

July 6, 1964

B 7/10

J-2 ENGINE

Bonnie
Let's place
this call
Monday
7/13
B

Two incidents occurred this reporting period which further substantiated the need for our recent meeting with Rocketdyne management. A bolt was found in a LM2 turbopump during a pretest checkout, and a pneumatic system failure on an engine test caused a LOX-rich cutoff which burned out the thrust chamber. Obviously, our recent meeting has not yet had an effect on Rocketdyne manufacturing and test operations. Perhaps a call to Sam Hoffman by you would emphasize our desire for immediate action. I also suggest you bring him up to date on the H-1 LOX dome problem.

F-1 ENGINE

As a result of the facility explosion on CTL-3 test stand at Santa Susanna as reported last week, F-1 engine component (heat exchanger and gas generator) testing will be transferred to Bravo I test stand, and gas generator testing on Bravo II.

The first very short duration checkout firing was made on the new test stand 1D on June 26, 1964.

RL10 ENGINE

The Atlas Centaur Vehicle AC-3 was launched June 30, 1964. The boost phase, separation, and operation of the RL10 engine was normal. However, 4 seconds after RL10 ignition, the vehicle hydraulic system on the #2 engine lost hydraulic pressure, causing the vehicle to spin at approximately 40 revolutions per minute. A LOX depletion cutoff occurred approximately 254 seconds after RL10 ignition which was 123 seconds prior to programmed cutoff. It is believed that the centrifugal force of the vehicle spin caused the propellants to uncover the boost pump suction lines. Preliminary evaluation of data indicates that the vehicle hydraulic pump shaft or coupling failed causing hydraulic pressure loss.

Testing at P&WA subsequent to the Centaur flight substantiates the structural integrity of engine hydraulic drive system. The S-IV hydraulic drive system, which differs in design from the Centaur system, has performed without incident during numerous static firings and two vehicle (six engine cluster) flights. As a result of the Centaur AC-3 flight, the S-IV hydraulic pump design has been reviewed, and no similar problems are anticipated.

H-1 ENGINE

Disassembly of the turbine on Engine H-2029 revealed that a retainer had separated from the turbine seal due to backing out of four screws in the assembly. This allowed the retainer to rotate on the turbine shaft at a high speed, causing break-up of the retainer and moderate damage to the turbine assembly. H-1 engines for Vehicles SA-7, 8, 9, and 10 have this same seal configuration. All turbines on the above vehicle engines will be removed and reworked. There is no impact on vehicle schedules due to this rework.

Previous development history on this component includes 111 turbopumps tested of this configuration for 2494 tests and 368,000 seconds. Three incidents occurred during this testing, two in which the seal retaining screws were loose or missing, and the third case in which the seal ring separated as on Engine H-2029. Subsequent to this last R&D seal ring failure, a design modification was incorporated which eliminates this problem. This design modification is effective on all Saturn IB Engines.

During the material analysis of the LOX dome on Engine H-2011 it was determined that the crack was caused by stress corrosion. Three other engines on Vehicle SA-7 have LOX domes with the same heat treatment. At the present time the course of action is to remove these three engines and replace the LOX domes with the new type 7075-T73, which is scheduled to become effective on SA-203 and subs. Engine H-2010 was removed from SA-7 and shipped to Neosho on July 4. Engines H-2012 and H-5013 will be shipped to Neosho on July 6. Engine H-2010 will be returned to KSC by July 9. Action on the remainder of SA-7 engines is contingent upon the availability of the new type LOX domes and final results of the metallurgical analysis which is in progress.

Vehicle impact due to this action has not been established.

B-7/10

NOTES 7-6-64 CLINE

1. LOX DOME CRACK DISCOVERED ON SA-7 ENGINE: The crack was found on engine H-2011, position 6, during engine leak checks. The engine was replaced with spare engine H-2019. Further investigation is being conducted. ✓

2. PROPOSED NONPROPULSIVE VENTING DESIGN IS ADEQUATE FOR S-IV-9 AND S-IV-8: Analysis has determined that initial vehicle tumble (induced by the main hydrogen propulsive vent) may not occur before orbital injection. Although failure to tumble will allow liquid propellants to enter the nonpropulsive blowdown vent system, the suitability of the system for post-injection venting will not be impaired.

3. F-1 ENGINE TESTING AT MSFC: Four tests were conducted on the second production engine, F-1002; the most recent turbopump modifications are incorporated on this engine. Testing was conducted to establish proper gas generator orificing that will provide satisfactory engine performance while maintaining turbopump explosion at Edwards Air Force Base. Correct orificing has not been determined. ✓

4. INSTRUMENT UNIT (IU)/S-IVB COOLING UNIT: The contractor, Budd Electronics, has indicated a three-month schedule slippage for delivery of the first unit to MSFC. We will investigate, during next week, what corrective action can be taken to improve the delivery schedule. ✓

FSE ?

F.C.

Nobody had ever expected that, anyway!
Up to injection, vehicle is under power and actively attitude-controlled. Also, under power, we have a positive g field and no ullage orientation problem at all. So, what do you mean?
B

NOTES 7/6/64 CONSTAN

B 7/10

Negative Report

NOTES 7-6-64 DANNENBERG

D 7/10

1. Saturn IB vs Titan III-C - Notebooks containing original correspondence and background information of past activities on the Saturn IB vs Titan III-C controversy and preliminary information of present MSFC Task Team activities have been assembled and distributed to Dr. Rees, Messrs. Williams, Maus, Evans, and various members of the Task Team. ✓

F.W.
Show me!
B

2. Saturn IB and V Brochures - have been printed in color. Mr. Williams handcarried a few advance copies to Washington on 7-1-64. ✓

3. GE Contract -

ESE Fabrication Mission - The Procurement Plan has been signed by IO (Dr. Hueter) and was forwarded to Mr. Gorman for approval. The Procurement Request will be ready for processing as soon as the scope of work is received. ✓

Annual Work Statement - The GE proposal of the Work Statement covering R-QUAL and R-SA tasks was received and is being evaluated. Evaluation will be completed by 7-10-64. ✓

Bob Y,
Do you
still
consider
such a
backup
desirable and
necessary in view of
Monroe Reed's rather
convincing "stall margin" curve?
B

4. J-2 LH₂ Pump - Mr. Young requested that Mr. Belew implement necessary action preliminary to initiating a backup centrifugal pump development program for the J-2. A R-P&VE memo was submitted to R-SA summarizing the R&D Operations position. R-P&VE has confidence in the present axial flow pump design and doesn't believe that the centrifugal pump is required. IO hasn't stated yet what action will be taken in response to Mr. Young's request.

NOTES 7/6/64 FORTUNE

B7/10

1. Mississippi Test Contractors Association Formed: Wednesday night most of the prime construction contractors met in Slidell to organize this association. Fred Tyvoll says that it will go a long way to effectuate the Project Stabilization Agreement, the building trades appear to be happy about it, and the labor situation is the best he has seen since coming down here. Since Mr. Yoakum of Chaney and James was one of the leaders in this action and Farrell is his sub-contractor, it is hoped that the latter will live up to the PSA. ✓

2. Rainy Week at MTF: It rained all but one working day this past week. The weather we had last Saturday, Sunday and Monday affected excavation operations in the canals, outside work for approximately two-thirds of the work being lost due to heavy rain fall. ✓

3. GE Contract Negotiations Still In Process: FY-65 anticipatory costs for month of July was authorized while attempting to conclude FY-65 support negotiations. NASA Auditor believes GE wage and salary costs to be excessive by about \$450,000. GE so far has offered to reduce by some \$200,000. Fee cannot be negotiated until total anticipated cost can be agreed upon. Phase II Technical Systems negotiations are continuing in Huntsville. ✓

4. Colonel Raymond Pays Last Visit to MTF: Colonel Raymond came by Thursday to say goodbye to personnel in the Area Engineer's office and to us. Colonel Marshall will be checking in at Mobile next week. Colonel Roberts will remain for about one month. ✓

1. Flight Evaluation Panel: The second panel meeting was held in Houston on June 25. It was agreed to use the MSC post-flight trajectory reports as initial Interface Control Documents; a special group was established to re-evaluate the exchange of processed flight data between MSC and MSFC. (this did not work satisfactorily in SA-6); KSC was requested to provide some minimum data office service during holidays and weekends to prevent re-occurrence of the excessive delays experienced in SA-6 data transmission; Headquarters (Earl Smith) requested MSC to adhere better to established flight test reporting requirements. ✓

E.F.
 What the heck is that???

B
 Who's suggested that study?

2. Titan III/S-IVB Performance: Preliminary performance estimates of the capability of the Titan III vehicle using the S-IVB as a second stage give a payload of 25,400 lb in a 100 n. mi. circular orbit if it is assumed that the solid strap-on engines are burned first, followed by cutoff of the solids and ignition of the core, and then ignition of the S-IVB. If it is assumed that the solids and core are ignited simultaneously on the pad, the payload in a 100 n. mi. orbit is about 36,000 lb. This performance data is very rough since good weight data for the Titan/S-IVB interstage was not available and drag data for the configuration was not available. ✓

???

As national equipment I hope

B

3. Orbital Debris Study: An orientation meeting to familiarize DAC with the results of the Orbital Debris Study, especially with proposed Saturn IB retro propulsion system, is scheduled for July 9, 1964. Douglas will be requested to participate in evaluating the impact of adding the debris system to the S-IVB stage. ✓ A special one hour presentation is scheduled for you on the status of the Orbital Debris Studies on July 28, 1964, at 2:00 P.M. in the ninth floor conference room. ✓

4. Saturn IB/Centaur: After the last discussion Mr. de Fries had with Les Fero in Washington last week the score is about as follows: OMSF thinks that they have the 2-stage Saturn IB future reasonably well-assured. The missions center around manned missions for Earth Orbital Operations but there is a problem with a 3-stager since OSS, though quite enthusiastic about the Voyager, is not coming around to accept multiple Surveyor missions. The difficulty is not one in principle but one of timing, namely that the project proposal for a 3-stager IB promised to Dr. Seamans by OMSF by early August cannot easily justify starting the Centaur integration in Fiscal '66 when it is only needed for the Voyager program which at best is in 1969. We are arranging that the survey of payloads conducted by Dr. Stuhlinger's Laboratory (Dr. Mechtley) is being made available to Les Fero in order to pull OART into the overall mission planning. ✓

B 7/10

NOTES 7-6-64 GRAU

- 1. NASA-DOD RELATIONSHIP: After the Zero Defect Seminar, Mr. John Riordon, Director for Technical Logistics Data and Information, Office of Assistant Secretary of Defense, who is in charge of Quality Control in DOD, visited with me and Mr. Howard Weiss of the Office of Reliability and Quality Assurance (NASA Headquarters) for a discussion concerning the relationship of NASA and DOD particularly in the quality assurance area. It was a very constructive session which showed that DOD understands the NASA requirements much better now than a year ago. Among other subjects, we discussed the possibility of combining the NPC 200-2 and NPC 250-1 documents at a later date and of incorporating some features of the MIL-Q-9858A document which could result in a uniform NASA-DOD document. Although the absence of an objection cannot be considered an endorsement of this plan, it indicates a more positive attitude than has been displayed in the past. ✓
- 2. AEROSPACE RELIABILITY AND MAINTAINABILITY CONFERENCE: For the first time after 2 1/2 years, I attended such a conference last week and made two (2) observations: (1) The thoughts planted into the NPC 200 and 250 series documents have been well accepted in the Aerospace Industry. The impact of these documents on industry has been profound. ✓ (2) In the reliability area, the trend is away from the strictly theoretical mathematical approach which prevailed several years ago. A more realistic approach emphasizing attention already in the early design phase, stressing the importance of failure mode analysis, using all available data from well planned integrated test programs for reliability assessment, applying mathematics as a tool, and utilizing past experience and engineering judgement has made good progress. ✓

Very good results were reported by one company with incentive/penalty type contracts for aircraft equipment in the reliability area which resulted in a sizeable profit increase for the company and multiple savings for the airlines due to considerably reduced maintenance. ✓

- 3. DEPUTY ASSOCIATE ADMINISTRATOR FOR INDUSTRY AFFAIRS: After a visit to Mr. Condon on the subject of his presentation to the Management Council Meeting (results of which I would like to discuss with interested parties separately upon request), I met Mr. George Friedl who has just taken over the above named position, succeeding Mr. Hilburn who was promoted to Deputy Associate Administrator. The Office of Reliability and Quality Assurance (Mr. Condon), as well as WOO and NEO report to him. Mr. Friedl plans to visit the Centers as soon as he becomes somewhat familiar with his job. ✓

D.F.
I'm eager to discuss this with you.
Please make appointment thru Weidner's office and Dennis
B

NOTES 7-6-64 GRUENE

B 7/6

SA-7 Status: A decision was made at MSFC to exchange three engines of the S-I Stage which had domes that came from the same batch as the one found with the crack. It was also decided that all turbines will be removed from the S-I and seals checked. The present schedule calls for shipment of the last repaired engine from Neosho to the Cape on July 12. A decision whether the other engines have to be exchanged is expected not later than July 8. Without doubt, there will be a delay of the launch date of SA-7, but the full impact can only be determined after the final decision on the other engines has been made. We were on schedule with all the other systems prior to the time of disassembly of the S-I propulsion system. ✓

NOTES 7/6/64 HAEUSSERMANN

B 7/10

No submission this week.

1. S-1 TESTING:

Reference NOTES 6/29/64 HEIMBURG (copy attached). The condition of the screws holding the I-B turbo seal in all turbines from S-1-9 has been investigated. The turbines were disassembled and inspected without finding any loose screws. S-1-8 turbines have been received from Michoud and will be inspected today. S-1-7 turbines will be fixed at Rocketdyne-Neosho, since three S-1-7 engines will have their lox domes changed there. The S-1-10 turbine seal screws will be secured at a later date. ✓

Yes)
B) It is assumed that you have been briefed by R-DIR and R-P&VE-DIR on the H-1 engine lox dome stress corrosion problem. An agreement has been reached with Rocketdyne whereby the three S-1-7 engines requiring new lox domes will be changed out at Neosho. It appears that this problem exists only with a certain series of the H-1 engines and not with all engines planned for use on S-1 stages. R-P&VE has been furnished with samples of all the available lox domes for metallurgical inspection and testing. The remaining required samples must come either from Rocketdyne or from the flight engines which are in the pipeline. ✓

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

Test TWF-023 (engine F-1002) was conducted on 6/30. Scheduled duration was 120 seconds; however, the engine was cut off after only 1.02 seconds mainstage, when the lox and fuel pump outlet pressures exceeded the redline values. The gas generator lox orifice had been enlarged prior to this test; however, the gain in performance exceeded the predicted gain. ✓

Test TWF-024 was made on 7/1. For this test, the gas generator lox orifice previously used on test TWF-022 was reinstalled. The scheduled mainstage duration of 30.73 seconds was achieved. Engine performance was slightly below nominal. Difficulty has been encountered in determining the proper orifice size for engine F-1002 because the Rocketdyne gain values for this engine do not appear to be true. Next test is scheduled for Wednesday, 7/8. ✓

3. SOUND SUPPRESSOR MODEL:

The sound suppression test facility previously utilized for the H-1 engine has been modified to provide for the testing of a 5-engine cluster to provide model sound suppression data for the S-1C stage. The engines being utilized are the 30K Vanguard thrust chambers which will be fed by one H-1 Mark 3-H turbopump. Two of these engines have been installed, and three tests were performed last week. One was an ignition test, one was a partial transition (75% combustion chamber pressure), and one was for two seconds of mainstage. The remaining three engines will be installed this week and the same series of tests will be repeated. This test facility is scheduled for "on stream" operation by the week of 7/13. ✓

NOTES 7-6-64 HOELZER

Negative report.

B-7/10

NOTES 7/6/64 JAMES

METEOROID PAYLOAD MANAGEMENT: John Disher of Apollo Test Office and Milt Ames of OART will be here Wednesday, July 8, to discuss with me the new Meteoroid Payload Management, in particular how we work with Dr. Mueller's office versus Dr. Bisplinghoff's. General Phillips is sending me a letter with his views on the meteoroid payload operation, but the letter has not been received to date. I have explained verbally to General Phillips the steps I am taking such as my trip to Fairchild/Stratos and Schjeldahl this week - the addition of Bob Pace to my staff, who will monitor for me the micrometeoroid effort, and General Phillips seemed to be satisfied. ✓

METEOROID PAYLOAD SCHEDULES: The latest FSC estimate for completion for shipment of the prototype to GE is now August 7. This is a slippage of 19 days from last previous estimate of this event. Discussions with FSC indicate that DATA System is now complete and of acceptable design, but acceptance testing has not been completed and formal acceptance testing will not be complete prior to July 14. My meeting is scheduled with FSC for July 8 to review schedule and manpower and facilities utilization with the aim of improving current completion dates. The critical item remains the electronics. ✓

SA-7: The schedule impact of H-1 engine LOX dome problem on SA-7 has not been determined. This office will be informed as soon as this information is available. I have issued instructions to investigate the possibility of installing the non-propulsive vent on S-IV-7, depending on the slippage caused by the LOX dome problem. ✓ Availability of hardware will very likely prevent this installation on S-IV-7. ✓

S-IVB J-2 ENGINE AVAILABILITY: A new forecast of J-2 Engine availability is being coordinated with DAC. The forecasted availability does not meet DAC's previously furnished requirements. DAC has been requested to furnish any potential impact of revised engine deliveries. ✓

S-IVB BATTLESHIP HOT FIRING: It appears that the Battleship hot firing schedule of August 19 has slipped two weeks and the time will not be made up by DAC. Up until last week DAC management had indicated they were behind schedule but the time could be made up. In the opinion of our resident personnel, this slippage is non-recoverable. ✓

NOTES 7-6-64 Koelle

B-7/10

No NOTES this week.

1. Saturn V, S-IC Stage: Delinquency of component delivery is the major cause of schedule delays. The majority of these components are not manufactured by Boeing but designed and developed by sub-contractors to Boeing, such as, Solar, Flexonics, Stainless Steel Products, H.I. Thompson, Bendly, Parsons, etc. The problems encountered at the various companies are typical development problems, for example, weld cracks in ducts, bellows design failure, inadequate manufacturing process, lack of design experience, component test failures causing redesign, new process learning, etc. Boeing is now making an increased effort to help these sub-contractors in finding solutions to their problems in an expeditious way by attaching a group of design and manufacturing engineers to each company which is delinquent in their parts delivery. This method of giving technical assistance to sub-contractors had been suggested by us and had not been used to this extent by The Boeing Company before. ✓

2. Meeting with MSC and Grumman: A discussion by MSC and Grumman engineers was held here at ME Laboratory last week on present or potential problems on sealed joints versus welded joints for the LEM. We had invited participants to this meeting as consultants for exchange of experience from Douglas, Narmco, and P&VE, Materials Laboratory. The major problems are accessibility and sealing joints of thin gage skin panels (.025"). Grumman design engineers had already made up their mind in favor of sealed joints however, we succeeded in having an open-minded exchange of knowledge and experience beneficial to all parties. We had suggested at the end of the meeting to consider and study a plan for a back-up program for usage of welded joints to a greater extent as presently intended. ✓

B 7/10

NOTES 7-6-64 MAUS

1. SATURN IB-TITAN IIIC COMPARISON - New schedule on meetings and hearings:

Senate Hearing	July 27 or later
House Hearing	Postponed indefinitely (not before September 1)
Aeronautics Astronautics Coordinating Board	August 6 or later

No final agreement was reached last week in various meetings between NASA and Air Force on cost estimating methods and criteria. In general, the status of this effort is as follows:

Air Force is interpreting Dr. Seamans' letter to Mr. Brown to permit excluding all development costs beyond FY66.

The Air Force now has cost estimates prepared by contractors, on both AF and NASA Launch vehicles. It is tentatively planned that NASA will review these studies this week.

Dr. Seamans has taken the position that NASA will develop figures according to a system proposed by Joe Malaga of his staff, with or without Air Force agreement.

Headquarters representatives are here today to interpret the Malaga system to us - it is still in formative stages.

Malaga is developing a plan for preparing Centaur cost figures; this plan will be coordinated with MSFC.

Saturn IB Program Office is making requests to the IB contractors for cost estimates. Chrysler will furnish brief vehicle description on which these estimates are to be developed.

✓

✓

B 7/10

Miss
? B

1. R&D OPERATIONS' MANPOWER AUDITS: The planned audit of R&D Operations civil service and contractor manpower will begin today and will be conducted throughout the month. The following audit schedule has been established:

<u>Laboratory</u>	<u>First R-RM Meeting With Laboratory</u>	<u>Full Day Director's Review of Laboratory</u>
ME	July 6	July 9
QUAL	July 7	July 13
COMP	July 10	July 14
TEST	July 14	July 20
AERO	July 16	July 21
P&VE	July 21	July 28
ASTR	July 22	July 30

The audit will be carried out at the organizational branch level of each laboratory, with additional penetration as required. Audit results will provide a detailed picture of single-support contractor manpower requirements for each laboratory. That information must be available before the laboratories issue RFQ's for single support contracting services. ✓

2. FY-65 ENGINEERING SUPPORT SERVICES: Agreements have been worked out with Industrial Operations and Financial Management Office to simplify funding of engineering services contracts by using a minimum number of account categories. By consolidating many details into a few general account headings, we will considerably improve our flexibility in contract management. At the same time, we will be able to identify, in an adequate depth of detail, the engineering support in our Program Authority Plan, and we will be able to accrue contractor cost data to a fineness required to judge fiscal needs and support future monetary requirements. ✓

3. FY-66 CofF PROGRAM: Last week, meetings were held with representatives from the Facilities & Design Office and the Laboratories to discuss criteria study requirements and project writeups. Preliminary writeups will be reviewed at MSFC on July 13 by representatives from Headquarters. ✓

4. PARTICIPATION IN LOCAL POLITICAL CONTESTS: A legal opinion has been requested from the Chief Counsel's Office concerning candidacy of MSFC employees in local political contests. By the end of last week, four R&D Operations representatives had requested permission to enter local political races. →

I thought we had enough politics within the Center! B

B 7/10

1. Saturn V Financial Status - As of June 30, 1964, the Saturn V program was 99.8 percent initiated and obligated. The balance of approximately 1.5 M is being utilized for obligational adjustments. ✓

2. S-IC Display System - The Boeing Company has been instructed to negotiate directly with RCA for an Input/Output Data Channel to interface with the Cathode Ray Tube (CRT) display system. ✓ This was done at the request of Astrionics Laboratory and will result in R-ASTR performing a monitoring function rather than a design direction function. ✓

3. S-II Stage:

LH₂ Tank Insulation - Recent negotiations with NAA/S&ID have failed to produce a settlement. NAA is willing to accept the additional costs without fee; however, they were insisting to get a change to the contract specification amendment of approximately 2300 pounds per stage. NAA also declined the final MSFC offer for a 1000-pound settlement. ✓

D.R. I think we should be stubborn in this case B

Configuration Management - A Configuration Control Board (CCB) was established on the S-II to control changes on the present contract and to provide experience for establishment of procedures for use on configuration management. This board was established, based on the ground rules presented by Dr. Mrazek, in the Executive Council Meeting on June 28, 1964. ✓

4. Instrument Unit:

Testing - The procurement plan for testing an S-IVB forward stage simulator, the S-IU-500FS, and an Apollo thermal simulator in the DAC Space Simulation Facility at Huntington Beach, California, has been approved. The RFQ for this effort has been transmitted to DAC; their proposal is due September 1, 1964. ✓

IBM Mission Contract - The IBM Mission Contract proposal has been evaluated. In general, the proposal indicated IBM has a good understanding of what would be expected of them as the IU Prime Contractor. A preliminary negotiation meeting was held with IBM to set up an agenda for the negotiations that will be conducted through the month of July in an effort to definitize a contract by August 4, 1964. Negotiations are scheduled to begin today, July 6, 1964. ✓

NOTES-7-6-64-SHEPHERD

B-710

No Notes

NOTES 7-6-64 Stuhlinger

B 7/10

1. SRT PROGRAM STATUS: The current status of the ART/SRT Program under the cognizance of this Laboratory is, as of July 2, as follows:

	<u>ANNUAL PLAN</u>	<u>AUTHORIZED</u>	<u>PROCESSED TO FMO</u>	<u>OBLIGATED</u>	<u>CHANGE IN OBLIGATIONS SINCE 6/26/64</u>
OART	10,515,000	10,515,000	10,407,000	8,268,636	2,675,746
OVSF	14,133,000	14,133,000	13,975,189	9,880,262	6,023,303
OSSA	675,000	675,000	666,928	401,731	220,759
	<u>25,323,000</u>	<u>25,323,000</u>	<u>25,049,117</u>	<u>18,550,629</u>	<u>8,919,808</u> ✓

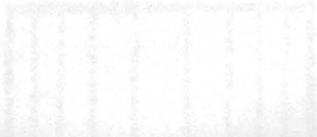
2. AIAA ANNUAL MEETING: I attended the AIAA Annual Meeting in Washington as one of the Technical Directors. Most of the time was spent in Board and Committee Meetings. It seems that the integration of the two antecedent societies is now successfully accomplished. Dr. Dryden, as recipient of the \$5,000 Hill award, gave a very fine banquet speech ("If every American citizen pays 50 cents a week, we can finance our entire NASA space program."). ✓



July 13, 1964

VOID FREE
SEPARATION

ETHE



OFFICE OF DIRECTOR - MSFC

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

REMARKS

This is the remainder
of the notes with
Comments, 7/13/64.



CODE <i>DIR</i>	NAME <i>Jeann</i>	DATE <i>7/30/64</i>
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B 7/30

NOTES 7-13-64 HOELZER

1. LOSS OF KEY PERSONNEL: A key Project Officer of the Data Center Branch is leaving on the promise of a GS-15 position at MSC. The employee, Mr. Earl Leech, is our PRINCE Project Officer and is one of only four civil service project personnel in the entire Data Center effort. He headed the group which installed Dr. Debus' business computer and also our Slidell business computer. The present restrictive grade policies at MSFC have encouraged this employee to leave. Furthermore, we have still been unable to obtain a waiver from Washington to qualify a GS-13 Project Officer because of nonsensical AST restrictions on business computer personnel. This recruitment problem becomes more serious with the loss of a key employee at a time when PRINCE is growing and the Data Center effort is at a crucial stage.

Harry S.
 Is there
 nothing
 we can
 do?
 B

2. USE OF BOEING COMPUTER IN THE HIC BUILDING: In order to provide more efficient computer support to contracts held by Boeing from our Aero-Astrodynamics Laboratory in the future, we are writing a contract with Boeing to use the 7094 computer they have installed in the HIC building. This will permit Boeing programmers who are located in the HIC building and who work on these contracts to have the computer near by. The price for machine time is competitive. The contract will be for computer time only. This, of course, includes operators. The contract will not include the programmers. ✓

3. LEASE VERSUS PURCHASE OF COMPUTERS: Congress has approved a considerable sum (around \$50 million out of A & O) for NASA purchase of computers in FY'65. Our Laboratory has presented our plan (purchase of some \$7 million) to Dr. Mueller and is working through the Inter-Center Committee. Mr. Bradshaw will attend the presentation to Dr. Seamans mentioned in Dr. Mueller's letter to you dated June 15, 1964. ✓

B
7/30

NOTES 7/13/64 JAMES

SA-7: In the meeting on July 8, attended by Messrs. Young and Weidner, it was decided to replace the LOX domes on the five remaining engines on S-I-7 and all domes on all engines on S-I-9, -8, and -10. The domes will be replaced with new domes fabricated from 7075-T73 aluminum. On Friday, the last three of the S-I-7 engines were sent to Neosho for new domes and static firing. As of today, two of the engines have been returned to KSC and the third is due back tonight. The third engine is one day late due to a leak in the "O" ring in the LOX dome which required changeout and another static test. The plan is to return all engines to KSC about July 20-22. The target launch date for SA-7 has been established. Based on this date and a review of the design and installation of non-propulsive vent by Dr. Mrazek, MSFC, KSC, and DAC, it is planned to incorporate the non-propulsive vent on S-IV-7 with a target completion date of August 27, in time to meet the plug drop overall test on the new launch schedule. ✓

S-I-9: The requirement to replace all LOX domes on S-I-9 could possibly have an impact on the SA-9 launch date. LOX domes will be available for rework and engines will be reinstalled on S-I-9 by August 16; however, the remaining time for completion of checkout and preparation for ship is short. Based on the one week pad refurbishment time for all Saturn I's, S-I stages must be shipped about four days before launch of the previous vehicle. In order to meet the thirteen weeks between launches, the time request by Quality and ME for checkout and preparation for ship must be curtailed to meet the schedule. Details will be presented tomorrow at the Management Council Dry Run. ✓

S-IV-9: A leak was discovered in the common bulkhead on July 9. The LOX tank was entered on Friday and numerous cracks were found. This was after the third cryogenic loading test. Maximum length was 3/8 inch. Efforts through the weekend and continuing today determined that eight cracks are leaking. It is estimated this problem could cause a two week delay in the static firing date previously scheduled for July 23. A two week delay will not slip SA-9 since the slip of SA-7 has allowed a later arrival at KSC. ✓

Pregnant Guppy: A new one year contract with Aero Spacelines, Inc., was signed on July 9. ✓

Meteoroid Payload Management Discussions: Last Wednesday I met with Milt Ames, John Disher and four other Headquarters people regarding operational procedures between the Meteoroid Payload Office and Headquarters. Agreements were reached on future operations as follows: Every two weeks a meeting will be held at the contractor's plant or at MSFC at which Mr. D'Auitolo, of Milt Ames' office, will attend. This will be in addition to a program type review in Washington monthly, separate from the normal Management Council Review. The first of these reviews is scheduled for the morning of July 22 at Headquarters. Mr. Saunders, of John Disher's office, will be the responsible point of contact between MSFC and Headquarters on program matters. Mr. D'Auitolo will continue as the technical monitor of the program, reporting to Ames. It is anticipated that the above will provide necessary program and technical information to MSF and OART on a continuing basis. I believe Milt Ames is quite satisfied with our overall approach. ✓

S-IV Battleship Hot Firing: The B/S hot firing has slipped two additional weeks to mid-Sept. I will look into this later this week during the Program Manager's meeting on the West Coast. ✓

B 7/30

NOTES 7-13-64 Koelle

The following are several tables which summarize the FY 1964 contracts for Advanced Studies, conducted or sponsored by our office, most of which have just been initiated:

I. <u>Summary</u>		<u>\$ x 10³</u>
<u>OMSF</u>	21 Study Projects 31 Contracts	9,095
<u>OART</u>	7 Study Projects 9 Contracts	835
<u>TOTAL</u>	28 Study Contracts 40 Contracts	9,930

16 companies -- 21 corporate divisions

II. Contract Expenditures by Study Area

Operations Analysis and Supporting Studies	1,025
Orbital Systems	700
Lunar Systems	2,445
Planetary Systems	860
Launch Vehicles	<u>4,900</u>
<u>Total</u>	9,930 ✓

III. Major Participating Companies

<u>Company</u>	<u>No. of Contracts</u>	<u>\$ 10³</u>
Boeing	8	2,194
Martin	5	1,800
General Dynamics	8	1,500
Lockheed	3	1,100
Bendix*	1	800
NAA	3	575
Douglas	3	385
STL	1	250
LTV	1	200
Bell*	1	200
Chrysler*	1	171
AVCO*	1	150
Garrett*	1	100
Westinghouse*	1	100
United*	1	85
GE*	1	<u>75</u>
16 companies.	<u>40 contracts</u>	9,685K** ✓

*8 companies contributing "new blood." ✓

**245K for MOLAB engineering support.

1. Delinquent Hardware for S-IC, (Reference: Your comments to my Notes 6-22-64, copy attached): The lead time for procurement or development of components is, of course, in our all-success schedules very short and in some cases marginal or too short. It is true that in some cases the orders for procurement were not issued in time to meet schedule VII requirements. However all these cases were caused by late design releases. For the majority of delinquent parts the procurement time was not impossible. ✓
2. Meeting at Aerojet on Manufacture of M-1 Engine, (Reference: Your comments to my Notes 6-22-64, copy attached): We act in this support strictly on request of the Lewis Center. We were again called last week for support on a specific forming problem they have encountered. I would only consider placing an ME man in residence at Sacramento on written request by Lewis to you or Dr. Rees. ✓ I do not volunteer to give this support because I cannot easily spare a good engineer for this purpose. ✓
3. S-II Common Bulkhead Fabrication: The first impression check on the fit between upper facing and honeycomb core, which is already bonded to the lower facing and machined, was completed last Thursday, July 9. The impression tape showed approximately 98% match fit; therefore, only minor hand fitting is anticipated before final impression check. Bonding is estimated to commence this week. ✓

NOTES 7-13-64 MAUS

B 7/30

1. POP 64-3 PROGRAM ADDITIONS - The Program Additions portion of POP 64-3 was coordinated at MSFC internally on July 7 and with Ed Gray on July 8. Formal submission was handcarried to Washington July 12. ✓

The Saturn IB- Centaur portion of the submission is based on an extrapolation of the schedule and resource estimates for the 154" version. The detailed investigation of the requirements for the 260" version will be reviewed with you tomorrow, July 14. If this alters the POP content, we will amend the POP at headquarters subsequently. ✓

Ed Gray's office is now consolidating the three Centers' submissions into one common document. MSFC representatives are participating. ✓

It is planned to present the consolidated package to the Management Council on July 21, prior to submission to Dr. Seamans on August 1. ✓

2. POP 64-3 APPROVED PROGRAM - Submission of the Approved Program portion of POP 64-3 including R&D, C of F, and AO, is due in Manned Space Flight August 1. MSFC review is scheduled on July 28.

The AO portion is being held up because of lack of guidelines on:

- a. FY65 civil service space allocations.
- b. Purchase versus lease of ADP computers.
- c. Guideline adjustments necessary to finance the pay raise. ✓

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B 7/30

NOTES 7-13-64 McCartney

1. STATUS OF SINGLE SUPPORT CONTRACTOR PROCUREMENT REQUESTS:

Procurement Requests have been completed by all laboratories. The respective Procurement Plans in support of these Procurement Requests have been completed for AERO, COMP, QUAL, and TEST, and the remainder are in process. NASA Headquarters has approved the Procurement Plans for COMP, QUAL, and TEST. Schedule of planned actions by the Source Evaluation Board, chaired by Mr. R. W. Cook, has been established. ✓

2. PROPOSED CONSOLIDATION OF MSFC SUPPORTING RESEARCH PROGRAMS: Action is continuing with Dr. Stuhlinger to develop the management arrangements for assignment of overall coordination of the Supporting Research Programs to Research Projects Laboratory. It appears that the logical approach to this problem is to first consolidate the management of those SRT programs within R&D Operations and, secondly, to undertake the arrangement with Industrial Operations for coordinating supporting research tasks that are performed by prime contractors. This would then provide a single organizational element within MSFC for SRT program coordination and should minimize duplication of effort between the laboratories and Saturn prime contractors. ✓

3. MANAGEMENT OF FY-65 R&D OPERATIONS CONTRACTS: A contract file is being established in R-RM on all R&D Operations contracts of \$50,000 and above. Management data will be developed from this file on a monthly basis to determine progress against planned obligations. By initiating this procedure at the beginning of the fiscal year, it is expected that a more orderly obligation rate can be achieved and the year-end backlog minimized. ✓

4. ADDITION TO COMPUTATION LABORATORY FY-66 Coff PROJECT: The planned addition to the COMP Laboratory, under the FY-66 Coff Program, was disapproved by NASA Headquarters. The requirement for physical space, nevertheless, is still urgent, and is needed primarily by GE personnel in their mission support role. As a possible solution to the problem, arrangements are being made with GE to provide off-site space for their support personnel under the general terms and conditions of the Single Support Contract. Planned reclama will be held in abeyance, pending the outcome of that action. ✓

5. MECHANIZED CONTROL OF PROCUREMENT ACTIONS: The large number of procurement actions (58,000 in FY-64) has been excessively difficult to keep track of in carrying out R&D Operations business. Therefore, a mechanized procedure has been developed by R-RM for control of the timely processing of Procurement Requests and Short Form Procurement Plans from point of origin until completion. This procedure would provide status information on an exception basis for those actions which exceed an allotted processing time in each station. Different levels of management printouts can be provided from a central computer master file as required. This procedure has been forwarded to the Deputy Director, Administrative, for approval. ✓

B 7/30

NOTES 7/13/64 RUDOLPH

1. Saturn V Performance Analysis - Mr. Weidner has been requested to initiate three special Saturn V Vehicle studies. These are: (1) Analysis of launch vehicle performance trends during development (2) Analysis of launch vehicle manning capability versus change incorporation and ground test experience (3) A Study of go-no go criteria for utilization during final launch count-down. Should R&DO not have the manpower to handle these studies on the schedule requested, it has been suggested that a qualified contractor be selected to do this work. ✓

A.R.

Why not Boeing? B

2. S-II Stage:

Common Bulkhead Status - The first fit-up and impression check completed July 9, 1964. The impression check looked extremely good - 98% of the vinyl chloride had an impression. It appears that they will not make another fit-up and the final bonding autoclave operation will probably be accomplished late next week (16-17 July 1964). ✓

Vendor Survey - A vendor survey is planned for S-II, similar to the S-IC vendor survey held approximately two months ago. The survey starts in Huntsville on July 21, 1964, with stops in New York and Pennsylvania that week. During the week of July 27, 1964, the survey team will concentrate in the southern California area. ✓✓

Quarterly Review - The S-II Quarterly Review is scheduled for August 12-13, 1964, at NAA/S&ID. ✓

3. S-IVB Stage:

Vertical Checkout Facility at Sacramento - A meeting was held at Headquarters with the office of Facilities Programming and Construction to discuss funding for the Vertical Checkout Facility at Sacramento. Headquarters personnel agreed to the MSFC position of not building a third test stand and in lieu thereof building a vertical checkout facility. Funds previously authorized for the third test stand will be reprogrammed for the vertical checkout facility. ✓

S-IVB/V Forward Skirt - A S-IVB/V Forward Skirt was delivered to MSFC via the Pregnant Guppy on July 11, 1964. The skirt is to be used in tests with the IU. ✓

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 CoF Budget: A joint House-Senate conference has agreed upon a NASA budget including a 5% reduction in the CoF 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

B 7/30

NOTES 7-13-64 Stuhlinger

1. ALSS SCIENTIFIC INSTRUMENTATION PROGRAM: Technical supervision of the 200K FY-64 MOLAB scientific instrumentation contract will be transferred from OMSF to RPL (Mr. Downey and Mr. Bensko). RPL participated in the preparation of this contract, and in the evaluation of proposals. The contract is to be negotiated with Bendix Systems Division, but this fact should not be disclosed until the negotiation has been initiated by the OMSF contracting group. ✓

2. SRT PROGRAM STATUS: The status of the SRT/ART program under the cognizance of this Laboratory remained unchanged since last week's NOTES. ✓

3. UNIVERSITY - NASA RESEARCH PROGRAMS: Mr. Miller (P&C), Mr. Russell (Training Branch), Dr. R. Shelton and I participated in a two-day meeting about the above subject in Dr. T. Smull's Office of Grants and Research Contracts (OGRC) in OSSA. A copy of my presentation will be sent to you separately. Statements of interest to us included the following: ✓

Mr. Webb: NASA must build up and maintain at Headquarters and Centers a competent staff to deal with its counterparts at industry and universities in technological and scientific depth. This staff must be used as effectively as possible. ✓

Boyd Myers, (OART): Centers should contract with the universities directly. One central point (Dr. Smull's office) should be maintained for information on total programs. ✓

Dr. George Mueller: A Science and Technology Advisory Board under Dr. Townes, MIT, has been established to "think and comment" on Apollo and other space programs. It is an "in-house board corresponding to the Presidential Scientific Advisory Board." ✓

Dr. J. Holloway, (OGRC): Very detailed reporting on manpower and money is required as information to Congressional Committees. ✓

Dr. Stuhlinger: Rather than reporting many details on manpower, research time spent, and funding, let's establish a good system for the reporting of research results. (The attendees showed greatest interest in MSFC's plans and efforts in this direction.) ✓

All Centers pleaded for more freedom in their research program relations with universities. ✓

Al Siefert, (KSC): Create the image of a NASA research program which does not always take second priority after hardware and other programs! Give your research scientists at Centers a stature which reflects NASA's genuine respect of research! Expect that university professors will motivate their students for or against the space programs, depending upon the treatment that university research, and NASA in-house research, receives from NASA! Streamline and simplify your research program organization! Use the existing brilliant talents at the Centers! ✓

RL10 ENGINE

AC-3 engine flight data indicates RL10A-3 engines performed acceptably for 254 seconds. An erratic flight pattern precipitated by hydraulic package failure on AC-3 engine 4 seconds after RL10 ignition caused LOX boost pump cavitation. Temperature conditions in the hydraulic pump area with both conventional cooldown and helium pre-chill is being studied.

Engine qualification is on schedule for initiation in July and completion by September 15, 1964. ✓

J-2 ENGINE

No significant change has occurred in the program as a result of our meeting with Rocketdyne management. One test stand was in operation this report period; the others being down for engine rebuild. Mr. Drummond is at Rocketdyne this week to follow-up on Rocketdyne action items resulting from the June 25 meeting. ✓

F-1 ENGINE

On July 6, 1964, the MSFC F-1 Turbopump Ad Hoc Committee met with Rocketdyne to discuss the investigations that resulted from the LOX pump explosion of F-1 engine. The committee recommendations essentially concurred with, and emphasized the MSFC interest in the actions that Rocketdyne is already taking. One area of future investigation is to determine if there are vortex formations in the facility (test stand 1B) suction lines under specific head and flow conditions. ✓

There is no noticeable improvement in F-1 progress since the management discussions with Rocketdyne on June 25, 1964. However, there has been an increase in the rate of engine and thrust chamber hot firings and testing was continued during the July 4 weekend, which indicates some seriousness of purpose. ✓

H-1 ENGINE

On July 8, 1964, it was decided to replace the LOX domes on the remaining S-1-7 engines and all engines on S-1-8, S-1-9, and S-1-10. This decision was based on examination of Heat Lot 62 domes of which most had undesirable grain configurations. The failed dome from S-1-7 was in this lot. It was found that 19 of the 32 engines on these vehicles contained domes from Lot 62 with 3 more in question. The impact to the program is under evaluation; however, no major changes in launch dates are foreseen. The impact will be on the H-1 200K qualification and production program. ✓

GENERAL

Santa Fe and Stolte, joint venture, two of the same contractors building the F-1 Production Test Stands, have received the construction contract for the Flox Test Area at Haystack Butte. The Corps of Engineers are supervising the contract for the Air Force. Grading of the site and access road has started with completion of the stand scheduled for June 1965. (LeRC Project) ✓

Answer to Notes 6-29-64 Belew: Dr. von Braun's copy only

In answer to the question on the F-1 portion of the report, 38% is considered normal, although a few tests have been conducted in the range of 35% to 38%. (How much by-pass is normal on F-1) ✓

RL10 question regarding meaning of disclosed - The sentence should have read: The thrust chamber was discolored due to extreme heat flux. ✓

B 7/15

NOTES 7-13-64 CLINE

✓✓

H. Weidner
H.H. Koelle
--- and you just told me today (in Koelle's home) that Finger was not interested in our continuation of nuclear power mission studies!! Has there been some change of heart, somewhere??
B 7/15

1. ADDITIONAL NUCLEAR VEHICLE STUDY MONEY FOR MSFC: During a visit to the Space Nuclear Propulsion Office, Washington, D.C., 6-29-64 to 7-1-64, Advanced Studies Office of this Laboratory presented an outline of a proposed contracted study to investigate nuclear vehicle "modular design concepts." Mr. Finger approved the study and requested preparation of a statement of work for NASA Headquarters' review and final approval. In addition, Mr. Finger requested an immediate expansion of the present Future Projects Office/Space Technology Laboratories contract, entitled "Mission-Oriented Study of Advanced Nuclear System Parameters." The combined additional FY-65 funding is expected to fall between \$350,000 and \$550,000, to be provided by Space Nuclear Propulsion Office. ✓

2. SA-D9 DYNAMIC TEST: Structures Division completed the SA-D9 dynamic test on 7-9-64, within the time schedule agreed upon by the Control Dynamics and Structural Feedback Committee and Industrial Operations. This test served a dual purpose in that it yielded important structural dynamics characteristics required by control networks designers, and served as a training program for contractor employees who will assume the responsibilities of this work in the future. ✓

3. FRT INJECTOR FAILS BOMB TEST: (Reference NOTES 6-29-64 CLINE, paragraph 5.) Injector was for F-1 engine. ✓

4. ALL ENGINES OF S-I STAGES S-I-7 THROUGH S-I-10 ARE BEING REMOVED FOR REPLACEMENT OF LOX DOMES: This action is the result of the discovery of a cracked LOX dome on engine 2019 on S-I-7. Stress corrosion is the suspected cause of the cracking. The present domes of 7079-F aluminum heat treated to the T-6 condition will be replaced by LOX domes of 7075 aluminum heat treated to the T-73 condition; this material is less susceptible to stress corrosion. ✓

5. TURBINES OF S-I-7, S-I-8, AND S-I-9 REWORKED: The eight turbines of S-I-7 are being returned to Neosho for rework of the IB seal, the type that failed during static test of S-I-8. All turbines of S-I-8 and S-I-9 are being removed for inspection and rework of the IB seal at MSFC. ✓

6. DRAFT OF THE INSTRUMENT UNIT (IU) MODEL SPECIFICATION: This Laboratory has completed a draft of the IU model specifications (MSFC-CD-506). They have been forwarded to Industrial Operations and other organizations for comments. ✓

B 7/15

I. VISIT OF NASA ADMINISTRATOR

Mr. James Webb, accompanied by the individuals listed below, visited the Michoud Operations on July 11, 1964, for presentations regarding the present status of the MSFC/Michoud Operations.

Representative Olin Teague
 Mr. Webb's Son
 General Phillips
 Mrs. Phillips
 Miss Phillips
 Mr. Breen Kerr, Deputy for OTU, NASA
 Mr. Phillip Drotning, Assistant to Mr. Webb
 Mr. Stan Smolensky, MSF
 General H. B. Hall

Dr. and Mrs. McCall, Ray Kline, and James Shepard were present during the presentations to Mr. Webb. ✓

II. CONTRACTOR VISIT REGARDING OVERHEAD COST

Dr. Victor Brown and Mr. Robert Gibbons (contractor employees of Touche, Ross, Bailey, and Smart) employees assigned to Dr. Seaman's office, visited Michoud Operations on July 9-10, 1964, to discuss with Michoud Operations Management the philosophy used by the Chrysler/Boeing contractors in applying overhead cost. ✓

III. STATUS OF S-I-10

The pre-static functional checkout of S-I-10 has been completed and the booster moved to the modification area prior to shipment to MSFC Huntsville for static testing. During pressurization of lox system on S-I-7 cracks were noted in the engines of S-I-7 in the lox dome. Impact is presently being evaluated. Shipping date for S-I-10 is during the latter part of July. ✓

IV. STATUS OF S-I-8

Discrepancies noted when investigating the two-step pressure decay of an engine during the long static firing of S-I-8, resulted in all turbines being removed from the engines of S-I-8 and shipped to MSFC Huntsville for modification, Impact on the schedule is presently being evaluated. ✓

V. SIC QUARTERLY TECHNICAL PROGRESS AND PROGRAM REVIEW

The seventh SIC Quarterly Review is scheduled for July 23-24, 1964, at MSFC/Michoud Operation and will review the period of April through June 1964. The management meeting will be held on July 23 and the technical meeting on July 24, 1964. ✓

1. Saturn IB vs. Titan III-C - MSF has furnished extensive plans on proposed IB missions for the Saturn IB vs. Titan studies. R&D material from these studies is being assembled and will be made available prior to the Senate Hearings on 7-27/28-64. ✓
2. GSE - A decision has been made between IO and R&D to employ Boeing and Chrysler as mission contractors for mechanical support equipment. R&D is presently preparing master schedules for the IB/V GSE hardware. These will be ready in early September. ✓
3. Apollo Boilerplate for SA-10 - Agreement was reached with MSC regarding the refurbishment and modifications of BP-9 which was used earlier for dynamic tests. A joint inspection team was formed to recommend required work on BP-9 for the SA-10 flight. ✓

Frank G.
When will
this Board
meet
next time?
I don't
want to
miss it
again!!
Please mail
me down
(Boris's
calendar)
B

4. Space Experiments on Saturn Launch Vehicles - At the request of the Manned Space Flight Experiments Board (of which you are a member) MSF has prepared general procedures for experiments to ride on spacecraft and L/V. So far MSC, specifically Gemini, has been the prime target. Because of the potential L/V capacity for passenger experiments, we are developing a Marshall procedure to handle such experiments; Williams, Stuhlinger, etc., are cranked in. We will brief you on our recommendations in the near future. (A Marshall Experiments Board and Coordination Office will probably be recommended). ✓
5. Manned Space Flight Awareness Program - Astronaut Freeman (3rd group) is visiting Chrysler and Boeing on 7-14/15-64 in connection with this program. A general briefing on the status of the Awareness Program is scheduled for the next Board meeting (7-31-64). ✓
6. The briefing to you on the MORL by MSF, MSC, and Langley has been rescheduled for 8-4-64. ✓
7. Data Management - The charter for a Data Management Organization was concurred in by R-DIR. ✓

1. Minor Labor Difficulties at MTO: About 100 men did not report for work one morning last week, because Leaveil-Kiewitt had not provided adequate parking facilities. This was wildcat action, not approved by the union, but served notice to the company that they needed to sharpen their labor relations. They have!!! Further incidents of this nature should be minimized. Friday morning, about 75 Operating Engineers struck Gulf Central, who is excavating a portion of the S-II canal, because of a union-management argument over firing the master mechanic. Tyvoll indicated that the problem was being resolved; he expected Operating Engineers back on the second shift. ✓

2. GE Negotiations Proceeding, albeit slowly: Agreements were reached during the week on reduced manpower build-up based on latest revised facility schedules. Direct and indirect labor numbers and cost come up next, then fee, which should conclude negotiations. ✓

3. Mississippi Municipal Association: Thursday, I joined the association of State mayors and municipal officials, and Friday was to have listened to the Governor's remarks to them, but he apparently was prevented from coming because of discussions with J. Edgar Hoover. Most officials believe they should comply with the Civil Right legislation, and Governor Johnson's announced intentions not to comply may have brought Mr. Hoover down. Saturday a. m., some 150 of the association and their families visited the test facility by bus. ✓

4. Mr. Webb Briefed Saturday: Along with Drs. McCall and Constan, I briefed Mr. Webb and party from Washington, a more detailed report of which will be submitted by the others. The Gulf Stream carrying the party flew over the test site before landing at Lakefront Airport. Since he has not yet set foot on MTO, I did extend an invitation to Mr. Webb to come down and dedicate an appropriate building. I left it that this would be worked out between your office and his, and will present further information to you when dates become more firm.

Frank's.

Please take up the ball
and work out something, in
accordance with my calendar

B 7/15

1. Saturn IB/Centaur: The 13 study guidelines and specific comments to them (made at June 16 OMSF Task Force Meeting) for the 260" shroud Saturn IB/Centaur study, in which you expressed interest in Notes 6/29/64 Geissler, are attached for your information. ✓

2. Saturn IB/Centaur Missions: (a) The composite NASA mission plan from Fleming is expected to be ready Friday, July 10, 1964. It will list the number of each type vehicle (Saturn IB, Saturn V, Thor, etc.) needed by NASA through 1975. It will not describe the missions assigned to each vehicle. (b) Mueller wants 3 Saturn IB/Centaur's (each carrying 2 surveyors) launched in 1967; 3 launched in 1968; and 1 launched in 1969. Mueller does not have much support for these missions since they belong to OSS, and OSS doesn't seem interested. ✓

3. S-IVB/IU Tracking After CSM Separation: ^{in lunar flight profile} A special meeting was held by Gen. Phillips on 7/8 in Washington to discuss the requirement for S-IVB/IU post-separation tracking. Attending were Instrumentation and Communications Panel, Flight Mechanics Panel, and Flight Control Operations Panel. A number of important decisions were reached: (1) There will be no tracking of the S-IVB/IU after separation if we retain our presently planned RF systems design; (2) As primary operations mode no impulse will be given to the S-IVB/IU at or after separation (trajectory known from previous tracking); (3) As secondary mode, an impulse will be given through depletion of APS propellants if needed for satisfactory separation from CSM; (4) No provision will be made to prevent lunar impact or earth re-entry (this may have a possible effect on future orbital debris studies); (5) MSFC (Hoberg) is to study all implications of implementing the Unified S-Band System on S-IVB/IU; this system would also provide tracking capability after separation and appeared to be favored by Gen. Phillips; (6) MSFC is to re-evaluate the need for command capability to S-IVB/IU after injection and prior to start of transposition. ✓

4. CCSD Final Review: Chrysler Corporation Space Division (CCSD) Aeroballistics final quarterly review for FY '64 was held at Marshall July 8, 1964. Review covered FY'64 Aeroballistics activities with emphasis on technical analyses conducted during latter portion of the year. While CCSD is doing well, and will probably reach the final goal of design analyses capability in the Aeroballistics areas, at present they cannot satisfy all of our requirements. Accordingly, we have made arrangements with Lockheed to fill the gap. ✓

OK, I
guess
those
just didn't
know what
you meant
B
→

Memorandum

TO Distribution

VB

DATE June 1, 1964

FROM Assistant Director, Aero-Astroynamics Laboratory
R-AERO-S

SUBJECT Saturn IB/Centaur Study

1. On May 25, 1964, a presentation was made to Dr. Seamans at NASA Headquarters delineating the results of our recent study on the Saturn IB/Centaur. Dr. Seamans showed considerable interest in the Saturn IB/Centaur for Voyager. Interest for Surveyor is not very high except with OMSF.

2. Accordingly, we are requested that efforts in our recent 154" Saturn IB/Centaur be updated to the 260" shroud diameter. The following are areas requiring concentrated study:

1. Vehicle Configuration.
2. Guidance Equipment Analysis.
3. Performance.
4. Control Analysis.
5. Aerodynamics.
6. Effect of vibration and acoustic environment on the Centaur and recommendation on corrective measures.
7. Effect of bending moments on 1st stage, interstage, and Centaur.

3. Guidelines for the study are:

1. 260" diameter shroud
2. Minimum modification to Centaur (same as previous study).
3. Integration of complete vehicle by MSFC (Saturn IB/Centaur/Payload).
4. Two parallel sets of program data required.
 - (1) Earliest availability of Saturn IB/Centaur - 260".



File

XXIII
1964-10-01

June 1, 1964

(2) Impact on program if SA 210 is the earliest flight and placed in Oct. 1968 with 211 and 212 following at 3 month intervals. 207 thru 209 would remain Apollo vehicles with potential retro fit for Voyager and flying after 212 if Apollo is highly successful.



5. MH guidance on Centaur, IU on Saturn (same as previous study).
6. Launch pad is 37B.
7. Variable launch azimuth 45° - 110° .
8. Centaur at AC - 8 configuration (as previous study). (two start capability) (30 minute coast time)
9. Suborbital start of Centaur.
10. Costs will be divided between recurring and nonrecurring.
11. Contact can be made with GDA through Lewis.
12. Voyager payload is to be assumed as 6400 lbs. Margin between this and IB/Centaur capability is to be used for increasing the launch window in order to get two flights off one pad.
13. Surveyor payload is to be assumed as 3000 lbs.

4. A project proposal (in accordance with 4-1-1) for submission to NASA Headquarters will be prepared as the output documentation for this study. Preparation of this document is as follows:

Overall Responsibility	H. K. Brown
(1) Project Designation	"
(2) Project Objective	"
(3) Technical Plan	Powers/Clingman
(3.1) Configuration and Payload Integration	- Stein
(3.2) Astrionics	- Digesu/Thornton
(3.3) Performance	- Cremin
(3.4) Control Analysis	- Baker
(3.5) Aerodynamic Analysis	- May
(3.6) Manufacturing Approach	- Chesteen

- (4) Reliability and QA (Including Test Plan) - McClard
- (5) Management Plan - Brown/McClard/Reinartz
- (6) Management Reporting - " " "
- (7) Procurement Arrangement - Reinartz
- (8) Schedules - "
- (9) Resource Requirements - McQueen
 - (9.1) Costing - Reinartz
 - (9.2) Manpower - McClard/Napper
 - (9.3) Facilities and GSE - McQueen

5. Harrison K. Brown is responsible for liaison with OMSF, OSS, JPL, and Lewis Research Center.

6. Time phasing for the study program is as follows:

- | | |
|---------|--|
| May 26 | Program Initiation |
| June 9 | Status Review <i>9am Rm 409 Bldg, 4200</i> |
| June 25 | Midterm Review |
| July 6 | Final Review |
| July 8 | Draft of Project Proposal |
| | Chapters into R-AERO-S |
| July 10 | Dry Run |
| July 14 | Presentation to Dr. von Braun |
| July 22 | Preliminary Release of Project Proposal |

P. J. de Fries
 P. J. de Fries

df
6/22/64

File!

NOTES ON FIRST SESSION OF PROGRAM OFFICE TASK FORCE: SATURN
IB/CENTAUR

ATTENDEES: Vince Johnson, OSSA
Carl Wentworth, Lewis Research Center
Les Fero, Chairman
Joe de Fries, MSFC

DATE: June 16, 1964

The guidelines which are being used at Marshall for the study of the 260" diameter configuration were discussed in detail and in essence were agreed to and confirmed by all participants. The following are comments of interest applicable to each of the 13 points:

1. Vince Johnson stated that under 240" is marginal for Voyager.
2. The insulation question and its present penalty on the payload was discussed repeatedly. We ought to contact Lewis Research Center (Wentworth) and see whether he would give us a quote as to what they would consider a proper new insulation, how much they would think it would weigh and how much of a job it would be, in their opinion, to do it.
3. What help Lewis Research Center and GDA are to give should be clarified.
4. Leave out "If Apollo is highly successful".
5. What are the discretetes that go into the "Minnie-Honey" system.
6. It is desired by Johnson to see a trade-off curve between the launch window width and payload. There is obviously the perennial concern of OSSA for the dual launch within one window. The question of the interval between launches was raised again and I objected strongly to using 90 days going out as saying that it could be as short as 30 days.

7. No Comments

8. Check with Lewis Research Center the situation of AC-8.

It might be better to take AC-12. AC-8 and 12 are the two two-burn R&D shots. AC-9, 10, and 11 are operational single-burn shots. Wentworth particularly felt that AC-12 might be more representative mainly in the telemetry.

9. No comment.

10. The effect of the launch rate on cost ought to be commented on.

11. All contacts through Carl Wentworth. I stressed that we would like after this study exercise to see GDA officially work the problem in a funded study. All participants considered it most practical to do this through Lewis Research Center. Lewis says that they have a standing contract under which they can issue Task Orders. It would be only a matter of days to get GDA cranked up that way. Johnson and Fero will discuss which funds and if any are to be transferred from whom to whom. The supervision of the work done by GDA under such a Task Order ought to be officially a joint Lewis Research Center/Marshall group with no restrictions on the Marshall group to contact GDA directly, but all official action going through Lewis.

12. Same as under 6 applies.

13. Justify the 3000 lbs. by stating that the payload adapter is included.

Copies to:

Mr. Tidd

Mr. Brown/McQueen

Mr. Trexler

Mr. Guyton

37/15

1. S-IU-9 INSTRUMENT UNIT: The S-IU-9 Instrument Unit continues to undergo electrical and mechanical buildup in building 4708. The Unit is scheduled to be turned back to this Laboratory July 15, 1964, for pressure and alignment tests. ✓
2. S-IV PROGRAM: The S-IV-9 stage is undergoing pre-static checkout at SACTO with static firing now scheduled for July 23, 1964. The S-IV-8 presently has approximately 34 shortages on the stage. Simulated flight test of the stage has been accomplished and data evaluation is in progress. Approximately 700 manhours of modification at Santa Monica and 374 man-hours of modification at SACTO remain to be accomplished. This rework will invalidate a significant portion of the post-manufacturing checkout. ✓
3. MANNED FLIGHT AWARENESS PROGRAM: Reference your remarks to paragraph 2 of my NOTES of 6-29-64 (copy attached). Since you had already asked Mr. Dannenberg in the Board Meeting of June 26, 1964, to present a status report on the Saturn Awareness Program at the July Staff and Board meeting, I do not plan to take any action. ✓ Mr. Dannenberg concurred in this approach in a telephone conversation of July 8. ✓
4. MICROMETEOROID PROJECT: Testing of the Data System for the MMC Prototype has resumed after a shutdown for incorporation of changes. Compatibility tests involving the Communications and Power Systems for the Prototype have been hampered by RFI problems. It seems that Monday, July 20 would be the earliest possible date for beginning Systems Testing of the Electronic Canister, and that Tuesday, July 28 would be an optimistic date for beginning installation of this Canister into the structural portion of the MMC Prototype at Hagerstown. It should be noted that this represents a schedule slippage of approximately one month since the Program Review Meeting June 16. !
5. BOEING QUALITY PROGRAM PROVISIONS REVIEW: A review was made in the following areas inasmuch as Boeing's Quality Program Provisions on the S-IC Program are inapplicable: Management Structure, Qualification Testing, Nonconforming Material Control, Maintenance of Identification, Internal Record Keeping, Internal Audit Procedure, Design Review. Overall, Boeing has adequate documentation to cover the above areas in accordance with NPC 200-2 requirements.
6. TECHNICAL TRAINING EFFORTS: The Laboratory technical training school was recently visited by Mr. Jerry Herbert from the Personnel Training Office, NASA Headquarters, accompanied by Mr. Dowdy from MSFC Personnel Training. They were interested in how the school operated, who was trained, courses involved and costs incurred. We explained why this program of specialized technical training is significantly different from the normal career development program associated with personnel training. Mr. Weiss from ORQA also visited for about three (3) hours with the school recently. He expressed approval of the present program and pledged support for future operations including an increased effort in the courses based on the NPC 200 series documents. Two (2) hours of his visit were spent in talking to the class in NASA Quality Requirements.

B 7/15

NOTES 7-13-64 GRUENE

SA-7 Status: As you might know by now, the decision to exchange all domes of the S-I engines was made on July 9. All eight engines were shipped from the Cape to Neosho. Two engines are back and already installed. The remaining engines will arrive, staggered, with expected arrival of the last engine by Monday, July 20. A new schedule, taking into account these engine modifications, was published and distributed today. The new schedule calls for a delay of the launch date of three weeks from the Revision A schedule, published June 29, 1964. ✓

1. STATUS REPORT - INSTRUMENTATION AND COMMUNICATION PANEL (I&CP)

MEETING: A called meeting of the Instrumentation and Communication Panel was held 6/25 and 26 at MSFC. Items discussed included:

- a. Deployment of the Lunar Excursion Module Adapter Separation System
- b. S-IVB/IU Post Injection Considerations
- c. I&CP Interface Control Documentation
- d. C-Band Radar
- e. S-IVB/IU Deepspace Requirements
- f. Frequency Interference
- g. Additional Telemetry Links for the Command Modulation

A summary report of the meeting is now available for distribution. A copy will be forwarded to you on request. ✓

2. S-IVB/IU POST INJECTION REQUIREMENTS MEETING: A meeting was held at NASA Headquarters 7/7 and 8 with General Phillips presiding. Organizations represented included: OTDA, MSF, Bellcomm, GSFC, MSC, and MSFC. MSFC representation included: ASTR, Richard, Hoberg, Barr, Golden; P&VE, Palaoro; AERO, Dr. Speer, Kurtz, Winch; I.O., McCulloch. The following summarizes the results:

a. The S-IVB/IU will be placed in a position perpendicular to the local vertical from injection to final separation.

b. There were three considerations in determining whether or not an impulse to the S-IVB/IU at final separation was necessary.

(1) Avoid collision with spacecraft - if systems perform correctly, knowledge of the trajectory will be available and when mid-course correction is made, collision can be avoided.

(2) Miss the moon and, if possible, earth - utilizing tracking data from the spacecraft, trajectory changes to the S-IVB/IU could be accomplished through the IU's telemetry and command systems, provided any propellant is left in the RCS.* If any of these were in operation, no changes would be made. Guidance data over the telemetry system would be used for tracking.

c. The problem of the LEM adapter panel deployment and a few possible solutions were discussed. This problem will be handled by a special task force made up from four Saturn-Apollo Panels. ✓

d. It was concluded that command and telemetry is mandatory to a maximum range of 15,000 nautical miles. Tracking, although desirable, is not a requirement. ✓

e. The basic ground rule to be followed is that there shall not be any modification to the ground stations.

MSFC's plan to satisfy the telemetry and command requirements fulfilled this basic ground rule and was accepted by General Phillips. ✓ However, a problem did arise when MSFC was made aware there is no 450 MHz command capability at two sites, Guam and Ascension. If these two sites are necessary to support the launch vehicle, this will force MSFC to reconsider their implementation plan and possibly revise it. MSFC has one week to determine if these sites will be required.

One other item was that General Phillips asked MSFC, in the best interest of the program, to investigate the possibility of utilizing the Unified Frequency System in the IU to satisfy the post injection requirements. He realizes that there would be a cost and schedule impact and is only asking MSFC to look into this possibility and to pass their recommendations back to him. ✓

* Reaction Control System

W H
U
Yes,
please B

NOTES 7/13/64 HEIMBURG

B-7/15

1. SOUND SUPPRESSION TEST STAND (S-IC SUPPRESSOR MODEL): Water deflector check-outs at the S-IC Test Stand and deflector repair work at the Sound Suppression Test Stand have delayed the 5-engine ignition test (GE model engines) until Thursday or Friday of this week. ✓

2. F-1 ENGINE TESTING (STATIC TEST TOWER WEST): Test TWF-025 was conducted on 7/8 at the Static Test Tower West on engine F-1002. Scheduled mainstage duration of 5.86 seconds was achieved. The GG lox orifice was enlarged before the test, and the increase in engine performance was as predicted. ✓

Test TWF-026 was made on 7/9. Scheduled mainstage duration was 45 seconds; however, cutoff was made after 18.92 seconds mainstage when the lox pump outlet pressure apparently exceeded the redline value. It was determined after the test that the transducer had failed, giving an erroneous pressure reading above the redline. The GG lox orifice was again increased in size before this test and the engine performance gain was as predicted. ✓

Test TWF-027 was made on 7/10 for a mainstage duration of approximately 57 seconds. Scheduled duration was 120 seconds. Cutoff occurred when both lox pump outlet pressures exceeded redline values. Once again, it was determined that the transducers used to measure this parameter had failed. This test was made with the same orifices as were used on TWF-026 and engine performance repeated.

An investigation of these failures has been made. The cause of failure has been determined to be condensation and corrosion across the glass bead insulator between the pin and connector, resulting in the insulator being shorted out. An attempt will be made to seal with O-rings to prevent the entry of water into the transducer. ✓

3. F-1 HEAT EXCHANGER TESTS. On 6/30, a 30-second facility checkout test of the F-1 heat exchanger test position at the Components Lab was successfully conducted. One additional test will be required to complete the facility checkout before F-1 heat exchangers can be installed and tested. ✓

4. S-IC TAIL SERVICE MAST (DICKIE BIRD). Reference NOTES 5/11/64, 5/18/64, 6/1/64 HEIMBURG (copies attached). The remaining test umbilical hardware was received from Boeing on 7/1. Installation was completed on 7/8, and two slow-speed test runs have been made using the secondary release system before trying the primary pneumatic system of full liftoff speed. The release system works but release occurs prematurely. Further adjustments are required. The umbilical connector is very complicated and, so far, has taken four hours for each connect operation. P&VE, KSC, and Boeing are aware of the problem. ✓

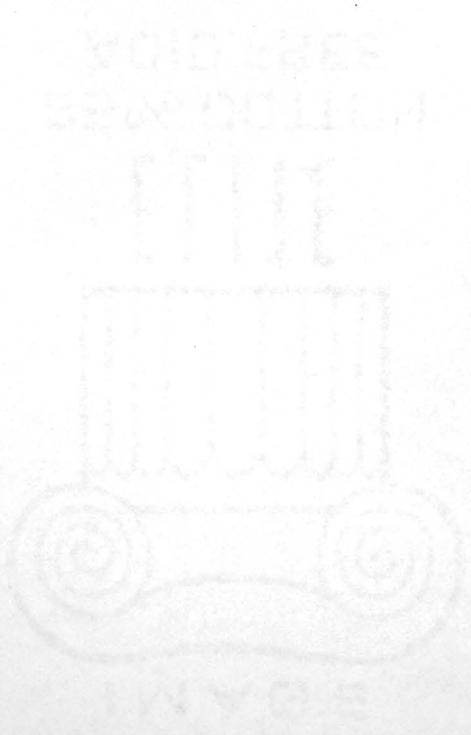
5. MTF WORKING GROUP: Progress on Air Products and Chemicals (APCI) LH₂ Plant near Michoud is on schedule. Work started early this month. Activation of plant remains scheduled 7/65. ✓

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

ATTACHMENT 2: NOTES 5/18/64 HEIMBURG (attached to Dr. von Braun's copy only)

ATTACHMENT 3: NOTES 6/1/64 HEIMBURG (attached to Dr. von Braun's copy only)

July 20, 1964



B 7/24

J-2 ENGINE

Four engine system test stands are active. Two R&D engines are undergoing checkout runs and PFRT engine J2004 is being acceptance tested. One stand is awaiting the next production engine. ✓

Production engine J2002 has successfully completed acceptance testing. ✓
 Production engine J2008 was damaged Friday during transport from the factory to the test area. The engine has been returned to the factory for assessment of the damage. ✓

Rocketdyne now has a responsible man from the Test group reporting directly to Norm Reuel, J-2 Project Manager, on all test activity at Santa Susanna. ✓ Also, Mr. Reuel reports directly to Sam Hoffman each month on all program details, particularly on each engine test that did not reach intended duration. ✓ These two changes in organization and procedure are apparently a result of our management meeting with Rocketdyne on June 25. ✓

RL10 ENGINE

Tests of RL10 engines using 0.10% O_3F_2 in the LOX have shown that ignition of the engine can be achieved hypergolically. Analytical studies have shown that explosive hazard of LOX/hydrogen are reduced significantly with this additive since the propellants burn on instant of contact rather than building up in mixed quantities. ✓ We are supplying a small amount of O_3F_2 "spiked" liquid oxygen in support of an MSF program with Aerojet to determine the relative explosive hazard of various propellant combinations. In the interest of crew safety and man-rating, we may want to use this technique to reduce the effects of inadvertent LOX/hydrogen combination. ✓

H. Weidner

Suggest you discuss

an implementation & evaluation

program with Heinburg, James, Rudolfph.

Please keep me posted

B 7/24

H-1 ENGINE

Six SA-7 engines have been reworked and returned from Neosho to KSC for vehicle installation. The remaining two engines are scheduled for shipment to KSC on July 20.

The H-1 engines from SA-9 are being removed at MSFC and will be shipped to Neosho during the week of July 20. These engines will all be returned to MSFC no later than August 12, 1964.

LOX Dome retrofit schedules for SA-8, SA-10, SA-201, and SA-202 have been established and coordinated with the S-1B Stage Manager and Chrysler.

No schedule impact is predicted for SA-9 and subsequent due to this problem other than that already imposed by the SA-7 launch slippage. ✓

F-1 ENGINE

In an effort to finalize the FRT injector with the right combination of stability, performance, and chamber compatibility (tendency to prevent tube burning etc.), injector 084, with enlarged and canted LOX orifices next to the radial baffles for better distribution, was tested on test stand 2A. It recovered satisfactorily after being bombed into instability. Performance was increased slightly and chamber compatibility was good. This injector, which is a slight modification to a thoroughly tested configuration, is now being installed in engine 020 for checkout in an engine system. If performance, stability, and chamber compatibility continue to prove satisfactory, the injector will be selected for FRT. ✓ If not, injector type 092, with more fuel in the outer rings, will be accepted. This latter injector unfortunately has lower performance; however, it will probably meet Isp used in the MSFC's latest payload commitment to NASA Headquarters for the 501 thru 503 vehicles. ✓

B 7/30

NOTES 7-20-64 CLINE

1. PROPOSED NONPROPULSIVE VENTING DESIGN FOR S-IV-9 AND S-IV-8:

(Reference NOTES 7-6-64 CLINE, paragraph 2.) To avoid the possibility of a structural failure within the Micrometeoroid Capsule, Douglas Aircraft Company (DAC) was directed to develop a venting system for the S-IV stage such that the angular acceleration during orbit shall not exceed $0.15^\circ/\text{sec}^2$ and the final angular velocity shall not exceed $6.0^\circ/\text{sec}$ about any axis. The presently proposed vent system for S-IV-9 and S-IV-8 is designed to meet this requirement. ✓

At the end of S-IV burn, if the vehicle is not tumbling at a rate greater than $0.1^\circ/\text{sec}$, then liquid could enter either the nonpropulsive vent or the main propulsive vent since the vehicle has no ullage location control in orbit. In either event, it was feared that this liquid in either vent system could result in an angular velocity or acceleration greater than the given limits. Analyses have shown that this venting of liquid will result in tumble and acceleration within the desired range and thus liquid venting could occur only until the minimum $0.1^\circ/\text{sec}$ tumble rate is established and then will not reoccur or exceed the specified limits. ✓

2. S-IVB STAGE (STRUCTURAL TEST CONTAINER): During hydrostatic tests of the S-IVB stage, the LH_2 tank failed. The tank ruptured in a longitudinal weld of the cylinder wall. The splitting went up the wall and across the forward bulkhead. The tank burst at approximately 95% of proof pressure (1.05% of operating pressure). Members of the Structures Division are at DAC to obtain more information. ✓

3. REWORK AND STATIC TEST OF ENGINES OF S-I-7 SUCCESSFULLY COMPLETED:

New LOX domes of 7075 T-73 aluminum and new turbine I-B seals with staked screws were installed on all engines. The fuel pump bellows-type seal was installed on all engines except positions 1, 5, and 7. All engines were successfully static fired and are scheduled for delivery to KSC by 7-20-64. The engines of S-I-9 are being removed for shipment to Neosho for rework. ✓

B-7/30

I. Saturn S-I Engine

The Chrysler Corporation has been directed to return all engines for S-I-8, S-I-10 and S-IB-2 to Rocketdyne at Neosho to be retrofitted with new lox domes. Returning the engines will cause a slippage in the schedule of approximately two weeks for S-I-8, approximately six weeks for S-I-10 and no slippage is expected for the S-I-B Boosters. ✓

II. Status of S-I-10

The weighing operation for the S-I-10 has been completed. The Chrysler Corporation is clearing inspection squawks and the vehicle is being given final inspection in preparation for shipment to Huntsville for static firing. ✓

IV. S-IC Quarterly Review

The FY64 Fourth Quarterly Review for SIC will be held at Michoud Operations in New Orleans on July 23 and 24. ✓

B 7/20

NOTES 7-20-64 DANNENBERG

1. Flight Mission Assignments. - A one-day opportunity was given to MSFC to review the Bellcomm draft for a revised flight mission assignment document. While no major objections were raised, the necessity for clarification of certain details and for more adequate review time was emphasized. ✓

2. Mechanical GSE (MSE) - As a result of the decision for Boeing and Chrysler to be prime contractors for MSE, R&DO is rewriting their mission statement. ✓

3. Astronaut Visit - Astronaut Freeman toured the Chrysler and Boeing facilities 7-14/15-64 under the auspices of the Manned Flight Awareness Program. Reports from Michoud indicate the visit was a success both from the management and the worker point of view. ✓

4. Boilerplate 9 on SA-10 - BP-9 inspection team, consisting of MSC and MSFC personnel, met on 7-15-64 at ME and QUAL labs and discovered an accumulation of rust on the interfaces between the modules and on the IU to adapter interface. ✓

5. MORL Project - KSC provided data concerning Saturn IB turn-around time (launch rate) for the MORL Launch Operations Feasibility study of Langley. The study shows that the Saturn IB turn-around time is equivalent to that claimed for Titan III-C, namely, 30 days. ✓

B 7/30

NOTES 7/20/64 FORTUNE

1. Questions on Notes 6/22/64 - Copy attached, Dr. von Braun's attention only: regarding impact of State of Louisiana not accepting Manpower Development Training Act program because of integration considerations. I understand Boeing and Chrysler have been able to work out satisfactory arrangements with colored schools to conduct training as necessary. Mississippi's Vocational Training Supervisor told us he had two million dollars Federal money for training technicians, on an Equal Employment Opportunity basis. However, the State Legislature just voted to censure compliance with new Civil Rights legislation so what effect this will have on other state agencies is being cautiously awaited. A Mississippi Power Company official told me it would probably prolong their resistance to signing any contract to service us which contained the non-discrimination clause. Southern Bell Telephone officials indicated similar feelings Tuesday when they visited MTO to talk about proposed permanent telephone systems. ✓

2. Project Stabilization Agreement (PSA) - may be signed in a few days by Malan Construction Company of Koppers, who were just awarded the first S-IC Test Stand position contract. Other than Morrison-Knudsen, only Carpenter Bros. of Gulfport Association of General Contractors, and two sub-contractors, are bound by it. The contracts as let by the Corps of Engineers spell out current Davis-Bacon wage rates and fringe benefits, such as travel time, so-called 2-4-8 hour minimums for reporting in, working less than half day, or more than half day respectively, etc., but nothing about hiring through Union hiring halls which is in PSA. NASA Headquarters has promised to fund added costs for certain contracts let before PSA, to incorporate benefits. ✓

3. GE Support Contract Negotiations Stymied Temporarily - FEE negotiations started Friday afternoon on an agreed FY-65 cost base of approximately \$13,127 million. Some GE salary levels are still subject to later review when job descriptions are available. We hope to satisfactorily resolve our differences early this week and conclude this wearisome task but at the present, GE fee request is approximately 40% higher than our proposed figure. ✓

4. GE Phase II Technical Systems Negotiations - are continuing with hopes that they can be satisfactorily concluded today, July 20, 1964. ✓

NOTES 7/20/64 GEISSLER

B 7/30

1. Titan III/S-IVB Performance: Reference your comment on item 2 (this subject) of Notes 7/6/64 Geissler, copy attached. This configuration is, of course, a ridiculous one, and its performance characteristics were hardly "NOTEworthy". However, it was mentioned by the Air Force in some of their presentations on possible uses of Titan III. Since the configuration had been discussed, Frank Williams asked us to roughly check the performance for his use in the Saturn IB/Titan III comparison discussions.
2. Project LIEF Meeting: Mr. Miller, Headquarters (Lilly) called a joint KSC-MSFC meeting on 7/15 at MSFC to discuss project management of LIEF. He proposed to include Project LIEF (Launch Information Exchange Facility) as one element of the Launch Instrumentation Project Development Plan (PDP). This PDP is to be coordinated and generated by KSC. We were reluctant to accept because Project LIEF also covers, by present definition, MSFC Flight Evaluation Facilities and Orbital Operations Support to MSC. Both activities should not necessarily be placed under management control of KSC. Miller conceded with an alternate proposal whereby MSFC would prepare, with concurrence from KSC, a separate PDP for Project LIEF and forward to Lilly, who in turn, would incorporate this in some convenient manner in the overall GOSS (Ground Operations Support System) project management. This appears to be acceptable for everybody involved.
3. Orbital Debris Study: Re: your comment on item 3 Notes 7/6/64 Geissler, this subject. The debris propulsion system being considered for the S-IVB stage is an optional system. The presentation to you on the status of the Orbital Debris Studies has been rescheduled for August 11, 1964 at 2:00 PM in the Ninth Floor Conference Room.
4. Special Fluid Mechanic Facility: At the request of Mr. Shepherd, we have been reworking our justification and have updated the Mueller folder for MSF. On July 16, Mr. Shepherd talked with Mr. Al Crobaugh, who is on Seamans' staff, and he related that Dr. Seamans personally turned down the facility. Dr. Seamans considers the facility a closed item irrespective of any agreements or disagreements with Dr. Silverstein or other NASA Centers. He considers that NASA has within its inventory sufficient facilities to perform all necessary launch vehicle technology and development. Whether or not there will still be a presentation to Seamans or a reclama by Dr. Mueller is unknown at this time.

1. S-I-9 POST-STATIC CHECKOUT: Final electrical testing of the S-I-9 stage continued on schedule until July 17 at which time the checkout was discontinued for approximately one (1) month to allow removal, rework and reinstallation of all engines. Checkout is expected to resume August 17. Multiple shifts, overtime and Sunday work will be required to complete checkout by September 1, 1964, the presently scheduled release date. ✓
2. MICROMETEOROID PROGRAM: The prototype models of the MMC Communication and Power Subsystems are being tested for mutual compatibility. The Detector Subsystem has been modified in an attempt to eliminate electromagnetic interference being generated within the subsystem, and testing has been resumed. ✓
3. S-IVB PROGRAM: On July 14, the Hydrostat Stage was ruptured during a tanking and calibration test. The extent and impact of this mishap has not been fully evaluated at this time. ✓
4. RELIABILITY PROGRAM PLAN: A program plan designed to execute the MAR* GSE Reliability requirements has been completed and transmitted to I-V-G for review, approval and submission to MAR. The plan contains specific task outlines, a milestone list, and a time schedule by which the various activities to execute the plan are related to each other. ✓
5. QUALITY PROGRAM CORRECTIVE ACTION FORM: In accordance with the requirements of the Apollo Test Requirements directive from Office of Manned Space Flight, a corrective action form, with appropriate detailed procedure is being generated to fulfill the need to formally document Quality Program deficiencies to Industrial Operations and other organizations as necessary. The method employed will apply both to the resident area and to the program inputs made here at MSFC. It is hoped that all requests for action, technical directions, etc. can be handled through an established form. Information type correspondence will continue to be handled by memorandums, trip reports, minutes of meetings, etc. In this manner, all inputs to the program can be filed, analyzed, and acted on in a more efficient manner. A trial effort will be expended on use of this system on the S-IV/S-IVB Programs only at this time. ✓
6. ULTRASONIC FLAW DETECTION: The first phase of evaluation of an ultrasonic flaw detector, which will soon be placed into service on fusion butt weld inspection as a supplement to X-ray, has been completed by this Laboratory. Evaluation of this equipment, Krautkramer USK-4 Portable Flaw Detector, was performed for detection of lack of weld penetration. The instrument proved to be approximately four (4) times as sensitive as X-ray in detecting this type flaw. ✓

* Office of Apollo Reliability and Quality in Dr. Mueller's organization

SA-7 Status

a. Six of the eight engines arrived from Neosho and are installed. The last two engines are expected to arrive at the Cape late today. The thickness inspection of the four domes, which was not done at Neosho prior to shipment, has been performed on the pad (NAA personnel utilizing a Bronson Vidigage, an ultrasonic device). All four domes were within minimum drawing tolerance. ✓

b. S-IV preparation is on schedule. The non-propulsive vent system is being installed at present. ✓

c. At the moment, the published schedule, Revision B, is still "o.k." ✓

NOTES 7/20/64 HAEUSSERMANN

B 7/20

No submission this week.

NOTES 7/20/64 HEIMBURG

3-7/20

1. F-1 ENGINE:

No F-1 firings were made this week. The scheduled test was postponed when it was discovered that a number of instrumentation cables would have to be replaced because of cracked potting compound in the plugs. The next test is scheduled for Monday, 7/20/64. ✓

2. SOUND SUPPRESSION TEST STAND:

On Thursday, 7/16/64, the first five-engine chamber ignition test was successfully completed. On Friday, 7/17, two attempts to achieve mainstage were unsuccessful. The first test was cut off as a direct result of human error. A hand valve (calibration) was closed in a pressure sensing line between the chamber and a pressure switch. The pickup of this switch was necessary to continue the sequence into mainstage. The second test was cut off because thrust OK failed to pick up on three engines. The gas generator run tanks pressure settings were too low to produce sufficient thrust. These pressures will be increased for the next test scheduled for today, Monday, 7/20, which is planned for five seconds mainstage. ✓

NOTES 7-20-64 HOELZER

B 7/30

1. PHYSICAL SPACE: In view of the crowded conditions in Computation Laboratory and the loss again of our second extension to Building 4663, we have asked General Electric to look for suitable space off post to house about 75 people. General Electric is to make recommendations as to leasing space or building a building. ✓
2. MTO COMPUTER SUPPORT: It has been determined by a competent study group that if we are going to perform atmospheric studies and noise focusing studies at MTO, a small computer is required on-site. If Mr. Karl Heimburg says the whole project is essential, this computer will be procured this fall through Slidell. ✓
3. QUALIFYING ADPS PERSONNEL UNDER AST-3 REGISTER: Mr. Newby arranged for our ADP personnel to meet with Mr. Lacklen, Director of Personnel, NASA Headquarters, and Mr. West, Chief, Classification Officer, NASA Headquarters, concerning our difficulty in finding business computer personnel with R&D experience. The case in point was Mr. Luckadoo who we have been trying to qualify for several months. Mr. Lacklen pointed out an additional avenue which we will pursue in attempting to qualify Mr. Luckadoo who we feel will be an ideal project officer for our ADP activity in Industrial Operations. We will continue the case and hope for better results under the new approach. The meeting did clear up some of our misunderstandings concerning regulations we have become entangled with on this case. (See NOTES 3-23-64 attached). ✓

NOTES 7/20/64 JAMES

B 7/30

SA-7: Six of H-1 Engines returned to KSC and last two due back tonight. Last week a problem occurred due to possible thin spots in new LOX domes. The first four of recently reinstalled engines in question were checked at KSC and found to be satisfactory. Effort progressing toward established launch date.

S-I-9: A new schedule on S-I-9 has been issued which will meet the required arrival date at KSC on September 22, 1964.

S-IV-9: Reference my June 29 Note on cryogenic calibration (attached). Cryogenic calibration or cryogenic weighing is the manner in which propellant utilization (P.U. probe) is calibrated. Accuracy of loading after this calibration will be $\pm \frac{1}{4}\%$. Each propellant tank is filled separately and weighed with load cells, previously calibrated with dead weights. Propellant is then detanked in steps corresponding to levels on P.U. probe. A weighing operation is performed at each step.

S-IV-9 COMMON BULKHEAD: Gas samples taken during cryogenic weighing revealed a 65% helium content indicating a leak from LOX tank to common bulkhead. Dye penetrant revealed 42 indications in meridian welds of aft face; 22 were cracks and 12 were drilled or cut out for plugging. Each of 6 meridian weld seams will have a doubler bonded over plugged area. Acceptance test will probably occur during week of August 3. Schedule is compatible with new SA-9 schedule.

MICROMETEOROID: Additional failures in time counter and parity check circuits occurred late Thursday preventing completion of Data Sub-System Acceptance Test. Neither problem has been solved to extent that a satisfactory fix has been made, however, appears that the causes of failures such as this are being systematically identified and solved. DSSA Test should be completed this week.

S-I-STAGE ENGINE TURBINE SEALS: Reference Heimburg's June 29 Notes (attached). This problem has been overshadowed by LOX dome problem. All turbines on S-I-7 and subsequent will be repaired using modified seal ring as designed for S-IB Stage engines. This will be accomplished during the time required for LOX dome replacement, which is the pacing item.

S-IVB STRUCTURAL TEST STAGE: On July 14, during initial phase of structural stage testing, the hydrogen tank failed at 70% of design ultimate load (1.4 safety factor). Stage was fully instrumented and was to be proof tested to 105% of design limit load. Dynamic, all-system and S-IVB/IB-1 Stages have already been proof tested to 105% of design limit loads. No impact anticipated on SA-201 by this failure. Tentatively established that failure originated 55" above aft skirt plane in weld repair area of H₂ tank sidewall and fracture progressed extensively in both directions. (See photos attached).

S-IVB BATTLESHIP: Current date for chilldown is August 19 and first engine ignition Sept. 15. Delay results from continuing problems in rework and retest of LOX pressurization modules and LH₂ pre-valve. Late availability of auxiliary pressurization system and several other hardware problems. DAC indicates hot firing date may be improved if chilldown progresses satisfactorily. During my visit to DAC this past week, following plan was discussed in light of slipping S-IVB schedule: restore battleship test to 6 months (3 months extension); continue all-systems ahead of first flight stage, including loading tests at SACTO until first flight stage requires stand occupation. This eliminates artificial cutoff of BS tests and gives factory checkout and loading tests of a flight type stage prior to S-IVB-1. MSFC S-IVB first battleship hot firing is scheduled for February, 1965.

1. ASSOCIATE ADMINISTRATOR'S ADVANCED STUDY REVIEW: Only now do I have the room for a report on the above review, which took place on June 25 and 26. Other than Dr. Seamans, Dr. Webb and Dr. Dryden attended the review part-time. Other attendees were Mr. Hilburn, Adm. Boone, Adm. Rose, Dr. Bisplinghoff, Mr. Cortright, Mr. Francis Smith and many others. It was a joint review for MSF, SSA and ART. I was the only MSFC representative and the only MSFC speaker. I made a 30-minute presentation on the Reusable Orbital Transport (ROT) and Post-SATURN. There were two MSF dry runs before; you attended one with Dr. Mueller. ✓

The total review was done in two mornings, four hours each. The emphasis was on what we have learned in the past year. There was a total of 20 speakers, mostly from Headquarters program offices. ART depended primarily on Center presentations.

The review was well received. MSF was much better prepared than ART. Top management was apparently satisfied with what they saw. They seem to feel that they got their money's worth. ✓ They stated that much progress has been made in the past year. Dr. Webb expressed his desire for a formal feedback procedure on study results in schedule and resource planning.

My presentation on ROT and Post-SATURN was received well and no exceptions were taken. I had a model of the ROT, which was examined closely by Dr. Dryden, Dr. Seamans and Mr. Hilburn. ✓ Particularly, Mr. Gray was happy with our data and form of presentation. ✓ His office made a good overall showing. ✓ I recommended that official contacts with the AF on the requirements for the Reusable Orbital Transport should now be initiated. We are in an advantageous position at this time. I think this will be taken up shortly. ✓

HKR

Very fine!
B

1. Saturn V, S-IC Stage:

a. The fuel exclusion riser developed into a serious problem area for S-IC-T. The exclusion riser is a body of plastic foam, bonded into the lower bulkhead of the fuel tank in order to minimize the residual fuel weight by about 4,000 lbs. During the first hydrostatic test, the bond between the exclusion riser and the aluminum separated in areas of major deflection, and water had soaked in. After careful and tedious repair and a second hydrostatic test, new places of separation and peeling were found. During the repair work going on presently, more and more separations, water pockets and now also corrosion, are found and no proper way of repair is seen. The cause of this situation is not bad workmanship but lies in basic design and technology problems, requiring a longer development and testing program in order to achieve the structural reliability of such a novel type approach. ✓

b. Fabrication of upper fuel bulkhead for flight number one has been started in our shop. All outlet fittings have been welded into gore segments for this bulkhead. Excessive warpage from welding of these outlets, experienced on the thin gores for -S and -1, has been corrected by use of our magnetic hammer, which was developed in our Methods Research Laboratory. Last week we saved with this method 4 gore segments (approximately \$120,000). S&ID and Boeing have used shrink fit methods to minimize weld distortion while roll planishing is extensively used for this purpose in the fabrication of the Command Module. This latter method would be of great help for the Saturn V program, but permission to use roll planishing has not been granted yet because of suspected increase of notch sensitivity after planishing. This investigation has been underway for approximately 9 months without producing a final decision. ✓

2. M-1 Engine Meeting: On request of Mr. Gomersall of Lewis Research Center (LRC) a second meeting between Aerojet, LRC, and ME Laboratory was held at Sacramento on July 16-17 to discuss areas of manufacturing development for the M-1 engine. ✓

3. S-II Common Bulkhead Progress: Final bonding of bulkhead was held up last week for incorporation of an engineering change order providing for groove in the fiberglass core for equalization of pressure within the honeycomb space. Bonding will be accomplished this week. ✓

Gilly Wozek
 What remedial action do you recommend?
 Why must the riser be bonded all over? If we accept a 1/2 inch gap between bulkhead and riser, we may not have a corrosion problem since no liquids can't get trapped. B

NOTES 7-20-64 MAUS

B7/30

1. SATURN IB - TITAN III C COMPARISON STUDY - There has been no agreement reached yet between NASA and the Air Force on the detailed cost system to be used in the Saturn IB - Titan III C Comparison Study. Discussions are continuing. According to Mr. Malaga of Dr. Seamans' staff, both Mr. Webb and Dr. Seamans prefer detailed study, using the Malaga system, which is still not fully defined. ✓

We expect the MSFC pilot application of a version of the Malaga system to be complete around July 31. ✓

Indications are that headquarters will place a requirement upon MSFC to complete a detailed study of the IB in accordance with some version of the Malaga proposal. ✓

2. APOLLO DOCUMENTATION MANAGEMENT PROGRAM - Mr. Andressen attended the July 16 meeting of the MSF Ad Hoc Task Group for implementation of the Apollo Documentation Management Program. The draft manual has been finalized and we expect General Phillips to sign off on it within ten days. ✓

Indications are that General Phillips will give a report to the Management Council which will show Marshall as clearly being in the lead in this area. ✓

3. WEBB VISIT TO MICHLOUD - Mr. Kline served as project officer on the recent visit by Mr. Webb to Michoud. Ray noted the following items which will require follow-up on and probably a positive response:
 - a. Economic impact of MTF & Michoud ✓
 - b. Analysis of computer loading at Michoud ✓

We will follow through with Dr. Rees and Mr. Gorman to assure this data is available for future response. ✓

1. R&D OPERATIONS MANPOWER AUDITS: The manpower audits of laboratories, as reported in 7-6-64 NOTES, are progressing on schedule. Audits in ME, QUAL, COMP, and AERO have been completed. All available personnel in this office and representatives from Executive Staff and Financial Management are devoting their entire time to these manpower audits. R&D Operations senior personnel (Mr. Weidner, Dr. McCall, and Mr. Cook) are performing comprehensive reviews in the laboratories, with penetration into the section and units. Cooperation with all concerned has been splendid. This series of reviews will be completed on July 31, with an overall review by Mr. Weidner.
2. PROCESSING OF RESOURCES MANAGEMENT DATA: In an effort to improve our management efficiency and conserve available manpower, we met with COMP Lab to initiate computer controlled programs for Resources Management. As a start, each contract over \$100,000 will be summarized at a R&D Operations management level. We will later consolidate budget and manpower information on computer tapes for cross-reference in analyzing R&D Operations present and future requirements. Other topics will probably be developed as we continue working with the Computation Laboratory.
3. SINGLE SUPPORT CONTRACT SOURCE EVALUATION BOARD: The first official meeting of the Source Evaluation Board was held July 13 to consider Request for Procurement and the source evaluation criteria for the single support contractor for the Test Laboratory. The NASA Procurement Regulations and the Draft Manual of Procedure for Source Evaluation Boards were reviewed to insure all members were familiar with existing policies, the disclosure of information, and other sensitive aspects of the Board proceedings. The overall planned schedule of events which will lead to the final recommendations to be made by the Source Evaluation Board on all laboratories and the administrative offices involved was tentatively established. In general, the schedule for preparation of proposals and the subsequent receipt and evaluation of proposals from contractors, although tight, has been established to afford the Board an opportunity to review all submissions before evaluation is completed, and will permit final evaluation based on the total MSFC picture rather than laboratory-by-laboratory.
4. VISIT OF NORM CRONE: Mr. Crone of the Requirements Group (Lilly's Office) visited Marshall on July 14 and 15. The main purpose of the visit was to become more thoroughly acquainted with the mission of the P&VE Materials Lab, to assist him in making final presentations of their FY-66 CofF projects (Additions to Materials Lab and Non-Destruct Test Lab) to the MSF Facilities Review Board early in September. This visit was fully coordinated with the Facilities and Design Office.

1. S-IC Stage:

S-IC Thrust Augmentation System - A Technical Assistance Order was issued to Boeing authorizing preliminary design of an S-IC thrust augmentation system utilizing a maximum of four Minuteman solid propellant motors. The TAO also requested a firm cost proposal be submitted by December 1964 on the final phase of this program (final design, test, procurement, and modification of stage hardware). ✓

Seamless LOX Tunnel - The first Parson's seamless LOX Tunnel arrived at Wichita on July 8, 1964. The tunnel was anodized and shipped from Wichita to Michoud on July 18, 1964. ✓

2. Instrument Unit:

Guidance Computers and Data Adapters - Negotiations are continuing on the definitization of the flight hardware contract for guidance computers and data adapters. Target date for completion is July 24, 1964. NASA Headquarters has allowed extension of the letter contracts covering this effort to August 15, 1964. ✓

IBM Prime Contract - Negotiations with IBM on the Prime Contract are proceeding. The scope of work for repricing by IBM was completed on July 17, 1964. IBM will resubmit new price data, based on the agreed upon statement of work, by July 24, 1964. Remaining negotiations will consist of price and incentive plan agreements and normal general contract provisions agreements. There is only a slim chance that the contract can be definitized and signed by IBM and NASA by August 4, 1964. It is still felt that a letter contract for a relatively short period of time will be required on August 4, 1964. ✓

3. Vehicle GSE:

MSE Effort - An agreement within MSFC has been reached to utilize Boeing for supporting P&VE Mechanical GSE efforts. This agreement is expected to provide P&VE with substantial relief in areas that were of major concern in follow-up, timely integration of equipment and technical decisions that are necessary from the Mechanical GSE System viewpoint. ✓

We have completed the TAO for providing support to P&VE until an MSE mission can be contracted for. As soon as Mr. Cline, R-P&VE-DIR has concurred, we will forward the task to the Boeing Company for action. ✓

Boeing GSE Support - We anticipate having a finalized RFQ statement for the Boeing GSE support mission within another week. ✓ This will be in sufficient time that the negotiations with the Boeing Company will not be delayed. This mission includes the MSE mission, the expanded Equipment Management System, GSE logistics support, and management support. ✓

NOTES - 7-20-64 - SHEPHERD

B 7/30

No Notes

B 7/30

NOTES 7-20-64 Stuhlinger

1. CONSOLIDATION OF IO AND R&DO SUPPORTING RESEARCH PROGRAMS: In a meeting between H. Hueter, W. Mrazek, other members of IO, and members of R&DO, possibilities of consolidation of the IO and R&DO research programs for the purpose of creating a uniform MSFC research program were discussed. An agreement on programming and implementation procedures was reached. A copy of the written agreement will be sent to you for your information. ✓

2. SRT PROGRAM STATUS: The current status of the ART/SRT Program under the cognizance of this Laboratory is as follows:

	<u>ANNUAL PLAN</u>	<u>AUTHORIZED</u>	<u>PROCESSED TO FMO</u>	<u>OBLIGATED</u>	<u>CHANGE IN OBLIGATIONS SINCE 7/2/64</u>
OART	10,514,311	10,514,311	10,483,311	8,957,857	688,221
OMSF	14,133,000	14,133,000	13,761,279	12,706,722	2,826,460
OSSA	680,000	680,000	666,928	585,461	183,730
	<u>25,327,311</u>	<u>25,327,311</u>	<u>24,911,518</u>	<u>22,250,040</u> ✓	<u>3,698,411</u> ✓

3. ALSS: In a meeting between Dr. Fryklund (OMSF) and J. DeFries, Dr. Fryklund stated that he expects RPL to provide a major contribution to the ALSS in the form of "scientific mission objective identification." In particular, we are to plan the "emplaced scientific station." Our first report on this subject is almost completed. ✓

4. FLIGHT TEST OF ELECTRIC PROPULSION ENGINES: I attended the SERT I (first flight test of two ion engines) at Wallops Island on July 18. The count-down was very smooth and successful until X-30 minutes, when a halt was necessary because of boats moving into the impact area of the first stage. After two hours of waiting, the launching had to be scrubbed (end of launch window). The test then took place early on July 20. As far as I learned from LeRC, the Lewis engine worked with 100% success. ✓ The Hughes engine apparently did not do so well.

↑ E.S.
I think you deserve a hefty pat on the back for this! I'd be curious to learn about the details. B



MADE IN U.S.A.

July 27 1964

VOID FREE
52% COTTON

ETILE



To: NOTES 7/27/64

7/26

8/26

Dave Kerby

I talked to Harry G. about
his speaking business in
Mississippi and he feels, too, that
Bill Fortune is going too
far with his concern. On the
other hand NASA has now
issued a pretty strongly worded
written directive.

Suggest Harry issues an
"interpretation" of this directive
for MTO situation.

B

8/20

DIR

Dr. von Braun

With reference to your comment on Bill Fortune's Notes (7/27/64), attached, I believe Bill's concern is misdirected. There is little doubt in my mind that the Mississippi Coast people understand the policy statement on speaking before segregated audiences. The policy has been widely publicized in the local press, including questions and answers. The basic problem is that the policy is not very palatable -- please see attached Clarion-Ledger (Jackson, Mississippi).

What I have attempted to do is alleviate possibility of misunderstanding by holding frank discussions with respect to the NASA position. At Bill Fortune's request, I sat in on the MTO Manager's meeting and discussed Mr. Webb's plan for implementing the White House guide. Subsequently, I, along with some of Bill's people, have met with a group of influential citizens from communities in the Mississippi Test Operations impact area. In addition, we have met with representatives of the larger Federal establishments on the Coast (Veterans Administration, Air Force, Navy, and Post Office Department) to discuss implementation of the directive and to suggest that the

Federal agencies work closely together in presenting a coordinated position to the communities in Civil Rights matters. You may recall, that in the latter case, we have taken this position with the Army and have found it to be quite effective.

I will plan to spend more time with Bill and believe I can help with some of his problems.

Marion I. Kent
Marion I. Kent

Attachments
as stated

*Concur
Dave Hewley
8-12-64*

-2-

DEP-A

Marion I. Kent

8-11-64

CONTRACT PROVISIONS FOR QUALITY ASSURANCE: Representatives of this Laboratory met recently with Purchasing Office representatives to discuss the inappropriate quality assurance provisions which have appeared in a number of recent contracts. Most of these contracts involved procurement requests which had been approved by Quality representatives in the using Laboratory, but the quality provisions were entered after our approval. The purchasing representatives did not realize this was occurring and assured us that instructions would be issued to correct the situation. Several of these contracts will be amended to correct the inappropriate provisions.

Shaw Director 572

OFFICE OF DIRECTOR ^{fw} MSFC

CODE	NAME	INIT.	<input type="checkbox"/> A C T I O N	<input checked="" type="checkbox"/> I N F O R M A T I O N
DIR	Dr. von Braun			
	<i>Bell</i>			

REMARKS

Joann file

Reference: Item No. 5
Mr. Grau's Notes of 7-27-64

A new employee in the Purchasing Office used a quality assurance clause that he had been in the habit of using in contracts where he had formerly worked. The situation has been corrected now. *VB*

CODE DEP-A	NAME D. H. Newby	DATE Aug 7, 1964
---------------	---------------------	---------------------

OFFICE OF DIRECTOR - MSEC

UNIT	NAME	DATE
	Mr. von Braun	10/11

Reference: Item No. 2
 Date: 10-11-64

A new employee in the Processing
 Office used a quality assurance check sheet
 and had the habit of using in contracts where
 he had formerly worked. The situation has been
 corrected now.



REPLA
 AUG 7 1964

B 8/3

fw
7/27F-1 ENGINE

Coordination with ME, Test, and the S-IC stage project office relative to realigning F-1 engine deliveries to take advantage of the latest vehicle assembly schedules has resulted in agreement to delay engine deliveries 2 months for the T stage, 2 months for 501 and 1 month for 502. This action permits additional R&D verification testing of the injector, nozzle extension and turbopump, prior to committing hardware to delivery. It also permits fewer deviations in the early engines for the "T" vehicle. This action is a direct follow-up to one of the items discussed in the meeting you held with Rocketdyne's management on June 25, 1964. ✓

J-2 ENGINE

R&D testing is continuing on two test stands. The PFRT engine J2004 is being acceptance tested. On the initial test of this engine, the fuel turbo-pump balance piston cavity pressure exceeded the redline value of 800 psi. After examination of the pump, the decision was made to replace it with a turbopump utilizing bronze rub-rings for the balance piston seal to improve seal life. ✓

Whaleser
that is
B

The damage to engine 2008, which was reported last week, has been assessed. The fuel pump inlet bellows, a temperature transducer on the fuel turbopump, and a gas generator bleed valve were broken. Replacement of these components is underway. A two weeks delay in delivery of the engine, slated for the S-II battleship program, is anticipated with no major impact on the S-II program. ✓

H-1 ENGINE

All engines for SA-7 have been returned (by July 20) to KSC and reinstalled in the vehicle.

All SA-9 engines are currently at Rocketdyne-Neosho being retrofitted with new domes. These engines are scheduled to be returned to MSFC by August 12, 1964; however, we are predicting August 5, 1964. One R&D rerouted inboard engine using partial aspirator began engine test during the report period. Eight duration tests/900 seconds have been successfully conducted. ✓

RL10 ENGINE

No-cost contract was released to Boeing last week for testing program using two RL10 engines. Engines will be provided by September 1 and November 1. ✓

Due to the phase-out of RL10 engine production at East Hartford, the NASA office at that location is being dissolved and remaining functions will be turned over to the Navy Plant Representative on August 1. Jim Sullivan, who was Resident Manager at East Hartford, will be assigned to the Canoga Park Office at Rocketdyne cognizant over the overall aspects of F-1, J-2, and H-1 manufacturing and production. ✓

B8/3

7/27/64

1. SATURN V, S-IVB STAGE: A trip to McDonnell Aircraft Corporation and MSC has been arranged to investigate the possibility of using Freon in lieu of the Tri-Flush method on the S-IVB Auxiliary Propulsion System Fuel and Oxidizer Servicing Units.

A letter from Industrial Operations to Douglas Aircraft Company (DAC) has resulted in cancellation of a necessary part of the Ground Support Equipment component qualification test program. DAC has cancelled the tests contending they are out of scope, while the letter informed DAC that the tests are necessary and are considered to be within scope. Since this program is behind schedule, the situation must be clarified and the test program reinstated as soon as possible.

2. KIWI B-4E TEST: The next test in the Los Alamos Scientific Laboratory KIWI reactor series, KIWI B-4E, will take place at the Nuclear Rocket Development Station on 8-28-64. Test objective will be similar to the last test. The Westinghouse test reactor, NRX-A-2, will be tested three weeks later.

3. F-1 ENGINE TEST AT MSFC: This test had been delayed for replacement of moisture contamination instrumentation cables. The test was performed on engine F-1002; cutoff by LOX depletion occurred after 125 seconds planned duration. Thrust was low (1450K), but this was expected. This is the first MSFC test of significant duration in which helium and LOX were used in the heat exchanger.

4. FLUORINE-HYDROGEN ENGINE TESTS: Pratt and Whitney Aircraft has completed four pump-fed firings on two RL10-A-1 engines modified for fluorine service. The following table gives a summary of the runs:

Engine	Thrust	Highest Attained Mixture Ratio	Duration
No. 1	15,000 lb.	7:1 (O/F)	30 Seconds
	15,000 lb.	8:1	73.6 Seconds
No. 2	15,000 to 20,000 lb.	9:1	71 Seconds
	15,000 lb.	9.67:1	51 Seconds

Specific impulse obtained?

F.C.

Are any Centaur/fluorine compatibility studies going on? If so, are we studying potential payload gains for Sat I/B Centaur 3-stager?
B

All test runs were of programmed duration and performance was similar to that obtained in the pressure-fed thrust chamber firings, and no detrimental effects to the engine were noted.

5. THIN INLETS DISCOVERED ON FOUR NEW-TYPE 7075 LOX DOMES: During inspection of LOX domes at Neosho, the lower portion of the inlet on four domes was found to be less than the required thickness. Inspection of the inlets of the LOX domes on the S-I-7 engines showed an acceptable thickness.

→ F.C.

Who can give me a good status report on the SIVB Aux. Propulsion Sy incl. attendant GSE? Please arrange something from Bonnie
B

NOTES 7/27/64 CONSTAN

B 8/3

July 27

I. STATUS OF S-I-8

Engine turbines have been modified by MSFC-Huntsville and returned to Chrysler Corporation-Michoud, but have not been installed. There has been very little activity on S-I-8 during this week. ✓

*fw II. STATUS OF S-I-10

CCSD moved S-I-10 out of the plant during the morning of ^{July} June 24 for shipment to MSFC-Huntsville for static firing. Correction of inspection squawks and modification for static firing were completed except for a minimum number of open items which are indicated on the vehicle status sheet. ✓

S-IB-1:
III. STATUS OF S-I-10

Clustering of all LOX and fuel tanks have been completed. ✓

7/27

NOTES 7-27-64 DANNENBERG

B 8/3

Negative report.

Jul 27/64

B 8/3

NOTES 7/27/64 FORTUNE

1. Visitors to MTO: Tuesday, General Wilson, Col. Marshall, Col. Roberts and other Corps of Engineers personnel visited the site to view construction progress. Gen. Wilson was familiar with the criticality of our navigation lock and pointed out how the delay in authorization of FY-64 funds had hurt. On Thursday, forty Mississippi Superintendents of Schools toured the site and were briefed on our activities. They were all whites, and had we not made arrangements for this visit a month ago, before the White House memo on Implementation of the Civil Rights Act, we would not have known what to do about it. I strongly urge that NASA issue a policy statement we can pass on to people hereabouts explaining the situation so that misunderstandings and possibly public recrimination will not result when we do turn down speaking or other requests. Veterans Administration personnel here would like to issue a joint Governmental agencies statement locally if we could agree on one. They have already been hurt by unfavorable reaction. Mack Herring will work with Bart Slattery on this.

Dave Newby

Please get into the act, with Marion Kent. We don't want to bungle this one!

B

2. Labor Problems: Operating engineers on all five Leawell-Kiewit prime contracts refused to work Wednesday morning. Issue centered around the discharge of a master mechanic and the individual selected as replacement. It was resolved in the President's Missile Sites Labor Committee weekly meeting and work resumed at 12:30. ✓

3. GE FY-65 Support Contract Negotiations - were completed at 3:00 p.m. on Friday, July 24, after 75 days of negotiations. Anticipatory costs to cover GE while awaiting Headquarters approval of contract will be extended as required. ✓

4. I Suggest we Change MTO back to MTF - if we are to follow Mr. Webb's recent comments. Mississippi Test Facility has been used in all C of F submissions to congress, and is more appropriate than Mississippi Test Area I believe. Harry Gorman has a letter file on previous correspondence relating to naming the Mississippi Test site, and in his present assignment could possibly determine if MTF is agreeable to Mr. Webb.

True statement!

B

Dave

Please handle this, too, but get Ind. Ops. in, also. Mr. Webb suggested also a change of "Michoud Operations" to avoid confusion with "Industrial Operations". How about "Michoud Facility" also. I am against "Michoud Assembly Plant", because we are doing more than assembly there! B

Suggest we check w/ Webb's office before we finalize

1. Saturn IB/Centaur: At a meeting of the Saturn IB/Centaur Task Group on July 23, Mr. Fero requested, based on a specific request by Dr. Mueller, the following: PERT chart of the schedule, a detailed breakdown of the \$2.5 Million recurring cost; cost, manpower, and other impacts if SA-205 is the first flight; a 260" payload compartment layout showing two Surveyors with the feet extended. Mr. Fero is coming again on Friday July 31. We will hand the answer to these questions to him then. The final version of our project proposal is being finished this week. Les Fero would like to have it by Friday so that he can give it to Dr. Mueller for the meeting between Dr. Mueller and Dr. Seamans the week of August 3. We will give to him on Friday an advance copy and officially submit to him the final version next week. Dr. von Braun and the Lab. Directors will have the draft proposal by Friday for review and approval. ✓

2. Instrumentation Aircraft: Mr. F. Kurtz attended the meeting held by Mr. Mueller and General Phillips on July 22 in Washington, D. C., to discuss the requirements for instrumentation aircraft (approximately 12 planned) to cover the S-IVB second burn on lunar missions. John Hodge of MSC reviewed the requirements, which are considered mandatory for the aircraft. The aircraft are required (1) to maintain real time voice communications between the astronauts and the Manned Spaceflight Control Center (MSCC) during the second burn, and (2) to insure recovery of engineering telemetry (post-flight analysis only) from the CSM and S-IVB/IU during the second burn. These requirements cannot be satisfied by the planned ground network, including ships, without unreasonable constraints upon the launch window. MSC considers coverage of both Atlantic and Pacific injection opportunities on successive days necessary to permit adequate launch windows, based on certain assumed launch constraints. Dr. Mueller admitted the desirability of these requirements, but did not agree that they were mandatory (meaning no-go if communications to the aircraft were lost). ✓ He did not commit himself on the question of whether the requirements are sufficiently desirable to permit expenditure of the approximately \$25 million current estimated cost, pending further study and budgetary consideration (\$18 million for this purpose programmed in FY 65 budget, remainder needed in FY 66). Alternate, less expensive means to satisfy the basic objectives with some compromise were requested, though none were proposed. Dr. Mueller also questioned several of the assumed launch window constraints, including the need for a 2.5 hour minimum daily window.

Dr. Fero
for info
and
discussion
with KSC
B

~~3. Flight Mechanics Panel Meeting: The Action Items and Agreements resulting from the Ninth meeting are attached.~~

4. Saturn IB/Centaur Missions: Mr. Clingman of R-AERO-S had a meeting with Mr. Hasting and Mr. Holiday from Langley on July 22. Langley is planning to manage a contracted study on Cislunar Micrometeoroid experiments. They are considering two classes of spacecraft: (a) 500 lb. (Atlas Class); (b) 4,000 lb. to 5,000 lb. (Saturn class). Time frame for the mission is so far '66 and '67, according to their intentions. We have promised them all the help we can give in formulating the guidelines for their study as far as launch vehicle is concerned. We are pushing for them to concentrate on Saturn IB/Centaur, with higher loads than 4,000 - 5,000 lbs. ✓

July
27

1. S-I-9 POST-STATIC CHECKOUT: Removal of all engines from the stage was completed July 20, 1964. Limited testing is continuing. Some re-verification will be required on measurements affected by engine removal and re-installation. Post-static checkout is scheduled for completion on August 30, 1964. ✓
2. S-IU-9 INSTRUMENT UNIT: S-IU-9, still undergoing modifications, has been delayed again; and it appears this Laboratory will not receive the unit until later this week. ✓
3. S-IVB PROGRAM: Preliminary investigation of the Hydrostat Stage rupture on July 14 has yielded no definitive findings. DAC has formed a formal investigation team headed by Mr. R. L. Johnson, VP, Product Development, to determine and report on the nature and cause of the failure.
4. S-IC FLEXIBLE DUCTING: In an effort to minimize qualification costs, representatives of Boeing, ME, P&VE, and this Laboratory agreed to re-design the high pressure gimbal joint on Fuel Pressurization ducting. Effective X-ray evaluation of the bellows to gimbal flange weld joint will be possible on the new design whereas with the present design it is not possible. The present design will be retained for the low pressure lines, and the welds will be controlled with fully automatic procedures and rigid process controls. ✓
5. CONTRACT PROVISIONS FOR QUALITY ASSURANCE: Representatives of this Laboratory met recently with Purchasing Office representatives to discuss the inappropriate quality assurance provisions which have appeared in a number of recent contracts. Most of these contracts involved procurement requests which had been approved by Quality representatives in the using Laboratory, but the quality provisions were altered after our approval. The Purchasing representatives did not realize this was occurring and assured us that instructions would be issued to correct the situation. ✓ Several of these contracts will be amended to correct the inappropriate provisions. ✓
6. AM-355 SLEEVE TESTING: Microstructural examination and hardness measurements have been conducted on a 5% sampling basis on 12,010 AM-355 sleeves re-heat treated by Poinsett Commercial Heat Treating Company. No sleeves failed this testing. Dimensional inspection of the entire 12,010 sleeves resulted in 2019 rejections. This completes the inspection of the MSFC stock of sleeves after re-heat treating. ✓

Harry G.
Ayi
B

NOTES 7-27-64 GRUENE

B 8/3

fw
7/27

SA-7 Status:

a. All eight engines of the S-I stage are reinstalled and the engine checkout is in progress. We expect to finish these special engine checks by the end of the week to be ready to start combined systems checks. ✓

b. A problem with the S-I stage antenna panel mounting bolts was discovered on SA-8 at Michoud and subsequently on SA-9 at MSFC. The antenna panels on SA-7 were checked and the same problem exists. The problem is that the mounting brackets are mounted to both the skirt section above the lox tanks and to the lox tanks proper. The increased heights of the lox level over earlier vehicles is apparently causing shear loads in the bolts. It was decided, together with P&VE, to take off the antenna panels and provide slots allowing for contraction of the lox tank. The work is in progress. We hope to be ready at the end of the week to make re-verification tests of the antennae. ✓

c. The installation of the non-propulsive vent system is still in progress, but we hope to have it finished during this week. ✓

B 8/3

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1. STATUS REPORT - APOLLO-SATURN ELECTRICAL SYSTEMS INTEGRATION PANEL:

The tenth meeting of the Apollo-Saturn Electrical Panel was held on 6/30 and 7/1/64 at MSC. The more significant agenda and action items discussed at this meeting were:

a. Electrical Panel's Responsibility as Related to GSE Interfaces: MSC proposed to transfer all GSE interface responsibilities to the Electrical Sub-Panel of the Launch Operation Panel. MSFC and KSC opposed; Mr. Fichtner stated that this interface was too closely related to the Spacecraft-Launch vehicle interfaces to be handled in a different panel. ✓

b. Interface Document Number 40 M 37505, Spacecraft Airframe 009-SA-201: The interface control document (ICD 40 M 37505) was presented and signed off by MSC and MSFC. ✓

c. Power Supply for Spacecraft - Saturn IB & V and Power Supply for MSC ESE: MSC stated that 28VDC power supplies meeting MSFC specifications, located in the Automatic Ground Control Systems (AGCS) and the LCC* would be sufficient to meet the 28VDC requirements of the spacecraft and the spacecraft GSE for Complexes 34 and 37B. ✓

MSFC recognized that MSC would have difficulty obtaining power supplies in time to meet schedules for LC-34 and LC-37B. MSFC, therefore, agreed to provide 28VDC power supplies to LC-34 and LC-37B as follows:

(1) Thirteen supplies to each launch complex. The Automatic Ground Control System supplies will be provided with backup batteries. Distributors and cables will also be provided, MSFC will supply necessary drawings, instructions, and specifications. ✓

(2) MSC must transfer sufficient funds to MSFC to cover procurement of this equipment. ✓

(3) After installation, management responsibility for checkout, configuration control, usages, and logistics will devolve to MSC. ✓

MSFC made no agreement on 28VDC power supplies for LC-39. MSFC stated that if they do provide supplies for LC-39, they would simply procure and deliver as stated for LC-34 and 37B. ✓ Since the LC-39 schedule does not present a problem, MSFC does not believe that there is any advantage in procuring power supplies for MSC. ✓

2. SA-9 PROGRAMMING DELAYED: Closed loop runs have been delayed due to R-COMP facility shutdown. R-COMP advises that the shutdown is the result of air-conditioning system failure--an annual occurrence. Having no backup provisions, the down-time duration is dependent on receiving and installing replacement parts. It is estimated that one week delay will result from this problem. R-ASTR simulation facilities could not be used for preliminary tests due to SA-7 work. This work was completed 7/24 and some SA-9 tests are now in progress. ✓

3. PERSONNEL LOSSES: Mr. Mandel's Division lost to the Army Missile Command a total of three engineers within the last six weeks. The losses are a result of AMC's ability to offer promotions and positions to our engineers, since it was designated the G&C Center for the Department of the Army.

* Launch Control Complex

Jim
Shepherd
Can't we
do something
about this?
B
Harry J.
Ry B

July 27

Bols

NOTES 7/27/64 HEIMBURG

*fw

1. F-1 ENGINE:

A tox depletion test, TWF-028, was conducted on engine F-1002 on 7/20. Following the test, it was discovered that a 2-inch-long piece of 1/4-inch-diameter stainless steel tubing had separated from the thermocouple in the gas generator outlet. The turbine was disassembled to search for the missing piece of tubing. The piece was not located; however, a close inspection of the turbine wheels revealed some small dents, indicating that it probably passed through. The next test is scheduled for Wednesday, 7/29. ✓

2. S-1C SOUND SUPPRESSION CLUSTER

A successful 5-second mainstage firing of the five Vanguard (30K) engine cluster was made on 7/23. The first attempt to fire was aborted after 0.92 second, because of a faulty control signal. However, the engines were recycled and the successful test was subsequently made. A successful 10-second mainstage test was made on 7/24. These tests indicate the feasibility of this cluster concept, and the test stand is now ready for the sound suppression study tests. ✓

*fw

3. MTF WORKING GROUP:

Negotiations with GE for Phase II Technical Systems were completed on 7/20. Contract finalization is expected by 7/31, after which this action will be submitted to Headquarters for review. ✓

July 27

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NOTES 7-27-64 HOELZER

MTO COMPUTER SUPPORT: Test Laboratory agrees that the atmospheric sounding work should be done at MTO, therefore, we are procuring the GE 205 computer. This is a small medium-scale computer and will be purchased. ✓

HH

Even if your airconditioning system is out, you should be able to muster enough strength to let me know that it caused you a 1-week shutdown!!

How about getting together with Jim Shepherd to get that system fixed, once and for all. L?

B

NOTES 7/27/64 JAMES

B 873

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*fw SA-7 - S-I: Reinstallation, connection and checkout of the H-1 engines is progressing. After reconnecting hydraulic lines on 3 engines, leaks were found which could not be stopped by overtorquing. New tubing is being formed by ME Laboratory to be completed 7/28/64. ✓

LOX dome replacement is progressing on schedule on balance of affected stages (S-I-9 through S-IB-2). S-I-9 is planned for shipment on Sept. 11. S-I-10 engines will be removed at MSFC, dome replaced and hot fired at Neosho, replaced and static tested. ✓

S-IV: Progress on installation and initial mechanical checkout of the non-propulsive vent system is continuing on schedule.

*fw S-IV-9: Repair of common bulkhead weld cracks (by bonding) was completed satisfactorily. The stage is scheduled for hot firing on July 30 and shipment to KSC on September 17. ✓

*fw S-IVB: Through minute investigation including reviews of X-rays, it has been determined that LH₂ structural tank fracture started at a point approximately 17'-6" aft of forward attach ring on LH₂ tank seam weld No. 4. According to inspection records there had been 2 weld repairs on this particular area and also a lack of penetration of weld material slightly aft of weld repair. A request has been sent to R-DIR requesting appointment of an Ad Hoc Committee from R&DO to investigate welding techniques, procedures, specifications, controls, inspection, etc., at DAC. ✓

H. Weidner
By B
I.U. IBM: In order to comply with requirements of Apollo Configuration Management Manual (NPC 500-1), IBM will prepare but not implement Contract End Item Specifications for major systems and components. ✓

GSE: Presentation to General Phillips on Sept. 17-18 on Saturn IB GSE at KSC with MSC participation. MSFC is preparing the scope of work to transfer vehicle MSE management from inhouse to CCSD. A 90 day task will be initially used to be supplemented by mission assignment. ✓

PROJECT "PEGASUS": NASA has officially renamed the micrometeoroid program for official documentation and PAO. All planned fixes on MMC prototype data subsystem have been incorporated by temporary means. The subsystem has successfully completed acceptance testing through high voltage-high temperature environment. ✓ No deviations in performance requiring engineering changes for correction were observed. Modifications to system in final form (redesigned printed circuit cards, etc) will be incorporated and tested at environmental extremes prior to initiation of canister tests. ✓

FAIRCHILD STRATOS: You will recall that at the Executive Session in Washington, we proposed to make the first micrometeorite a test article so that we could lower somewhat the required probability of success and thereby keep it on schedule. Ames could not give a final comment for Bisplinghoff at the meeting. I have had a call from Ames' office today and Bisplinghoff does agree with our plan. ✓ We will implement it in detail immediately. ✓ At the same time, we will set up the verification group which Ames requested in order to determine if the detector panels are really going to work. Dr. Stuhlinger will be asked to be a member of this group. ✓ It is now planned that George Mueller, Bob Young and myself visit Fairchild Stratos on August 4. Ed Uhl is coming here tomorrow to visit me prior to the Mueller meeting, per Uhl's request. ✓

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NOTES 7-27-64 Koelle

1. IN-HOUSE FLYBY STUDY: You had several questions on the 6-22-64 NOTES, regarding the flyby study.

- a. You will get a briefing on our study approximately two months from now. ✓
- b. We will request a Phase II for this study. It will be a similar effort - definition of scientific equipment; tandem staged, S-IVB orbit launcher; definition of midcourse requirements. ✓

2. HEADQUARTERS CONTRACTOR ORIENTATION - HOHMANN MARS MISSION:

Mr. Jerry Smith of this office returned a week ago from Headquarters where he participated in a Douglas orientation meeting on the conjunction class mission study (i.e., Manned Planetary Hohmann Missions - see your "Mars Project" - chemical propulsion and/or aerobrake; no nuclear propulsion. Technical supervision is by OMSF (Dr. Dixon's group under Ed Gray). *← No capisco. Request explanation B*

3. MANNED INTERPLANETARY SYSTEM STUDIES - FY 1964:

<u>Headquarters:</u> Conjunction Class (Douglas)	} Dr. Dixon's group, <i>65?</i>
Space Propulsion (Chemical only - Martin)	

MSC:

- OMSF - Flyby (NAA)
- OART - Support Requirements (Study of critical subsystems - Douglas and Boeing)
- Mars Surface Operations - (This study may not materialize.)

MSFC:

- OMSF - Mars and Venus Exploration (Ehricke; GD/A)
- Mission Requirements for Mars and Venus Exploration (Dr. Austin; GD/FW)
- Mars Surface Operations (AVCO)
- OART - Low Acceleration Missions (GE and United Aircraft/Research Laboratory)
- Mission Model Continuation (GD/A and Martin)

4. PSAC PRESENTATION ON MANNED PLANETARY MISSIONS: A briefing on manned planetary missions, requested by PSAC, was held on July 23, 1964 at JPL in connection with a briefing on the unmanned program. Presentations were made by Dr. Dixon and Dr. Casel, both from Ed Gray's group, and Dr. Ruppe. Our topics were Earth to Orbit Transportation, Orbital Operations, and Space Propulsion. Mr. H. Finger lead the PSAC group. N. Golovin was the senior member. Dr. Ruppe put the main emphasis upon solid-core heat exchangers, whereas Dr. Dixon stressed the all-chemical possibilities. Our presentation was well received, especially by H. Finger, who told Ruppe that he was disappointed in not getting help for his project from Ed Gray's office, only from MSFC.

What??
B

July 27

B 8/3

NOTES 7-27-64 KUERS

Bob Young
I would appreciate your comments.
B

1. Saturn V, S-IC Stage: Just to give you a typical example of our daily problems with Boeing in pushing the S-IC-T schedule: Drafting errors discovered by working through the installation drawing 60B52200 (Control Pressure System Installation Thrust Section, 4 sheets), in order to get the parts and work orders out, will require Boeing Liaison to issue a ten page E.O. correcting these errors. The Engineering Order total received stands now at 18,867, not including the major changes, which are reflected in CAM's. (CAM total 234)

|||

2. S-IVB Stage Welding Problems: DAC has used the conventional "down hand" position in their LH₂ tank longitudinal seams, which is considered the safest way in welding and is also used in the Titan program. The tooling requirements are more elaborate and larger, especially with increasing tank diameters. (That was one of the reasons for us to go to "out of position welding" in the S-IC program.) However, DAC encountered penetration difficulties on the first two vehicles, 1001 and 1003, where they used a single pass butt weld in down hand position. The subsequent weld repairs are presently considered the cause for the failure on 1001. All vehicles, after the first two, are welded already by a double pass operation in down hand position, which eliminated the penetration sensitivity. A careful evaluation program and recheck of all weld seams is underway. ✓

B 8/3

✓ July 27

1. NEW STARTS - As a result of the review of New Program Starts at the Management Council Executive Session on July 22, E.Z. Gray has prepared and forwarded to MSFC, MSC & KSC a request to perform additional analysis and costing as an extension of the submission we made on July 10. We are requested to submit: (1) A cost estimate for a proposed advanced missions launch schedule worked up by MSF. (2) Furnish comments on the three new starts which were presented at the July 22 Executive Council Meeting. This schedule is based on Dr. Mueller's guidelines to utilize existing hardware (with mods) to the maximum and to plan on a continuing launch rate of six Saturn IB and six Saturn V vehicles per year. The new schedule (which is available for your review) is mission oriented rather than project oriented, avoiding the impression NASA is starting "new programs". ✓

→ Please see me B F.M.

2. PROGRAM OBLIGATION PLAN 64-3 - MSF has requested that an addendum be added to the POP 64-3 which includes costs vs. obligations on all MSF-R&D contracts over one-half million dollars. This requirement will be extremely difficult to comply with and we are negotiating a compromise with General Phillips and Bill Lilly's offices. Present MSFC proposal is to submit this information only on major primes to meet the August 3 deadline. MSF review with Dr. Mueller is scheduled for August 14, 1964. Center Directors may be invited to this review. No. off. B

Center submission of the Administrative Operations portion of POP 64-3 will be deferred by NASA headquarters until after Congressional approval of FY65 NASA funds and the centers have received firm FY65 manpower and dollar ceilings.

We plan to review the POP activities with Dr. Rees on July 28, 1964. ✓

3. SATURN IB - TITAN III C COMPARISON STUDY - Dr. Seamans' staff has developed a new detailed cost system which will be applied to the Saturn IB-Titan III C Cost Comparison. Both present R&D programs and planned follow-on programs are required to be assessed by this system. We plan to explain the system in detail to the Saturn IB contractors in the immediate future. A consolidated NASA/DOD mission model will be the basis for determining production rates for follow-on programs. No deadline has been established on MSFC's submission; however, we anticipate the deadline to be on or about the first of September. Twx from Mueller set deadline at 31 Aug Fu ✓

B 8/3

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1. R&D OPERATIONS CONTROL ROOM: A Control Room has been established in R-RM to provide central management information for R&D Operations. ✓ The activity will support the R-DIR Office and his staff, including R-SA, R-FP, and R-RM. The initial project type effort has been concentrated on Saturn GSE, due to its interface complexity. Basic information for visual displays in the manpower, budget, and facilities areas has also been developed and submitted to the Illustrators for final art work. It is planned to maintain the Control Room on a moderate basis, maintaining the essential management data required by the Director, *McC*
R&D Operations, and his staff. *where is it? I'd like to see it! B*

2. SPECIAL CONSULTANTS: Dr. Goldberg, Professor of Mathematics, University of Michigan, will join R&D Operations in August as a Special Consultant. This is the first of a series of well known personnel in the field of education which is planned for introduction into our operations on a consulting basis. In addition to their immediate effort, valuable contacts for recruitment of professional personnel will be established. ✓

3. SOURCE EVALUATION BOARD, SINGLE-SUPPORT CONTRACTORS: The Board met July 21 and finalized the Request for Proposal for the Test Laboratory. The Request for Proposal (RFP) is scheduled to be issued on August 1. At the same time, a news release will be issued on the overall, single-support contractor program. On July 27 and 28, meetings of the Board have been scheduled with the Facilities and Design Office and the Quality Laboratory, respectively. These RFP's are to be issued August 15. In general, the Board proceedings are continuing as scheduled. ✓

4. CONVERSION OF EXCEPTED POSITIONS: The Director, R&D Operations, and representatives from the Personnel Office met this past week to begin action on conversion of Excepted Positions to Super Grades. Action will continue until all desired conversions are made. ✓

July 21

B873

NOTES 7/27/64 RUDOLPH

1. S-IC Stage:

Power Supplies - Action has been initiated to stop Boeing engineering effort on the incorporation of 700 VAC, 60 CPS power supplies in the Stage test and checkout complexes. This effort was halted due to an impending safety decision to consider 500 VAC engine igniters in lieu of the 700 VAC igniters. Rocketdyne is presently studying the impact of such a change upon the engines. The Engine Project Office has the responsibility for problem resolution. It appears that such a change will impact both the cost and schedule of the S-IC Stages.

A.R.
Please
keep me
posted
B

Facility Checkout Stage - Two last minute changes to the S-IC-F Ground Test Description were received from KSC. KSC would now like to have the mock-up engine to practice engine change out; this would be returned to MSFC upon completion of the KSC mission. Also, KSC expects to have a requirement for four (4) fins and fairings, instead of one (1). The KSC change requests were incorporated, and the S-IC-F description is again in final review prior to transmission to the Contracting Officer. ✓

2. S-II Stage:

Dr. L. Kavanan, Vice-President of NAA/S&ID, visited MSFC July 20-23, 1964. He toured Manufacturing Engineering, Test, Astrionics, and Propulsion and Vehicle Engineering Laboratories and participated in technical discussions on S-II stage insulation, common bulkhead status, and Saturn V checkout procedures at MILA. ✓

Vendor Survey - On July 20, 1964, the joint NAA/S&ID and NASA Contractor Survey activity was inaugurated with visits to Brown Engineering Company and SPACO in Huntsville, Alabama. The effort will continue through July 31, 1964, with visits to all major subcontractors on the S-II stage program, including vendors on both the East Coast and the West Coast. Preliminary results indicate the effort is extremely worthwhile and should benefit the program considerably. ✓

NOTES-7-27-64-SHEPHERD

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FY-65 CofF Program: The House/Senate conference actions resulted in a 5% reduction for each location in the CofF budget. This reduction does not reduce any authorized project but rather the total authorized for each location: The following table lists the amounts budgeted by location:

Location	Budgeted Amount	Amount after House/Senate Conference Action	Reduction
Huntsville	15,288,000	14,523,500	764,500
Michoud	6,534,000	6,207,500	326,500
Mississippi	61,991,000	58,891,500	3,099,500
Various Locations	26,411,000	25,090,500	1,320,500
Grand Total	110,224,000	104,713,000	5,511,000

The above cuts have been tentatively made as follows:

Huntsville-Cold Flow Test Facility cut from \$2,368,000 to \$1,603,500 ✓

Michoud - Utility Extension, Alterations & Rehabilitation to Support Saturn

S-IB & S-IC Production cut from \$2,011,000 to \$1,684,500. ✓

Mississippi-Sound Suppressors cut from \$8,757,000 to \$5,651,000.

Various Locations - Facilities for S-IVB Stage Program cut from \$10,709,000 to \$9,388,500.

Special Fluid Mechanics Laboratory: Mr. Al Crobaugh of Dee Wyatt's office stated in response to the question as to why the Special Fluid Mechanics Laboratory was disapproved by Dr. Seamans as an FY-66 Advanced Design item, Dr. Seamans believed that there were sufficient wind tunnels in NASA and he was not going to approve any additional ones. I related this conversation to Bill Lilly on July 20, and he stated that he had been instructed by Dr. Mueller to prepare the back-up for the reclama for the Special Fluid Mechanics Lab. and that Dr. Mueller intended to reclama this facility. ✓ Mr. Lilly further stated that he believed that a presentation to Dr. Seamans had a very good probability of convincing him that the facility was required. There is a meeting scheduled between Dr. Mueller and Dr. Seamans on August 3, at which time they will discuss the Special Fluid Mechanics Laboratory. Bill Lilly does not know if anyone else is to attend the meeting.

*fw S-IVB: The Gamma Complex at Sacramento was accepted by Douglas Aircraft on July 22. First testing is scheduled for August 23. ✓

Shes
I thought they had been eliminated altogether because of that foundation lead time problem.
B

Dr. Seissler
FY 1 B

July 27

B 8/3

NOTES 7-27-64 Stuhlinger

1. DESIGN CRITERIA HANDBOOKS: Reference item 1, Notes, dated 6/22/64, Geissler, title, "Stability, Guidance, and Control Sub-committee of the NASA Design Criteria Steering Committee." The reduction of the OART Program to provide for \$1.9M overrun in the MMC project, caused the cancellation of four of five procurement requests in the referenced area. Subsequent reprogramming of year-end residual balance and recent receipt of authority to reprogram between sub-programs, up to 10%, has allowed us to fund two of the four PRs with FY-64 funds. Two more PRs have been processed against FY-65 funds; thus all five tasks have now been turned over to FMO. The complete explanation of what has transpired, and a funding plan for the balance of the total \$750,000 program was forwarded to Dr. Geissler by memo, dated July 15, and is believed to be acceptable to him. ✓

2. SRT PROGRAM STATUS: The current status of the ART/SRT Program under the cognizance of this Laboratory is as follows:

	<u>ANNUAL PLAN</u>	<u>AUTHORIZED</u>	<u>PROCESSED TO FMO</u>	<u>OBLIGATED</u>	<u>CHANGE IN OBLIGATIONS SINCE 7/17/64</u>
OART	10,514,311	10,514,311	10,483,311	8,989,110	31,253
OMSF	14,133,000	14,133,000	13,761,279	12,706,722	2,826,460
OSSA	680,000	680,000	666,928	585,461	183,730
	<u>25,327,311</u>	<u>25,327,311</u>	<u>24,911,518</u>	<u>22,281,293</u>	<u>3,041,443</u>

3. RPL LUNAR SCIENCE SYMPOSIUM PUBLICATION: We are presently in the process of publishing the papers of the Lunar Science Symposium held by RPL late last year. It will appear as a NASA technical memorandum. ✓