

July 6, 1965



ELITE
RESIDENCE

NOTES 7-6-65 HOELZER

Mr. Cavaliere
Please get an
answer for
B 7/8 Dr. V. B. H.
Thank
Newby
7-15-65
(Copy sent
7/16/65
to)

1. SLIPPAGE OF LIEF/HOSC INSTALLATION:

a. The Launch Information Exchange Facility/Huntsville Operation Support Center (LIEF/HOSC) has slipped schedule to the point where MSFC flight support commitments to Headquarters and Manned Spacecraft Center may be in danger. LIEF/HOSC is committed to be fully operational by SA-203, but operational experience through 201 and 202 is needed.

b. The system cannot be installed and checked out by 201 and if the present situation continues for another 30-60 days, there is a good chance that we will not make 202 either.

c. The slippage is due to a delay in the Purchasing Office of granting approval to our support contractor (General Electric) to do subcontracting in this area.

2. TRANSFER OF RESPONSIBILITY - PARTS RELIABILITY INFORMATION CENTER:

a. Effective July 1, 1965, all computer support for the Parts Reliability Information Center (PRINCE) will be provided by Engineering Systems Branch, Computation Laboratory (R-COMP-AD). In the past, a local contractor has been responsible for creation and maintenance of the PRINCE computer master files; although R-COMP-AD compiled the data, prepared the reports, and provided the capability for file interrogation on a real-time basis. ✓

b. Under the new concept, all computer services required will be provided by R-COMP-AD. The contractor will continue to gather and code the raw data, and provide the necessary keypunch services. An appreciable reduction in cost will result from this transition, as well as permit better integration of the Parts Reliability Information Center with mainstream MSFC data systems serving Engineering Documentation and test programs. ✓

Bill Davis
Please
help
B

NS
7/6

B-18

NOTES 7-6-65 BALCH

1. S-II Simulator - The S-II simulator, which is thirty-three (33) feet in diameter and eighty-one (81) feet long, arrived at MTF on Monday, June 28.

C-1 ENGINE Dr. Mueller, John Disher, Charles King and Bill Brown visited STL last Friday to review their C-1 progress. Dr. Mueller has verbally stated that the Apollo Service Module engine requirements be added to the C-1 and that negotiations be effected with both RMD and STL prior to selection of a Phase II contractor. ✓

S-IVB ULLAGE ENGINES - ROCKETDYNE/GEMINI A modified engine for vibration testing at MSFC is to be hand carried from Rocketdyne. The vibration testing is scheduled during the week of July 5.

MSFC formal Qual engine has been returned to Rocketdyne and will be modified accordingly after successful completion of the vibration testing during the week of July 5. ✓

F-1 ENGINE The F-1 Engine Development Contract NASw-16 (Cost Plus Incentive Fee) has been sent to the contractor for signature.

Engines F-3014 (S-IC-1 spare) and F-4017 (S-IC-2) are still in final checkout at Canoga Park (Rocketdyne) and projected shipping dates are July 8 and July 12.

Ring-to-land braze separation on the F-1 injector requires rework of four of the five S-IC-T engines. Evaluation of potential impact on the flight vehicles is underway. Flash report teletype I-E-F-40 of 1 July covered more details. ✓ ✓
attached ✓

H-1 ENGINE Reliability demonstration of the 205K engine is progressing, utilizing R&D engine S/N H-140. Testing to date has not revealed any degradation in reliability at the increased thrust level. ✓

The first four engines for SA-205 have been accepted and will be delivered in support of CCSD requirements. ✓

RL10 ENGINE Three firings for a total of 961 seconds were completed on an RL10A3-3 engine with a Hastelloy N thrust chamber. Specific impulse measured on a 470-second run last week was 445 seconds. ✓

J-2 ENGINE We have negotiated the schedule incentive features of the production contract conversion but the "hot test" risk clause is still open. I will discuss this subject personally with Joe McNamara and Sam Hoffman this week. ✓

The premature engine shutdown on the S-IVB Battleship engine restart test on June 26 was caused by a faulty gas generator temperature probe. The second J-2 engine restart test on the S-IVB Battleship was terminated at 1.7 seconds of main-stage due to a fire above the gimbal plane. Reportedly the fire was caused by a ruptured propellant duct on the Battleship stage. Preliminary investigations reveal no engine damage.

The foreign material that caused the premature shutdown on the S-II Battleship (reported last week) was teflon from the stage fuel pre valve. The engine is being replaced with a spare engine. ✓

9/7/6

B 7/10

1. BLAST HAZARDS TEST: The Saturn S-IV blast test at Edwards Air Force Base is now given approximately 90 percent chance of being accomplished on 7-10-65. Alternate dates in the event of slippage are 7-11-65, 7-17-65, and 7-18-65. ✓
2. FEASIBILITY STUDY OF CAPTURING EXPLORER ONE SATELLITE: Included in the information needed for the proposed capture of the Explorer One Satellite are the decay time and the tumbling rate. The Advanced Studies Office, Propulsion and Vehicle Engineering Laboratory, is supporting Future Projects Office in this area and has furnished Future Projects Office with an estimate of the decay rate. For data on the tumbling rate, information was furnished by the Smithsonian Moonwatch Program, Smithsonian Astrophysical Laboratory. ✓
3. EXPLOSION OCCURS DURING S-IVB BATTLESHIP FIRING: On 7-1-65 battleship test was terminated after 1.7 seconds mainstage operation during the first burn due to a fire. There was an explosion associated with the fire that caused severe damage to the LH₂ suction duct just below the prevalve. The duct was twisted, bowed out of position and split. There was also extensive damage to electrical wiring (approximately 75%). The complete extent of damage to the stage is being assessed. ✓
4. EXPERIMENTAL RL-10 ENGINE THROTTLED TO 4% RATED THRUST: Engine FX-122 was throttled to a chamber pressure of 12 psia without fuel system instability. ✓ The engine was operating with nominal inlet conditions and at a mixture ratio of 5.5. The engine control system incorporated a variable area, cavitating venturi downstream of the fuel pump. This provided the capability to isolate the pressure oscillations generated in the heat exchanger (thrust chamber cooling tubes) at reduced flows from feeding back to the fuel pump. Previous minimum limit before instabilities were encountered was 63 psi chamber pressure (21% of rated thrust). ✓ ✓
5. SPACE PROPULSION SYSTEM PROJECT: Oxygen and hydrogen system cold flow tests have been completed on the Space Propulsion System Project at Boeing's Boardman, Oregon Test Facility. These tests verified the cracking and reseal pressures for the tank vent and relief system, the propellant pressurization system, and the flow characteristics of the fill, dump and feed lines. ✓ An RL-10A-3 Engine is being installed on the test stand this week. Engine cold flow tests are programmed to begin the week of 7-19-65 to further verify system readiness for hot firings. ✓

B 7/8

NS 7/6

NOTES 7/6/65 CONSTAN

Negative Report

1. Crew Safety Panel met last week in Houston. ^{qds 7/4}

a. The explosion situation is aggravated by the fact that MSC does not know the limiting overpressures for the CM which include such factors as (1) a deformation of the heat shield, of no consequence during flight, but of serious consequence during water impact, (2) explosion pressure interference pattern with LES tower overpressure. Estimates range from 6 to 20 psi limit. ✓

b. We rejected MSC's suggestion to investigate the impact of changing EDS from cold to hot wire engine cut-off on the basis of lack of justification. ✓

2. Panel Review Board Meeting on June 21 decided:

a. The ICD Log will be identified in the Apollo Program Specification as a required program document. ✓

b. The Apollo Change Board will be in operation June 28, 1965. Level "A" interface changes will be handled by Level II CCBs at each Center; only cost/schedule/performance changes will be transmitted to the Level I CCB at APO. ✓

c. "Preliminary" ICDs will be established to handle incomplete ICD issuance. The repository will identify these ICDs as such. ✓

d. The Executive Secretariat will identify criteria for non-hardware related information in ICDs. Panel operations will identify ground rules, criteria, and operational constraints to be formally documented in ICDs. ✓

e. As alternate mission ground rules are defined in the Mission Assignment document, the appropriate Panel will be directed to prepare alternate mission ICD information as required. ✓

f. Release dates have been established for all remaining 201 and 204 ICDs. The structural load compatibility appears to be only SA-201 ICD problem. ✓

g. General Phillips requested Board members to consider relationships between Apollo PRB/Panel structure and the newly initiated Saturn/Apollo Application Programs.

↑
K.D.

What do you mean by that?

B

7/8/65

1. ST-124 Optical Alignment: Re your comments on item 1, Notes 6/28/65 Geissler, subject: SA-8 Flight Evaluation (copy attached). The fan would not be a very good solution to eliminate the LOX vapor problem since on the Saturn IB the alignment prism will be on the opposite side of the vehicle from the tower at a height of approximately 182 feet above ground. This would mean an additional structure for the fan. Other methods of controlling this problem are under study, such as closing S-IB vents earlier, however, the studies are not far enough along to make any recommendations at this time. Attached is a sketch of the Saturn I vent configuration relative to the alignment prisms.

2. Four Gimbal Platform for IB and V: Possible need for a four gimbal platform on IB and V for polar orbits (which require large yaw maneuvers) has been discussed by Aero and Astrionics. Following conclusions were reached: (a) Conversion from a three gimbal to a four gimbal platform could be readily accomplished using existing spare parts; (b) approximately four to six months lead time (before IU delivery) would be required if formal go ahead were given; (c) since the circuitry is the same as that for the three gimbal there is no need to fly the four gimbal platform as passenger before it is used actively inflight. ✓

Too bad!
B

E.F.

What action have we taken so we won't be faced with the same problem on Saturn V?

Could we not place a light-weight plastic cover over the vent outlets which duct the fumes outside the line-of-sight and which are dropped at take-off? How about a high-powered strobe light (such as used for airport approach lighting) which can penetrate some fog?

B

1 JUL 1965

DBG/27

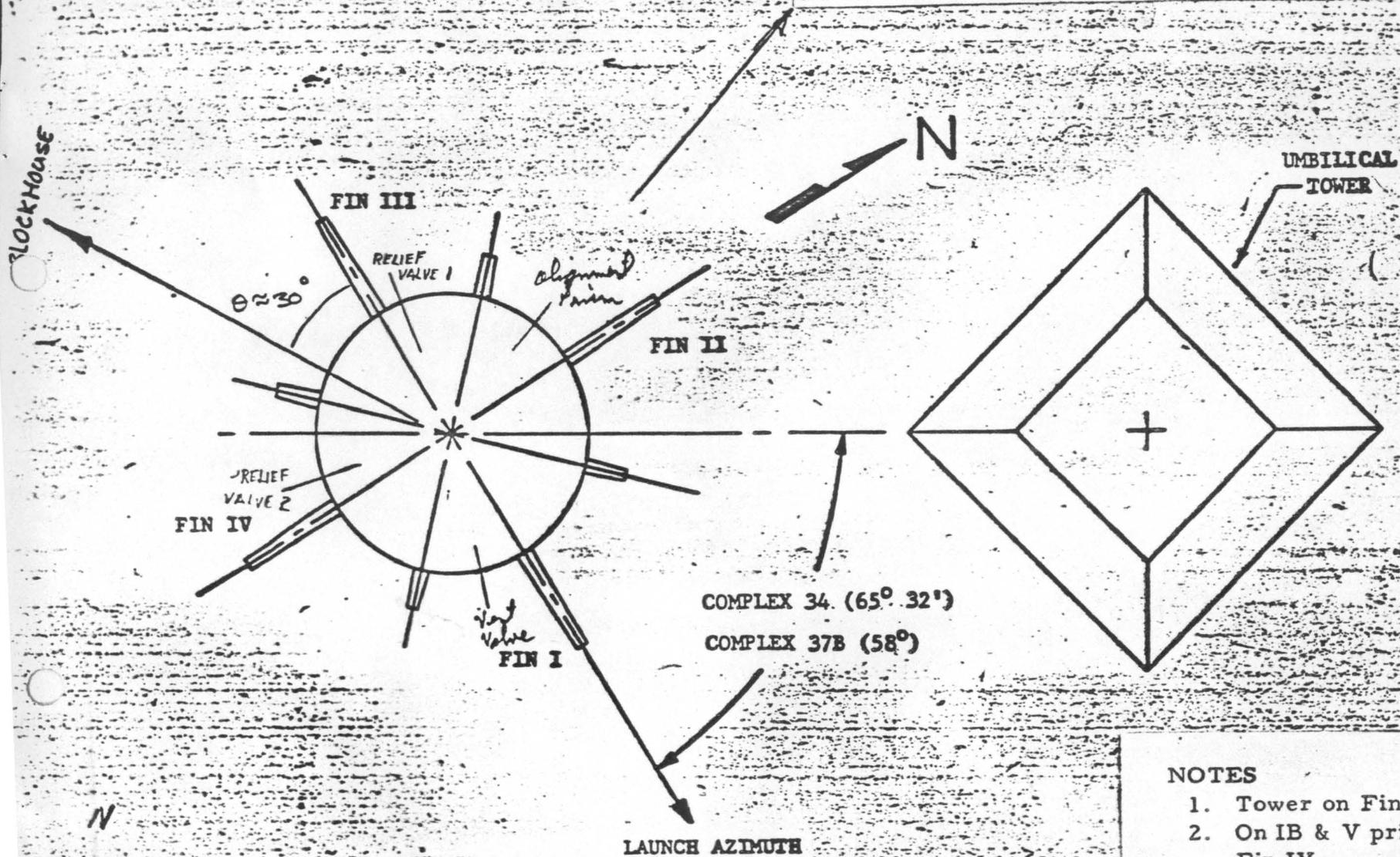
B6/30

NOTES 6/28/65 GEISSLER

1. SA-8 Flight Evaluation: The early engineering evaluation of the SA-8 flight test has been completed on schedule. The analysis has revealed a near perfect flight. The final post-flight trajectory shows that the total space-fixed velocity was 0.5 m/s less than predicted, the altitude 0.01 km less than predicted and 0.1 km to the right of predicted at S-IV cutoff. The interference of GOX with the ST-124 optical alignment window that occurred on SA-6 reoccurred during the SA-8 countdown. R-ASTR is now investigating what action should be taken for the Saturn IB since, at the present, the optical alignment is in the automatic sequence. This visual interference will likely occur on any launch attempted when surface winds are light. The special instrumentation installed to study the S-IV aft interstage panel debonding which had been observed on the SA-5 and SA-7 flights revealed that panel debonding did not occur on SA-8.

EF
 Has
 about
 a good
 fan?
 Heimberg
 uses an
 old
 aircraft
 engine
 plus
 propeller
 for such
 problems
 B

Theodolite \approx 350 feet slant range distance at elevation angle of 25° .



NOTES

1. Tower on Fin II for Sat V.
2. On IB & V prism is on Fin IV.
3. Slant range distance 350 ft on I & IB and 750 ft. on V from prism to theodolite.

Figure 13. Block II Vehicle to Umbilical Tower Orientation

SIS 7/4

1. S-IU-201: The flight cables for IU-201 were received from Hayes and upon inspection approximately 70% of the cables were rejected by IBM. The cables were returned to Hayes for rework. It was estimated that ten days would be required for rework. ✓
2. F-1 ENGINE INJECTORS: Test Laboratory personnel detected that the brazed joints between the injector rings and injector band were failing on Engine S/N 2009 on the power plant test stand. Subsequent inspection on S-IC-T revealed that four of the five S-IC-T engines contained injectors that had failed in the same area. The defective engines are in the process of being removed for replacement of the injectors. Consideration is being given to replacement of all S-IC-1 and S-IC-2 injectors. ✓
3. RCA-110A COMPUTER: The RCA-110A, Michoud (Boeing) System #2 has been acceptance tested at RCA, Van Nuys. The system was shipped from Van Nuys June 29, and is scheduled to start installation at Michoud July 7, 1965. ✓
4. S-IVB 201: No recovery from the static firing schedule slippage has been effected on this stage. Manufacturing work and shortages tend to keep prestatic checkout at a slow pace. ✓

1. REPORTED SWITCH SELECTOR FAILURE AT DAC: Difficulty that arose during vibration and acoustical noise testing of S-IVB mounting panels at DAC involving a non-flight Switch Selector (Mod I) was investigated. The Switch Selector had been furnished with the intention it be used as a dummy for panel testing similar to all other equipments on the panel; however, electrical power to the Switch Selector was applied by DAC. The results of the investigation indicated one wire was broken in the Switch Selector and three transistor failures had occurred. Failure of the transistors was due to external overload or shorts. Wire failure was at a point on a printed circuit board which has been improved in later serial number equipments. MSFC personnel remained at DAC to witness further panel testing utilizing a flight designated Switch Selector. These tests have been successfully completed. ✓

2. S-IC ACTUATOR REDESIGN: (Reference Notes of 6/14, Item 2, copy attached*),. A redesign of the mechanical feedback mechanism for the Moog S-IC servoactuator will be incorporated on the Moog units for 501. The changes include minor modifications to prevent failure as described in referenced note. ✓

3. STATUS OF ST-124 SLED TESTS: Three successful sled runs testing the ST-124M platform system have been made at the Holloman track during the week of 6/28. This is a total of five successful runs. An additional five are scheduled over the next two weeks. ✓

JH/C

B7/8

1. S-1C

The next test on the S-1C-T stage will be rescheduled for sometime after July 15. This change in schedule anticipates delivery of both the LOX and fuel tank onboard pressurizing hardware. Additionally, it is necessary to change out thrust chamber injectors in engines at position numbers 1, 2, 4 and 5 because of cracks between body and rings. Rocketdyne says this is a manufacturing process problem for which they have been working on a fix (gold-plated injector). Cracks occur in a random fashion both as to locations on the injector and firing time. Injectors will be replaced with same type because of non-availability of improved version without major schedule slip. All engines should be back on the stage by July 11, 1965. ✓

Next test will be a 40 seconds duration, with a full load of propellants for checking the performance of the pressurization systems. Short duration was chosen as a safety precaution because of large amount of new hardware added. ✓

2. F-1 WEST AREA

Initial firing for ¹⁰~~15~~ seconds scheduled July ⁸~~7~~, 1965. ✓

3. S-1B-2

Short duration firing scheduled for July 8, 1965. ✓

4. S-1V-B MSFC

Initial spin test of J-2 engine S/N 2013 is scheduled for July 9, 1965. ✓

5. S-1VB BATTLESHIP (SACTO)

Extensive damage occurred to stage hardware on July 1, 1965 due to hydrogen explosion in the thrust cone. Test was terminated at 1.7 seconds of mainstage by a pill-box observer due to fire. DAC (Mr. Duval) will increase the purge rates in this area for future Battleship and flight stage firings. Local Battleship already has much higher flow rates. ✓

NOTES 7/6/65 JAMES

7/6
JAB

B 7/8

After co-chairing the Pegasus C Review at KSC Thursday, General Phillips held a meeting with Lt. Col. Petrone and myself on the readiness of KSC for the 201 launch. He found several problems and also poor "visibility." The next day he came to MSFC and reviewed the ESE. As always happens, GE announced another week's delay as he arrived. This is more than KSC can absorb and must be pulled back. General Phillips called Dr. Beaton. Also, General Phillips will attend the GE Quarterly Review at MSFC Friday. ✓

PEGASUS C: The Flight Readiness Review was held on Thursday, July 1, at KSC. General Phillips and Mr. Milton Ames of MSF and OART chaired the meeting. The general concensus was that the current status of the Pegasus was satisfactory. The only unplanned open item to be carried to the pad is an anticipated modification of the Data Power Distribution Unit. Mating was accomplished on July 2. The spacecraft was transported to the pad in a vertical position. All mating operations were completed at 10:00 AM. ✓

CCSD QUARTERLY REVIEW: The Twelfth Quarterly Review of the S-IB was held at Michoud on June 29 and 30. This review proved to be of considerable benefit technically to the program. For instance, in two areas of component failures, one was found to have failed, at least in part, as a result of excessive vibration levels being applied due to insufficient examination of the test setup. ✓

SA 202 FLIGHT MISSION DIRECTIVE: The MSFC Flight Mission Directive for the Apollo-Saturn 202 Mission has been prepared in final form and is in review within I.O. and R&DO for approval signature. The document should be ready for distribution by July 15. ✓

EDS TEST PROGRAM: The review of all EDS Test Program components was completed July 1, 1965. Agreement as to realignment of the program where considered necessary was reached by the committee in each case. A summary of the results and the realignment program will be presented July 8 at the Saturn I/IB Program Review. ✓

1. SAE Meeting at Los Angeles in Fall 1965: The society of Automotive Engineers is making plans for its fall meeting at Los Angeles for the week of October 4 to October 6, 1965. This symposium is named "National Aeronautic and Space Manufacturing Meeting" and provides for a number of interesting panel meetings on the following topics: Joining Dissimilar Metals; Advancement in the Manufacturing Techniques for Aerospace Metals; Adapting Manufacturing to the Space-Age Nonmetallics; Configuration Management and its impact on Aerospace Manufacturing; etc. One all day panel meeting will be held Tuesday, October 5, on "Fabrication and Assembly of Large Space Vehicles" with Mr. N. Shappell and Mr. K. Boucher from DAC being the organizer and chairman. In this panel the manufacturing managers and directors of the MSFC and MSC Prime Contractors will present the concepts and techniques for fabrication and assembly of the Saturn V/Apollo stages. I will conduct the introductory panel explaining the Saturn V configuration and management structure and special aspects of structural manufacturing for launch vehicles. This will be followed by presentations by Boeing, S&ID (S-II), Douglas, S&ID (Apollo), and Grumman. Mr. J. L. Bromberg from Douglas will probably ask you whether you would have time and be inclined to support the meeting by addressing the group in a luncheon speech on Wednesday, October 6, 1965. ✓

2. Large Manhole by Magnetomotive Tooling: Reference your question on NOTES 6-28-65, see enclosure. It is quite probable that the present technique can be extended to accommodate up to 80" flares. Basically the field strength requirement per unit circumference becomes smaller with increased size of the hole and curvature of the shell. However, the total energy requirement will be much higher. The 20-inch flare required 25% of our available capacitor energy. In any case, the present mill pattern in the S-IVB forward dome (weld lands) has to be changed in order to have a consistent wall thickness in the area of the flare. The present manhole in the S-IVB forward dome has 30-inch clearance. ✓

Woke
Can't
commit
myself yet
"Maybe"
B

4/3/78

B6/30

1. S-IC-1: The Lox Tank Assembly was moved from the vertical assembly tower to Building 4705, and horizontal mating to the Fuel Tank/Thrust Structure assembly is underway. This operation is 3 weeks ahead of schedule. The pacing item is still the Thrust Structure due to shortage of parts. The long delayed Lox PVC's are now available from Arrowhead; installation has started. ✓

2. Advanced Technology: A 20-inch manhole outlet was successfully flared into the full hard skin of the experimental Torus Tank by local magneto-motive tooling. This operation could not be duplicated by any known conventional method. ✓

Application of the new process will eliminate the critical welding of heavy forgings for outlets into bulkheads of future vehicles. Analytical studies were done with Republic under P&VE supervision, because valid theories did not exist covering the interaction between the flare and the primary shell. The test phase of the experimental tank later will serve, among evaluation of other advanced features, for evaluation of this new approach for large outlets.

3. Visit by Boeing to the West Coast: Last week I accompanied Mr. G. Stoner and Mr. R. Nelson from Boeing on a short tour of our prime contractors at the West Coast. This was the first time the Boeing people have seen the S-IVB facilities at Huntington Beach and Santa Monica. We visited also the Apollo manufacturing facilities at Downey. We had excellent informal presentations by the prime contractors. Topics of discussion were control of development and qualification testing at sub-contractors and control of part shortages for systems installation. I believe that this visit was valuable and beneficial to Boeing and our West Coast prime contractors. ✓

W.K.

Can you
make a
GO to 80"
manhole
into the
top dome
of the
S-IVB

What way?
(Orbital
workshop?)

B

NOTES 7/6/65 McCartney

9/8 7/4

B 7/8

Negative Report

B-2/2

NOTES 7/6/65 REINARTZ

9/27/6

Stam R.
Such a mockup may also go a long way
to convince Hq. people why we need as much Centaur info as we ask for.
B

MOCKUP PROGRAM: A look into the full scale mockup program was initiated in response to a request by you. The objective of this look is to completely identify the various requirements to be placed upon the mockup, particularly from an overall vehicle system point of view. All the requirements and the total plan will be collected under a single cover and released by the project office. ✓

CENTAUR MOCKUP TANK: The Centaur tank to be used for mockup at MSFC was shipped from GD/C but was delayed due to holiday traffic over the weekend. The stage is scheduled to arrive at MSFC approximately July 8. ✓

COMMENTS FROM SATURN IB/CENTAUR DESIGN REVIEW: The participation of you and Mr. Rees in the recent Saturn IB/Centaur Design Review was very beneficial to the program in that it demonstrated the interest of the Center management in the "fledgling" program. I believe the review and my subsequent discussions with Mr. Nettles, LeRC, brought several points to light which I want to bring to your attention: (a) R&DO progress to date puts them in a position to proceed on a reasonable time schedule to complete the design and testing to meet a delivery to KSC in about 33 months (the new schedule) as required for SA-210; (b) All R&DO labs will have to phase into the Saturn IB/Centaur Program at a substantially increasing rate if the momentum to date is to be maintained; (c) The problem of mating the Centaur to the IB does involve several complicated interfaces and cannot result in a "completely standard" (interchangeable) Centaur unless we want to start our design over and only furnish JPL that payload that remains (the presentation showed a margin of about 10 percent six years prior to launch on the present preliminary design and payload data); (d) LeRC is strongly opposed to the panel method of operation as we know it in the Apollo Program. Dr. Silverstein will probably answer your letter of June 1, 1965, stating that Mr. Nettles and his seven staff members are the working interfaces for technical discipline problem areas and that one overall interface panel of MSFC, LeRC, KSC, JPL, etc., be formed to resolve and maintain the interface; (e) I am setting up an interim procedure to handle data flow and meeting requirements in a method that is clear-cut to MSFC and LeRC; (f) LeRC will insist on performing certain tests on Centaur hardware when combined with shroud hardware and without control of their funds, it will be difficult to control (OMSF, in June, agreed to sub-allot funds to OSSA rather than MSFC to LeRC); (g) I want to give our people an opportunity to work with LeRC and GD/C for about six weeks on the GD/C study and then give you an appraisal of our progress. ✓

Stam R.
Would appreciate your comment.
Would this be feasible and compatible with the rest of our organization?
B

What kind of tests? Where?
B

B 7/8

NOTES 7/6/65 RUDOLPH

9/8/6

Negative Report.

1. PEGASUS A AND B: Dr. Johnson and I presented data and results of the first two Pegasus spacecraft at a seminar at MSC (about 600 attendees). We were received most cordially. ✓
2. PEGASUS C: The buy-off meeting at KSC went very well; Gen S. Phillips and Mr. M. Ames were among the participants. Pegasus C was mounted on top of SA-10 on July 2. Besides different frequencies for the beacon and for the command address code, Pegasus C differs only insignificantly from Pegasus B. The orbit of Pegasus C will be changed as suggested by MSC. Last week, a total of 352 samples of more than 50 thermal control surfaces were mounted on detachable panels on Pegasus C wings for visual inspection at a later time. Dr. Debus agreed to leave the SATCON station at its present location at KSC as long as needed for Pegasus C. ✓
3. PEGASUS D AND E: Dr. Seamans cancelled the Cis-Lunar Pegasus Project last week, but he indicated his willingness to authorize two more earth-orbital Pegasus flights with thicker Al-sheets for another data point on our meteoroid abundance curve. OART presently establishes desirable thickness and orbital data; OMSF will check into the question of vehicle availability. It is expected that Dr. Mueller will make a decision with respect to this project on July 7 or 8. ✓
4. AES STATUS: All of the FY 1965 AES task contracts for which RPL is responsible (eight) are now obligated. The last five contracts started the week before June 30. (Emplaced Scientific Station; Lunar Terrain Analysis; Environmental Effects; Optical Systems; Surface and Subsurface Probes.) ✓
5. AES EXPERIMENTS PLANNING: Bill Taylor, OMSF, held a meeting last week on the division of AES experiments development and integration responsibilities between MSC and MSFC. Mr. George Anderson of Bellcomm presented a plan which gave lunar surface AES responsibilities to MSFC, lunar orbital to MSC, and divided technical areas of responsibility for earth orbital AES as follows: MSFC - astronomy, biosciences, physical sciences, atmospheric sciences, and earth sciences; MSC - biomedical-behavioral, advanced technology, extravehicular activities, advanced subsystems, and communication-navigation. After Bellcomm had presented this plan, Mr. Taylor asked that the team now consider two options to the plan. One option would assign the lunar orbital AES mission to Marshall and give more of the Earth Orbital areas (for example, astronomy) to Houston. The other option would shift the area of earth sciences, which is considered related to lunar orbit AES, to MSC and assign some of the extravehicular activities to MSFC.

E.S.

How about construction of large assemblies?

B

NOTES 7/6/65 WILLIAMS

B 7/8

7/6/65

1. Establishment of Advanced Systems Office: The Advanced Systems Office has been established, pending Headquarters approval and is now operating. No transfer of personnel, except for my secretary and myself, have been made; however, plans are being developed for the staffing of the Office as fast as practical. ✓
2. Current Operations of ASO: Those individuals and organizational elements who will be involved in the Advanced Systems Office activities have joined in with wholehearted enthusiasm in helping to bring about a rapid evolution into the new organizational structure. We are continuing to operate under the present organizational setup for the interim, and it is our plan and desire that very little, if any, work currently going on will suffer as the change takes place. As the office starts picking up the new assignments which are not presently being accomplished within the Center, they will be farmed out to other organizational elements as required until the staffing has been completed. ✓
3. Temporary Quarters for ASO: I have taken up temporary quarters, until the Office moves into Building 4202, in the office vacated by Dr. Koelle, Room 822, Building 4200, and my telephone numbers are 876-1503 and 876-4714. ✓

July 12, 1965



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7/12

B 7/19

NOTES 7-12-65 BALCH

No Notes This Week.

RL10 ENGINE Pratt & Whitney has placed a variable cavitating venturi between the RL10 turbopump and thrust chamber to prevent feed system instability at low thrust levels. This device was tested on an RL10 engine with throttle controls last week. A 25:1 throttling ratio (lowest chamber pressure of 13.8 psi for 23 seconds) was achieved with excellent stability at all thrust levels. This work is being done as part of an RL10 engine feed systems dynamics program jointly supported by project and technology funds. The engine was accelerated from 4.6% thrust to 33.3% thrust prior to shutdown. ✓

F-1 ENGINE Reference the braze-ring separation problem on thrust chamber injectors. A meeting of MSFC and Rocketdyne personnel was held to consider gold plating in lieu of nickel plating in order to improve bonding of the braze to the copper ring. One gold plated injector will be delivered for test lab local single engine testing in July. Rocketdyne has been authorized to build gold plated injectors for retrofit into engines for S-IC-1 and S-IC-2 and production of later engines. It should be noted that this retrofit, if accomplished as planned, will not require hot fire calibration corrective action nor will there be significant stage schedule impact (see Apollo Program Flash Report I-E-F-41 for additional details). ✓

Engine F-3014 (S-IC-1 spare) was accepted July 8. ✓

C-1 ENGINE Dr. Mueller has expressed an interest in discussing the C-1 Engine Program in the next Management Council. In a meeting with Mr. Rees last Friday, it was concluded that such a discussion would be highly desirable. ✓

S-IVB ULLAGE ENGINES - ROCKETDYNE/GEMINI The modified MSFC pre-qual engine has successfully passed two of the three orthogonal axes of sinusoidal sweep and random vibration testing. The remaining axis of vibration will be completed Monday, July 12. ✓

H-1 ENGINE The first static test of Stage S-1B-2 was attempted on Thursday, July 8. A premature cutoff was sustained approximately three seconds after ignition because the signal from the No.2 Thrust OK Pressure Switch (TOPS) of engine position 4 was not obtained at "Launch Commit." Immediately following the test, the TOPS and its circuitry were functionally tested and everything was normal. Since the failure could not be explained, it was decided to static test again with the switch active but not capable of initiating cutoff. The second static test was conducted on Friday and the switch functioned normally. Even though indications are that the switch is good, it is being replaced and will be subject to extensive testing. ✓

J-2 ENGINE The center engine on the S-II Battleship stand has been replaced and a cluster firing is scheduled for July 13. ✓

The S-IVB Battleship incident reported last week did not damage the engine. It is my understanding that the next test is scheduled for August 4. ✓

Four additional FRT tests were accomplished last week. This completes eight of the scheduled 18 tests for a total accumulated duration of 2159.4 seconds. ✓

Discussions are continuing between this Center and Col. Roy Seccomb, Headquarters; and this Center and Rocketdyne regarding the addition of the word "negligence" to the Hot Test Risk Clause of the J-2 Production Contract. Col. Seccomb advised that Dr. George Mueller may discuss the addition of the word "negligence" with Mr. Atwood of North American Corporate Office this week. ✓

- 22
1. S-IVB STAGE UMBILICALS: During qualification testing of the S-IVB propellant debris valve, the valve failed to open after thermal shock tests. The reason for failure has not been determined at this time. Furthermore, four quick disconnect couplings failed qualification testing and have been returned to the vendor for modification. No date has been received from Douglas Aircraft Company on when they can deliver fully qualified valves and couplings to MSFC. The S-IVB aft umbilical that was shipped to the Cape, in support of the Saturn IB wet test, was short these items. ✓
 2. F-1 INJECTOR CRACKS: The injectors on five of the six S-IC static test vehicle engines including the spare experienced ring-to-land separation and to a lesser extent ring to radial baffle separation during recent tests at MSFC. Because the injectors to be used in the first flight vehicles (501 and 502) are identical to the S-IC-T injectors, the 501 and 502 engines will be retrofitted with an improved injector that was already planned for 503 and subsequent vehicles. It will require some reallocation of injectors but will be done without effecting the S-IC-501 launch schedule. ✓
 3. VIBRATION TESTING OF THE 200V INSTRUMENT UNIT: This testing was completed at Wyle Laboratories, Huntsville, Alabama, during June 1965. Significant problems encountered were debonding of numerous component mounting structures from the instrument unit skin and excessive vibration amplification by several of the component mounting brackets. Problem areas of the instrument unit included the gas bearing supply panel, launch vehicle data adapter and digital computer, the flight control computer, and the ST-124 guidance platform. These areas were redesigned and successfully retested to the qualification environments as specified in Zone 16 of Internal Note IN-P&VE-S-63-1 (Saturn IB Vibration and Acoustics Specification). Redesigns consisted of the addition of mechanical fasteners to either supplement or replace the bonding adhesive, and the utilization of new mounting techniques for the gas bearing supply, launch vehicle digital computer, and the flight control computer. Retesting was completed on 6-28-65. Recommendations have been made to cognizant groups that these redesigns be incorporated on all Saturn IB and V flight instrument units. ↑

FC

Effect on 201?

B

1. S-IC

9/12/12

B 7/12

Thrust structure assembly, effectivity "502" was shipped to MSFC July 2, 1965. Thrust structure assembly, effectivity "F", 98% complete, to be moved into the Vertical Assembly Building approximately July 12, 1965. Thrust structure assembly, effectivity "503", approximately 35% complete. ✓

Fuel Tank "F" effectivity underwent hydrostatic test on July 8 and was okay. ✓

"D" vehicle final assembly proceeding and approximately on schedule. ✓

2. S-IB

Status of S-IB-1 - Vehicle post-static testing completed on S-IB-1 is approximately 80%. ✓

Status of S-IB-3 - Pre-static testing is underway and approximately 30% complete. ✓

Static Test of S-IB-2 - The first static firing of S-IB-2 was cut after approximately 3 seconds. Preliminary investigations indicated that a thrust O. K. pressure switch, in number four position, was slow in pickup. This switch will be changed. However, a check of the switch shows it to operate within specification limits. A second static test will be made July 9 after an electrical check is made. ✓

3. MEETING OF MICHOU D MANAGEMENT WITH MTF MANAGEMENT

On July 9, 1965, Mr. Lowrey, President, Chrysler Corporation Space Division; Mr. Nelson, Manager, Boeing's Launch Systems Branch; met with Mr. Balch, Site Manager of Mississippi Test Facility; Bill Eaton, Manager of General Electric; and Harry Cox, Manager of S&ID. Topics discussed were (1) application of Davis-Bacon classification to GSE installation by Boeing, (2) hiring of Chrysler and Boeing employees by General Electric and S&ID, and (3) swamp pay by S&ID at MTF. Mr. Gorman was contacted and will rule on the Davis-Bacon application to the Boeing installation work. The other topics were discussed by the interested parties. Nothing of any particular significance was settled other than a better understanding of the problems. ✓

NOTES 7/12/65 COOK

B 7/13

7/12/65

1. SYSTEMS ENGINEERING UNDER THE CHRYSLER PRIME CONTRACT:

A portion of the present systems engineering effort under the Chrysler prime contract (structures and propulsion work for P&VE Laboratory) terminated July 1, 1965. Some portion of this effort particularly Mod 86 of the Chrysler Contract could probably be more properly classed as engineering support performed under the Single Support Contract. A series of meetings have been held with Key personnel of P&VE Laboratory and Lee James in an effort to sort out the true systems engineering which can be given to Chrysler on a mission basis. This office will continue to follow up on this problem until a workable solution is obtained. ✓

2. REVIEW OF SINGLE SUPPORT CONTRACT ACTIVITIES:

Meetings have been held with AERO, ME, P&VE, QUAL, and F&D Laboratory Directors/Office Chiefs, contract officials, and Center Management to discuss progress to date under the new Single Support Contractor structure. No significant problem areas have developed. ✓ TSO, ASTR, RP, TEST, and MSC are scheduled over the next two weeks. A summary of the meetings will be prepared for your review upon completion. ✓

3. PROGRAM OBLIGATION PLAN - POP 65-3: The Manpower and Budget Groups of R&D Operations have been engaged in the receipt, consolidation, and preparation of the R&D input to the 65-3 POP. The final figures after negotiation with IO will be incorporated in the Center submission to NASA Headquarters on or about August 1. ✓

JVB 7/12

1. Experiments Coordination

IU Experiments Integration - An IBM study on experiments covering capabilities of the IU, with typical examples, has just been completed and will be made available to you this week. ✓

Little Joe II - White Sands technical representatives will be at MSFC on 7-15-65 for discussion of an R-AERO (Dr. Rechten) proposed experiment to determine unsteady aerodynamic loads on available Little Joe II vehicles. ✓

2. Crew Safety - The preliminary IB Crew Safety System (automatic plus manual abort) is presently being tested in the Ling-Temco-Vought Spacecraft simulator at Dallas, Texas. MSFC members of the Crew Safety Panel have been offered an opportunity by MSC to fly the simulator this week. ✓

3. Interim Status Report on Working Group Review - An R&D Operations position was presented to the R&D Council and accepted in principle: Working group-type activities are required for R&DO to support IO (to include interface with contractors). They will be performed as a line responsibility, but require clearly defined authority (not expressed in existing laboratory charters) and provision for permanently assigned group membership. On this basis, discussions with IO have been initiated. As soon as agreement is reached in sufficient detail your approval will be requested prior to implementation.

H. W. Seidner → Do you mean to say that not a single working group can be abolished? That's quite contradictory to the story I got. I had the impression that while some working groups must definitely continue, others should be abolished now. B

NOTES 7/12/65 GEISSLER

7/12

B-7/19

1. AS-201 Pre-Launch Wind Monitoring: It was agreed at the joint MSFC/ MSC meeting of July 1, that MSC will define the equations they desire to be added to the MSFC pre-launch wind program for AS-201. It is anticipated that they will require bending moment, shear and axial load to be calculated at several stations. Bending dynamics are also planned to be included. The MSC equations are to be furnished to us the first week in August with the computer program checkout completed in the first half of November. ✓

2. Saturn V Control System: AERO and ASTR personnel met this week to decide on a Saturn V base control system. AERO presented results of evaluations of various Saturn V control systems, which showed that by using some form of load relief system (body fixed accelerometers) a 15 - 20% reduction in bending moment and a 7-10% reduction in total loads would be realized in the spacecraft and S-II/S-IVB interface. Since the structural capability of these two areas is fairly critical and the spacecraft capability is not well determined at present, this amount of load reduction is very important. By employing some form of trajectory optimization coupled with load alleviation, an increased payload into orbit is also realized. Therefore, a decision was reached to use some form of load relief system coupled with an optimized trajectory during boost phase flight. The primary mode of load relief would be based on the signal output of the platform accelerometers instead of body fixed accelerometers. The determination of the mode of trajectory optimization and load relief will require an extensive study, the results of which will be presented in a meeting in approximately two months. This should result in the selection of the final system. ✓

958 7/12

B-7/19

1. AUTOMATIC INSTRUMENTATION CALIBRATION: A contract this Laboratory has with Nortronics for development of an automatic instrumentation calibration capability has been successfully concluded except for the final Nortronics report. This effort has resulted in a technique which allows initial bench calibration of flight instrumentation to be a basis for performing all subsequent calibration by computer in an entirely automated mode. Further, it allows for more accuracy, requires no additional hardware, and automatically maintains historical data. It encompasses most Saturn flight instrumentation, and with minor vehicle modification can be used in flight. This is one of the more significant breakthroughs we have made in checkout technology.

Dr. Lanse
FYI

→ B | A NASA technical memorandum is being prepared for release, since the method is useful for any complex system with much instrumentation, including non-aerospace use. ✓

2. TECHNOLOGY UTILIZATION: NASA Headquarters has requested use of a 3-dimensional television system, developed as part of a contract initiated by this Laboratory with Spaco, to study human capabilities as an operator and decision maker in the environment of highly complex, automated checkout systems. NASA Headquarters wants to use the system in cleanup operations at the Jackass Flats, Nevada Test Site, following a reactor malfunction which scattered radioactive material. Plans are to use the device for control of the AEC remote crawler-manipulator. The system and personnel will be provided by modification to our development contract. ✓

NOTES 7/12/65 HAEUSSERMANN

9/18 7/12

B 7/19

No submission this week.

NOTES 7/12/65 HEIMBURG

B-7/L

QV8 7/12

1. F-1 Engine

F-1 Engine F-1002-3 was tested for a mainstage duration of 9.78 seconds on 7/8/65. This was the first test on the F-1 Stand in the West Area and was primarily a facility checkout. The next test will be on 7/12/65 for a mainstage duration of 40 seconds. ✓

2. S-1C

The next test, S-1C-09, on the S-1C-T stage is still scheduled for 7/22/65, pending arrival of stage pressurization system components. There will be a stand-by period of $6\frac{1}{2}$ hours with a full load of LOX prior to the 40-seconds firing. ✓

Engines in positions 1, 2, 4, and 5 have been removed, cracked thrust chamber injectors replaced, and reinstalled on the Stage. ✓

3. S-1B-2

Test SA-27 was conducted on 7/8/65 for a 3 seconds duration. Cutoff was given by malfunctioning thrust OK pressure switch No. 2 on Engine No. 4. ✓

Test SA-28 was conducted on 7/9/65 for a 35 seconds duration as scheduled. Five engines ran above thrust specifications on site values and may have to be reorificed. ✓

4. S-1VB (MSFC)

Problems encountered with the checkout of the Pesco recirculation pump prevented the spin-up test on 7/9/65. This test was rescheduled for 7/12/65. ✓

5. Low Gravity Drop Tower

On 7/10/65, the first drop tests were conducted at the Low Gravity Drop Tower, which is located in the Saturn V Dynamic Test Stand. The dummy drag shield was dropped from heights of 48 feet and 72 feet. These tests were conducted to checkout the catch tube (stopping device) and to provide preliminary data for the computer program before the facility fabrication is complete. The catch tube functioned as expected. Additional drop tests up to 168 feet will be conducted the week of 7/12/65. ✓

6. Accident

On 7/7/65 a Support Contractor employee, Don Irvin, Brown Engineering Company, sustained a serious flesh wound in his left leg above the knee from a projectile (fitting) coming from a hydraulic system failure. The employee is hospitalized and some skin grafting is required. The exact cause of the failure has not been determined yet. ✓

NOTES 7/12/65 JAMES

9787/12

B 7/13

S-IVB 201: Installations on the stage at SACTO are virtually complete. Several subsystems checkouts remain to be completed. The first auxiliary propulsion system module for the stage has arrived at SACTO and is scheduled for confidence firing at the Gama Complex on July 17. Static firing of the stage is still scheduled for July 21 but the specific date will depend upon a successful initial propellant loading operation. I will be at SACTO and Huntington Beach this week. ✓

IU 201: Assembly operations continue to progress to a July 31 completion date. The GE ESE deliveries to the IBM checkout station were completed this weekend with the exception of one panel. and three racks which are to be delivered Wednesday, July 14. ✓

S-IB-202: A short duration static test was attempted on July 8. The test was terminated after approximately 3 seconds by the activation of the thrust O.K. pressure switch. The short-circuitry which initiated cutoff was associated with Engine #4. The engine and circuitry is being investigated to determine the cause of this automatic cutoff. A second attempt at the short duration firing was successfully completed. ✓

ND 7/12

1. S-IVB Welding Problems: We still have welding problems on the S-IVB bulkheads, in spite of the very cautious approach of DAC to make all the welds in a down hand position. Several months ago MSFC had recommended to DAC to switch from MIG welding to TIG welding in order to improve the quality of welds. The Aft Common Bulkhead for 206 which was the first dome fabricated utilizing the TIG welding process did not bring the expected improvement in weld quality but exhibited rather a high number of defects which became worse after applying non-optimum repair techniques. DAC announced plans to return to MIG welding on the bulkhead Meridian seams. Three gore segments have been replaced in this 206 bulkhead which is now acceptable. No further conversions to TIG welding will be attempted by DAC until such time as it can be definitely determined that the major manufacturing problems can be overcome. ✓

2. ME Laboratory Support to MSC in Manufacturing:

a. Mr. P. Maurer and Mr. P. Wormell from our Laboratory accompanied Mr. R. Olsen, Director of Manufacturing, S&ID/Apollo, on a visit to Grumman Aircraft Company, Bethpage. Mr. Olsen discussed his concept of intense need for pre-planning activities and reviewed the Grumman production effort and their problems. ✓

b. At the request of Dr. Shea, an Ad Hoc Meeting was arranged at S&ID/Apollo on July 9 to discuss tube brazing and an examination of the state-of-the-art as applied to space vehicles. Mr. Maurer chaired the meeting and the following companies had representatives in attendance: (1) The Boeing Company, (2) NAA, (3) Grumman, (4) Rocketdyne, (5) McDonnell, (6) Lewis Research, (7) DAC, (8) MSFC-ME Laboratory, (9) S&ID/Apollo, (10) Lockheed, and (11) KSC. ✓

1. PROGRAM OPERATING PLAN (POP) 65-3 - due in MSF August 9.

Administrative Operations POP 65-3 - Guidelines for the AO POP 65-3 were received July 9 from MSF. Included in this package are requirements for extensive manpower data. We issued an internal budget call on June 8, 1965, and this will provide most of the information requested, although some additional effort will be required to present the data in the new formats required by MSF. ✓

R&D POP 65-3 - A draft copy of the MSF Guidelines for R&D POP 65-3 were handcarried to MSFC on July 7, 1965. These guidelines contain schedules for Saturn IB/Centaur launches in accordance with Plan 3, and adjust AES flights accordingly. We expect to receive the official guidelines later this week. ✓

2. AES/MOL STUDY - The NASA effort in the AES/MOL Study conducted by a study team led by Mr. Garbarini has been completed. The purpose of this effort was to supply data to DOD to aid in their determining whether DOD would use NASA hardware to perform the DOD missions or whether they would use DOD hardware. The Apollo Cost Study to which MSFC and MSFC's contractors furnished data was used in pricing launch vehicles and spacecraft. ✓

The data, generated by NASA, including technical and cost information, have been delivered to DOD. As we now understand from Seamans' office, in accordance with the initial agreement between NASA and DOD, there will be no delivery of DOD information to NASA. ✓

3. HEADQUARTERS' SURVEY OF FORM 533 - For the past three months, Mr. Doug Burrows, an assistant to Mr. Hilburn, has been leading a study exercise to evaluate the use of NASA Form 533, the system for Contractor Financial Management Reporting. Tom Smith and Jack Sharkey headed an MSFC study team, and coordinated local effort and visits to MSFC prime contractors. They have received the headquarters committee's Preliminary Survey Report for review and establishment of the MSFC position.

The conclusions and recommendations contained in the report are generally in line with revisions already planned by MSFC. The Associate Administrator's (Dr. Seamans') Management Committee is expected to meet later this month to review the survey results and centers' comments. We will arrange an appropriate briefing for you after the report is finalized. ✓

4. NASA'S FY66 APPROPRIATION BILL - The Senate has scheduled floor action on NASA's FY66 Appropriation Bill for today, July 12, 1965. ✓

NOTES 7/12/65 REINARTZ

B 7/14

9/15 7/12

GD/C WORK STATEMENT: Dr. Silverstein signed the work statement last week and it is being processed through procurement at LeRC. The contract should be effective later this week. ✓

CENTAUR MOCKUP STAGE: The Centaur mockup stage arrived at MSFC on July 6, 1965. ✓

CENTAUR/SHROUD ALTERNATE ASSEMBLY LOCATION STUDY: Discussions were conducted last week on alternate assembly locations for the Centaur/ Shroud with KSC and LeRC. The results of the study will be presented to General O'Connor early next week and to you on July 22, 1965. ✓

MSFC/JPL PANEL MEETING: The first Voyager-Saturn IB/Centaur Panel Meeting was held at JPL on July 7 and 8, 1965. The discussions included: a. the establishment of a detailed panel operations concept, b. consideration of an MSFC proposed scheme for interface control, and c. the identification of critical action items. It was concluded that initially, at least, formal sub-panels did not need to be identified. Four specialty areas, however, were agreed upon to operate as splinter groups within the panel. There are: Mechanical Integration, Electrical Integration, Tracking and Data Acquisition, and Flight Mechanics. Approximately ten critical action items were recorded. Most of these require initial action from JPL to establish spacecraft requirements for interface consideration. The meeting was conducted in a very cordial atmosphere as basic agreement was quickly reached on the general mode of operation. The next panel meeting was tentatively scheduled for August 16, to be held at MSFC. ✓

NOTES 6/12/65 RUDOLPH

B-7/19

RS 7/12

1. Michoud Test and Checkout Complex MSE No. 2

The RCA-110A computer has been installed and successfully completed acceptance test. Boeing is currently running various program tapes through the computer. The complex will be partially activated by 18 October 1965, which will support S-IC-F checkout. ✓

2. S-II Battleship Stage Status

Engine #5 has been replaced. Five fuel prevalves were removed and replaced with spacers. The recirculating pumps have been sent to PESCO for repair. The next 25-second firing is tentatively scheduled for tomorrow, 13 July. ✓

3. Pyrogen Initiator Status

S&ID has successfully completed thirty-two firings using the modified design. Qualification is scheduled to be completed by August 15, 1965. 165 Units will be made available for Boeing and DAC use by July 31, 1965. ✓

4. S-IVB Battleship Stage Status

A plan is currently being developed by DAC to resume the Battleship Stage test program with a hot firing scheduled for August 4, 1965. MSFC's acceptance of the plan is dependent on the schedule impact on Saturn IB flight stages.

The cause of the fire has been determined to be the result of hydrogen gas trapped in the area between the thrust cone and lox dome igniting in the lower thrust cone. The gas was ignited by the burning of the hydrogen lead gas. ✓

9/13/12

1. PROJECT SUPER MEETING: In reply to your question on 6-28-65 Stuhlinger NOTES (copy attached) - Dr. E. Steinhoff, who has expended a considerable effort in the reusable booster program in the past, is in close contact with Frank Williams and others at MSFC working in the program. Frank has discussed with Dr. Steinhoff the possibilities of study work within the SUPER program, and we expect that jointly initiated studies may be included in the SUPER program soon. ✓

2. PEGASUS B: Reply to your question on NOTES 6-14-65 Stuhlinger (copy attached). You are right in concluding from present PEGASUS data that 1 m² of 0.4 mm thick aluminum will be penetrated once every 250 days in the vicinity of the earth. The comparison of various materials with respect to expected puncture rates is a very complex question which has not been solved so far. A widely accepted empirical formula, developed at the Ames Research Center, states that the penetration depth under otherwise equal conditions should be inversely proportional to the 2/3 power of the density of the target material. Comparing aluminum with steel, this should give roughly twice the penetration depth in aluminum as in steel. ✓

Meteoroid measurements on Explorers 16 and 23, and on PEGASUS A and B permit us to compare penetration thicknesses of aluminum, steel, and copper-beryllium. Surprisingly, these measurements imply that the depth is almost independent of the density of the target material (see attached diagram). We have reasons to believe that the foam backing of the PEGASUS sensors gives some protection to the aluminum, and that consequently the aluminum sheets appeared thicker to the meteoroids than they actually were. Whether this point sufficiently explains the unexpected results of equal penetration depth through aluminum and steel, is not yet known. ✓

3. OMSF SUPPORTING DEVELOPMENT PROGRAM QUARTERLY REVIEW: The second Quarterly Review of MSF tasks by E. Z. Gray at Marshall, which had been previously scheduled for July 20, 1965, has now been re-scheduled for July 22, 1965. ✓

3 Enc:
NOTES (2)
Chart (1)

ASG/26

B2/30

1. PEGASUS A AND B: Upon invitation by Dr. Gilruth, Dr. Johnson and I will give presentations on the Pegasus Project at MSC on June 28. ✓
2. PEGASUS C: A flight readiness review of Pegasus C, hopefully resulting in the buy-off of the vehicle and payload, will be held by M. Ames at KSC on July 1 and 2. At the same time, the future of the SATCON organization will be discussed between OART, KSC, the Pegasus Project Office, and RPL. Col. James has requested that RPL take over SATCON after Pegasus C launch. RPL prepared several "snap-on" panels with a number of thermal coating samples to be attached to Pegasus C. Upon recovery by Gemini, these samples can be investigated with respect to deterioration effects. The panels will be taken to KSC June 28. ✓
3. AES: Negotiations for two more tasks of the FY 65 Program, the Emplaced Scientific Station and the Environmental Effects on Instruments, have been completed, and funds were obligated. Funds for the Lunar Drill study will be obligated early in 1966. ✓
4. PROJECT SUPER MEETING: The second annual Project SUPER Review was held Tuesday and Wednesday of last week. Approximately 40 civilians and officers from the Air Force attended and a few NASA Headquarters people. The presentations by both Marshall and the Air Force were excellent. We might expect a few more Project SUPER tasks to generate between technical counterparts at Marshall and in the Air Force as a result of this meeting. Project SUPER presently consists of 10 tasks. ✓ *E.S. Suggest we crank more problems re reusable boosters into SUPER. This*
5. FIFTH RESEARCH ACHIEVEMENTS REVIEW: MSFC Research Achievements Review No. 5 was held Thursday of last week. The subjects covered were "Ground Testing Research at MSFC" and "Quality Assurance and Check out Research at MSFC". Outside visitors included one from MSF, two from the Air Force, and one from NASA Headquarters. ✓ *has been Schriever's fullest blessings*

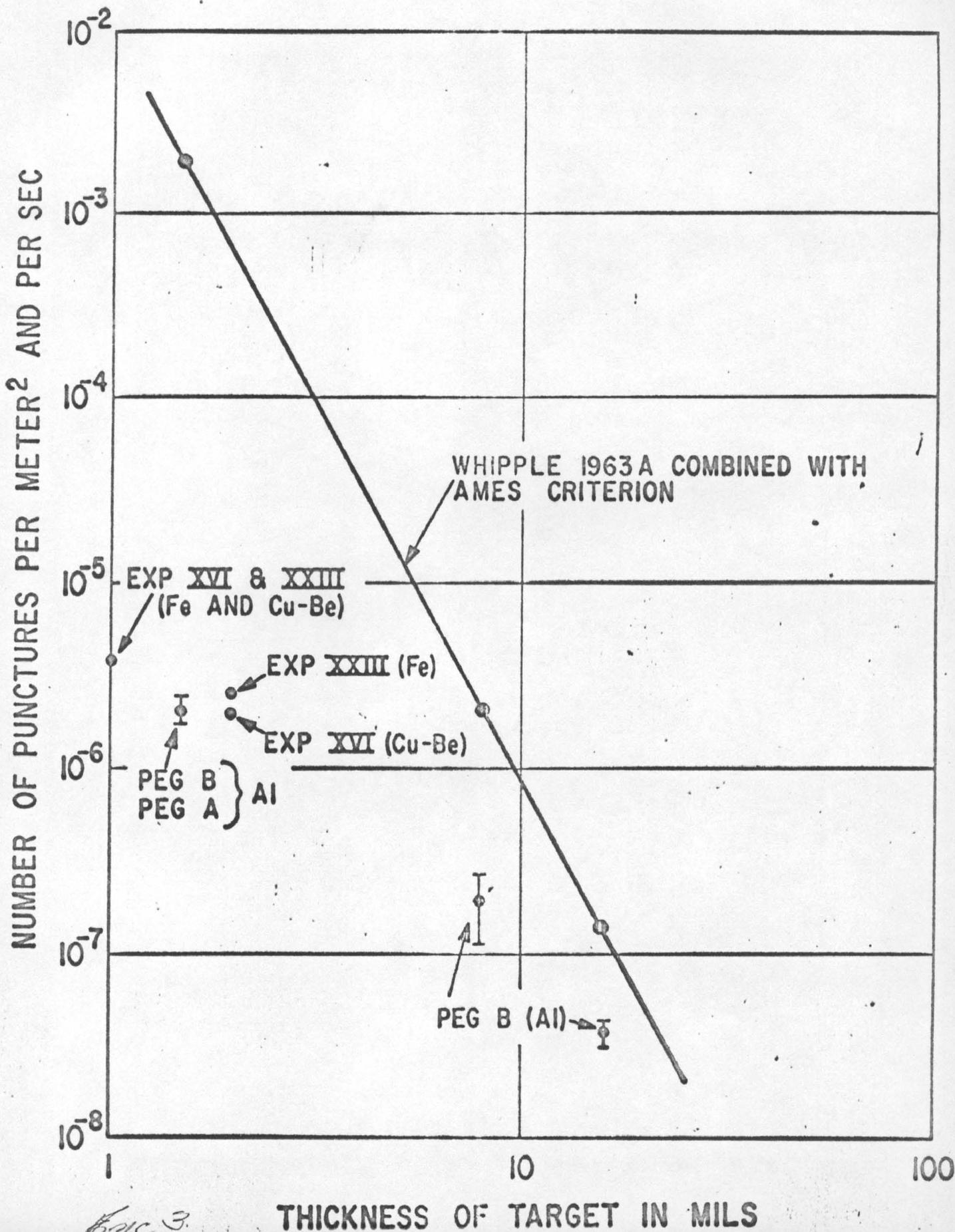
(Discuss w/ Frank Williams, please) B

6. TOTAL ART/SRT STATUS:

	<u>ANNUAL PLAN</u>	<u>AUTHORIZED</u>	<u>PROCESSED TO FMO</u>	<u>OBLIGATED</u>
OART	15,170,000	15,170,000	14,854,941	7,022,820
MSF	22,000,000	22,000,000	21,280,000	12,817,097
OSSA	1,363,000	1,363,000	1,349,247	420,975
OTDA	2,000,000	2,000,000	1,999,665	1,137,751
TOTALS	40,533,000	40,533,000	39,483,853	21,398,643

Emel

PEGASUS A AND B DATA
AS OF JULY 5, 1965



Enc 3

987/12

1. AES Integration Contract. The contract (two contractors for a total of \$1.5M) which Headquarters approved for release by MSC has now been stopped pending reapproval of the statement of work. MSFC will now have equal representation on the Source Selection Board and the Technical Evaluation Board as well as helping prepare the revised statement of work and supplying a man as CO-COR (Contracting Officers' Representative). Jim Madewell has followed this very closely, and I feel we are in a relatively good position at this time.
2. Staffing of Advanced Systems Office. Paperwork has been initiated to detail personnel from the Future Projects Office and those involved from the Systems Concepts Office (de Fries' office) to the Advanced Systems Office (R-AS) for a period of 6 months. It is planned that permanent transfers, including duty statements, etc., will be worked out during the next couple of months and those involved will be formally transferred prior to the end of the 6-month detail.
3. Mode of Operation for R-AS. Several meetings have taken place during the past week with regards to the staffing and mode of operation of the Office, and I feel progress is being made toward a solution. It is hoped that a reasonably well-defined solution will evolve by the latter part of July and can be presented to you at that time.
4. Your AIAA Presentation in July. Harry Ruppe and others have prepared the Mars story in response to the Management Council request and it will be reviewed during the 7/14/65 AES dry run. It is planned that this same material will be used in part for your AIAA presentation in July. If sufficient time is available on 7/14/65 for you to review this material, please let us know; or if you want a more detailed discussion, when it could be worked into your schedule.

July 19, 1965

1. Work Stoppage - On July 12, approximately 189 man days were lost to the Koppers-Malan S-IC Test Complex job, contract DA-01-076-ENG (NASA) 2588. The stoppage was jurisdictional in nature and not sanctioned by the local unions involved. The job was fully manned on July 13. ✓

2. Labor Relations Conference - A labor relations conference was held on July 15. Presentations were made on both contractor interfaces and labor interfaces. NASA labor relations policies were similarly discussed. Also included in the days events was a tour of the entire Mississippi Test Facility. The meeting was adjourned at 3:30 p.m. following the Industrial Presentation by Mr. Paul Styles. ✓

7/19

B 7/26

RL10 ENGINE

RL10 engines on the Centaur Stage Mockup which was received at MSFC on July 7 will be up-dated to the latest configuration by Pratt & Whitney Aircraft. Kits which will convert the external configuration to the RL10A3-3 (Up-rated Isp) version are expected here by the end of this month. ✓

J-2 ENGINE

Three additional FRT tests were accomplished last week. This completes 11 of the scheduled 18 tests for a total accumulated duration of 2,222 seconds. The FRT program should be completed this week.

The first 230K/5.5 mixture ratio engine, J005-2, has completed a calibration test and a 503 second performance test. Three more duration tests are planned prior to moving the engine to the altitude simulation facility for altitude start tests.

Engine J-2025, the engine scheduled for SA-204, was delivered to DAC/Huntington Beach on Friday, July 16.

The latest "Hot Test" risk clause, negotiated between MSFC and Rocketdyne, is being discussed today among Roy Seccomb, Gen. Bogart and George Mueller. This particular contractual clause has been under discussion since mid-May. As it is the first major incentive conversion where the contractor has insisted upon such a clause, MSF is wringing it out thoroughly to set the stage for other incentive conversions. I hope we can have this settled this week. ✓

F-1 ENGINE

R&D engine 020-2 with an X051 type injector (major contender for Qual II) was bombed into combustion instability which damped in 18 ms (well within Mod Spec); the Isp readily meets Qual II level. Additional bomb-instability tests are planned on other engines and injectors of this configuration.

R&D engine 026 was subjected to maximum ambient temperature of 130°F for over 16 hours followed by a 129 second mainstage test which was terminated by LOX depletion. All systems performed satisfactorily. Additional demonstrations are scheduled at both high and low temperature test requirements.

In view of Guppy schedule problems and non-availability of C-133's from MATS, a road test of an instrumented hard mock-up F-1 engine mounted on an air-ride trailer is being run from MSFC to Michoud to Houston and return to assess the feasibility of truck transport in emergencies. Assuming favorable results, an instrumented flight engine will be similarly shipped from Canoga Park, California to MSFC in August 1965, to determine the damage effect, if any, on operable components. Gemini Project personnel are interested in the test results for possible use of highway transport in their program and the Houston stop was arranged to provide the Gemini Project with an opportunity to examine the rig and test procedure.

Engines F-3014 (S-IC-1 spare) and F-4017 (S-IC-2 flight engine) have both arrived at MSFC. ✓

NOTES 7-19-65 CLINE

9/19/19

B 7/26

1. HYDROGEN BLAST HAZARDS TEST: The S-IV full scale blast test was completed 7-14-65. A quick look at part of the data indicated that the explosive yield was less than 5 percent. Ignition occurred spontaneously on rupturing the bulkhead with a ram-cutter assembly. Unedited documentary films of the test should be available by 7-20-65. ✓

JWS 7/19

B 7/26

1. S-I/IB

Negotiations - An agreement on cost has been reached with CCSD on all the backlog of documentation type changes. We are now current through March 1965. ✓

Spider Beam - On July 13, 1965, the S-IB spider beam successfully completed reliability testing by withstanding 200% of design loads. This test concluded the test program of the S-IB spider beam. ✓

LOX and Fuel Wrap Around Suction Lines - Recent vibration tests have induced failures in both the LOX and fuel wrap around suction lines. Weld failures in the boss installation have occurred in several cases after 70 minutes. Failure in a lap joint was induced after 15 minutes testing of a Flexonics LOX line. The suction lines are manufactured by Solar and Flexonics to a specification control drawing. Chrysler will recommend by ECP a revision to the boss installation and tighter controls on the lap joint and weld. The wrap around lines on S-I-10 have been checked using dye penetrant examination, no discrepancies were noted. Chrysler recommends S-I-10 be launched with the existing Flexonic wrap around lines. ✓

9/8 7/19

B 7/26

1. ADMINISTRATION OF SINGLE SUPPORT CONTRACTS: This office is conducting a continuing review of the administration of R&D Operations Single Support Contracts. This review is being made to assure that our management process is in conformance with Center policy. In this review, particular emphasis is being placed on the type of control exercised over Schedule Orders issued under the terms of the contract. Our goal is to assure sound management with minimum bookkeeping and paper work. In this regard, there is considerable effort required to standardize and simplify the several reporting requirements called for under the contract. Our effort in this area will be coordinated with the laboratories, Financial Management Office, Purchasing, and the present committee reviewing the 533 contractor reporting system. ✓

2. 65-3 PROGRAM EXECUTION PLAN (65-3 PEP): A summary of the R&D funds as submitted to IO for the 65-3 PEP are as follows (dollars in thousands) with the FY 65 Program shown for comparison:

<u>Program</u>	<u>FY 65 Actual</u>	<u>FY 66 Requirements</u>	<u>Guidance</u>
MSF	\$ 201,444	\$ 240,640	\$ 214,058
ART	15,380	19,040	17,030
SS&A	1,293	8,670	8,395
T&DA	2,000	1,500	1,500
TOTAL	\$ 220,117	\$ 269,850	\$ 240,983

The over guideline requirements will be the subject of negotiations between this office and the Stage Managers in IO for the next two weeks. The final negotiated figures will be reflected in the 65-3 Program Operating Plan which will be submitted by the Center the first week in August. ✓

3. S-IVB HYDROGEN EXPLOSION: In response to Dr. Rees' concern about hydrogen accumulations in the S-IVB, action has been initiated with P&VE to fully investigate the matter. The results of this investigation are due to be completed July 26. At that time, a briefing will be arranged for all concerned which will address itself to the major problem of explosion and possible solutions since the Emergency Detection System cannot cope with this hazard. ✓

NOTES 7-19-65 DANNENBERG

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7/19

1. Configuration Management - R-COMP reported that the configuration accounting program in support of IO is on schedule; the computer programs are to become operational around 8-1-65. ✓
2. Crew Safety - Several MSFC members of the Crew Safety Panel had an opportunity last week to "fly" the Saturn IB-Apollo abort simulator at Ling Temco-Vought in Dallas, Texas. Each participant was subjected to 15-20 varying abort situations and two nominal flights (one with extreme tolerances). The purpose of the simulator was to evaluate the overall EDS capability and limitations, and the astronaut ability to make proper on-time abort decisions from EDS displays. A joint report on the group's reaction to the simulation is being prepared. You will receive a copy. ✓
3. Experiment Coordination - Little Joe II - On 7-15-65 Mr. Van Goey, WSMR, reported to MSFC personnel that three surplus Little Joe boosters are available for the program, but need to be equipped with fins and a stabilization system. WSMR will be able to assist with design of instrumentation and telemetry equipment.

A follow-up meeting is being planned for late July at GD/Convair (booster manufacturer).

R-AERO (Dr. Rechten) is proposing to add to the Little Joe II a boiler plate model of Saturn V (4/10 scale).

After cost data have been compiled and checked with I-V-DIR, you will be briefed on this project. ✓

4. Saturn/Apollo Application Program - Re Notes 7-6-65 Dannenberg (attachment 1) - This refers to the "Saturn/Apollo Application Office" under General Jones which is being formed parallel to General Phillips' "Apollo Program Office." It will handle AES, Saturn IB/Centaurs, while "Experiments" will be under Dr. Gray. ✓

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1. MTF QUALITY SUPPORT: As you are aware, this Laboratory was requested to provide quality assurance support to MTF during activation and operation of that facility. We determined that approximately 44 Department of Defense (DOD) personnel would be needed during the activation phase, with this requirement decreasing during the operational phase. Presently, there are 26 DOD personnel on board, all with more than three years experience in missile site activation. The remainder are being recruited. After further discussion with Mr. Balch on July 2, 1965, I have assigned additional personnel from this Laboratory to support MTF. Mr. William D. Howard, Sr., of this Laboratory, was selected to head up the Quality organization during both activation and operational phases. In addition, personnel with program backgrounds have been assigned to assist in establishing overall program requirements and operational interfaces to be carried out between the NASA Quality Office, Activation Task Force (which we are part of), a DOD team, and the contractor. We will also supply personnel from the checkout area to participate in the GSE activation effort currently underway. It is intended that this support will continue, within our resources, until spaces are made available at MTF and until personnel can become sufficiently trained.
2. PARTS RELIABILITY INFORMATION CENTER (PRINCE) EFFORTS: The portion of the PRINCE which serves as the focal point for parts and material information for all Apollo Program participants has been designated Apollo Parts Information Center (APIC). The APIC program anticipated by this Laboratory has been coordinated with MSC, KSC, MAR and the GE Reliability Office at Daytona Beach. The scope of APIC as defined to date is within the capability of the PRINCE system.
3. S-IB INSTRUMENT UNIT GSE/ESE: First Article Configuration Inspection (FACI) was completed for the "I.U. Checkout Station" and shipment by R-ASTR was completed to IBM on 9 - 10 July. Several items of power supply equipment have yet to be modified prior to use at IBM.

1. STATUS OF ESE DELIVERY SCHEDULES: The ESE schedules presented by General Electric during the 7/8/65 Schedule Assessment Presentation to General Phillips were accepted by General Phillips and representatives of MSFC and KSC as mandatory to meet the SA-201 firing dates. ✓

During the past 10 days, the delivery of S-IB stage ESE to the Systems Development Breadboard Facility (SDBF) has slipped from the promised 7/16 to 7/21. In addition, it appears that the IU-ESE delivery to the Cape will slip from 8/7 to 8/14.

The remaining delivery schedules seem possible to meet; however, all scheduled dates for GE's SA-201 ESE delivery are very tight and almost any problem during checkout in Building 4373 can jeopardize the committed dates. ✓

2. S-II/S-IVB ACTUATORS: A design review was made of the mechanical feedback of these actuators to preclude malfunction mode experienced with S-IC actuator in 6/8 Static Test. The findings were: The S-II and S-IVB mechanical feedback spring mounting arrangements are identical, with the design concept being similar to that employed on the S-IC actuator. However, the dimensions are considerably different. The S-II/S-IVB spring is much smaller and stiffer (30 pounds/inch as compared to 5 pounds/inch on the S-IC). The S-II/S-IVB design appears to be adequate. ✓

9/27/19

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1. S-IC

Test No. S-IC-09 has been rescheduled from 7/22/65 to 7/27/65 due to late delivery of stage hardware from Boeing. The stage fuel pressurization system installation has been completed. The remaining hardware, GOX system, required for this test is scheduled for delivery on 7/20/65. This test will be a short duration following a 6½ hours standby with a full load of propellants. ✓

2. F-1 ENGINE - WEST AREA

Test FW-002 was conducted on 7/12/65 on Engine F-1002-3 with a mainstage duration of 35.42 seconds. This was a LOX depletion test with the S-IC inboard configuration. The engine was also gimballed 2° and 0.5 c.p.s. in a circle pattern. The next test is planned for 7/19/65 for a mainstage duration of 40 seconds. ✓

3. S-IVB MSFC

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An ignition spin-test utilizing J-2 Engine 2013 was attempted on 7/13/65. The countdown proceeded without difficulty until X-20 minutes. At this time chilldown of the turbo machinery was attempted. The fuel pump inlet temperature and pressure were out of the start box. Post-test investigation revealed a blind gasket in the fuel recirculation line which had been inadvertently left in during the build-up phase of the S-IVB Battleship Stage.

A loading and countdown test will be conducted today (7/19/65) but ignition and spin-up test will not be attempted because of problems with the engine control package. ✓

4. S-IB-2

Performed data analysis of test SA-28. All engines performed normal and in the proper thrust range. Test SA-29 is scheduled for Tuesday, 7/20/65, at 2:00 p.m. for a mainstage duration of 145 seconds. ✓

5. S-11 BATTLESHIP

A 25 seconds cluster mainstage test was successfully conducted on 7/13/65.

A 150 seconds test was attempted on 7/16/65 with observer abort at 34 seconds of mainstage due to redline measurement loss on the engine No. 4 fuel balance piston cavity pressure. A faulty connector was determined to be the cause for this malfunction. ✓

6. S-IVB-201

A 10 seconds firing is planned for 7/21/65 instead of the previously planned propellant loading test. The full duration firing would follow approximately one week later. ✓

7. S-IVB BATTLESHIP

A one month rebuilding program is underway to repair damages from the LH2 explosion. A mid August finish date is planned. ✓

NOTES 7/19/65 HOELZER *9512* 7/19

B 7/26

NO NOTES.

SA-10: No problems are known to date which would impact the launch date. Two S-IV-10 problem areas developed during the Propellant Loading Test on July 15. The problems were not serious enough to stop or delay the loading test. One problem was an umbilical disconnect leaked slightly during the loading test. DAC is actively investigating cause and repair. The other was associated with the propellant utilization system. The P. U. System readout in the blockhouse had two indicates (dropouts and spikes) at approximately 60% load, which were thought to have been caused by a metal particle shorting out the LOX mass sensor. The indications lasted for approximately 4 seconds then cleared up giving no further indication of trouble for the remainder of the loading test. DAC intends to lower the LOX probe and clean the elements, hoping to eliminate the problem. Indications of this nature have been experienced on previous stages and this cleaning procedure was accomplished with success. ✓

S-IVB-201: Delays in completing mods and stage checkout have necessitated changing schedule date for propellant loading from July 14 to July 23, 1965, and acceptance firing from July 21 to July 29, 1965. A decision was made this week to extend the propellant loading and start bottle blowdown test to include a 10 second main stage hot fire test. ✓

SATURN IB CONTROL WEIGHTS: A meeting is scheduled July 19 between R&DO and this office to determine what increased payload commitments can be made for SA-204 and SA-206 vehicles. MSC indicated a need for increased payload on these vehicles in the recent Flight Mechanics Panel. After agreement with R&DO, we plan to hold a meeting July 22 with R&DO, MSC, and NASA Headquarters to arrive at the proposed payload revisions. Simultaneously, we plan to request new control weights from R&DO based on these new commitments as well as the official engine performance parameters. We foresee no problems in accommodating MSC in their increased payload request. ✓

NOTES 7-19-65 KUERS *KS 7/19*

B 7/26

1. S-IC-501: The progress on the final assembly or systems installation on 501 is increasing; i.e. the number of manhours we are able to expand daily on this stage in Building 4705 is now at an almost satisfactory rate. ✓ Our efforts to control changes for 501 and speed up delivery of components, started in March, are now bearing fruits. The supply of parts is such that we can now accomplish approximately 200 manhours of installation work per day and could even last week work on Saturday for the first time. We hope to increase the speed substantially in about 2 weeks from now at which time the cable harnesses manufactured at Michoud will be delivered. These cable harnesses for the Thrust Structure are being manufactured by Boeing using the full scale S-IC mock-up for development of the best routing, shape, and length of the cables. Most critical are the engines for 501 on which we have probably to exchange the injector plates. The delivery of new injector plates for 501 engines is such that we cannot deliver 501 to checkout with all engines mounted. This is being discussed with QUAL Laboratory and will not prevent start of checkout on September 27, 1965. ✓

2. Personnel Change: Mr. Milton Steen, former Manager of Manufacturing Development for the RIFT Program at Lockheed, Sunnyvale, who joined us last summer and served as ME Laboratory Project Engineer for the S-IC has left us. He has given us valuable help in setting up controls for our work and improving our relations and coordination with Boeing. He plans to go back to Lockheed. ✓

1. MSF R&D GUIDELINES FOR POP 65-3 - The MSF Guidelines for POP 65-3 were received at Marshall on July 13, 1965, and subsequently distributed to cognizant offices within MSFC. The contents provide adequate information for the preparation of POP 65-3, although received well down the preparation cycle. Among the salient points included within the guidelines were:
 - a. A change in Saturn IB/Centaur from the old PDP Plan A to a new Plan 3 (Saturn IB/Centaur to be covered by a separate addendum to the POP). ✓
 - b. A reduction of \$10 M in the MSFC Apollo Program from the MSF POP 65-2. ✓
 - c. A request for a summary of the 6/6/8 program identifying Apollo, IB/Centaur, AES and unassigned vehicles. ✓

Although no AES submission has been requested by MSF, we decided to include a revision of the AES information previously included in POP 65-2. This was done primarily due to increased emphasis we are now placing on earth orbital activities. ✓

2. SATURN IB STANDARD LAUNCH VEHICLE STUDY - The next meeting of the contractors on this study will be July 20 at Michoud. Woody Bethay will attend. The concern expressed by Messrs. Lowry and Gordon over the interplay of this study with their current incentive contract preparations has come to the surface. Bernie Meldrum informs us that Douglas will not deliver their cost data to the group of contractors on July 20. The reason for this is that Mr. Able has decided that (1) Douglas will not release this data until it has been cross-checked with their incentive contract proposal, (already furnished to Marshall) and (2) the Douglas position is secure. ✓
3. MANPOWER SPACE TRANSFER MEETING - The Monthly Space Transfer Meeting of Messrs. Hueter, Cook and Maus was held, and it was agreed that 10 spaces each would be transferred from R&DO to IO, effective July 1 and July 31. After these actions, 62 spaces will remain to be transferred to IO to satisfy the original agreement of 250 spaces. ✓
4. OPERATIONS EXECUTIVE GROUP - Ray Kline has been designated MSFC Coordinator for the Operations Group, which you plan to attend on July 31. Paul Cotton has promised to send a list of the members and the agenda early this week. ✓

FIRST MEETING WITH GD/C: The contract for GD/C study effort was made effective last week. This was sixteen weeks after MSFC requested this study contract and does not contain all of the initial scope. The first meeting in which GD/C will participate is scheduled at GD/C today. Program office and R&DO representatives will attend. ✓

PROGRAM GUIDELINES FROM MSF: I received a letter from Colonel Russell on July 15 which indicates Dr. Seamans has approved for planning purposes a schedule using SA 210 for the first R&D launch in the Saturn IB/Centaur program, to be followed by two Voyager test missions using IB/Centaur for the 1969 Mars Opportunity. The letter requested that MSFC obligate no more than \$10M (\$5M in FY 65 and \$5M in FY 66) through December 31, 1965. In addition, no obligations for flight hardware are to be incurred before January 1, 1966. The anticipated funding level for FY 67 will determine the 3rd and 4th quarter FY 66 obligations for the program. I have not agreed that the \$10M is adequate through December 1965 to maintain the 210 schedule. Indications are that LeRC budget requirements for this fiscal year will be substantially higher than the total program guidelines of \$10M through December. Upon receipt of budget requirements from LeRC and a reevaluation of inhouse requirements based on the new schedule, the FY 66 requirements by quarters will be determined. At this point the impact of limited funding through December can be analyzed, if any exists. ✓

CENTAUR/SHROUD ALTERNATE ASSEMBLY LOCATION STUDY: Results of the study on alternate Centaur/Shroud assembly locations will be presented to General O'Connor and Mr. Weidner on July 21, and to you at 10:30 a.m., July 22. ✓

S-IVB FORWARD SKIRT STRENGTHENING: In response to Saturn IB/Centaur requirements Douglas Aircraft has been requested to submit a Quick Response Estimate on the structural strengthening of the S-IVB/IB forward skirt to the Saturn V configuration by exchanging the longitudinal stringers. The change would be effective on SA 210 and subsequent Saturn IB/Centaur vehicles. ✓

9/8/19

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1. S-IC-1 Stage Status - Horizontal assembly operations are progressing satisfactorily. The stage is currently predicted to be delivered to R-QUAL on September 27, 1965 (on schedule). ✓

2. S-IC-D Stage Status - Delivery to MSFC on schedule (October 15, 1965) remains firm. ✓

3. S-II Battleship Stage Firings - A successful 25-second firing was conducted on July 13, 1965. All test objectives were fulfilled. ✓

At approximately 1:30 pm, on Friday, July 16, 1965, a 150 second duration firing was initiated. After 32-seconds, an observer cut-off was initiated when he observed the No. 4 engine fuel pump balance piston pressure decay to zero. It has been determined that the difficulty was actually an instrumentation failure and not a failure in the fuel pump piston mechanism. Firing rescheduled for tomorrow, (Tuesday, July 20, 1965). ✓

4. Common Bulkhead Test Tank - The LN₂ burst pressure test was conducted on July 10, 1965. Structural loads imposed were as expected and the test was successfully completed.

The first LH₂ test was attempted on Saturday, July 17, 1965. The LH₂ fill and drain was not accomplished due to leaks in the tank insulation. Repairs will be made this week (July 19, 1965) and firing will be attempted again on Saturday, July 24, 1965. No overall schedule impact predicted. ✓

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NOTES-STUHLINGER

July 12-16, 1965

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1. OSSA Workshop: Recently, some members of RPL attended a two-day workshop on thermal control problems organized by OSSA. The thermo-physics people of the following teams were invited: Mariner, Pioneer, Surveyor, Nimbus, Lunar Orbiter, Pegasus. We presented our experience with Pegasus. The meeting was very valuable as a discussion of problems and solutions. It was an open discussion of the things which didn't work and which are never written up in reports. We will receive the taped discussions and intend to analyze those parts of interest to us. ✓

2. Lunar Drill: Negotiations with the two companies who submitted the best proposals were continued and are near finalization. FY-66 funds from E. Z. Gray are available. ✓

3. Woods Hole Conference: A conference on NASA Lunar Exploration is to be held during the next two weeks. It is organized by OSSA and OMSF. RPL will be represented by Mr. J. Downey, Dr. A. Weber, and Dr. D. Hale. The purpose of the meeting is to obtain a consolidated endorsement of the scientific community of the type scientific mission which could most profitably be conducted on the lunar surface. Five specific scientific missions will be given to the group and the scientists are requested to criticize and modify the missions, or to recommend better missions. ✓

4. Pegasus B: PAM commutator data (which supplies most housekeeping data) continues to function intermittently. It is not known exactly, but is believed to be caused by moisture in the commutator due to the exposure to the storm prior to launch. Contrary to expectations, the spin rate has decayed very slowly. It was initially $6.5^\circ/\text{sec}$ and after 30 days reduced to $4.5^\circ/\text{sec}$. around its longitudinal axis. ✓

5. FY-67 CoF Bldg.: Mr. G. B. Heller and Mr. H. Lawson, F&D, met with Mr. Rod Diaz at Headquarters July 16 regarding the new building. Our approach was developed around our mission which will be all AES by the time the building is finished. This mission requires in-house lab activity. The building must house the scientific instruments RPL is buying now under Hqs. approved projects. We obtained valuable inputs as to preparing our case. Mr. Diaz advised us to make our present plans on the basis of a two-wing building, and to consider further increases on the basis of additional AES assignment at a later time. Mr. Diaz authorized funds for an architect engineering contract. ✓

NOTES 7/19/65 WILLIAMS

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1. Detail of Personnel to Advanced Systems Office. Effective July 14, 1965, the personnel of the Future Projects Office and Joe de Fries' office of Aero-Astrodynamic Laboratory were detailed to the Advanced Systems Office for a period of 6 months. It is planned that ASO will be defined, set up and operating prior to the end of the detail, and that formal transfer actions will be completed. ✓
2. Charter for ASO. I am planning on having a new package (charter, organizational breakdown, staffing plan, etc.) ready for Mr. Weidner to review the week of July 26. ✓
3. Revised AES Submission to POP 65-3. Although it was not requested, we plan to make a "revised" AES submission to the POP 65-3. The MSFC activities in earth orbit will be increased to coincide with the directions which you gave during the past two weeks. ✓

July 26, 1965



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NOTES 7-26-65 BALCH

1. Youth Opportunity Campaign- The first 191 employees under the YOC were hired last week. An additional 109 report today. The first work project will be the clearing of a 260 acre tract owned by the Government in the "Buffer Zone". This property will be used ultimately by Government and contractor employees at MTF as a recreational area. Other projects will follow. The Corps of Engineers are furnishing supervision on a reimbursable basis, Keesler AFB is providing materials and supplies and MSFC is providing eleven vehicles and other support. ✓

2. S&ID Status Review- held Friday at MTF. S&ID indicated that its peak workload would require approximately 1,318 employees. I consider this excessive. We intend to work this out at the local level. ✓

J-2 ENGINE The FRT test series has been completed with engine S/N 2023 logging 2752 seconds and 25 starts. The FRT program has shown that certain deficiencies exist in the engine. The main oxidizer valve failed to open all the way on the last test, resulting in damage to the engine. All known deficiencies will be corrected in engine S/N 2032, which is planned for use in the Qualification Test, expected to begin in late August. ✓

The first 230K/5.5 mixture ratio engine J005-2, completed a calibration test and four performance tests on test stand Delta 2B. Three of the tests were for full duration. ✓

Engine J-2012, the spare engine for SA-201, 202 and 203 was delivered last week. ✓

The "Hot Test" risk clause for the incentive conversion of the production contract has been negotiated per MSF guidelines and the contract is being staffed through the Center for transmittal to Rocketdyne for signature. We are preparing a letter to Dr. Mueller for your signature, in answer to his letter to you on this subject. ✓

F-1 ENGINE Early indications from the F-1 Engine Truck Transportation Test are that an approximate 3"G" load may be expected under normal highway conditions (maximum allowable is 4"G"). The truck departed Thursday, July 22, enroute from MSC to MSFC following an orientation stop for the benefit of the Gemini Project. ✓

RL10 ENGINE During quad tanking (filling both Atlas and Centaur tanks) test on AC-6 the fuel inlet temperature on one RL10 engine exceeded acceptable levels. Tests are being conducted to resolve the problem at both Sycamore and Pratt & Whitney Aircraft. Launch of AC-6 is postponed to August 9 at the earliest. ✓

H-1 ENGINE The duration test of Stage S-1B-2 was successfully conducted on July 20 and preliminary inspection and data indicate that all engines performed satisfactorily. The only hardware discrepancy noted was a slight thrust chamber leak on one engine which can be easily repaired. ✓

S-IVB ULLAGE ENGINES - ROCKETDYNE/GEMINI The vibration testing on the modified MSFC pre-qual engine has been completed. Non-destructive inspection indicated the modification to effect stress distribution in the trunnion and flange area to be adequate. Subsequent destruction-type inspection revealed a hair-line crack, approximately 1-1/2 inches in length, at the metal shell flange weld. Detail materials analysis of the cracked area is being conducted by MSFC. ✓

1. S-II BATTLESHIP 150-SECOND FIRING SUCCESSFUL: The S-II battleship was test fired for a scheduled duration of 150 seconds on 7-20-65. ✓ Preliminary data showed that the chamber pressure on Engine #1 (2004) dropped from 680 to 530 psia. This pressure had been redlined on previous tests at 590 psia minimum, but S&ID deleted the redline prior to this firing. The Oxidizer Turbine Bypass Valve (OTBV) actuation line cracked at T+80 seconds, causing the OTBV to open and an excessive drop in helium bottle and accumulator pressure. Opening of the OTBV caused no problems, since it is required to function only during engine start; however, the pressure decay in the helium bottle could cause problems, particularly if it occurred in flight.

Overboard bleed was used for propellant conditioning, since no recirculation pumps or stage prevalves are presently installed (due to previous problems).

This test had been attempted earlier, but was terminated by observer cutoff at 34 seconds due to a faulty instrumentation reading. ✓

B 812 B 811

1. S-IB

Static Testing of S-IB-2 - The S-IB-2 booster was successfully static fired with a long duration (144 seconds) test run on Tuesday, July 20, 1965. Post static checkout of S-IB-2 at Huntsville revealed a pinhole leak in engine H-7051, position 1, thrust chamber. It is felt that a braze repair can be made here when it returns; however, an official recommendation from the engine contractor has not been received, as yet. ✓

LOX and Fuel Wrap Around Lines - Outboard - The following plan has been developed to resolve problems (failures) encountered in qualification testing of the LOX and fuel wrap around suction lines:

- a. Conduct an in-depth inspection of all outboard LOX and fuel wrap around suction lines in use or in stores.
- b. Test an additional sample with instrumentation comparable to that used in static firing.
- c. Requalify the vendors as sources for the lines.
- d. Revise procurement specifications.

Inboard - Qualification tests of the LOX and fuel inboard suction lines are presently being conducted. No failures have been encountered to date. ✓

2. S-IC

Status of S-IC-D - Vehicle is in horizontal assembly area with assembly operations being performed in the forward skirt, intertank, fuel tank, tunnels, and thrust structure areas. ✓

Status of S-IC-F - The fuel tank has been removed from hydrostatic test area to the paint area. Painting of exterior of tank has been completed. Repairs to exclusion riser will be made when tank is moved to vertical assembly area. The LOX tank is in the hydrostatic test tower. Electrical wiring is being installed in preparation for hydrostatic test. ✓

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1. PLANNED OBLIGATIONS FOR FY-66: In a recent memo published by DEP-A, all elements of Marshall were requested to give special attention to their planned obligations for FY-66. The memo emphasizes the importance of insuring that our actual obligations were at or near the planned figure. Listed below is R&D Operations' planned obligations versus initiations as of July 21 for the Saturn Projects. (Dollars in thousands)

<u>Saturn Projects</u>	<u>July FY-66 Planned Obligations</u>	<u>Initiations Thru July 21</u>	<u>Percent Initiated</u>
Saturn I	\$ 20	\$ 1	5%
Saturn IB	5,414	3,687	68%
Saturn V	19,677	16,063	82%
Engines	97	114	118%
TOTAL	\$25,208	\$19,865	79%

In summation, R&D Operations has initiated 79% of the funds planned for July in approximately 68% of the time available. ✓

2. SA-501 VEHICLE WEIGHT STATUS: The actual weight status of the SA-501 vehicle improved significantly during July. Due to the reduction of 328 lbs. in the weight of the S-IC Stage, the overall dry weight of the three stages, interstages, and instrument unit has been reduced 180 lbs. from the June figure. Contrary to this trend are the subordinate weights of the S-II and S-IVB Stages, which have increased a relatively small amount. This has resulted in a dry weight of SA-501, not including the LES, to be 444,907 lbs., as compared to the control weight of 453,250 lbs. At separation, the July weight has been calculated to be 526,278 lbs., considerably under the control weight of 534,818 lbs. ✓

QB 8/2 B 8/1

1. Experiments - All laboratories and offices are being informed about the authority of the MSFEB to cover all experiments, regardless of Program (Apollo, Saturn IB/Centaur, AES) and the necessity to get moving on experiments proposals in additional disciplines. Priority will be given to experiments which can be integrated into the Orbital Workshop concept. ✓

2. Crew Safety - ARINC has performed a study of explosions of previous liquid fueled missiles which shows what failures have led to explosions, time available between malfunction detection and explosion, time between "first flash" and full explosion, and whether the presently conceived Saturn EDS monitors could have detected the failure. ✓ K.D. I think you have heard about the much-lower-than-expected TNT equivalent found in H₂/O₂ explosion tests.

3. Configuration Management - Arrangements are being made to conduct Configuration Management Training at Michoud on 8-19-65. Approximately 50 people will participate in the training. ✓

What effect do these findings have on EDS?
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1. SA-201: The L/V performance has significantly increased relative to the published reference trajectory. This is due to considerable projected weight decreases in the S-IVB, IU, and adapter coupled with an ISP increase in the J-2 engine. This increase in performance may allow an increase in CM re-entry heat rate. However, Chrysler has found that a general performance increase cannot necessarily be used to advantage due to the following principal constraints imposed upon the shaping of the launch vehicle trajectory by the S/C: (a) Minimum apogee altitude for the conic defined by S-IV B cutoff conditions is 250 nautical miles; (b) Entry longitude at 400,000 feet altitude with no SPS burn is -14.12 degrees nominal. Tolerance is ± 1 degree; (c) The entry velocity and flight path angle with no SPS burn must not exceed a given limit curve; (d) Target plane definition: longitude measured from the launch pad meridian at launch to the descending node of the required trajectory plane is 62.12 degrees. Inclination of the plane is 31.78 degrees. Flight azimuth is 105 degrees East of North; and (e) Nominal entry conditions will be such as to produce a maximum entry heating rate without exceeding a deceleration load of 20 g's.

It has been proposed to provide two L/V trajectories to MSC by August 1 to bracket the possible methods of utilizing the added performance: (a) Insert into a conic defined by the SA-201 reference trajectory with a maximum payload weight, to be reflected as additional SM propellant; (b) Terminate S-IV B thrust at the same radius and flight path angle as in the SA-201 reference trajectory maximizing the cutoff velocity. It is anticipated that each of these trajectories may violate one or more of the S/C constraints, thus requiring a complete reshaping iteration. Required data to perform SA-201 trajectory analyses has been transmitted to Chrysler Space Division. Results are expected in sufficient time for transmittal to MSC by August 1. ✓

2. Flight Mechanics Panel: The Thirteenth Flight Mechanics Panel Meeting was held at MSFC on July 13 - 14, 1965. Attached is a copy of the resultant action items and agreements. Final documentation of the meeting will be distributed within 2 weeks. ✓

8/12

B 8/11

1. F-1 ENGINES: The last S-IC-501 engine, S/N 3014, is undergoing functional testing. The first engine which has rigid high pressure propellant fuel lines, S/N 4014 for S-IC-502, has been delivered and functional testing will begin July 30, 1965. Representatives of Rocketdyne, Manufacturing Engineering Laboratory and this Laboratory are witnessing the functional testing of engines 3014 and 4017 as part of the effort to reduce the discrepancies being found during receiving at MSFC. ✓
2. S-IV B PROGRAM: Due to recent difficulties in prestatic operations the full duration firing of S-IVB-201 has slipped to August 4, 1965. This delay will effect an additional reduction in post-static checkout time. In an effort to obtain an acceptable checkout, plans are being formulated for "crash" support at SACTO by personnel of this Laboratory. S-IVB-202 stage assembly and checkout continue at Huntington Beach. Checkout is scheduled to terminate August 9, 1965. As of July 14, 1965 there were 137 line shortages, 224 open A.O.'s and 4,847 open released manufacturing hours. It is anticipated that the stage will be shipped to SACTO with approximately 3,000 manufacturing hours remaining to be completed. S-IVB-203 has been moved into the checkout tower with 60 of 95 black boxes and 14 of 115 wire harnesses installed. There are 9,237 open released manufacturing hours and 457 A.O.'s on the stage. Megger checks are currently in progress. ✓
3. FIRST ARTICLE CONFIGURATION INSPECTION (FACI) ON S-IVB STAGE: A S-IVB 201 FACI plan has been generated and defined to IO and Laboratory personnel. A FACI Team is being drafted to accomplish this operation on or about August 2-13. This group will consist of resident Laboratory and AFQC personnel plus representatives from Astrionics, P&VE, and Q&RA Laboratory personnel from MSFC. Government representation will consist of approximately 12 people to be matched by roughly that number from DAC. This plan will consist primarily of a drawing and documentation review. An increasing amount of hardware will be included with the FACI on future stages. Depending on the experience with this first exercise an identical or modified approach will be taken for the stages of other contractors. ✓

9/15/82

1. S-IC SERVOACTUATOR: Two Moog S-IC servoactuators have been returned to the vendor's facility because of excessive null shift. Both units had a cracked mechanical feedback cam follower bearing. This is a serious problem. Both units have been subjected to static firings on S-IC-T. Further information on the resolution of this problem will be furnished as soon as available. ✓

2. MOD 1 SWITCH SELECTOR: Astrionics personnel, who were analyzing discrepancies in the MOD 1 Switch Selector which were detected in data accumulated by DAC during environment tests, discovered that the trouble is due to dropout time differential of the redundant read relays and is not due to environmental factors. The discrepancies showed up as pulses on nonprogrammed outputs with a duration of 0.2 to 0.4 milliseconds.

As a result of this analysis all MOD 1 Switch Selectors are in process of being corrected by disabling one of the redundant read relays. This fix will not have any impact on schedules for Saturn IB and Saturn V. ✓

F89/2

1. F-1 ENGINE

Tests FW-003, FW-004, and FW-005 were conducted on the F-1 Test Stand with durations of 0 (cutoff occurred at ignition due to igniter links relay malfunction), 79.54 seconds, and 145.2 seconds, respectively. Only minor engine and facility damage occurred during these tests which had primary objectives of checking out the new facility. The next test will be after the S-IC-T test due to conflicts of personnel and equipment. ✓

2. S-IC

Test S-IC-09 previously scheduled for 7/27/65 is tentatively rescheduled for 7/29/65, pending timely delivery of the GOX line upper ducts from Boeing. This continued slippage of the test is a direct result of Boeing's failure to meet meaningless promises. The scheduled duration is 40 seconds of mainstage following a 6½ hours standby with full propellant load. Engine cocoons will be on engines at positions 3 and 5. ✓

3. S-1VB (MSFC)

An LH₂ and LOX loading and countdown test was conducted on 7/19/65, all systems operated satisfactorily. The engine control package was found defective on 7/17/65, this item is not repairable in the field, therefore are awaiting shipment of one from Rocketdyne. Promise date 7/28/65 - cannot test engine until the above item is received. ✓

4. S-1B-2

Test SA-29 was performed on Tuesday 7/20/65, at 2:36 p.m. for a duration of 144.3 seconds. Performance was satisfactory on all engines. Several ripples were found after the test on the skin of fuel tank No. 3. They apparently were caused by the radiation heat from the exhaust flame. The vehicle is scheduled to be removed on 7/29/65. ✓

5. RANDOM MOTION SIMULATORS

Contract with AMF for Random Motion Simulators is still a critical problem. Most of the hardware is at the site for installation, however, a few critical cylinders will not be delivered until the end of the month (approximately 6 weeks behind schedule). Installation pace has taken on new impetus and checkout of Command Module Position (required for 1-B access arm tests) has been started with scheduled completion on 1 August. AMF intends to complete all simulator checkouts by 8/27/65, which would just precede deliveries of arms from KSC (Hayes).

Purchasing Office was informed of a \$651,000 overrun which is mainly attributed to increasing overhead rates and an abnormal amount of rework required within the York, Pa. plant. ✓

6. S-11 BATTLESHIP

Post-evaluation of Test -016 (150 seconds duration) revealed a 10 p.s.i. pressure drop on engine position No. 3 LH₂ Inlet. Investigation revealed a bellows liner, between the tank outlet and prevalve collapsed. About 4 days work is involved to remove the liner on engine position No. 3 and inspect the other 4 bellows liners. Test 017 (full duration) is scheduled Wednesday, 7/28/65. ✓

NOTES 7-26-65 HOELZER

Q392

B 8/1

Negative Report.

8/12

B 8/11

S-IB STAGE: As reported on previous occasions, we have experienced failures in the LOX and fuel wrap-around lines during environmental testing. We have had failures in both solar and flexonic lines. The design is essentially the same as that flown on all Saturn I vehicles. We are currently engaged in a comprehensive investigation with CCSD and R&DO to determine if we have a design problem, a test specification problem, a test setup problem, a quality control problem, or some combination of these. We do not presently anticipate any impact on SA-201 launch schedule and the course of action on subsequent stages will be determined after completion of the investigation.

S-IVB-201: Considerable concern has been generated over the adequacy and quality of a jamb weld around the manhole cover fitting after discovery of cracks in this weld on stages at Huntington Beach. Examination of the weld and of X-rays revealed a surface crack which had been removed to eliminate stress concentrations. Additional indications of cracks have been resolved. Fred Cline and others from R&DO have been on the west coast participating with DAC and our people in the resolution of this problem. The 10 second shake-down firing is scheduled for tomorrow. The countdown commenced Sunday and the integrated systems tape is being run today. Propellant loading will commence Tuesday morning with the firing scheduled for Tuesday afternoon.

I. U.: We have a number of problems related to the mechanical/structural design of the I. U. A meeting has been scheduled with Dr. Rees for August 4 to discuss these problems. The ECS status and problem areas as well as the aspects of mechanical design will be explored.

SATURN IB PAYLOAD COMMITMENTS: A meeting was held last week with I. O., R&DO, MSC and NASA Headquarters personnel to review current Saturn IB payload commitments against the projected payload capabilities. Projected payload capabilities have increased significantly over the last several months and we feel that we are in a position to offer MSC more payload to provide a more meaningful mission to the spacecraft. Our proposed payloads are as follows: AS 204 & 205 - 35,300 lbs.; AS 206 - 36,200 lbs.; and AS 207 - 38,100 lbs. These new commitments will allow an additional 1500 lbs. on AS 205. We expect to finalize these commitments through appropriate program management channels in the next few days.

9/2

B 8/1

1. S-IVB Problem: As previously reported, we still have problems with weld joints in the S-IVB structure. Cracks in the welds of jamb rings to skin segments have been found in the container for 205 and the test container 9003. Reinspection of other S-IVB vehicles, because of these defects, has uncovered a crack in the lox jamb ring on 203 and a possible crack in the forward jamb ring of vehicle 202. There is, of course, serious concern at DAC over the cause of these cracks which had not been detected before and probably occur only after static load tests. All the cracks occurred in areas of weld repairs. DAC is presently evaluating these defects and has not yet determined the cause of the cracks or the corrective action to be taken. ✓

2. Transfer of S-IC Tooling to Boeing, Michoud: In connection with the relocation of the machine shop from Building 4711 to 4706 which has now been approved by NASA, we are presently removing all fixtures for bulkhead fabrication from 4706. One load of tooling will be shipped to Boeing on the return trip of the barge which brought the 502 Thrust Structure to Huntsville, and another shipment will be made on the return barge which will bring the 502 Intertank. Total number of fixtures and tooling transferred to Boeing as of this date is 572. We have still to build at MSFC one short lox container for load testing the light-weight design with milled-in stringers in the Y-ring. The tooling still required at ME for this job and for the final stage assembly will be transferred to Michoud in the beginning of the next year. ✓

1. VISIT OF GENERAL SCHILT - Gen. C. Frank Schilt, USMC (Retired), will visit MSFC on August 12 and 13. Mr. Webb has asked Gen. Schilt to join NASA as a consultant, and Gen. Schilt wants to be sure he can make a contribution before he agrees to serve. The purpose of the visit to MSFC is to review our operations and activities for familiarization purposes. Ray Kline is coordinating with Col. Vogel. ✓
2. AEROSPACE PILOT SCHOOL - The date of July 30 is now firm for the visit of the Air Force astronauts to MSFC. ✓
3. LETTER TO CONGRESSMAN BOGGS - The proposed draft we prepared for Mr. Webb to send to Congressman Boggs concerning removal of Boeing research people from the Michoud Plant has been approved by Dr. Mueller and forwarded to Mr. Webb. ✓ *I'd like to see it B*
4. PROGRAM OPERATION PLAN (POP) 65-3 - An internal MSFC review of POP 65-3 has been scheduled for 1:30 p.m., August 3, 1965, in the Tenth Floor Conference Room. Your presence would be welcome, but is not essential. ✓

The main problem that we have in preparation of POP 65-3 is that we have not yet received the OART guidelines. Latest information from OART and MSF is that OART guidelines will be available Wednesday, July 28. This means they can only be considered at management level for minor adjustment. We are proceeding, and expect to meet the August 9 due date in MSF. ✓

5. GENERAL MANAGEMENT (ADMINISTRATOR'S) PROGRAM REVIEWS - We have received the new schedule for the General Management (Administrator's) Program Reviews to be held in FY-66. The first of the series will be September 21-22, on Gemini; Manned Space Science; and Advanced Manned Missions. The review of "Saturn IB, V, J-2 and F-1 Engines; Related Facilities; and Apollo" is scheduled for November 16-17. ✓

Ray Kline will publish the full schedule and coordinate MSFC participation in these reviews. ✓

H.M. ✓

This seems to collide with MSF Program Review and Management Council Executive Session, both of which require Dr. Mueller's presence. Please clarify. B

NOTES 7/26/65 REINARTZ

B 8/1

8/2

MANAGEMENT RELATIONS: In view of our meeting with Dr. Mueller on IB/Centaur on July 20, I plan to revise the Project Development Plan to insure that MSFC has the authority to exercise its overall vehicle systems management responsibility. ✓ As I indicated last week, MSF has revised the MSFC prepared Project Development Plan and we should receive this revision later this week. Our comments to this Headquarters Project Development Plan will be prepared as soon as possible and submitted through General O'Connor to you for approval. In this manner I think we can best state the minimum authorities required by MSFC to accomplish this job. ✓ I realize that many of our R&DO Saturn IB/Centaur people are unhappy with the July 19 meeting at GDC. However, I urge that the laboratories continue to work with Mr. Palaoro to the best of their ability during this interim period until management relationships are clarified. ✓ The July 22 and 23 meetings at LeRC on navigation, telemetry, and instrumentation were generally satisfactory and useful to R&DO persons attending and progressive in nature. ✓

CENTAUR/SHROUD ALTERNATE ASSEMBLY LOCATION STUDY:

I plan to put into final form for presentation to Colonel Russell the study on alternate Centaur/Shroud assembly locations. In this presentation I will tell him we plan to perform the assembly and checkout at MSFC as per our meeting on July 22. ✓

NOTES 7/26/65 RUDOLPH

9/28/812

B&H

1. S-IC-1 Stage Status - Stage predicted to be delivered to R-QUAL on September 27, 1965, as scheduled. ✓

2. S-IC-2 Stage Status - The thrust structure arrived at MSFC from Michoud on July 19, 1965 and moved into the R-ME work position on July 22, 1965. The Fuel Tank is in the hydrostatic test position and work is progressing on schedule. The LOX Tank buildup is progressing on schedule. ✓

3. S-II-S Structural Failure - An engine support longeron failed at 125% of limit load. The condition under test was simulating all engines burning and gimbaled 10° in one direction.

The failure consisted of a number of rivets shearing in the skin panel of the thrust structure between the No. 1 engine longerons (the previous failure was the No. 3 engine longeron). The failure was of a minor nature and the fix should not present a problem. A re-test is planned. ✓

4. S-II Battleship Stage Test - The S-II Battleship Stage was successfully fired for 150 seconds at approximately 10:00 am, CST on Tuesday, July 20, 1965. ✓

The full duration test scheduled for Thursday, July 22, 1965, was postponed due to (1) leak in Fuel poppet valve at the gas generator on #3 engine, (2) restriction in fuel feed duct to #3 engine. Ball type facility prevalves or screens are suspected as the cause.

Full duration test is scheduled for Wednesday, July 28, 1965. ✓

5. S-IVB Battleship Firing Program:

MSFC S-IVB Battleship Stage - The MSFC S-IVB Battleship was successfully loaded with propellants July 19, 1965. The test proceeded as planned up to the point of ignition, however, due to problems with the engine electrical package the test ceased at this point. The most likely fix will be to replace the faulty part and proceed with the first firing July 30 or 31, 1965, based upon Rocketdyne delivering a new package by July 28, 1965. ✓

DAC S-IVB Battleship Stage - Current plans are that the Battleship will be ready for resumption of testing on July 30, 1965. However, due to the 201 acceptance firing schedule, this date may slip a few days. ✓

Use correct format, please.

B 8/1

NOTES - STUHLINGER

July 19-23, 1965

98812

1. AES EXPERIMENTS PLANNING: In reply to your question in Notes of 7-6-65, attached: In the referenced Headquarters meeting, MSF people objected to the Bellcomm plan and did not feel that it was appropriate to give all earth sciences and no hardware to MSFC. Taylor's option includes major hardware assignments to MSFC, which he called extravehicular activities. I assume that it is up to MSFC to define and claim the large assemblies for orbital operation as part of this, as presented to you in the July 14 briefing. This earlier meeting seems to be obsolete in light of last week's Executive Council Meeting. Your recent discussions with Dr. Mueller and the Executive Council have carried this much farther, especially since they now think of MSFC in connection with project definitions of lunar surface exploration, the earth orbital workshop, cryogenic propellant transfer in orbit, and other assignments. ✓

E.S.

Please discuss consequences with Häussermann, (Rendez-Vous with Pegasus C) B

2. PEGASUS B: Total hit data on Pegasus B through July 22: .406 mm (16 mil) panels 31 hits; .203 mm (8 mil) panels 14 hits; and the .038 mm (1.5 mil) panels 66 hits. The rotational behavior of Pegasus B is entirely different than A: the rotation is still mainly about the original axis with a precession cone angle of 21° after 51 days. We are investigating this in terms of rigid body mechanics. Members of this lab have been invited to present Pegasus results at a NASA sponsored meteoroid symposium in Cambridge, Massachusetts in August. ✓

3. WOODS HOLE MEETING: Feedback from the first week of the meeting on Lunar Surface Exploration: the scientists are in general agreement with our philosophy on lunar surface scientific mission. The scientific community seems to be impressed with the status of preparation and with the potential offered to scientific investigators. ✓

4. LUNAR MISSION STUDIES: Upon Dr. Mueller's request, we sent copies of the interim Bendix report on the lunar mission studies to him and all members of his Science and Technology Advisory Committee (STAC). ✓

1 Enc: Notes 7-6-65

B p/3

NOTES 7/26/65 WILLIAMS

9/18 9/2

1. Action Items Resulting from Management Council Executive Session. As a result of the Management Council Executive Session and your discussion at the MSFC Board Meeting, the following actions will be taken:

a. Develop a plan for continuing the activities on the S-IVB Workshop. It is hoped that it can be presented to you in the Future Projects Policy Board meeting prior to your departure in mid-August.

b. Refine the manpower picture on AES for the next year.

c. Wrap up what has been done on the 208/209 refueling experiment and file it. In view of the current feelings, it looks dead and no further action is planned.

d. I will get in touch with Ed Gray on the Wilson Committee investigation on "NASA Planning". This could cause us a lot of trouble.

O.K.
10 August
1:30-5:30
B

2. AES Integration Contract. I learned last week from Davy Jones that the planned AES Integration Contract which was to be jointly run by MSFC/MSC starting in September/October has been dropped. Current thinking from Mueller/Jones is to have four contracts, two for MSFC and two for MSC, starting about January 1. These are to last about five months and accomplish the Program Definition Phase of AES integration. (After the contract is completed and evaluated, MSFC would, according to the plan, select an integration (hardware) contractor about August 1966). If it is done as they see it, MSFC will have a much greater task to do in (a) getting ready for the January 1 contract; (b) managing the program definition contract; and (c) getting in a position to select a hardware contractor about 12 months from now.

F.W.
What's that?
B

✓