testing will be delayed about two months. ✓

5. Vehicle GSE:

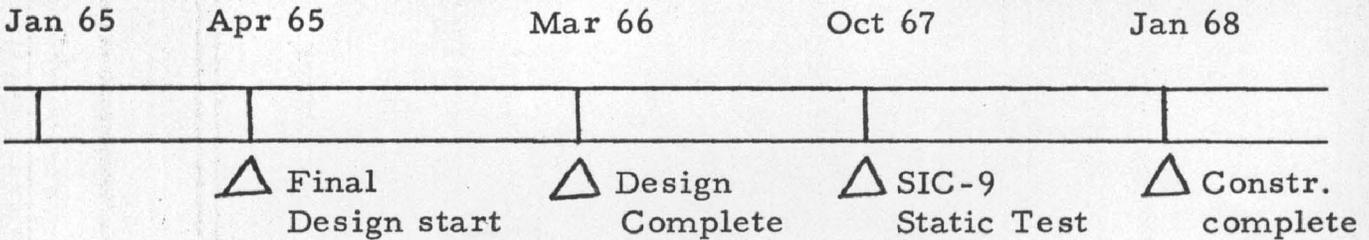
G. E. Design Mission - A pre-negotiation conference on the G. E. design mission contract was held on August 11, 1964. Messrs. Linn, Underwood, and Keuch from NASA Headquarters were present. Actual negotiations will probably take place within three weeks. ✓

B 8/25-

NOTES 8-17-64-SHEPHERD

Sound Suppressors - MTF: (Reference attached NOTES 7-27-64)

The sound suppressors are still carried as a FY-65 CofF budget line item. Of the items at MTF they are the most uncertain and, therefore, serve as a source for the 5% cut. During the meeting of May 1, in which you participated, it was decided that the sound suppressor studies and development program would be continued but that prior to final design go-ahead a critical review would be made of the need to continue the effort. In any event, sound suppressors will become available at MTF very late in the present program. This is based on the following schedule:



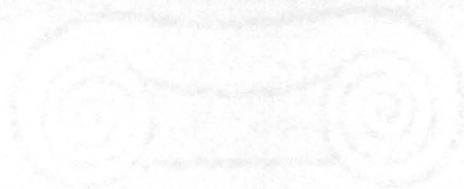
Foundation modifications have been made that will permit the installation of sound suppressors at a later date. Any modifications to the superstructure required for sound suppressors will be made at the time that sound suppressors are installed. Dr. Mueller is not convinced that sound suppressors are necessary or workable and, therefore, prior to final design start it will be necessary to convince him of the necessity and practicality of the sound suppressors.

✓ → 2

B 8/25

1. Lunar Scientific Mission: Several members of MSFC visited Dr. Shoemaker (United States Geological Survey, Flagstaff) and Dr. Kuiper (University of Arizona, Tucson) last week to discuss the Ranger pictures and the ALSS mission. Bonnie is scheduling a short presentation to you. ✓
2. ALSS Mission Report: The preliminary 300-page report "Experiments and Instruments for Scientific Investigation of the Moon, ALSS" was completed by RPL. It is now being informally reviewed by Don Beattie, OMSF. ✓
3. Bendix Study of ALSS Mission: The Scientific Mission Support Study of the ALSS has been awarded to Bendix. Supervision of the contract is being transferred from Headquarters to RPL. ✓
4. Project Pegasus: Members of RPL and of I-1/1B-P participated in a meeting at KSFC together with FSC and GSFC to plan retrieval, analysis, and evaluation of Pegasus data. ✓
5. SI Units: Dr. Dryden has decided not to make a formal NASA policy announcement at present on SI Units but has approved distribution of Dr. Mechtly's SI Units paper to NASA Centers and to contractors. ✓
6. OMSF-SRT Program: Ed Gray's Office advised us informally this week that 13 of 28 FY 65-OMSF tasks, amounting to \$9.86M, had been approved, but that the other 15 tasks are doubtful. The \$10M funding involved may be transferred to development projects. Dr. Rees is being briefed on this matter for the Council Meeting. I plan to discuss the matter this week with Ed Gray. ✓
7. FY 65-OART Research Program: A total of \$2.120M has been committed so far. Coordination with the laboratories in processing priority procurement requests is being continued. ✓

E.S.
 but Dr. Speer also quite active in this area. Is Gene Mechtly's work coordinated?
 B



ELITE

25% COTTON

ACID FREE

August 24, 1964

McCartney
Hausserman
Fortune
notes removed

~~add to~~
Gallian
Lambson
Shepherd (2)

PAW

NOTES 8/24/64
WITH COMMENTS

Mr. Newby's Copy

7/24

B 8/21

*fw F-1 ENGINE

During this report period, water blow-down tests were performed on test stand 1C to assure readiness of propellant feed lines. Construction is complete on test stand 1C and it is ready for checkout firing late in August. Work is proceeding satisfactorily on environmental capability on test stand 1E. ✓

*fw H-1 ENGINE

All S-I-10 engines have been retrofitted with new LOX domes and static tested at Rocketdyne-Neosho. Six of these engines have been returned to MSFC for installation into the vehicle. All S-I-8 engines are at Rocketdyne and retrofit has begun. ✓

*fw J-2 ENGINE

Production engine J2004, installed on test stand Delta-2A successfully completed the initial checkout test. During the second acceptance test an external leak was noted in the combustion zone of the thrust chamber jacket. Leak tests are being made to determine the source of the leak. It is believed that the leak is not serious and can be corrected so that acceptance testing can be completed this week, thereby allowing PFRT to begin early next week. ✓

Production engine J2008, installed on test stand Delta-2B, successfully completed the initial checkout test. Barring unforeseen difficulties, this engine should complete acceptance testing this week. ✓

Testing has resumed with R&D engine J003-2A. Four tests were attempted during this report period. Of these tests, one was successful. The other three tests were cutoff by an erroneous accelerometer reading, excessive pressure in the LOX pump primary seal cavity due to the wrong size facility line being installed, and fuel turbopump overspeed trip caused by excessive ramping (opening) time of the main oxidizer valve.

All 3
lost due
to sloppy
procedures
B

RL10 ENGINE

A 20 firing program has been initiated to substantiate the use of a turbine "spin up" to allow Centaur hydraulic system checkout on the launch pad just before launch. Three firings, each preceded by a turbine spin up to 4500 RPM for 3 minutes, were completed last week. This pre-launch checkout procedure is planned for use on AC-4.

An engineering change has been approved which provides for a revised accessory drive interface to accept the redesigned GD/A hydraulic pump package. The retrofit will be effective on AC-4. ✓

7
Aug
8/24

B 8/31

NOTES 8-24-64 CLINE

Bob Young
FYI B

1. S-IVB AUXILIARY PROPULSION SYSTEM (APS) PROPELLANT LOADING: There has been no decision made by Industrial Operations concerning using an umbilical for hypergolic propellant loading for the S-IVB. A memorandum dated 5-17-64 from this Laboratory requested a redesign for loading and draining of the APS:

2. MSFC APPLICABLE DOCUMENTS LIST: A preliminary copy of the MSFC Applicable Documents List (ADL) has been prepared. The preliminary ADL contains 728 documents, excluding parts specifications, model specifications, and applicable company specifications. Company specifications are presently under review to determine their applicability for implementation on various contractors. ✓

3. CONFIGURATION CONTROL BOARD ACTION: The material used to prevent galvanic corrosion between the GOX Diffuser and the bulkhead of the 105-inch LOX Tank has been determined to be incompatible with LOX. Correction of this problem on SA-7 is impossible without a schedule delay. A change of material on SA-9 may also cause a schedule delay. Investigation of the problem will continue. →

Fred C.
Who goofed?
Please see to it that procedures are tightened
B

4. F-1 FLIGHT RATING TEST (FRT) INJECTOR HAS SELF-INDUCED INSTABILITY WITH SUCCESSFUL DAMPING CHARACTERISTICS: (Reference NOTES 8-3-64 CLINE, paragraph 2.) Information concerning contemplated action is being forwarded under separate cover. ✓

↓
P.S. I'm not interested in name of culprit. I am interested in steps to prevent recurrence
B

7/24

B 8/31

1. SUPPORT SERVICES

The Source Evaluation Board for procuring support services for Michoud Operations for Calendar Year 1965 has been appointed and met to review and finalize the scope of work. The Request for Proposal is expected to be mailed out on August 28. ✓

2. ENGINEERING AND OFFICE BUILDING

Movement of personnel of Chrysler and Boeing into the new building is planned to start on September 1. A time-phased plan has been made to occupy the space as rapidly as final construction is complete and to substantially finish the movement of personnel from the Baronne Building by the end of October. ✓

3. S-IC TANK BULKHEADS

Two LOX tank top bulkheads have been completed; one for S-IC-S and the other for S-IC-501. The acceptability of these bulkheads is in question, since mismatch and warpage along the meridian welds (tenting) exists. MSFC/Huntsville (ME, QUAL, P&VE) are assisting in evaluating these discrepancies, as well as the peening of "bulkhead to filling" weld areas and ripple in the polar cap area. It appears that the chances are good for acceptance of -S bulkhead. Boeing engineering and quality will present additional data on -501 on Tuesday. ✓

Discussions with NASA technical personnel and a viewing of the 501 bulkhead indicate to me that it does not appear to meet the standards required for a flight vehicle. ✓

R. Rudolph
Concur?
B

In my opinion, the above problem, and other contributing problems are slipping assembly schedules in an unrecoverable manner, however, Boeing does not officially admit this.

4. CCSD

The SI/IB program generally is very close to being on schedule.

a. STATUS OF S-I-8

Rework in process on modifications and DMN's. Removed all (8) Lox pre-valves for modification. Reworking ceramics on torque boxes and water quench panels. Testing of liquid level probes, per special Quality Control Instruction (QCI) 76132. ✓

b. STATUS OF S-IB-1

Working on operation 0100, tail section. Working on operation 0700, access shute. Working on operation 0900, spider beam. ✓

c. STATUS OF S-IB-2

Working on operation 400, Lox Tank. Working on operation 500, Fuel Tanks, August 17, received Fuel #4 from Ling Temco Vought. All tanks have been received for S-IB-2. ✓

d. STATUS OF SAD-5

Declustering is complete, and rework is being accomplished. ✓

July
24

Notes 8-24-64 DANNENBERG

B 8/31

1. Panel Review Board - During Meeting on 8-17-64, Dr. Mueller overruled the decisions of three panels regarding GSE. Their agreements called for interface of S/C and L/V oriented GSE to be handled in the Electrical and Mechanical Panels, and the interface of S/C GSE to launch complex and of L/V GSE to launch complex to be handled in the Launch Operations Panel. Dr. Mueller decided to have all three handled by the Launch Operations Panel which is chaired solely by KSC. He argued that they all belonged together and that the S/C - L/V GSE interfaces are small. The impact of this decision is under evaluation and will also be properly considered in details of KSC/MSFC relationships. Preparation of ICDs for GSE to GSE was accepted by MSFC upon request by KSC.

2. Interface Control Documentation - Recent progress of the ICD Repository operation has been disappointing. Although the number of identified ICDs increased from 234 in June to 454 in August, 1964, the number of ICDs available from the Repository only increased from 140 to 153 in the same time period. Dr. Mueller asked in the PRB meeting for a plan to improve the progress. Studies towards this goal are under way. ✓

~~Boydine~~
I'd like to see it
B

3. Annual GE Work Package - Approval has been received from Headquarters to extend Task 19 (R-QUAL) through 3-31-65 and Taks 8, 9 and 18 (R-ASTR) through 4-30-65. These extensions are the result of slippages of contract action for other mission support contracts for the laboratories. The Space Vehicle Summary for SA-7/BP-15 was distributed.. (Copy attached) This is an updated and improved version of the Summary for SA-6/BP-13. In spite of the popularity of this document, no further issues will be generated. This was covered under Task 17 of Contract NASw-410. Gen. Phillips' office decided this work would not be included in the extension of the contract which becomes effective 10-1-64.

4. ESE - The slippage of ESE delivery to the Saturn IB and V(SDFs), announced by Mr. Fichtner's memo of 8-11-64, has been checked out and steps are being taken to alter the present situation. Some effort has taken place since the memo was written. R-ASTR-E has discussed the documentation problem with Mr. Parker and Wickham and received assurances that things would get better. The problem may not be the availability of information, but the usability of S&ID format. Mr. Godfrey is presently at DAC discussing this problem. ✓

✓ K.D.
2
'B

K.D.
Before we agree to omit that, I'd like to have a detailed briefing B

5. Automatic Interlocks - Gen. Phillips has requested (letter to Dr. Rudolph and Mr. James, dtd 8-5-64) to review the need for automatic interlocks which would prevent engine firing on Saturn vehicles. KSC, R-ASTR, R-P&VE, and IO will discuss this week how to most logically accomplish this request.

B 8/31

July
124

1. Preliminary Ranger 6 & 7 Data: Recent informal communications from Mr. Victor Clarke at JPL indicate that the moon radius of 1738.57 km (radius toward the earth), which we are currently using in the Apollo program, may be somewhat in error. Ranger 6 and 7 doppler data indicated that the moon's radius is 1735.3 km. JPL is trying to determine the validity of this new number before release, and is planning to discuss the new lunar data in-house within three weeks. Results will be released in a Press Conference. ✓

2. Range Safety Sub-Panel: A Range Safety Sub-Panel Meeting is scheduled for September 1, 1964, at MSC. An agenda for the meeting is attached. ✓

3. Tumbling of Pegasus Payload: A meeting was held 8/18/64 regarding the orbital tumbling of the Pegasus payload. An analysis of the DAC non-propulsive (N.P) venting system by P&VE indicates that the design requirement of 6 deg/sec attitude rate will be exceeded unless the residual propellants are reduced to essentially zero (50-75 lbs. LH₂). Briefly, we have the following situation: The N.P. vent system is the primary system; the main system used on SA-5 and SA-6 coming in only if the pressure within the H₂ tanks builds up to a given level (41-44 p. s. i.). The venting systems are designed such that with the spacecraft attached to the S-IV stage, both the main and non-propulsive vents are located near the CG of the vehicle. After spacecraft separation, the CG of the orbiting body shifts aft about 7 1/2 feet to a point within the H₂ tank. R-AERO had been told by DAC and P&VE that the CG of the orbiting Pegasus payload was essentially at the station where the non-propulsive vent is located i. e., above the H₂ dome. When the H₂ is thrown forward by cutoff, and the 0.5 m/s deceleration force imparted to the S-IV stage by separation, LH₂ will crawl up the tank walls, and due to rapid expansion, because of hot walls (260°R), cause a pressure spike, and a resultant discharge of LH₂ through the main vent. Simultaneously, LH₂ will be vented through the NP vent system with a higher force than gaseous H₂, resulting in an unsymmetrical venting, thus the allowable tumbling rate of 6°/sec will be exceeded. If the CG of the orbiting body were forward of the H₂ tank (as in the unseparated version) a small attitude rate (0.2°/s) would force the LH₂ to the rear, thus, resulting in only gas being vented. Two avenues are being investigated to solve the problem. First, an investigation is being made to see if spacecraft separation can be delayed for about one orbit, such that any venting of liquid will be done with a favorable CG position. Several problems exist with this approach: (1) R-ASTR presently does not have power available beyond 30 minutes, which is necessary to initiate separation and wing deployment. (2) A sequencer would have to be added. (3) The TV system with which Mr. Boehm plans to monitor wing deployment would not transmit a signal to earth with a tumbling body. (4) R-RP may have difficulty determining direction of meteoroids without a good attitude reference. The second alternative is to employ a depletion cutoff of the S-IV stage and separate the spacecraft shortly after S-IV cutoff. The impact of this solution on our first flight of the IGM guidance would be that a cutoff signal would be telemetered but the accuracy of cutoff would not be known completely. Astrionics prefers depletion cutoff approach on SA-9, but wants some other solution for SA-8 and SA-10. Another meeting on this is scheduled 8/24/64. P&VE is looking carefully into some other design of a venting system such as venting through the RL-10 engines.

First
StuhlingerFYI
Problems
Problems

B

Agenda for First Range Safety Sub-Panel Meeting to be Held
at MSC, Building 30, Room 3037, 9:00 A.M., on September 1, 1964.

B 8/31

- 1.1 Introduction (MSFC-MSFC)
- 1.2 Review of Agreement for Handling Range Safety Interface Problems (MSFC-MSFC)
- 1.3 Review of Range Safety Problems Encountered in the Saturn I Program (MSFC)
- 1.4 Abort Sequence of the Saturn IB Vehicle (MSC)
- 1.5 Plan of Destruct for the S-IB and S-IVB Stages (MSFC)
- 1.6 Destruct Criteria for the Spacecraft (MSC)
- 1.7 Discussion of flight envelopes and time delays of Saturn IB failure modes with reference to the Range Safety Sub-Panel supporting work. (MSFC-MSFC)
- 1.8 Discussion of Vehicles 201 and 202 (MSC-MSFC)
- 1.9 Plans for Next Meeting (MSC-MSFC)

fw 8/24

NOTES 8-24-64 GRUENE

B 27/31

SA-7 Status:

a. The All Systems overall test planned for last week was performed satisfactorily on schedule. Part of the test was cancelled because of the need to clear the pad due to approaching thunderstorms. This part of the test will be covered in one of the future All Systems tests. ✓

H.F.
You better get used to that situation. That's one of the advantages of "All-up" ✓

b. Because of the installed LES rockets, we are experiencing almost daily interruption in our checkout schedule due to the necessity of clearing the pad area. We are studying means to resolve this problem at the present time, but I am not very optimistic because of the sensitivity of Pan American Safety after the last mishap. ✓

c. An MSFC furnished, altitude tested, C-Band Radar Antenna and Cable Assembly have been installed on SA-7. Breakdown at altitude was suspected in past flights. ✓

*fw

d. Milestones in the SA-7 Preparation Schedule which are different from the published daily schedule are:

- | | |
|---|--|
| Plug drop overall test | Thursday, August 27 |
| Simulated Flight Test | Thursday, 3 November ^{SEPT.} ✓ |
| Countdown demonstration test
(a new test consisting of a complete countdown, including loading, but prohibiting ignition). | Saturday, 12 September ✓ |

B 8/31

fw
8/24

1. S-I-9 POST-STATIC CHECKOUT: Systems reverification of the S-I-9 stage is progressing very well. ✓ Power Distribution and Components, General Networks and Malfunction and Control Systems Tests have been satisfactorily completed, and Instrumentation Systems Tests are approximately 95% complete. ✓
2. S-IU-9 INSTRUMENT UNIT CHECKOUT: The S-IU-9 Instrument Unit is now three (3) days behind schedule due to spare parts shortages and contamination in the Air Bearing Sphere Assembly. Contamination specs call for 0.2×10^{-6} parts Hydro Carbon content, the actual content of the system is presently 2.8×10^{-6} parts. ✓
3. S-IV PROGRAM: S-IV-9 post-static checkout procedures have all been received and approved. Approximately ten (10) days have been lost plugging bulkhead leaks and testing after the August 6 static firing. DAC has started a 58 hour week in an attempt to recover some of the lost time. Modification installation continues on the S-IV-8 stage while awaiting removal of S-IV-9 from the test stand. The S-IV-10 stage is undergoing post manufacturing checkout at Santa Monica. Approximately 70 components shortages presently exist on the stage. ✓ | Jw
4. LOS ANGELES AREA MATERIAL REVIEW BOARD (MRB): A MRB has been established in the Los Angeles, California area to review, for approval, major deviations which pertain to BAC contracts in that area. The Board consists of representatives from Boeing, Quality and Reliability Assurance Laboratory, Manufacturing Engineering Laboratory and a WOO Contracting Officer's representative. Location of approval authority in this area will materially assist in expeditious resolution of major deviation requests. ✓

NOTES 8/24/64 HEIMBURG

B 8/31

1
8/24

S-1 STAGE:

The special propellant loading test with stage S-1-10 was performed on Wednesday, 8/19. Different lox bubbling flowrates and bubbling times were applied to establish the most suitable condition for a lox load with 2.2% ullage. Data evaluation is in progress. ✓

Two of the engines which were shipped to Neosho for lox dome replacement were returned on Thursday, 8/20, and one of the engines was reinstalled in the stage, Saturday, 8/22/64. ✓

NOTES 8-24-64 HOELZER

B 2/31

7/24/24

1. LEASE VERSUS PURCHASE OF COMPUTATION EQUIPMENT: As of this date, neither the amount of money to be given to Marshall for this item nor the time at which it will be given is known. MSFC has stated its plans to NASA Headquarters for the lease versus purchase and is expecting some answer in the near future. Once the date and amount is known, it will be reported by these notes. ✓

2. DECENTRALIZED COMPUTER INSTALLATION: Thursday, the 13th of August, an Electronic Associates, Inc., 231R-V analog computer arrived and was placed in Astrionics Laboratory. This computer will be maintained by the Simulation Branch but programmed and operated by the Guidance and Control Division of Astrionics Laboratory. These Astrionics personnel have attended Electronic Associates training courses. Further instruction and assistance will be provided by the Simulation Branch as required. ✓

3. ROCKETDYNE SIMULATION FACILITY: On Tuesday, the 11th of August, the finalized specifications for the analog computers to be purchased for Rocketdyne were agreed upon. Personnel from Rocketdyne and from the Simulation Branch, Computation Laboratory, who had met on three previous occasions arrived at the final configuration of the computers. The evaluation of the request for analog computers by Rocketdyne and the conferences on the computer specifications were the result of a request from Industrial Operations. The evaluations of the bids and the selection of the computer vendor plus assistance in checking out the equipment after delivery will complete the task as far as Simulation Branch commitments are concerned.

4. VISIT TO DATACRAFT, INC.: Two employees of Data Reduction Branch, Messrs. J. A. Jones and M. H. Newberry, visited Datacraft, Inc., Gardena, California during the week of August 10-14, 1964, with Mr. Gassaway of P&VE Laboratory. The purpose of this visit was to deliver the Random Vibration Analysis program for IBM 7094 computer to the Datacraft people. Datacraft has a contract with R-P&VE to analyze acoustic and vibration data acquired from large solid propellant rocket boosters. The computer program will be used in this work. The Random Vibration Analysis program, which represents about four man-years of programmer effort, has previously been given to MSC, NAA, Chrysler, DAC, Boeing, Westinghouse, and AEDC, Tullahoma. AEDC has no 7094 of its own, but buys computer time from the Army Missile Command. ✓

5. COMPUTER CONTROLS: MSFC has been criticized from time to time for lack of control on programs to be placed on the computers. A new procedure has been written incorporating these controls and is at present being staffed through MSFC top management. This procedure is designed to assure proper controls through requiring a proper documentation and proper signatures of the customer, together with the agreement of the Computation Laboratory that this is a necessary program. ✓

Lee
Belew
A
B

Aug 24

*fw SA-7 Prelaunch Review: The SA-7 Prelaunch Review has been rescheduled for September 8 from 2:00 to 3:30 in the 10th Floor Conference Room, Building 4200. ✓

First
stuhlinges
fyi
B

S-IV Nonpropulsive Venting: Analysis of nonpropulsive venting indicates low probability of meeting mission requirements on S-IV-9 and subs because of events caused by separation sequence: (a) the slight de-acceleration at capsule separation plus the spring action of the tanks at cutoff causing forward motion of LH₂ residuals, (b) shift of cg approximately 7 1/2 feet aft. This will result in venting of LH₂ through normal vent and cause stage to tumble. A meeting to determine solution to problem on S-IV-9 and subs is being held today.

Pegasus: I have noted several times your concern over the schedule and technical status of Pegasus. You have also noted that whereas a number of difficulties do exist, I have described the Pegasus' launchings optimistically. I assure you that I am not as optimistic over the future of Pegasus as I have expressed myself to be in the Management Council. On the other hand, too dim a view in project management sometimes has an ill effect. We have recently made quite a number of changes to this project. We have cranked in to the extent possible all of the technical suggestions of the Laboratories, we have made major changes in the contractor's project management, we have reevaluated and rephased the schedules, we have made the early articles more of a test article in order to deepen the effort on later flights, and we have gotten some of the troublesome electrical areas through subsystems and systems tests. It is true that many difficulties remain and the Laboratories turn these up daily. One thing that I am at a loss to explain is some of the comments which you receive in the Weekly Notes. We have solicited all of the technical assistance which we can obtain. We, of course, get together with the technical people at the end of some assessment, determine what can or can't be done, and assure ourselves that we are not leaving undone anything which jeopardizes the program. At this point, we seem to have an understanding with the technical person concerned; yet when these same items are written in your notes, they are written in a more alarming manner. We are now reviewing several such items that have appeared recently in your notes to see if our assessment of the Pegasus status is proper. At the moment the prototype is two weeks behind the revised schedule and there is no known effect of this on the first flight article. We know that we have a tight success schedule. We will require a lot of hard work and some good fortune if this is to be met. At the present time, however, we do not know of any part of the Pegasus that will not function as designed nor do we know today of any reason why the present schedule cannot be met. We have a number of technical difficulties in quality, structures and electrical components which we must get on top of. We welcome the assistance of the Laboratory personnel in achieving this objective.

10/24

NOTES 8-24-64 Koelle

B 8/31

1. ORBITAL OPERATIONS TEST PROGRAM STUDY IN DANGER: Reliable information has been received through Headquarters personnel that FY 65 studies for the Orbital Operations Test Program, Advanced Orbital Launch Operations (AOLO), the Orbital Launch Facility (OLF), and the Space Checkout and Launch Equipment (SCALE), a KSC study, will have "zero" funding for FY 65. We will try our best to see that these studies are funded to some level regardless of whether it meets our initial request (\$800K). This may be difficult in light of the study emphasis on space stations, even though these studies do affect the design of space stations. If they are eliminated, it is highly possible our efforts in this area can be picked up and camouflaged in the contracts done by MSC and Langley. If this occurs, the possibility of our obtaining future funding in these study areas will be greatly reduced or eliminated; thus the MSFC and KSC future responsibilities for hardware projects in this area will be jeopardized.

2

URGENT

HHK
Let's discuss this. B

We may need your and Dr. Debus' assistance to pull this out of the fire. Highly reliable sources have stated that Dr. Mueller has previously disapproved these studies. We will know more after August 26, and may prepare a special memorandum for your action.

HHK

2. SATURN IB/CENTAUR - MMM: In case we do not get the SATURN IB/CENTAUR program started this year (which is likely if we do not get the SURVEYOR mission assignment), I would suggest a restudy of the MMM as an alternative. A three-stage IB would probably then not be needed before the 1971 VOYAGER mission. Present plans at Headquarters call for LESA missions to begin in 1972. This would bring these requirements so close together in time and performance that only one stage should be developed. Because the requirements for the lunar landing are more stringent, the stage will look much more like a MMM (with a 1 to 3 engine option) than the present CENTAUR. We could call the MMM CENTAUR II to make it more palatable.

Very dangerous suggestion!!
B

Doesn't help one bit!
B

NOTES 8-24-64 KUERS

B 8/31

fw
8/24

1. S-IC-T: New superficial cracks in the welds of the fuel and lox tank were discovered. The only known remedy is presently the removal of the weld bead by shaving it down to minimum tolerance. There are problems to reach the welds at the inside of the tanks, and the rework was restricted to cracked areas, former weld repairs and runouts, as far as accessible. Recleaning of at least the lox tank will be required. Schedule impact approximately 4 weeks, affecting -T, -S, 501 and 502.

2. S-IC-S: The welding of the upper half of the fuel tank has been completed. We are now for the first time through the cycle of gauges concerning the critical Y-ring to bulkhead weld, where the upper fuel bulkhead represented the thinnest case (.224" in the weld area). The Y-ring joints have troubled the program from the beginning by very poor repeatability between the successful horizontal sample welds and the actual hardware. Process development and increased process reliability was considered the means to overcome the problems, but we have reached the point now, where the difference in the Y-ring material versus the sheet and plate material is recognized to be a major factor in horizontal welding technology. Action was initiated with R-P&VE-M and Boeing in order to improve the Y-ring material. ✓

3. S-IC-501: The upper lox bulkhead being fabricated by Boeing, has been finally rejected. R-P&VE recommends scrapping. Impact evaluation and recovery proposal including possible support from R-ME was requested from Boeing.

LTK
Sounds like there is trouble all over the place!
But Cohen of Boeing tells me he saw no reason
at all to use electron-beam welding on the Y-ring
since they were perfectly happy with everything as is!
B

1. APOLLO DOCUMENTATION MANAGEMENT

Manned Space Flight has assigned the task of developing a computer program and running the preliminary Apollo Documentation Index (ADI) to General Electric-Daytona. We have delivered to GE, the MSFC computer input required for them to prepare the ADI base-line run and make the base-line ADI operational by September 1. ✓

The Ad HOC Committee plan is that only the committee will sign off on the base-line ADI. In this way the Centers are not officially committed. The Data Managers will then take over and during the period September 1 to January 1, the ADI will be purified and made official by working thru the appropriate management channels. ✓

2. OVERTIME CONTROLS

Dr. Mueller, in a letter dated July 29, cited a study by Jack Young's office showing \$3,581. ^K ~~M~~ overtime at MSFC. Dr. Mueller requested that MSFC review the use of overtime "to assure that only essential overtime is worked and that effective controls are maintained in authorizing and certifying the performance of overtime work." Action to respond to the July 29 letter was assigned to the Financial Management Office; we are assisting them. ✓

Dr. Mueller's letter also asked that we consider the "MSF Overtime and Time and Attendance Policy" in our local assessment. This instruction provides that overtime for GS-13, 14, and 15 levels can be paid only under certain conditions and if personally directed by Dr. Mueller. As a consequence, there is none.

We have received information that Dr. Mueller and Jack Young are considering extending this policy to affect the Field Centers, hence we are preparing an impact statement based on discussions with IO and R&DO. ✓

fw
8/24

B 8/31

NOTES 8/24/64 RUDOLPH

1. Logistics Support - Discussions with NASA Headquarters' personnel, concerning the MSFC Saturn V approach to logistics support of the Saturn V vehicle, have revealed that our approach is completely in consonance with the thinking at NASA Headquarters and that they will probably use our Saturn V plan as the format for the Apollo requirements. ✓

2. S-IC Stage:

Power Supplies - Boeing engineering effort on the 60 CPS igniter power supply for the S-IC Stage Test and Checkout Complex has been resumed. This effort was halted during July 1964 to allow Rocketdyne to define the safe operating voltage for the igniter at the power supply/igniter interface point. The supplied voltage is to be 550 volts, ± 50. ✓

Minuteman Strap-on Study - Boeing made a presentation on the Minuteman Strap-on Study (S-IC Thrust Augmentation System) on August 18, 1964. In the presentation, several attachment methods were systematically eliminated, and it was decided to concentrate the remainder of the program on the three arrangements below, listed in the order of decreasing desirability.

a. Minuteman mounted in pairs between F-1 Engine fairings canted approximately 10° to the S-IC center line. ✓

b. Minuteman attached to hold down post, and canted approximately 60° to the S-IC center line.

c. Minuteman mounted between the F-1 Engine within the base area parallel to the S-IC center line and beneath the heat shield.

Boeing will make another presentation on October 1, 1964, to obtain approval on one attachment configuration which will form a basis for a firm cost proposal to be submitted by December 1, 1964.

3. S-II Mission Performance - On August 14, 1964, representatives from NAA/S&ID visited MSFC to present the status of the study to increase the mission performance of the S-II Stage. The study as authorized reflects the employment of six J-2 Engines with modifications thereto. As a result of the presentation, contractual action has been inaugurated to realign the study effort to include the seven J-2 Engine concept. ✓

*fw 4. S-IVB Quarterly Review - The S-IVB Quarterly Review has been rescheduled to September 29 and 30 at MSFC due to the Apollo Assessment now in progress. ✓

A.R.
I'd like
to attend
B

7/24

B 8/31

NOTES-8-24-64-SHEPHERD

AIR CONDITIONING - COMPUTATION LABORATORY, BUILDING

4663: (Reference NOTES 7-27-64-Haeusserman, NOTES 8-10-64-Hoelzer, copy attached.) The air conditioning breakdown on July 10 was due to baffle failure in the chiller vessel. Upon separation, the baffles became entangled in the first stage impeller causing an unbalanced condition and severe vibration. These chillers are sealed units and according to the Carrier Corporation's representative there is no previous history of failure of this nature within the chiller unit. Breakdowns which have occurred in Computation's air conditioning are as follows: one in 1960 (11 hours), two in 1962 (254 hours), one in 1963 (23 hours), and two in 1964 (100 hours). In all except one instance, failures were due either to material fatigue or equipment not meeting reliability standards. The exception to this was a failure caused by storm water flowing through an improperly sealed pipe opening in an equipment room wall. In this case the switch gear was shorted and down-time was four hours. Records show that out of a total of 35,800 hours possible operating hours the air conditioning equipment in building 4663 has been out of service 388 hours, or approximately 1% of the time. This record will be improved. The equipment, as you may know, operates whenever the temperature exceeds 40° F. which is most of the time in this latitude. The spare parts availability, as well as, the maintenance policy of the Technical Services Office has been reviewed and they appear to be adequate to prevent most mechanical emergency situations. We are currently modifying the air conditioning capability in building 4663 which will provide back-up capability for the operation of those areas deemed, by Computation Lab, to be critical. The Facilities and Design Office has undertaken the expediting of the hookup of the additional chilling equipment to provide this emergency stand-by capability. It is estimated that this equipment will be available for use by September 21, 1964. ✓ A similar review of air conditioning systems is being initiated for all of our facilities. ✓

- Attachment # 1: NOTES 7-27-64-Haeussermann (Dr. von Braun's copy only)
- Attachment # 2: NOTES 8-10-64-HOELZER (Dr. von Brauns copy only)

fw 8/24

B 8/31

NOTES 8-24-64 Stuhlinger

E.S.
Then I read James Peiser's and Haussner's appraisal of the remaining Pegasus problems (see their NOTES 8-24-64)
I can understand OART's grave concern!
B

1. PEGASUS VERIFICATION BOARD: The first meeting of the Board took place at OART on August 19. The purpose of the Board will be the penetrating study and appraisal of the entire Pegasus system, not only the detectors. My impression of the attitude of the Chairman, Hank Wilson (Langley Research Center), is very positive; however, I feel grave apprehension with respect to the inevitable imposition which this all-inclusive assignment will cause to the Project Office. I will discuss this problem with Lee James and Bill Johnson, and keep you informed of the situation.

2. RESEARCH PROGRAM CONSOLIDATION: I have discussed RPL's proposal for program consolidation with IO, Astrionics, P&VE, Aero-Astroynamics, and Management Analysis, and to some extent with R&DO. Very satisfactory agreements were reached in all these discussions. Our next steps will be: a draft of the complete proposal; discussions of this draft with R&DO, IO, and the Laboratories; a presentation to you; and finally a presentation in the MSFC Board Meeting. ✓

3. GREEN MOUNTAIN STATION FOR PEGASUS: The Pegasus Project Office and RPL deem it very desirable that our Green Mountain receiving station be operated for Pegasus launches in order to obtain additional information on vehicle performance, housekeeping, and meteoroid hits. Astrionics is hopeful that this will be possible. ✓

4. ALSS SCIENTIFIC MISSION: The Bendix personnel working on the Scientific Mission Support Study of the ALSS, and their subcontractors UED (United Electro Dynamics, Inc.) and IIT Research Institute (Armour Research Foundation), are to visit Research Projects Laboratory on August 28, 1964. The plans and coordination of the study will be discussed. RPL has technical supervision of this contract. ✓

August 31, 1964

IMAGE



ELITE

FOR COTTON

*Tag to
McCall
Clive's notes
removed*

DM

NOTES 8/31/64
WITH COMMENTS

Mr. Newby's Copy

B 8/31

H-1 ENGINE

During cutoff of the fifth test on R&D engine H-130 at Rocketdyne-Neosho, the main oxidizer valve locked in a 90% closed position. This resulted in a LOX rich cutoff and subsequent thrust chamber damage. The main oxidizer valve was disassembled and the idler shaft and bearing found to be galled. Preliminary investigation has revealed that the bearing bore in the valve housing was not the correct diameter, and therefore, under cryogenic conditions, the bearing was squeezed against the shaft causing it to gall. The thrust chamber and improved performance injector are still useable, but not for compatibility testing for which they were intended. Another engine is being assembled to complete the test objective. One week slip in injector selection date is anticipated.

*
Lee B
Sounds like a tolerance problem!
Symptoms -
matic?
B

F-1 ENGINE

During the third engine system test of the 084D injector, a "pop" (self-trigger) was encountered at 4.2 seconds of mainstage of a 40 second test. The disturbance damped in one cycle (10 ms.). Nature, cause, and potential impact of the "pop" are under investigation. The "D" version of the 084 family of injectors represents the final tuning of the FRT injector. ✓

RL10 ENGINE

A thrust chamber with the reduced throat, high Isp (444 Isp) RL10 engine has been fabricated and the first engine test is expected to be conducted by November 1. Centaur project management has indicated that, where possible in the design of this engine, it would be desirable to have seals and materials compatible with fluorine. ✓ Lee - Who will pay for additional cost for this compatibility? ✓

J-2 ENGINE

J-2 engine #4 has run into difficulty in completing its acceptance firings due to an instrumentation boss leak on the turbopump. The leak has been repaired and acceptance testing should resume this week.

Engine #8 has completed its acceptance firings. (This engine will be used for PFRT with engine #4 scheduled for PFRT backup).

Two tests were run this week on R&D engine #J003-2A to evaluate the start sequence at vehicle inlet pressures and to evaluate the "chamber-attached" diffuser at low chamber pressure. Performance was satisfactory in both tests. ✓

100-Pound Thrust Space Engine

The Procurement Plan for the 100-pound thrust space engine is expected to be transmitted to MSF by Wednesday. (A draft copy has already been forwarded.) The RFQ is being prepared. It is expected to be completed by mid September. The preliminary mod spec is the pacing item. ✓

B 8/31

1. Visit of Dr. Seamans and Party

A briefing and tour of Michoud Operations, including the Computer Operations Office at Slidell, was conducted for NASA Headquarters and MSFC personnel on August 26, 1964. Included in the party were Dr. Robert C. Seamans, Dr. George E. Mueller, Mr. William E. Lilly, Mr. Clyde Bathmer, Capt. Robert Freitag, Adm. W. F. Boone, Mr. D. D. Wyatt, Mr. George Friedl, Dr. W. von Braun, Dr. E. Rees, Mr. Dave Newby, Mr. James Shepherd, and Mr. Ray Kline. ✓

2. Apollo Program Assessment Team Visit

A special assessment team visited Michoud Operations and was headed by Gen. Samuel C. Phillips, and included Major Jack Calopy, Mr. Charles King, Mr. Melvyn Savage, Mr. B. L. Johnson, Mr. George White, Mr. Tom Newman, Mr. Jerry Kubat, Mr. T. H. Thomson, Mr. Jack Underwood, Dr. Arthur Rudolph, Col. Lee James, and Mr. Leland Belew.

This team spent the day reviewing the Boeing activities on August 25, and spent a half day on August 26 with the Chrysler Corporation. Schedule assessment program problems and their solution and cost to completion seemed to be the items of greatest interest. ✓

3. Status of S-I-8

Rework is in progress on cables, harnesses, flame shields, engine skirts and air scoops. Return of engines from Neosho is the pacing item. ✓

4. Status of S-IB-1

Assembly operations continue on schedule. ✓

5. S-IC Lox Tank Bulkheads

The questionable forward lox tank bulkhead for S-IC-501 has been dispositioned as follows: all meridian welds will be cut out. Two gores which had tensile test specimens cut from it will be scrapped. The remaining six gores will be split between the S-IC-D and the new S-IC-501 bulkhead. This intermix of used and new gores and by oversize trimming on new gores preserves the dimensional location of fittings. The schedule impact of this action has not been completely assessed, but will result in some slide to S-IC-D and S-IC-501. ✓

1. Boeing Saturn V Systems Engineering and Integration Proposal- Prenegotiation between IO and R&D Operations representatives were concluded 8-24-64 with the presentation of a revised section 6.0 "Program Controls." The revised statement of work removed all objectionable features and was satisfactory to R&D Operations with the exception of section 5.0 "Vehicle GSE Engineering," which has not been reviewed by R&D Operations (see below). Negotiations are tentatively scheduled for the week of Sept. 7, 1964. ✓
2. Vehicle GSE Engineering (Boeing Company) - The scope of work for Mechanical GSE support (R-P&VE-VM) was hand carried to IO, 8-26-64. It was to be transmitted to the Boeing Company for proposal by 8-29-64. The IO support scope of work in GSE Engineering has not been reviewed by R&D Operations. The preliminary writeup appears to have overlapping areas of responsibility assumed by IO. It is expected that prenegotiation meetings between IO and R&D Operations can resolve any areas of misunderstanding concerning responsibilities of IO and R&D Operations and involvement of the Boeing Company. ✓
3. Future Planning Group - at Dr. McCall's initiative a group was formed to delineate MSFC's future technical march route for post Apollo projects. The group will meet every two weeks under Koelle's chairmanship and will consist of de Fries, Digesu, Barber, Downey (RPL), Thomae, Kuettner, Voss, Evans, Williams and two IO representatives. ✓
4. Saturn IB- Titan III Comparative Study - All R&D Operations inputs to the present phase of the study including the material on the Titan III program furnished by the AF have been submitted by R-SA to Mr. Evans. A presentation of the total report will be made to you on 9-3-64, ~~9:00 a.m.~~, 10th floor Conference Room. ✓
2:00 p.m.
5. SPERT - Remington Rand (Mr. Segreve) gave a presentation on 8-27-64. SPERT is a manual information display system that combines certain desirable features of PERT with the simplicity of bar charts. The system can be quickly updated and provides a great deal of information necessary to manage a system. ✓

NOTES 8/31/64 FORTUNE

B 8/31

1. Contractual Agreements with Southern Bell Tel. Co. - have not been formalized for either Michoud or MTO, as brought out Wednesday afternoon. However, Michoud has a Communications Services Authorization (CSA), and Mason-Rust a letter contract for termination charges made two or three years ago. NASA Headquarters instructions and our legal personnel indicate more binding contract coverage should be arranged for MTO. ✓ Friday, I talked to Clarence Lott, company Vice President in Jackson, Miss., who said his lawyers were still studying our proposed contract (sent to them by Harry Gorman May 19, with follow-up from Ling mid-July.) Meanwhile, Lott promised to send John Mobley, Director of Marketing, down to get our permanent system arrangements initiated. Ed Hildreth from MSFC Communications and Henry Auter will participate. ✓

2. Boat Tour of Western Buffer Zone Boundary - was given key Michoud and MTO personnel by Sheriff George Broom of St. Tammany Parish Thursday. We made a five hour sweep through Honey Island Swamp via the West Pearl and three middle Pearl tributaries in two sheriff patrol boats. There isn't any habitation, but just dense swamp and woodland, and amazingly enough, very few mosquitoes. The Sheriff says mosquitoes are bad only two out of every five years, and we had the two bad years last year and the year preceding. I am not sure. ✓

3. MSC call regarding cooperative mosquito control measures with County Officials - was received late Thursday afternoon from Mr. Bill Parker in Houston. He asked if we were working with local mosquito control officials, stating that MSC lawyers were concerned about legality. We explained procedures we propose to use, and are sending him copies of KSC's contract with Brevard County, and the one we are negotiating with Chris Elmore and the three coast counties. We offered fogging equipment and other assistance, but he said they had sufficient equipment. ✓

NOTES 8/31/64 GEISSLER

B 8/31

1. Dynamics and Control Working Group: A meeting of the S-II Stage, Vehicle Dynamics and Control Working Group, has tentatively been scheduled for September 16 and 17, 1964, at MSFC in Room 508, Building 4200 at 9:00 a.m. A copy of the proposed agenda is attached. ✓
2. Peak Winds - Launch Complex 37B, Cape Kennedy, Florida: The recent hurricane in Florida produced a peak wind speed of 64 knots at the 113-foot level on LC 37B about 4:00 p.m. Thursday, August 27. For comparison purposes, our design conditions are: for the 99 percentile value, about 41.5 knots, the 99.9 percentile design value about 52 knots, and our hurricane associated peak wind design value is 108 knots at Cape Kennedy, with respect to the worst wind month reference period. ✓
3. Ultra Low Frequency Symposium: On 8/20/64, Mr. W. T. Roberts of our Aero-Astrophysics Office and Mr. J. Boyer (of Northrup) jointly presented a paper at the Ultra Low Frequency Symposium at Boulder, Colorado. Subject was: "Effects of Ultra Low Frequency on the Detailed Structure of the F₂ Layer of the Ionosphere." (F₂ layer is the ionospheric region of maximum electron density.) ✓

B 8/31

NOTES 8-31-64 GRAU

*
7/5

1. S-I-9 POST-STATIC CHECKOUT: Post-static checkout of the S-I-9 stage was completed and the stage released to Manufacturing Engineering Laboratory August 28, 1964. From the electrical checkout standpoint, S-I-9 was the most complete and trouble free stage to undergo checkout by this Laboratory. ✓
2. S-IU-9 INSTRUMENT UNIT CHECKOUT: Electrical checkout of the S-IU-9 Instrument Unit continues in Building 4708. Difficulties previously encountered with contamination, missing components, parts failure, etc. have been resolved, but the Instrument Unit is now approximately five (5) days behind schedule. Industrial Operations is investigating possible schedule adjustments. ✓
3. PEGASUS: Tests on the complete Electronics Canister, utilizing the Pre-Prototype Data System, are progressing satisfactorily. The Prototype Data System is being fabricated and assembled and will be ready for testing in approximately two (2) weeks. ✓
4. DOD QUALITY ASSURANCE SUPPORT TO NASA: Mr. John Condon, Acting Director, Office of Reliability and Quality Assurance, NASA Headquarters, advised on August 24, 1964, that Assistant Secretary of Defense, Mr. Tom Morris, issued a letter August 19, 1964 to the Departments of Air Force, Army and Navy concerning DOD Quality Assurance support for NASA. The letter directs these departments to give full support to NASA in accordance with NASA Document NPC 200-1A. ✓
The letter rescinds and replaces a previously issued DOD letter which had caused difficulty in obtaining full cooperation of DOD personnel. The effect of the August 19, 1964 letter (combined with other efforts underway to streamline DOD manpower justification procedure) should be a significant improvement in the timeliness and effectiveness of DOD Quality Assurance support. ✓

SA-7 Status

- *7W a. Hurricane Cleo did not do any damage to the vehicle or ground support equipment. 72 miles per hour wind velocity was measured on top of the blockhouse which definitely was exceeded on the service structure, but measurements at this place were not available because of the disconnection of the cables and power loss. ✓
- *7W b. The successfully completed Overall Systems Test, including disconnect and full operation of the swing arms on August 29 verified that all systems were in satisfactory condition after Cleo and a one-day drying period. ✓
- *7W c. The firing date has slipped by two days, but the milestones reported in my Notes of 8-24-64 are still valid. ✓
- *7W d. The proposed launch window for SA-7 firing is from 0930 hours to 1400 hours, EST. The beginning time is based on the onboard TV camera positions relative to the position of the sun; the end of the period on necessity to give sufficient time for recovery of camera capsules. The exact firing time has not yet been determined by Dr. Debus. ✓

e. Summary of SA-7 Measuring System

	<u>S-I</u>	<u>IU</u>
Total vehicle measurements	659	188
Initial out-of-tolerance adjustments after arrival	210	27
Changes performed in the Measuring System	41	6
Components replaced	31	5
Additional out-of-tolerance adjustments during pad "stay time"	159	12

f. Enclosed are some pictures that show the progress of construction work at MILA. (Pictures with Dr. von Braun's copy only.) ✓✓

Attachment
5 Pictures

CONFIDENTIAL

NOTES 8/31/64 HEIMBURG

B 8/31

X 7W 1. S-1 STAGE: The remaining six engines, which were shipped to Neosho for lox dome replacement, were received and installed in the stage.

Preparations and checkouts continue for the second lox loading test and the short duration firing, presently scheduled for ~~8/19~~ and ~~8/16~~, respectively. ✓

X 7W 2. F-1 ENGINE: Test TWF-033 was conducted at the Static Test Tower West with F-1 engine F-1002 on 8/25, for a mainstage duration of 61.92 seconds. Post-test inspection of the main injector revealed a hole at the lower edge of the center baffle and random cracks in the lox injector rings (see photograph attached). The problem will be further investigated.

The engine was removed from the stand and a new injector will be installed. The next run will be on or about 9/18. Actuators will be installed; however, we may not be able to gimbal either engine, F-1001 or F-1002, because of soft strut welds. P&VE is investigating this problem and will make their final recommendations next week. ✓

3. J-2 GAS GENERATOR - HEAT EXCHANGER PROGRAM: On 8/27, the first hot firing utilizing LH₂ and lox was conducted with the J-2 gas generator and heat exchanger system at the test position 115B at CTL. The 10-second test was to check out the facility system as well as the J-2 engine gas generator and heat exchanger system. No helium was used in the heat exchanger coils. They were cooled with GN₂ instead. The test was a complete success; all functional and data requirements were met. Future testing in this test position will be concerned with the development of a heat exchanger for the J-2 engine and the pressurization systems of the S-11 and S-IVB stages. This program was requested by the P&VE Laboratory. ✓

X 7W 4. FACILITIES: The contracts for the installation and checkout of technical systems for the Advanced Saturn GSE Test Facility and the East Area Blockhouse Expansion (J-2/S-IVB) were signed by Lear Siegler on 8/29. The notice to proceed is effective 9/1. The contract for installation of technical systems for the Components Test Facility has been signed and will be effective 10/1. The contract for design-through-delivery of technical systems for the modernization and expansion of East Area Instrumentation and Controls was signed 8/25. The contract must go to NASA Headquarters for approval. Reference NOTES 8/3/64 HEIMBURG (copy attached). ✓

5. VISIT OF AETRON AND AEROJET-GENERAL PERSONNEL: On Tuesday and Wednesday, 8/25 and 8/26, Mr. B. Rose and Mr. K. Mundt were at Test Laboratory to discuss the design shortcomings of the S-1C test stand; specifically, the lox loading system, which has to be redesigned completely.

ATTACHMENT 1: Photograph (to be attached to Dr. von Braun's & Mr. Weidner's copies only)

ATTACHMENT 2: NOTES 8/3/64 HEIMBURG (to Dr. von Braun's & Mr. Weidner's copies only)

CONFIDENTIAL

B 8/31

1. STATUS REPORT ON PEGASUS PROJECT: I have grave concern in regard to the status of the Pegasus Project. The reliability of the project appears to be seriously impaired because of the following reasons:

a. The volume of work still to be accomplished within the frame of the prevailing time schedule

b. The number of necessary changes, modifications, and improvements required for the electronic systems, power supply system and electrical network

c. Investigations for the deployment systems to obtain conclusive data for orbital conditions

d. Deficient subsystem testing

e. No systematic testing nor preparation of test equipment for electronic systems

f. Layout of the electronic canister.

The continuity of the project is endangered because of too frequent changes of key personnel at Fairchild Stratos Corporation (FSC). Suggestions and proposals given by MSFC personnel to FSC have often been disregarded. The situation has been discussed with I.O. (Mr. Young, Dr. Johnson, and Col. James) and a thorough review has been requested; depending on the result, a delay of the firing schedule is recommended.

URGENT

Lee
James

Your
comment
is
invited

B



1. R-COMP RESOURCE AND PROJECT CONTROL SYSTEM:

a. A Resource and Project Control System is being designed which will permit Computation Laboratory to exercise tighter control over expenditure of computer and manpower resources. ✓

b. Procedures now being written will permit Computation Laboratory to request proper justification prior to approval of computer applications. This justification will be based on feasibility studies with emphasis placed on resources expenditure. ✓

c. This system will provide utilization reports sufficient to analyze and control computer and manpower resources. ✓

2. SINGLE-SUPPORT CONTRACTOR ACTIVITIES: A procurement plan has been routed through for signature which allows General Electric to pick up the present work performed under IBM Data Center contract either by direct methods or subcontracting. This is the first step in combining of all in-house contracts into a single support type. ✓

3. HYBRID FACILITY AT SLIDELL: Members of the Staff of the Simulation Branch spent two days with the Assistant for Analog Systems from the Michoud Computer Office at Slidell developing specifications for a hybrid system to be located at Slidell. This hybrid system will be composed of existing analog computers located at Slidell plus an interface equipment group and a small digital computer. Specifications for the interface equipment and the digital computer were discussed at this meeting. Final approval of specifications will be made at a meeting in Slidell next week. ✓

Installation of the hybrid system was approved at the Slidell Computer Board Meeting on July 29. ✓

4. SATURN V PILOTED CONTROL STUDY: Simulation Studies are proceeding for study of pilot control from launch to first stage burnout of the Saturn V. This simulation is being done in conjunction with personnel of the Astrionics Laboratory, Flight Dynamics Branch, and is a continuation of their studies begun at Ames Research Center. The simulation presently uses an interim instrument panel and three-axis control stick in addition to three analog computers. Astrionics' personnel have provided the system equations and the operator's equipment. The computer program includes roll, pitch, and yaw dynamics; two bending modes; engine gimbaling dynamics; and filters for rate feedback and the control stick. Astronaut and test pilot participation is being arranged by the Astrionics Laboratory. ✓

No sloshing?
B

SA-7: Schedule for SA-7 has slipped 2 days due to hurricane Cleo and crew fatigue. [Pre-launch review is scheduled for Sept. 8, 2-3:30 PM, Center Conference Room.] ✓

S-IV STAGE NON-PROPULSIVE VENTING: A meeting on non-propulsive venting was held with interested Labs to determine solution to this problem. Additional effort will continue this week and results will be reported in next week's notes. ✓

S-IV-9: The stage was removed from the stand and transferred to E&D Building on August 27. Installation of non-propulsive venting system is proceeding. Stage is scheduled for shipment to KSC Sept. 17. ✓

PEGASUS: Electronic System (a) The electronic canister is currently in thermal-vacuum test at Bladensburg. Low temperature tests were completed Friday with no deviations in performance indicative of design failures. There were recurrences of failures previously encountered in canister testing. Corrective action will be taken at the completion of the first "step-through" of the test procedure and the systems will be retested to qualify the fixes incorporated. (b) As a result of failures of box structures in vibration tests, Fairchild/Stratos has initiated actions to "beef-up" the boxes and make fixes to assure system survival during launch. An engineering team from MSFC will assist in the effort on a consulting basis. (c) Packaging of the Data System Power Distribution Unit is to begin August 31. The new design is now scheduled to be available for incorporation in Pegasus A on October 2. Testing of the circuit is now underway in the prototype; testing of final design and packaging will be completed subsequent to incorporation in the first flight capsule.

Detector Panels (a) G. T. Schjeldahl has now successfully completed sample production of 1.5 mil detectors bonded to F/S rigid foam. Latest samples have passed all acceptance tests without failure. ✓ (b) As of Thursday, GTS had demonstrated an acceptable capability to produce thermal control coatings in production lots. ✓ A new protective mask procedure, to protect the copper deposit electrode, has been developed. GTS rate of production of acceptable coating is now greater than F/S rate. Full production at GTS has now been restarted. ✓ (c) Rejection rate due to mylar burn-out failures is currently running less than 2%. Rejection rate due to solder failures is currently running less than 10%. ✓ Schedule Delays in meeting target dates in prototype schedules continue. An additional 2 day delay to completion of prototype test has occurred in the past week. Impact of rework on prototype schedule cannot be evaluated prior to completion of survey of MSFC engineering team. As of this date, there is no effect on Pegasus A delivery schedule, provided minor retro-fit action can be accomplished at Hangar D, KSC. It should be noted that in a meeting with Dr. Haeussermann, Bob Young, Dr. Johnson and myself, it was determined some rework may be required and that ASTR will investigate this. ASTR is now reviewing some faulty circuitry and electronic mounting and a delay in the schedule could result from this review. ✓

S-IVB: It was mutually agreed at a meeting at DAC last week that there would be no additional changes on 201 and 202 unless they are required for safety or accomplishment of the vehicles flight mission and even these will be individually assessed for impact prior to implementation. ✓

B 8731

1. ANSWER TO PRESIDENT'S LETTER: A preliminary draft of the answer letter is now in circulation among staff offices in Washington and plenty of "surgery" is applied. It is a very broad description of the entire program, avoiding specifics. However, the following three projects are singled out as the most probable new starts this year: VOYAGER, ALLS and APOLLO X. The draft is supposed to be coordinated with DOD, PSAC and Dr. Welsh before it will be submitted in a final version in December. ✓

2. USSR ACTIVITIES IN THE AREA OF THE REUSABLE ORBITAL TRANSPORT: Soviet Chief Air Marshal Konstantin Vershinin, in an interview with the Soviet news agency Tass, said the USSR is developing an aerospace plane that "our generation" will see fly. Vershinin says that such a craft is "technically feasible," and that Soviet scientists and engineers are concentrating on development of the plane "not without success." ✓

3. STATISTICS OF FY 1964: After evaluating the accounting system used at MSFC, with respect to Project 981, Advanced Systems Studies, OMSF, we can report the following summary:

Total Hours (including OT) for Project 981: 244,908

Director's Office	16,352	=	6.68 %
Director, R&D Office	17	=	0
Future Projects Office	83,053	=	33.93 %
Resources Management	102	=	0.04 %
RP	6,838	=	2.79 %
LVO	14,993	=	6.12 %
ME	1,172	=	0.48 %
ASTR	13,723	=	5.60 %
P&VE	59,588	=	24.33 %
QUAL	9,190	=	3.75 %
COMP	12,685	=	5.18 %
AERO	26,882	=	10.97 %
TEST	313	=	0.13 %

These are direct charges to the 981 account to which some 50 percent indirect time would have to be added. This results in about 200 man-years out of about 7,500, e.g. ~ 2.6 %. More statistics in the next NOTES. ✓

B 8/31

A. RUDOLPH
rw

1. S-IC-T: In order to eliminate any chance of development of new surface cracks in the welds of the fuel and lox tanks, the local shaving requirement at crack sensitive locations was extended to the shaving of all accessible welds, inside and outside. Re-hydrostatic testing and re-cleaning of both tanks will be required. This will occupy the vertical assembly tower at least 5 weeks longer than scheduled. The delivery of the -T vehicle to the test stand will, therefore, slip approximately 5 weeks, from the 3rd week in February 1965 to the first week in April 1965.

2. S-IC-501: Present estimate of schedule impact, because of the cracks, is in the order of 7 weeks. The actual situation may be further aggravated by the recent scrapping of the upper lox bulkhead by Boeing. Evaluation is not complete. ✓

*
rw
3. S-II Stage: The first common bulkhead passed acceptance on August 24. The ultrasonic inspection had not been conclusive, and two 1/4" plugs were taken from the questionable areas and later patched. ✓

4. S-IVB Stage: We assisted Douglas' Plant Engineering in establishing maintenance of electronic and electrical controls of major weld equipment at the Santa Monica plant. ✓

5. Pegasus: The alodine and masking problems of the capacitor panels have been solved. Schjeldahl successfully produced alodine coated panels last week. ✓

6. LEM: Mr. Sullivan, MSC, and Mr. Maurer have introduced a manufacturing liaison engineer at Grumman for an initial stay of two weeks, (Mr. Landreth, R-ME-U). ✓

B 8/31

1. NATIONAL LAUNCH VEHICLE STUDY - The overall approach to this study has been modified. A joint NASA-DOD panel has been formed for the cost portion of the study. Co-chairmen are Joe Malaga of NASA headquarters and Col. Roy Seccomb representing DOD. Members are from NASA headquarters, Manned Space Flight, Space Sciences and Applications, and Air Force Headquarters. This panel will assemble on August 31 to analyze the cost data for all vehicle systems shown on the mission model established for this study; and will present their conclusions to the Aeronautics/Astronautics Coordinating Board.

Air Force has agreed to collect cost data in the same detail for Air Force Systems (including Titan III) as required of MSFC by NASA headquarters. J. A. (Woody) Bethay of this office accompanied a team from NASA headquarters and AF headquarters to AF Space Systems Division during week of August 17 to initiate collection of cost data on Air Force systems, furnishing formats, definitions, etc., to Air Force and their contractors. ✓

The panel co-chairmen visited MSFC last week, Purpose was to show Colonel Seccomb that estimates for the Saturn IB are being approached in the same detail and manner as Air Force Systems. ✓

Our submission to the Launch Vehicle Cost comparison is being assembled now and will be delivered late today. (Data from Douglas were received only Saturday night, August 29). ✓

Results from the Saturn IB/Titan III C Technical Comparison, will be reviewed with you, Dr. Rees, and Les Pero of Manned Space Flight on Thursday afternoon, Sept. 3, for delivery to headquarters on Sept. 4. ✓

2. MANAGEMENT COUNCIL - The MSF Management Council is scheduled to meet in special session on September 10 for the Apollo Assessment. ✓ The regular Program Management Council will meet on September 22, and the Apollo portion of the program review has been deleted due to the Sept. 10 meeting on Apollo. At the Sept. 22 meeting the time normally used for Apollo will be available for special topics. ✓ H.M.

→ Do we have any?

B

Maus Maus
Food
idea!
Suggestions?
B

1. TRANSFER OF PERSONNEL SPACES TO INDUSTRIAL

OPERATIONS: In accordance with the R&D Operations' agreement to transfer 250 spaces to Industrial Operations, a schedule of planned monthly transfers for the next 6 months has been prepared. ✓ That plan, for transfer of 125 spaces, has been furnished to the Executive Staff. The plan for the remaining transfers will be furnished at a later date; however, before that plan is finalized, it appears desirable, from a Marshall viewpoint, that other organizational elements examine themselves with the thoroughness and objectivity recently applied to the examination of R&D Operations' manpower requirements. Dr. McCall has suggested such reviews to Mr. Maus.

2. NOMINATIONS FOR PRESIDENTIAL CITATIONS: Fourteen individuals and seven organizational elements of R&D Operations have been nominated for Presidential Citations in recognition of significant economy or efficiency achievements. ✓

3. SOURCE EVALUATION BOARD, SINGLE SUPPORT CONTRACTORS: On August 27, the Board finalized the P&VE Request for Proposal (RFP). The Board will have completed finalization of all planned RFP's with the review of the Research Project's RFP on September 1. The Purchasing Office has now issued all RFP's with the exception of those for P&VE, scheduled for release this week, and for Research Projects, scheduled next week. ✓ Five of the ten Pre-proposal Conferences have been held; the remaining conferences will be completed in September. ✓

4. GREEN MOUNTAIN FACILITY: The lease-sale proposal made by the owners of the Green Mountain property appears to involve some severe legal problems, insofar as the Government is concerned. The MSFC Chief Counsel has enumerated the principal legal questions or impediments related to the Green Mountain proposal. This matter is being pursued by the MSFC Facilities and Legal people. ✓

NOTES 8/31/64 RUDOLPH

B 8/31

Apollo Program Assessment - Saturn V Program Stage and Staff Office personnel are actively participating in the high priority Apollo Program Assessment. ✓

B 8731

E.S.
 with
 all out
 well see
 is happy
 as he
 B

1. PEGASUS TECHNICAL REVIEW TEAM (PTRT): Mr. Don Davis, LaRC, and six more members of LaRC and Bellcomm visited MSFC on August 28 for a full-day briefing on the Pegasus Project. After the briefing, Don Davis expressed his general satisfaction regarding the design and testing of Pegasus components. He would like to see impact tests performed with our thinnest detector panels. (These tests have been planned by our Project Office.) ✓
2. OART FY-65 SRT PROGRAM: We were notified last week that Dr. Bisplinghoff signed the technical approval of our FY-65 OART-SRT program. It will be mailed to us through OMSF. ✓
3. SRT PROGRAM STATUS: The status of the portion of the ART/SRT program under the cognizance of RPL is, as of August 28, as follows:

	<u>ANNUAL PLAN</u>	<u>AUTHORIZED</u>	<u>PROCESSED TO FMO</u>	<u>OBLIGATED</u>
OART	9,355,000	4,840,000	2,145,000	0
OMSF	13,000,000	0	0	0
OSSA	450,000	30,000	0	0
	<u>22,805,000</u>	<u>4,870,000</u>	<u>2,145,000</u>	<u>0</u>

suggest
 monthly thru Dec
 bi-weekly thru March
 weekly thru June
 PW

Would you like this status report weekly, bi-weekly, or monthly?

4. ALSS MISSION STUDY: Mr. Don Beattie from OMSF participated in the initial Bendix briefing on RPL's Scientific Mission Support Study for the ALSS contract on August 28. Also he discussed in more detail his desires regarding our analysis of various lunar traverses (an in-house assignment from Mr. Beattie to RPL). ✓
5. HIGH VELOCITY IMPACT SIMULATION: OART requested RPL to accept technical responsibility for an experimental study of high velocity particle impact effect (meteoroid simulation), to be contracted to NAA (Dr. Scully). The existing high velocity range needs some technical modifications, and possibly modifications in the velocity measuring system, before impact testing can begin. Dr. Orlo Hudson, RPL, will be technical supervisor. ✓