

OCTOBER 4, 1965

1. The United Association of Pipefitters, which struck against Allied-Webb's and Glantz' support of the NOWSCO service contract recharger operations on Thursday, September 23, resumed their work on the second shift Thursday, September 30, under pressure of an NLRB court-issued restraining order. The order runs through Monday, October 4, 1965, on which day our request for a permanent injunction will be heard in Federal Court in Jackson, Mississippi. Only 42 mandays were lost by the fitters involved, but the total effect on the program is much more extensive due to loss of schedule in other areas. ✓
2. The International Brotherhood of Electrical Workers, which withheld all its members on the site from work last Friday, September 24, in protest of NASA's Davis-Bacon interpretations, returned to work on Monday, September 27, with a direct loss of about 500 mandays and other indirect schedule loss. ✓
3. Tropical Depression "Debbie" placed MTF in Hurricane Condition IV due to possible threat of tropical depression "Debbie". "Debbie" increased to tropical storm status early September 28, 1965, with maximum winds of 50 mph. Emergency personnel of all major organizational elements at MTF maintained alert status until condition "All Clear" was assumed at 4 p. m. on September 29, 1965. No major problems occurred at the site or personal residences. ✓
4. Cryogenics Barges #4 and #5 arrived last week and #6 should be delivered by October 8. ✓
5. Contractual Activity encompassed continuation of finalization of natural gas supply, review of MTF LOX supply proposals, negotiation with Aetron on completion of S-II GSE installation contract, finalization with Aetron on completion of Phase I Technical Systems, and continuing with GE/MTSO on FY 66 Plant and Technical Support. Hopefully, the latter can be completed this week. A proposal has been received from GE/MTSO which recommends changes in Phase II Technical System installation contract management and is being evaluated by MTF with particular view to its relation to the S-IC project. ✓
6. Arrival of S-II-T at MTF is anticipated on October 16, 1965. Appropriate publicity for this milestone is being planned and agenda will be forwarded at a later date. ✓
7. Revised S-II GSE delivery dates announced by S&ID on September 27, do not appear to support the January 2 firing but are being further evaluated to determine if this is so. Impact on MTF of structural test stage destruction is not known at this time. ✓
8. Review of MTF C of F status will be held here by Bill Lilly and others from Huntsville on Thursday, October 7. ✓

9/28/64

F-1 ENGINE

Engine F-4020 (fifth S-IC-2 engine) left Canoga Park by truck on September 29. It is instrumented to gather accelerometer data, thus providing evidence that truck shipment is or is not suitable. The engine is expected to arrive at MSFC about October 5, 1965. ✓

J-2 ENGINE

The production contract incentive conversion package is still in NASA Headquarters awaiting final approval. It has been there since September 16.

The third engine of the second set of Battleship engines was delivered to S&ID this week.

The accent on preparation for the QUAL I demonstration and the 205K engine development has produced an acceleration in the test program. As of September 29, we had conducted 68 R&D tests for an accumulated duration of 8,794 seconds compared to our previous high month of 6,335 seconds. ✓

C-1 ENGINE

The Source Evaluation Board completed its ranking of RMD and TRW September 30.

Dr. Mueller has requested early presentation of the findings; therefore, plans are being made to make presentations to MSFC Management and Dr. Mueller during the week of October 4. ✓

H-1 ENGINE

The procurement plan for 83 H-1 engines to be utilized in the Apollo Applications Program was approved on October 1, for submittal to NASA Headquarters. ✓

RL10 ENGINE

The second two prototype RL10A-3-3 engines are being acceptance tested presently and should be delivered by mid-October. The first two prototype engines have been received at General Dynamics/Convair for installation on the Battleship propulsion test vehicle.

There have been five firings totaling 2,224 seconds with an RL10A-3-3 engine utilizing a silver section cast into the throat to optimize the throat contour to increase specific impulse. The throat section was not damaged by the tests. ✓

9/8/10/4

1. SATURN IB INSTRUMENT UNIT: S-IU-201 Coolant Pump has passed Acceptance Test. ✓

2. KSC CRAWLER BEARINGS: Materials Division was called in on bearing material problems on Labor Day. A sleeve bearing is under test with various lubricants in the Materials laboratory at the present time. ✓

3. S-II-S COLLAPSE: Structures Division has sent personnel out to S&ID to assess the failure and study effects on test program. The impact on dynamic testing schedule and possible work arounds is being studied by another group. ✓

4. S-II-T: A team headed by Mr. Hellebrand comprised of Industrial Operations, Propulsion and Vehicle Engineering Laboratory, Astrionics Laboratory, and Test Laboratory personnel is going to S&ID to assess the suitability of S-II-T for first firing at MTF and assist with necessary work arounds, fixes, etc. ✓

5. S-IVB 201: A team is leaving today to review qualification of S-IVB prior to flight with emphasis on critical components. Mr. Kroll of Structures Division is assuming single point of contact with DAC for this operation in support of S-IVB Stage Manager. ✓

9/8/10/4

B 10/4

1. HURRICANE BETSY DAMAGE REPAIR

The Engineering and Office Building No. 350 is approximately 80% complete with permanent reroofing. Concrete roof panels received for reroofing the VAB and Building 103. Reroofing of VAB to commence this weekend with completion within 90 days. Temporary repairs to the levee are progressing with an understanding from the Levee Board that permanent type repairs will be made as soon as possible. ✓

2. TROPICAL STORM DEBBIE

Michoud was very fortunate in that Tropical Disturbance Debbie did not cause additional damage either by rising water or high winds. ✓

3. BOEING STRIKE

The IAM (International Association of Machinists) strike against Boeing has not been settled and picketing is continuing at those gates assigned specifically for Boeing utilization. The number of hourly workers reporting has averaged approximately 560 out of 1800 during this past week. ✓

4. VISITS AND TOURS

Michoud Assembly Facility hosted representatives of the Bureau of the Budget, the Apollo Executives group, Paris Match representatives, and attendees of the Thirteenth Quarterly Review by Chrysler during this past week. ✓

B114

9/28/1914

1. Data Management - In response to repeated complaints about excessive paper work, R-S is conducting the following activities - as presented to the last R&D Council Meeting:

a. Review the functions of laboratory data managers and assign the responsibility to determine and review laboratory needs for documents, distribution, etc., to them. R-S will assist the laboratories by establishing guidelines which are compatible with NPC-500 requirements. ✓

b. Conduct an educational program "Operation Paper Mill" to make all lab personnel aware of recent requirements and their responsibilities to help reduce any unnecessary paper. ✓

2. ICD Management - ICD matrices for 500F & 501 have been prepared by Boeing and have been furnished to R-ASTR, R-P&VE, and R-TEST. Their reviews indicate that the approach is sound and should result in identifying interface relationships which MSFC will want to control. Simplification of these matrices are planned. A presentation on status and future plans will be given to Dr. Rudolph in the immediate future. ✓

3. Re Notes 9-27-65 Dannenberg - (Attachment 1) - Dr. Turnock stated that under the present funding limitations and as far as the Apollo Program Office is concerned, MSFC should fund experiment development out of funds already authorized. In other words, re-program in-house R&D and program funds which are presently intended for other areas. ✓✓

These attempts to discover experiment funding sources have been without result to date; however, possible solutions will be recommended to R-DIR shortly. ✓

NOTES 10/4/65 FELLOWS

Bofa

KB 10/4

1. BOB VISIT: Messrs. Don Crabill and H. T. Heintz, representatives from the Bureau of the Budget, visited MSFC on September 26 through September 30 for the annual BOB Program Review. Mr. Cook briefed them in detail on the Single Support Contractor operation plus a general presentation on the over-all R&DO operation. Individual laboratory presentations were given at P&VE, Research Projects, Aero-Astro dynamics, and Astrionics by the Lab Directors. An advanced programs presentation was given by Mr. Williams. The visitors had a walk-through tour of Test, ME, and Quality Laboratories. ✓

2. R&DO MANPOWER: The planned reduction in R&DO civil service personnel over the remainder of fiscal year 1966, which has been worked out to provide spaces for MSC, is proving to be very difficult to absorb. A detailed review of the workload and manpower requirements of each of the laboratories is now being planned so that less essential work can be eliminated and the necessary support given to essential work. ✓

1. Structural Separation Between Command and Service Modules: Re: your question on item 2, Notes 8/30/65 Geissler, copy attached. To improve the behaviour of the interface between Command and Service Modules, MSC personnel have agreed that the following modifications are desirable, and are investigating the possibility of making them: (a) additional torsion ties, and (b) improved mating procedures, including use of strain gages on the tension ties to assure adequate hold-down forces. Neither of these modifications will require major changes or any schedule slip. Pending their completion, we are confident in the adequacy of the interface from a control point of view.

Observations of the final series of Saturn IB upper stage tests, after remating under very carefully controlled conditions, showed a much improved behaviour; the severe thumping sounds which occurred on earlier tests were absent. Strain gage readings on the interface during these tests still indicate some separation, but it is apparent that the situation has improved greatly.

2. Michoud Atmospheric Measurements: The U. S. Weather Bureau of the Environmental Science Services Administration, has requested MSFC/MTF's Atmospheric Measuring Station to support them in obtaining upper air atmospheric measurements until the USWB station at Burrwood, La. is in operational condition again. The Burrwood station was damaged during Hurricane Betsy. This request has been accepted, and assistance will be provided by the MTF Atmospheric Measuring Station. You may recall that our laboratory has technical cognizance over this operation of M. T. F.

3. Propellant Utilization - Guidance System Interaction Meeting: A meeting was held at MSFC Sept. 29, 1965, between DAC and MSFC to discuss the problems caused by the S-IVB thrust excursions recently revealed in the battleship and AS-201 acceptance firings. The thrust oscillations are caused by PU probe calibration nonlinearities. MSFC presented data showing IB performance loss, guidance inaccuracy and attitude excursions for varied assumptions of amplitude and frequency deviations caused by the PU probe. Only nominal conditions were available for analysis. Performance loss doesn't appear to be a problem since penalty will not exceed 100 pounds payload for thrust oscillations with amplitude of 10,000 pounds or less peak to peak. Insertion errors are about 1 km altitude and 10 degrees attitude for oscillations of 5,000 pounds peak to peak amplitude. These guidance scheme errors are within the IB mission requirements, however, they are undesirable, and for Saturn V applications, they are unacceptable. Since the PU probe is causing the problem, DAC was given an action item to study the problem and provide a fix.

4. High Reynolds Number Facility: At our Sept. 29, 1965 BOB Visit meeting, we gave a description of our planned High Reynolds Number Facility. We were asked about possibility of getting equivalent data from other existing facilities and test flights. We explained why present facilities cannot produce the required data, outlined why use of free test flights (e.g. Little Joe) is unattractive, and indicated why data cannot be obtained from normal fullscale flights. It appeared that BOB personnel accepted our arguments as valid ones.

Very interesting
B

9/8 10/4

B 10/3

1. S-IC-1 CHECKOUT: It presently appears that October 25, 1965 is a good estimate for beginning of S-IC-1 stage checkout. This delay is due to hardware shortages such as distributors and telemetry systems and many necessary modifications to other systems. We have established a daily meeting with ME and other labs to expeditiously resolve these problems. ✓
2. S-IC QUALIFICATION TESTING: The monthly qualification status meeting was held recently. All items necessary for the automatic firing of the S-IC have completed qualification testing satisfactorily. ✓
3. S-IVB PROGRAM: Action has been completed on establishing the documentation which will follow each S-IVB stage from build-up to launch. This documentation will be physically located in the working area of the stage at all times and will accompany the stage as it moves from site to site. The documentation will be available to NASA personnel and will serve to assist in acceptance of the stage at SACTO. It will be officially turned over to NASA fifteen days after launch. ✓
4. UNSATISFACTORY CONDITION REPORTS (UCR): The first of the ADPS punch cards in accordance with the MSFC UCR system have been received from Douglas. The first transmission began with post manufacturing checkout of S-IVB Stage SA-203. The system will begin on SA-201 with launch checkout and on SA-202 with static test. ✓
5. S-IVB ACCEPTANCE TEST OR LAUNCH LANGUAGE (ATOLL): Douglas Aircraft Company has been unable to develop ATOLL sufficiently to incorporate it as a checkout language on S-IVB-203. Personnel at MSFC felt that implementation of ATOLL on the first manned flight stage (204) would be unwise. Therefore, MSFC has directed DAC to cease attempts to implement ATOLL, and to concentrate their efforts on their operational checkout language, Saturn Test Oriented Language (STOL). ✓
6. S-IB IU CHECKOUT: On September 30, 1965 a meeting was held with IBM to discuss the turnover of responsibility for IU checkout to IBM effective with IU-202 instead of IU-205 which the contract now provides. This approach had been discussed with IO and agreement reached. IBM will submit a proposal October 6, 1965 to accomplish the early turnover, and a decision will be made based on their proposal. ✓
7. IU-201: We are in the simulated flight test for checkout at the present time. Barring further major problems checkout will be completed October 6, 1965. There are approximately 200 cable discrepancies plus other minor reworks that must still be corrected. ✓

9/3/64

B 10/4

1. MOTOR PUMP FOR ENVIRONMENTAL CONTROL SYSTEM: A backup motor pump system by IBM cannot be expected before SA-204. An intermediate solution for backup will be attempted in agreement with P&VE by using a dc/ac inverter in connection with a coolant flooded induction motor driving the present pump. ✓
2. S-IVB ENGINE THRUST FLUCTUATIONS: (Reference Item 1 Notes of 9/13, copy attached*). This problem was reviewed in a meeting with representatives of AERO, P&VE, ASTR, IO, and DAC 9/29. It was agreed that these thrust fluctuations are marginally acceptable for any flight and will have to be considered on mission-by-mission basis. Since the SA-201 mission is not critical from the standpoint of injection accuracy and payload, the presently-predicted thrust behavior appears acceptable. It was also agreed that immediate action should be taken to correct the problem as early as possible by making whatever modifications are necessary to correct the non-linear characteristics of the propellant utilization probe. ✓
3. SECURE RANGE SAFETY SYSTEM: With SA-202 and subsequent, the Secure Range Safety System will be used in place of the conventional tone-destruct unit. The Secure Range Safety system will provide a substantial improvement against man-made interference and greater reliability. Development was carried out jointly with KSC, ETR and MSFC. As a result of recent meetings of these groups KSC has requested, through MSFC to Headquarters, the security requirements be waived on SA-202 and 203. A decision on this request will be made by Headquarters following further discussions between Headquarters, MSC and MSFC scheduled for 10/7. During the development of the system, occasional contacts with the National Security Agency have been required. There have been some questions as to the secret pieces of the system being under NSA jurisdiction. NSA indicated it possibly should both generate the codes and be responsible for manufacture and distribution of the code plugs. This matter was reviewed with representatives of NSA and NASA Headquarters in meeting 9/30 and is to be resolved by NASA Headquarters. ✓
4. TM DESIGN RESPONSIBILITY: (Reference 9/30 memo James to Hoberg with info copy to you). Details on this subject will be reviewed in a meeting with James 10/7. ✓

*Copy to DIR and R-DIR only.

18/10/4

3/10/4

S-1C

Stage checkouts were begun last Saturday. Some difficulties were experienced which are being resolved. The anticipated firing date is 10-8-65. ✓

F-1 ENGINE

Test TWF-069 was conducted on F-1 Engine F-210 at the Static Test Tower West on 9-30-65, with a mainstage duration of 35 seconds. The primary purpose of this test was to determine if cutoff roughness (actuator problem) could be reduced by varying the engine valve closing times. Contrary to Rocketdyne reports our test did not indicate a significant improvement. ✓

S-11 STAGE

The All-Systems Vehicle withstood a 9 p.s.i.g. He purge pressure on the inlet to the insulation purge channels. A 1.0 p.s.i.g. pressure was noted at the purge outlet indicating severe leakage and/or delta P in the purge channels. The stage was then shipped out of the plant on 10-1-65, for a ship transport time to MTF of approximately three weeks. ✓

BATTLESHIP - Two J-2 Engines (2046 & 2020) are being installed on the S-11 Battleship with a third (2029) in checkout at the site. Other build-up operations support a 11-19-65, firing date. ✓

S-1VB-202

Manufacturing buildup and checkout are continuing on stand at SACTO with a 11-15-65, firing date scheduled. ✓

SATURN 1B - COMMAND MODULE ACCESS ARM TESTING

The KSC Environmental Chamber was received from the vendor, Hayes, on 10-1-65. The Environmental Chamber will be mated to the truss structure today with system testing to follow. The truss structure is scheduled to be on dock at KSC 10-25-65 and the Environmental Chamber 10-29-65. (Photographs attached to Dr. von Braun's and Mr. Weidner's copies only) ✓

GSE RANDOM MOTION SIMULATORS

The S-11 Aft position is scheduled to begin acceptance testing today. The S-1VB Aft and Fwd positions are in checkout. Checkout of the positions are proceeding satisfactorily. ✓

LOW GRAVITY TEST FACILITY

The first tests on our drop-tower were made on Friday, 10-1-65, from a height of 293'. Checkout tests were successful. ✓

9/28/65

B 10/9

1. SIMULATION BRANCH PRESENTATION TO AERO-ASTRO-DYNAMICS LABORATORY:

In order to familiarize more civil service personnel with Computation Laboratory capabilities, personnel of the Simulation Branch (R-COMP-RS) made a presentation to Dr. Geissler and other personnel of the Aero-Astrodynamic Laboratory on September 28, 1965, in the Saturn Evaluation Room (M-207) of Building 4663. ✓

The presentation covered areas of application in both analog and hybrid simulation, with demonstration problems. In the near future, a similar presentation will be made to the Propulsion and Vehicle Engineering and Astrionics Laboratories. ✓

2. AUTOMATIC CHECKOUT PROGRESS: ATOLL training manuals are being written and classes have been set up with the Quality Training Branch at the University Drive Center. The classes will last for two weeks. Two classes will be held at Huntsville and two at Cape Kennedy. ✓

9/31/64

B10/4

SA-201: The S-IB-1 Stage fuel tank was replaced Wednesday with no difficulties and the S-IVB 201 Stage was "stacked" Friday as scheduled. ✓

I. U. -201: Checkout is progressing on schedule and we are planning to ship the I. U. by barge working toward a shipment of October 9 which will permit a delivery consistent with the current KSC work schedule.

I am becoming increasingly concerned about the status of the follow-on I. U. We recognize that the "big push" on 201 has certainly had its effects on the subsequent I. U. 's; however, there appears to be scheduled slips and incomplete work not associated with the 201 effort. I am planning to take action with IBM management on this matter in an attempt to prevent a situation from developing which could make the I. U. the overall program "pacer." ✓

GSE (ESE): It has become abundantly clear that the magnitude of the job of supplying the Saturn I/IB ESE has been grossly underestimated by all concerned. Even with the move of 37B ESE to Daytona, GE cannot recruit sufficiently to handle the remainder of the job here in Huntsville. Because of this, GE is now proposing to subcontract with Chrysler to provide a "task force" of about 60 engineers and technicians experienced from the Saturn I ESE Program to assist in sustaining engineering and possibly other areas, such as CEI and Logistics. Chrysler has indicated interest and is to submit a proposal to GE today, following which GE will develop a proposal for MSFC. We understand GE is making a similar proposal on Saturn V involving Boeing, IBM and Sperry-Rand. ✓

STATUS MEETING WITH KSC: We had a meeting with Col. Petrone, Dr. Gruene (and staff), R&DO and the Program Office this week to review the status of SA-201 and problems of mutual concern with respect to our "new" way of doing business both between Centers and with Headquarters. We spent considerable time discussing our plans for the formal reviews and assessments which are required of us by Headquarters and, particularly, the participation in these reviews and assessments by KSC. Since KSC has their own responsibilities in this regard, it is quite important that we clearly understand our interfaces and coordinate to the maximum extent to eliminate undue duplication both in effort and responsibility. ✓

KSC also brought out current and potential problems in our configuration management procedures. It was quite clear that some revision to our current procedures is required if KSC is to perform the job for us that we require. We are reviewing these procedures now. ✓

KSC expressed some concern over the logistics spares and we are planning a meeting with KSC on this subject within the next few days. ✓

With regard to hardware and software status, the installation and updating of ESE continues to be a major problem. This problem is covered under another item in these Notes. ✓

This is the second meeting of this type that we have held with KSC. We have found both of these meetings to be very fruitful. The R&DO participation and the KSC participation has been excellent. We will continue these meetings as required until the launch of 201. ✓

9/28/10/19

1. Common Bulkhead Development: The common bulkhead development and test program, initiated as a back-up and thorough testing program with DAC, has reached a significant milestone. An 18' diameter test bulkhead has been built with DAC tooling using the strip seal design. Major manufacturing steps in this concept are: (1) build a complete lower face sheet dome (all welded); (2) bond honeycomb core to this lower face sheet; (3) fit and bond upper face sheet not in one piece but in single gore segments, collar piece and ring sections; and (4) bond strip seals for splicing of sections. This bulkhead has been completed and is being assembled into the test fixture for shipment to Sacramento for cryogenic testing. It is of interest to note that DAC Quality Control considered the observed absence of bond defects as indicative of one of the best common bulkheads built to date. ✓✓

2. Automation of Tube Flaring Machine: For achievement of optimum results with respect to meeting MSFC design specifications consistently it is important to eliminate the human element as much as possible in the forming process of tube flares. This has now been accomplished in our manufacturing process development shop by the design and fabrication of a fully automated tube flaring machine. First try-out of this machine produced real precision flares. ✓

3. Engineering Change Order Status for S-IC: The following is a listing showing totals of Engineering Change Orders by categories as released by September 17, 1965:

<u>Change Category</u>	<u>Total Number Released</u>
5001 (Paper Changes)	13437
5002 (Hardware Changes)	33043
5003 (Instrumentation)	4
5004 (GSE)	20107
5005 (MSFC Issued)	242
Other (CAM Generated)	26983
TOTAL	93816

This certainly high number of changes indicates:

- a. A rigid documentation system requiring a great number of documents and paper, which is not very flexible for R&D work.
- b. Design engineering teamwork not yet being optimum causing changes which might have been avoided by better coordination in basic design.
- c. The loving care and eagerness of design engineering at Boeing and MSFC to perfect components and functional systems.

Agree!
B

|| We should evaluate the present system in order to determine the documentation requirements for AAP.

9/8/10/4

BUREAU OF THE BUDGET FIELD TRIP - The Bureau of the Budget review team, headed by Mr. Don Crabill, BOB, has completed its review of MSFC activities and requirements. During the past week the review team visited or had discussions with practically every office and laboratory within the MSFC organization. Compared with the reviews of the past two years, this was the most complete coverage of the MSFC organization by the BOB review team.

One of the most significant areas of interest which Mr. Crabill seemed to pursue during his visit here was how the Center correlates its various resources requirements. He was especially interested in how well we tie together our manpower capabilities requirements to our facilities and equipment capabilities requirements. Mr. Crabill displayed a good understanding for the problems involved in fully coordinating such requirements for our activities, but he emphasized on several occasions the importance of completely coordinated long range center planning for all resources requirements.

At MTF the BOB team was given a presentation by the Corps of Engineers outlining the work in progress and status. It was pointed out that the greatest pressure was to get the S-II Stand ready for a January firing. It was stated that there was a possible increase due to pending claims of about \$5.7 Million. After a tour of the area, Mr. Balch held a very good exit discussion in which the BOB team was given good first-hand knowledge of the delicate problem of managing resources at MTF where NASA, NASA primes, Corps of Engineers, and Corps of Engineer primes are involved.

The Michoud briefing and tour was conducted by Mr. Constan. The need for a clarification of a follow-on program in the Saturn IB project was emphasized, to avoid a phase down of manpower.

Both Mr. Crabill and Mr. Johnson, MSF, and the other members of the review team expressed satisfaction with the accomplishment of the MSFC visit. They seemed to be favorably impressed with all elements of MSFC and appreciated the cooperation which was displayed by all MSFC personnel contacted. ✓

NOTES 10/4/65 REINARTZ

B 10/4

No submission this week.

9/8/10/4

NOTES 10/4/65 RUDOLPH

B 10/4

9/8/10/4

1. Saturn V Monthly Program Review is scheduled for Tuesday and Thursday, October 5 and 7, 1965, in the Saturn V Control Center. General Phillips and Colonel Seccomb will attend the Tuesday session. Discussion on this day will be restricted to - (1) Resources, (2) S-II Stage and (3) Vehicle GSE. ✓
2. Mr. Webb/Mr. Schultze visit - Mr. J. Webb, NASA Administrator and Mr. Schultze, Director, BOB, will visit the Saturn V Program Control Center on Saturday, October 9, 1965. ✓
3. Presentation to Presidential Scientific Advisory Committee (PSAC), on October 14, 15, and 16, 1965, at Manned Spacecraft Center, Houston, Texas - Marshall answers to PSAC questions have been completed and distributed for review and comments. Official transmittal to General Phillips is scheduled for Tuesday, October 5, 1965. Advance copies of answers marked "Preliminary" have been transmitted to Mr. Lemke, MSF, Reliability and Quality Office. ✓
4. S-IC-T Stage - First automatic firing scheduled for Tomorrow, Tuesday, October 5, 1965, has been postponed to Thursday, October 7, 1965, because of parts shortages (electrical power distributors). ✓
5. Strike at Boeing - The Boeing Company has made an offer to the union which is being voted on by the union today, Monday, October 4, 1965. The Boeing Company is very optimistic that the strike will be settled today. ✓
6. S-II-S/D Stage Structural Test Failure - At approximately 7:30 pm, PDT, on Wednesday, September 29, 1965, the structural stage experienced a complete failure, at approximately 138% of limit load. Efforts are currently underway to - (1) assess the damage to determine cause and impact and (2) develop a workaround approach with minimum program impact that will provide a dynamic test stage. ✓
7. Shipment of S-II-T Stage to MTF - The S-II-T Stage was shipped on Friday, October 1, 1965, and is scheduled to arrive at MTF on Monday, October 18, 1965. ✓
8. S-IVB Dynamic Stage (S-IVB-500D) - Saturn V configuration aft skirt for Dynamic stage conversion was shipped to MSFC on the Paint Barron on Friday, September 24, 1965, as scheduled and is scheduled for arrival at MSFC on Sunday, October 24, 1965. ✓
9. S-IVB 1st Flight Stage (S-IVB-501) - The stage is in a horizontal position in tooling tower complex for jamb weld doubler installation. The stage is approximately four (4) weeks behind schedule because of parts shortages and current emphasis on Saturn IB effort to meet earlier schedule commitments. DAC continues to predict on schedule delivery for Stage 501. ✓

NOTES 10/4/65 SPEER

B 10/4

KSC 10/4

1. OPERATIONS MANAGEMENT GROUP: Mr. Christensen has invited me to participate in the next meeting of this group to be held on 10/6 at KSC. The agenda concerns primarily Gemini operations. Our participation will become important in the long run as the Joint Operations Group is being abolished. ✓

2. AZUSA/GLOTRAC REQUIREMENTS: An MSFC meeting on the Azusa/GLOTRAC problem was held on 9/28 to establish the validity of our requirement for continued use of high precision tracking. The situation has become rather complex due to factors such as limited availability of AF transponders, requirement for frequency change, uncertainty about future ETR plans and the fact that none of the available Azusa transponders meet Saturn specifications. Additional meetings with MSF and ETR are being prepared by the Instrumentation and Communications Panel to establish a final MSFC position on this subject. We are planning to have such position on or about 11/1. Azusa is considered an MSFC requirement throughout both the Saturn IB and Saturn V programs due to: (1) Range Safety; (2) flight control in connection with guidance switch-over; and (3) post flight evaluation of the guidance system. ✓

3. AS-201 MISSION RULES: The number of MSFC mandatory measurements has been reduced from the initial 85 to 20. However, there are an additional 17 functions where at least one out of two measurements is considered mandatory for launch. This reduction is a consequence of the very rigid criteria for the "mandatory" class and our own attempt to increase the probability of launch. The final MSFC input to the KSC Launch Mission Rules (containing both MSC and MSFC inputs) is due on 10/11. ✓

4. DAC SUPPORT FOR AS-203 OPERATIONS: Ted Gordon has submitted a proposal to make available approximately 5 qualified DAC personnel for a period of 4 months to aid in preparation and conduct of LH₂ experiment related flight operations. We are coordinating MSFC position. It appears that we should accept at least some of this support. ✓

B 10/4

9/28 10/4

1. PEGASUS: All three satellites continue to work as previously reported. Flux rates on Pegasus II and III are remarkably similar for the 0.4 mm and 0.4 mm panels; the difference for the 0.2 mm panels is a little larger, but still within possible statistical fluctuations. ✓

E.S.
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That portion of the FHC contract dealing with the operation of SATCON was terminated on September 30th. A new contract for this operation has been in force since October 1st. (15 FHC employees) It is technically supervised by RPL. ✓

2. AAP - LUNAR SURFACE: The AAP Optical Astronomy study with Kollsman proceeds satisfactorily. The mounting configurations selected for further design effort involve (1) mounting the telescope rigidly to the side of the LEM/Shelter in a permanently fixed position (aiming would be accomplished with the use of a moveable plane mirror above the telescope) and (2) mounting the telescope on the top of the shelter on an azimuth mounting ring. The later approach provides the greatest viewing flexibility but will involve operational problems of mounting on the lunar surface. ✓

Very interestingly, Dr. Nancy Roman's Astronomy Subcommittee provided the following recommendation: "The subcommittee considers that the moon may well offer an attractive base (possibly unique) for astronomical observations. The subcommittee recommends that studies begin as soon as possible to explore the lunar capabilities for astronomy. This will involve evaluating engineering studies on earth, environmental studies on the moon and testing with small telescopes on the moon." ✓

3. DEGRADATION OF SIV PAINT: The temperature-controlling S-13 paint on the SIV stage of Pegasus-carrying boosters showed an unexpectedly large amount of degradation at the beginning of the flight, besides the much slower, continuous degradation later on. In an attempt to identify the reason for this early degradation, S-13 samples will be exposed to rocket exhaust plumes in ground tests at Thiokol. In a parallel effort by P&VE, samples will be exposed in tests at AEDC; RPL will participate by on-the-spot radiometric measurements. ✓

4. MSFC RESEARCH ACHIEVEMENTS REVIEW: The seventh Research Achievements Review was held on September 30th, in the Morris Auditorium. Personnel of the Astrionics Laboratory spoke on Marshall's Instrumentation Research and Power Systems Research. Total attendance was 89; outside organizations sent 22 representatives. ✓

B 10/4

9/3 10/4

1. Saturn IB Zero Stage Performance. The Saturn IB Zero Stage has come into considerable discussion recently and has been compared with the Saturn IB/Centaur for the Voyager mission. Saturn IB Zero Stage performance has been quoted from different sources, and for different mission conditions, and has resulted in some confusion. The figures quoted differ for two main reasons: (1) Different energy levels, and (2) different mission mode (e.g., direct injection vs. parking orbit mode). Our present studies with AERO and P&VE give results as follows:

	<u>C₃ (KM²/SEC²)</u>		
	<u>0</u>	<u>10</u>	<u>25</u>
<u>Saturn IB/Centaur</u>			
(1) Direct injection	16K	14K	10.8K
(2) Parking orbit	14K	11.7K	9K
<u>Saturn IB/Zero Stage</u>			
(1) Direct injection	20K	14.9K	8.6K
(2) Parking orbit	12.7K	7.8K	1.7K

Handwritten notes: A double-headed arrow between 14K and 11.7K with '!!' next to it. A curved arrow points from 10.8K down to 8.6K. Another curved arrow points from 9K down to 1.7K. There are three vertical lines '|||' on the right side of the table.

The Zero Stage "parking orbit" case can probably be increased a little bit by (1) closer examination of weight items for re-pressurization/re-start, and (2) refinement of flight profile. ✓

At this point, the Zero Stage does not look promising for the Voyager mission (based on payload mass ~9000lbs. and energy level 15 - 25 KM²/SEC²). We are looking further, however, including a look at 7-segment solid motors, in lieu of the presently standard 5-segment motors. We will have a report for you later this month. ✓

2. Planned FY-66 MSF Study Program. Bird's eye view of the planned FY-66 MSF Study Program is as follows:

<u>Area</u>	<u>MSFC</u>		<u>MSF</u>	
	\$	# studies	\$	#studies
Orbital	1400	2	4000	6
Lunar	1200	3	1850	5
Planetary	11000	3	1650	5
Vehicles	1700	3	2200	5
Other		0	300	1
Total	5300	11	10,000	22
MSFC % of total	53%	~ 50%		

Handwritten checkmark ✓ at the bottom right of the table.

This data has not been signed off by Dr. Seamans and may change in the future.



OCTOBER 11, 1965

NOTES 10/11/65 BALCH

1. Beneficial Occupancy of S-II Test Stand A2, LH₂ Transfer Dock and Shelter Area, and Saturn V Heating Plant and six high pressure water pumps was obtained last week. Working off "punch-list" items now. ✓
2. Off-site Telephone Trunks were increased from 78 to 174 this week by the cutover of Southern Bell microwave facility just south of the Fee Area. Clarence Lott and John Mobley, Southern Bell Tel. & Tel. Co., were here Wednesday to officially open the MTF telephone exchange. ✓
3. General Electric/MTSO negotiations for FY 66 Plant and Test Support have been concluded except for fee. Total cost, including fee, will approximate \$43 million. Reporting requirements are being revised to insure maximum ability to stay within the budget supporting this contract. ✓
4. GE/MTSO Proposed Revision for direct management of Phase II Technical Systems installation, checkout and training rather than by subcontract to Lear Siegler and Aetron was concurred in by MTF. Advantages to the Government are potential C of F cost savings, less contractor interfaces on site, and more integrated responsibility to GE. ✓
5. Weekly Review Meetings with Aetron on status of Phase I Technical Systems will continue until job is completed. Bob Balch has moved on-site as overall project manager and will stay until completion. Productivity of electrical installers has improved in the past week and must continue to improve to prevent further overruns in this contract. ✓
6. Community participation during the week included talk to Mississippi Board of Realtors, talk to Harrison County United Givers Fund Kickoff, participation in Bay St. Louis Hospital expansion (24 bed wing) ceremonies, and visit by Major General Puryear, CG, Keesler Air Force Base. ✓
7. Recent Review of S-II Program by MSFC and project reduction emanating from this will have significant direct impact on MTF in the areas of MTF utilization of S-II-T, S&ID manpower, Corps construction activity in the A-1 test stand and S-II checkout building, S-II GSE requirement, and GE/MTSO support. ✓

NB 10/11

H-1 ENGINE

The H-1 Engine Program Review will be held October 12 and 13, 1965 in Canoga Park, California with Rocketdyne. ✓

J-2 ENGINE

In answer to your comment on Dr. Haeussermann's notes 9/13/65 (copy attached) the following is submitted:

A meeting was held at the Astrionics Laboratory 9/29/65 to discuss the problem and potential fixes. The conclusion reached as to the source of the problem was that the thrust variations were due to PU excursions resulting from non-linearities in the propellant utilization system mass probes in the propellant tanks. These non-linearities are traceable to the supports for the inner probe. The fixes proposed in the meeting involved changing of the probe supports and nothing was proposed regarding changes to the engine system. ✓ The problem could be eliminated by adding a thrust controller to the engine which is highly undesirable from a complexity schedule standpoint. ✓

A procurement plan for combining the J-2 engine contracts plus the addition of sustaining engineering through April 1970, was forwarded to NASA Headquarters for approval. ✓

The J-2 production contract incentive conversion package has been at NASA Headquarters since September 16, awaiting final approval. ✓

Engine J-2027 was received at MSFC on October 5 and is at the Test Laboratory. ✓

The last engine required for delivery in October, J-2038, and the first engine required in November, J-2010, are expected to be delivered during this period. Rocketdyne is expected to remain approximately two weeks ahead of schedule. ✓

C-1 ENGINE

The C-1 Engine Special Board findings are scheduled for October 11, 1965 to General Bogart and October 12, 1965 to Mr. Webb. ✓

F-1 ENGINE

Reference remarks on the 9/20/65 notes concerning records and replacement of LOX pump impellers (copy attached). A record is kept on impeller service time. In the past impeller life has been limited to one engine build, or one engine life. This limit was established when engine life was about 2,500 seconds. Now that engine life is running over 4,000 seconds Rocketdyne is studying impeller data in order to establish a new impeller life limit for R&D engines only. ✓

Engine F-4020 (fifth flight engine for S-IC-2) which left Rocketdyne/Canoga Park, California, by truck to MSFC on September 29 has been delayed by sand storms and instrumentation failure. Arrival at MSFC is now estimated for October 13, 1965. ✓

The deliverable hardware incentive conversion position was reviewed with the NASA Headquarters review team at MSFC on October 8. While general agreement was reached, a final go-ahead is contingent upon Dr. Mueller's approval. ✓

Attachments - Dr. von Braun's copy only

NOTES 10-11-65 CLINE

JTS 10/11

B 10/11

NEGATIVE REPORT

9/10/11

I. S-IC Program

S-IC-D Vehicle - The S-IC-D vehicle left the Michoud dock at 2:15 p. m. , October 6, 1965. The vehicle was complete with the following exceptions: Government Furnished Property which will be installed at the Manufacturing Engineering Laboratory and CAMs 274, 289, and 321 which will be installed in the Dynamic Test Tower. The vehicle is expected to arrive in Huntsville on Wednesday, October 13. ✓

S-IC-F Vehicle - The Boeing Company is confident that the "F" vehicle delivery schedule can be met in spite of the lost time due to the hurricane and the strike. ✓ However, such effort will require the expenditure of overtime at a greater rate than anticipated before the above mentioned disturbances. ✓

Boeing Strike - The strike of the Boeing hourly employees ended Monday, October 4, 1965. A detailed presentation of the effects of this strike was made to MSFC management on Wednesday, October 6. ✓

II. S-IB Program

S-IB-1 - Fuel tank # 3 on the S-IB-1 stage was successfully replaced at KSC. The damaged fuel tank is at Ling-Temco-Vought for repairs. CCSD has presented an Engineering Change Proposal describing the planned repairs and a letter describing the repair and usage of the damaged tank on the S-IB-6 stage. ✓

S-IB-3 - LOX tank # 2 on the S-IB-3 stage was damaged during LOX loading at MSFC static test stand. The LOX sump and the fill and drain line were deformed. These components have had x-ray tests, dye penetrant tests, and pressure tests to operating pressure. The results of these tests indicate that there are no cracks or leaks. It is anticipated that CCSD will recommend using LOX tank # 2 as it is. ✓

NOTES 10-11-65 DANNENBERG

B 10/11

NO NOTES.

9/11 10/11

NOTES 10/11/65 FELLOWS

B 10/11

R&D 10/11

1. Reduction in AO Funding: R&DO will be required to absorb a considerable amount of a recent Headquarters-directed \$5.337M cut in AO FY 66 funding for MSFC. A drastic reduction in laboratory overtime and single support contractor work may be required. Some relief will be obtained by transferring certain types of costs from AO to R&D funds. A transfer will, of course, require Headquarters approval. An assessment of the impact is underway. ✓

2. R&D Operations Support to IO: R&D Operations management documents regarding support to IO have been revised to reflect the recent R&D Operations staff reorganization and to clarify responsibility reassignments. The revision updates the matrix of R&DO personnel who are designated to provide technical support to IO at vehicle, stage, and systems level. The revision also clarifies the organization R&DO will use in supporting IO through Project Support Agreements. The revised documents have been sent to the Laboratory Directors and IO for comment prior to formal implementation. ✓

9/5/10/11

B10/11

1. S-IC-1 CHECKOUT: Vehicle status determination (outstanding E.O.'s, missing components, and outstanding defects) has been completed and some systems testing is underway. Engine Number 1 has been modified and reinstalled and Engine Number 2 removed for modification. Present estimate for connecting GSE to stage is October 13, 1965. A very concentrated effort is being made collectively by this Laboratory, the ME Laboratory, and the Boeing Company to get all stage hardware delivered and installed on a schedule to support the checkout activities. It appears that progress is being made. ✓

2. SPACECRAFT RELIABILITY ANALYSIS MANAGEMENT PANEL MEETING: A representative of this Laboratory attended the third Spacecraft Reliability Analysis Management Panel Meeting at MSC recently. MSC had requested MSFC attendance and participation in the session devoted to the Emergency Detection System. A presentation was given by ARINC on the reliability work of this system. The meeting was essentially a review of the reliability analysis status of each contractor's efforts, exchange of information and direction from MSC to make the outputs of each contractor more compatible. MSC is using teams to review and verify the contractor's models, and it was interesting to note that these teams consist mostly of MSC reliability support contractors (G.E.) and Headquarters support contractors (G.E.). Also, MSC used their support contractor to conduct the meeting and assign action to hardware contractors. MSC civil service personnel were present very little during the meeting. ✓

3. NASA/DOD QUALITY AND RELIABILITY COMMITTEE MEETING: The NASA/DOD Quality and Reliability Committee met in the Pentagon, Washington, D.C., on September 30, 1965. Discussion centered around research needs in the quality area with the primary purpose of determining subjects for developmental effort by government, industry and/or educational institution personnel. It was decided that the first priority item is the requirement for developing methods of determining true and proper costs of quality and reliability, coupled with the cost of defectiveness. This and other priority items will be further detailed by an ad hoc group prior to the next meeting to be held in the latter part of November 1965. Final course of action will be decided and initiated at that time. ✓

NOTES 10/11/65 GEISSLER

B 10/11

1. Incentive Contracts: Considerable effort has been expended in developing the flight performance criteria for use in incentive contracts, and as a result, several meetings have been held with R&DO and IO management. During two recent meetings (one for General O'Connor and one for the stage and program offices), an approach was discussed which would include performance of the stages during quality and reliability assurance testing, subsystem performance during flight, and overall performance. This approach would provide an incremental incentive which would begin during vehicle manufacture and continue through vehicle flight. A plan to include subsystem performance during flight is currently being prepared by AERO, ASTR and P&VE. Compatibility between the stages will be stressed to assure overall vehicle flight performance and to provide an effective monitoring system. This system for measuring contractor stage performance should not be complicated to the extent that performance monitoring efforts overburden our present manpower, however, it should be detailed enough to effectively determine each stage's flight performance. ✓
2. Azusa Tracking on IB&V: Aero-Astroynamics Lab. representatives attended a meeting with Astrionics, IO, NASA Headquarters (McClanahan), KSC and ETR on 10/7/65 to discuss problems of Azusa tracking on Saturn IB and V vehicles. The agreements reached at this meeting were that Azusa would be carried on IB and V vehicles for sometime down the programs (to be defined later). After this time we would consider using Mistram B transponders or possibly adapt the unified S-Band system to meet MSFC requirements for precision tracking. As a consequence of this meeting and in anticipation of future questions about our tracking requirements, we are initiating some new studies in this area. Capabilities of C-band radar, Azusa-Glotrac and a modified ground network utilizing the unified S-band will be investigated. ✓
3. Flight Evaluation Working Group: On 10/6/65 we had a FEWG meeting with DAC concerning the support they will provide for S-IVB evaluation on IB and V. We have reached essential agreement on what this support will be. One problem still remains in contractually covering the local DAC liaison group for flight evaluation. IO has already taken action to get us the required coverage. The plan for local support, which is modified from the S-IV program, is considered to be completely acceptable by us. ✓
4. Saturn IB and V Panel Flutter: A letter has been received from the Director of Langley Research Center, which confirms previous verbal information by Mr. A. G. Rainey that the S-IVB forward skirt panels are expected to exhibit flutter at dynamic pressures between 75 psf and 400 psf. (q max of Saturn trajectory is 640 psf.) Currently, static tests of these panels are underway by R-P&VE-S to determine the elastic characteristics of the interstage skin. Contingent upon analysis of the test results, a panel flutter wind tunnel program will be conducted. P&VE in the meantime is surveying the possibility of fixes (if the test program should indicate a need), including emergency solutions for
201.

NOTES 10/11/65 HAEUSSERMANN

B 10/11

No submission this week.

JB 10/11

NOTES 10/11/65 HEIMBURG

B_{10/11}

9/10/11

1. CRANE FAILURE: After two crane failures at Huntsville and one at MTF, the Corps of Engineers and Test Laboratory decided to repeat load testing on all of our MSFC cranes installed in the last year. On 10/6, the 50-ton crane at the S-IVB Test Stand failed causing serious injury to one man. The Corps of Engineers is investigating cause of failure. Also, on 10/8, one of our welders (Civil Service) slipped and fell while coming down the ladder in the crane house, and suffered a broken leg. ✓
2. S-IVB-202 (SACTO): Modifications to the stage are approximately 75% complete. Checkout is progressing on schedule for 11/3, firing on test stand Beta III. ✓
3. S-II BATTLESHIP (SANTA SUSANA): All J-2 engines are on site, and two of the five are being installed on stand. The P.U. computer delivery from DAC has slipped until 11/1. Plans remain for a 11/19 firing. ✓
4. S-IC: The first S-IC-T test, test S-IC-11, using the automatic ground support checkout equipment was successfully conducted on 10/8 at 4:41 p.m. ✓✓
Test was terminated as planned with lox depletion using lox pump inlet temperature redlines for cutoff of both inboard and outboard engines. The main-stage duration was approximately 42.4 seconds center engine, and approximately 46.4 for the outboard engines. ✓
5. GSE RANDOM MOTION SIMULATORS: Three out of eight test positions have passed the acceptance test. ✓
6. APOLLO BARGE POSEIDON: Even though the barge is not 100% complete, it was towed to Michoud and the S-I-D stage was loaded aboard for shipment to MSFC on 10/6, for dynamic testing. The barge is scheduled to arrive on 10/12. The vessel will be returned to the contractor for completion on 10/18. ✓

Write-up & photos on crane failure attached to DIR and R-DIR copies only.

NOTES 10-11-65 HOELZER

B 10/11

9/18 10/11

1. 7094 COMPUTER UTILIZATION AND PROGRAM ABSTRACTING:

A significant amount of computer time has been lost during the normal work week for the past few months due to power and air conditioning failures. Much of this lost time might have been prevented with better facilities, engineering, and planning. The capability of the portable air-conditioner system has yet to be proven. The response of maintenance personnel to such failures has been slow, probably due to lack of personnel resources.

Version 13 of the IBM 7094 operating system (IBSYS) has been installed successfully. A significant reduction (3 to 1) in the time to compile FORTRAN IV programs has been noted.

A concentrated effort to abstract all computer programs is being made. Abstracts will be made on the abstract form recommended by the Resources Sharing Committee. ✓

2. ACCEPTANCE OF THE CONTROL DATA CORPORATION (CDC) 3200 EQUIPMENT:

Acceptance test has passed for the CDC 3200 computer, recently installed in Building 4200. One person confers with the manufacturer in order to improve the software of this system and to make it FORTRAN programs fully compatible with the IBM 7094 machines in Building 4663.

In order to prepare our Laboratory for the new centralized facilities, all smaller computers which cannot be programmed in FORTRAN are being replaced by newer machines with FORTRAN capability. Also out-dated small machines are being replaced by newer, less expensive ones. ✓

3. FORTRAN IV IMPLEMENTATION ON GE-235: A third version of FORTRAN IV for GE-235 computers was received from General Electric, Phoenix, and another attempt was made to get a system tape written. ✓

9/18/10/11
 S-IB-3: The stage is on the static test stand and is due for short duration firing tomorrow. ✓

Lee ✓
 IU-201: The system test of IU-201 was successfully concluded with one exception. The water-methanol system test was not completed with the pump in the system because of a pump failure. The problem has not been completely identified although analysis indicates the electronics are working satisfactorily and there is a possibility that the impeller is stuck. The pump was removed and the test was completed without it.

Is that the new coolant pump?
 B
 A system to bypass the pump for flight, if required, has already been configured and the hardware is in a kit form accompanying the IU on the barge. If we have to fly in this configuration, we do not anticipate that it would result in any significant pre-launch delays. ✓

Testing of the ST-124-M platform mounting frame indicates a potential vibration problem. Tests are continuing at Wyle Labs to determine the criticality of this problem. Vibration levels may be acceptable for AS-201 flight. If changes to the mounting frame are required, this work would be accomplished at KSC. We are currently investigating this with the labs and with KSC. ✓

GSE: Late delivery of E. O. 's to update the breadboard has delayed delivery of the operations program to KSC for AS-201. The VLF-34 ESE has been updated ahead of the breadboard which must now be brought up to an equivalent status before a verification program can be furnished. Without the program, KSC cannot apply power automatically to the stages. Applying power manually is a tedious operation and must be performed with extreme care. How far beyond power application KSC can go into the checkout is not yet known. KSC and MSFC are currently studying this problem. The delay may have a KSC impact. Most of the necessary E. O. 's have been furnished the breadboard and are being installed on a 24 hour basis. ✓

MOD II SWITCH SELECTOR: We have been advised by R-ASTR that the Mod II switch selectors will not be available for AS-201. Problems with cracked resistors have persisted and the most recent predicted delivery slip (8 weeks) makes it impossible to get them on AS-201. Our stage managers have been working on the assumption that the Mod I and Mod II switch selectors are directly interchangeable. We are re-verifying this with our primes. This being the case, there will be no impact except, of course, we will lose the predicted reliability increase of the Mod II switch. ✓

9/11/11

Bo/11

1. Aeronautic and Space Engineering and Manufacturing Meeting:

I attended the above meeting of the Society of Automotive Engineers (SAE) in Los Angeles last week. A whole day session was devoted to presentations and discussions on "Fabrication and Assembly of Large Space Vehicles". The manufacturing plans for the Modules of the Apollo Spacecraft and of the stages of the Saturn V Launch Vehicle were shown with discussions on welding, forming, bonding, testing, inspection and shipping problems associated with the Saturn program. Attendance at the meeting was good. I have obtained several sets of the papers presented for anybody who might be interested in the manufacture of hardware of our program. ✓

Indeed!
B

2. S-II-501 Manufacturing Completion Forecast: A short review of S-II-501 schedules and actual status of problems and status of manufacture indicated a need for better visibility of progress and/or delay. We will immediately try to apply our method of control, developed and used for the S-IC-501, to the S-II stage. ✓ This method provides for the planning of work and workloads in very small increments, the status of which can be assessed currently. The summarization of these increments provides then a meaningful total picture. ✓

NOTES/10/11/65/MAUS

B 10/11

NS 10/11

Negative Report.

NOTES 10/11/65 REINARTZ

B 10/11

No submission this week.

9/10/11

NOTES 10/11/65 RUDOLPH

B 10/11

1. Visit of JPL Voyager Project Office Personnel - Messrs. Blomeyer, Williams, Schmuecter and Goodwin from JPL - Voyager Project Office visited the Saturn V Program Office, Saturday, Oct. 9, 1965, to discuss Saturn V launch vehicle in its Apollo application. The purpose of the meeting was to provide an informational exchange as to the design characteristics of the Saturn V vehicle. ✓

2. Boeing Strike - Strike has been settled. In summary, there is no anticipated schedule impact on end item deliveries. Total cost impact, is approximately \$400,000. ✓

3. Potential S&ID/NAA Strike - No strike is expected. Negotiations are still underway and indications are that the union and the company are not too far apart. ✓

4. Incentive Contract Conversion:

S-IC Stage - Pre-negotiation position for conversion presented to Gen O'Connor on Wednesday, Oct. 6, 1965, and to representatives of NASA Hdqtrs at MSFC on Thursday, Oct. 7, 1965. Minimum re-adjustment will be required. Plans are to present to Dr. Mueller, on Saturday, Oct. 16, 1965, for go-ahead approval. ✓

Really? B | S-II Stage - Complete proposal expected to arrive this week (Oct. 11, 1965) and plans are to complete MSFC review by Wednesday, Oct. 20, 1965. ✓

S-IVB Stage - Target cost negotiations are scheduled to resume today, Monday, Oct. 11, 1965, here at MSFC. ✓

5. S-IC Stage:

S-IC-T Firing - First firing (40 seconds) utilizing new automatic checkout equipment accomplished at approximately 4:45 pm, on Friday, Oct. 8, 1965. All elements apparently functioned as programmed. ✓

S-IC Dynamics Stage - Departed Michoud by Barge on Wednesday, Oct. 6, 1965, enroute to MSFC and is expected to arrive on Wednesday, (Oct. 13, 1965) of this week, two days ahead of schedule. ✓

6. S-II Stage:

Funding Problem - On Monday, Oct. 4, 1964, NAA presented new funding requirements. Efforts currently underway to review newly stated requirements to:

- (1) Assess validity, (2) determine possible sources of additional funds,
- (3) investigate possible program adjustments, (4) determine impact on schedule of limited funds availability. ✓

7. S-IVB Stage:

S-IVB - 501 Stage - DAC has developed a work around plan to recover schedule slippage. Out of position work will be used to protect the time schedule for factory checkout. Schedule resulting from this work plan is realistic and allows sufficient time for all essential operations to support on schedule delivery for S-IVB-501. ✓

NOTES 10/11/65 SPEER

9/8/10/11

B 10/11

1. OPERATIONS MANAGEMENT GROUP: I attended the meeting on 10/6 at KSC. Christensen was chairman; others attending: Gen. Davis, Kraft, Preston, Holcomb. Most agenda items referred to Gemini Operations. A planned presentation on MOL plans and schedules was cancelled by the AF. Of special interest to MSFC was a presentation on the ETR single point of failure study. Out of 45 significant holds for NASA programs, 7 were caused by the range. 150 potential single failure points have been identified. Corrective actions have started. Some major items are not yet funded for. Total cost: 6.6 M. Christensen invited same presentation to Dr. Mueller during Management Council Meeting. ETR requested and obtained NASA approval for the use of the Mission Control Center - Cape for control of Apollo and Gemini recovery operations.
2. KSC APOLLO/SATURN OPERATIONS PLAN: Comments to subject plan have been received from various Center elements. One important general observation is the inadequate coverage of inter-Center interfaces during the various phases of planning, preparation, checkout, and operation. A letter to Dr. Debus, including this comment, is being prepared for your signature. ✓
3. GT-6 KEY OPERATIONS PERSONNEL: Mission Director, Christensen; Launch Mission Director, Preston; Launch Director (Atlas-Agena), Maj. Allen; Launch Director (Titan-Gemini), Col. Albert; Flight Director, Kraft. ✓

NOTES 10-11-65 Stuhlinger

1. PEGASUS: No essential changes.

2. AAP-LUNAR SURFACE SCIENTIFIC INSTRUMENTATION: In connection with the AAP Lunar Surveying Staff development (the Jacob's staff), a decision has been made by OSSA that the Apollo field camera will be used on the Jacob's staff. The design of the camera will be GFE to our contractor responsible for the overall Jacob's staff development. The Apollo field camera design is being modified somewhat based on recommendations from the USGS (Dr. Shoemaker). ✓

3. OPTICAL TECHNOLOGY SYSTEM: Contract negotiations with Perkin-Elmer for the Optical Technology AAP Phase A feasibility study began Thursday. (Chrysler, whose bid was selected for a parallel Phase A study, will enter contract negotiations soon.) The scope-of-work was agreed upon by all participants. Perkin-Elmer's calculated cost is 380K. There are 350K programmed. Perkin-Elmer representatives agreed to cut costs and/or hours allocated to various tasks in an attempt to remove the 30K difference. They are expected to submit their new cost calculations within several days. ✓

4. CORRECTION: Our last weeks NOTES contained a regrettable typographical error in connection with the hit data information on Project Pegasus. The number should have read 0.04 mm. ✓

NOTES 10/11/65 WILLIAMS

B 10/11

JS 10/11

Negative report.

October 18, 1965

MSFC ROUTING SLIP					
	CODE	NAME	INIT.	<input type="checkbox"/>	<input type="checkbox"/>
1	DIR	Mr. Shepherd		A C T I O N	I N F O R M A T I O N
2	DIR	Dr. von Braun			
3					
4					

REMARKS

The attached letter is in reply to your query on my October 18 NOTES, copy attached.

In discussions with Geo. Hardy he thinks a larger problem is involved and would like to brief Dr. von Braun on the overall procedure involved, not just the Catalog portion to which this memo addresses itself.

✓ B 11/7 Sheep
Please arrange

CODE	NAME	DATE
R-OM-DIR	W. S. Fellows	11/4/65



Memorandum

TO Dr. von Braun, DIR

DATE NOV 3 1965

FROM Director, Operations Management Office, R-OM-DIR

SUBJECT Approval of KSC Test Catalog and Test Procedures Catalog

In my October 18, 1965, NOTES to you, I pointed out that R&DO was reviewing the KSC Test Catalog and Test Procedures. The review, now completed, was performed to determine if these test documents satisfied the MSFC test requirement responsibility, which was tentatively agreed upon in the "Prelaunch Checkout and Launch Operations Subagreement." This review is a normal instance of technical information coordination and interchange between MSFC and KSC. Our comments were directed toward technical content and do not impact the overall test schedule or the MSFC/KSC Subagreement.

The Test Catalog lists the tests of the launch vehicle or its components and Systems for Launch Complex-34, Facilities Checkout, and AS-201. The Operational Procedures Catalog is a catalog of the operations required to prepare the Saturn IB and the GSE for launch. These catalogs will be prepared for each vehicle in accordance with the test requirements submitted to KSC by MSFC.

As a result of our laboratory review, R&DO is requesting a number of additional tests not included in the documents and adding certain test description details. Such changes are to be expected, since this was the first iteration of these test documents for the Saturn IB vehicle.

We are now forwarding our comments to IO for transmittal to KSC. It is possible that a joint MSFC/KSC working meeting may be held later to finalize technical details of the documents. ✓

These comments have been prepared in coordination with Mr. Hardy, IO. ✓

876-3277

IO will arrange a briefing on this subject - 9/11/65

W

✓ Bill

W. S. Fellows

W. S. Fellows

cc:

I-I/IB-MGR, Mr. Hardy

NOTES 10/18/65 FELLOWS

B 10/19

9/18 10/18

1. Mission Support Contractor Evaluation: The Single Support Contractors for the MSFC laboratories and staff offices are completing their first six months of mission support work under CPAF controls. I am the Chairman of each Performance Evaluation Board and have scheduled technical and business performance evaluation reviews during the next two months' period. ✓

2. SATCON Operation: IO and R&D Operations agreed to transfer of responsibility for the administration of SATCON to R&DO effective October 1. A contract for the continued support of the SATCON operation through December 31 has been negotiated with Fairchild-Hiller. Contract administration will be transferred from IO Contracts Office to R&DO about October 31. Mr. Harvell Williams, R-RP, will be the Contracting Officer's Technical Representative. Funds to continue operational support through September 1966 have been committed from the Pegasus funding. Dr. Stuhlinger has agreed to assume responsibility for negotiating the extensions to the current SATCON contract as required. ✓

3. S-IVB Technical Review: A dry run of the S-IVB Technical Review was held last week with R&DO and IO representatives. The formal presentation to IO is scheduled for October 20. ✓

4. KSC Test Catalog and Test Procedures: The subject documents are still being reviewed by P&VE and ASTR Labs. Their comments and recommendations will be coordinated with the other labs prior to forwarding to IO. ✓

Scott F
Request
briefing
on this
subject B

NOTES 10/18/65 BALCH

B 10/19

AS 10/18

1. S-II-T Arrived at MTF aboard the barge "Little Lake" on Sunday, October 17. Stage is to be unloaded, depackaged in the S-IC Booster Building, reloaded on the "Pearl River" and installed in Test Stand A-2 on Tuesday, October 19. Once installed, stage will be impounded until present configuration is confirmed and completion activity schedule is approved. ✓
2. S-IC Test Stand Acceleration activity is continuing to provide for reprogramming of funds to insure maintaining schedule to support 504 requirements. Tentative go-ahead has been obtained from NASA Headquarters and MSFC. Concurrent with this a complete review of all existing and presently planned change orders for C of F funded construction and technical system contracts is being implemented and rigid control established to minimize additional costs. ✓
3. Liquid Hydrogen Supply problem is requiring adjustment of activation schedules and minimizing of requirements for Test Stand A-2 to avoid the extremely high costs of product. Present APCI (New Orleans) on-stream date of December 15, 1965, looks firm and hopefully can be bettered. ✓
4. Beneficial Occupancy was taken of East lane of Road "B" and parking area southwest of L&E Building on October 13, and tunnel between S-IC Test Control Center and Data Acquisition Facility on October 12. ✓
5. General Electric FY 66 Support Contract negotiations were completed on October 13 for
Estimated Cost \$41,000,000
Fixed Fee 1,925,000
Total C of F \$42,925,000 ✓
6. Negotiations with Aetron on costs to completion have been completed on Phase I Technical Systems and essentially complete on S-II GSE installation. ✓
7. Labor Situation is relatively quiet at this time. Two minor stoppages involving approximately 75 pipefitters occurred on October 13, but work resumed after appropriate explanation. The Temporary Restraining Order obtained by NLRB on September 29 has been extended indefinitely awaiting further action from the Union. ✓

9/28 10/17

B 10/19

F-1 ENGINE

Engine F-4020 (completes S-IC-2 set of engines) arrived at MSFC via truck on October 13. Data gathered enroute is presently being evaluated.

As previously reported, a successful pre-negotiation conference was held at MSFC with Dr. Mueller's team last Friday (October 8) for the conversion of the F-1 engine buy from CPFF to CPIF. We have an appointment to brief Dr. Mueller with our incentive plan at 2:00 p.m. Thursday, October 21 in Washington. It is planned to begin formal negotiations with Rocketdyne today with the limitation of not consummating a final agreement until such time as we receive NASA Headquarters "green light." ✓

C-1 ENGINE

RMD was selected for the Phase II development program. The contract is in Headquarters for approval. In the meantime, RMD has been notified that they may proceed with the program, effective October 18, 1965. ✓

J-2 ENGINE

The first engine (J-2040) for S-II 502 was delivered this week.

The first 230K/5.5 mixture ratio J-2 R&D engine has completed its planned test program. This engine completed 60 system tests and accumulated 5,104 seconds.

Liquid hydrogen storage tanks from plant 74 at West Palm Beach have been promised for AEDC by January 1, 1966. Due to a breakdown of the plant (which could preclude its going back into operation) there is a possibility that the tanks may be obtained before this date. The AEDC test schedule still looks good. ✓

RL10 ENGINE

The first prototype RL10A-3-3 (uprated specific impulse) engine scheduled for flight was shipped to the General Dynamics Corporation last week, and the second will be shipped this week. These engines will be mounted on Centaur vehicle AC-8 which is scheduled for flight in early 1966.

Two such engines have already been delivered to Sycamore Canyon and mounted on the Battleship Propulsion Test Vehicle which is scheduled for its first firing with the uprated engines early in November. ✓

H-1 ENGINE

During the post static checkout of S-IB-2, oil contamination was discovered in the LOX Seal area of engine H-4051. This engine is being removed and returned to Rocketdyne for rework. It will be replaced with spare engine H-4046. All other engines on the stage were inspected for contamination and are in satisfactory condition. The source of the contamination has not yet been identified. No vehicle schedule impact is anticipated due to this retrofit. ✓

NOTES 10-18-65 CLINE

9/10/18

B
10/19

NEGATIVE REPORT

NOTES 10/18/65 CONSTAN

Negative report

QTS 10/18

B 10/19

NOTES 10-18-65 DANNENBERG

B 10/19

1. MSFC In-Flight Experiments - A letter has been sent to General Phillips requesting assignment of In-Flight Experiments MSFC #3 and #4 "Propellant Mass Determination" and "Interface Stability" to a specific flight vehicle. A request for funding in the amount of \$1.28M for FY 66 has also been forwarded to Mr. Lilly on the basis of developing these experiments for an assumed flight on AS 208. One MSF experiment has been approved by the MSFEB as a part of the AAP program. This experiment, MSF #1, "Lunar Mapping Photography" has been assigned to vehicles AS 507 and AS 511. ✓
2. Payload of opportunity for SA-210 - With receipt of the guidelines for the Voyager program, R&DO has cancelled all further effort to propose experimental payloads of opportunity for this vehicle. The labs are being requested to review the proposed payloads for their applicability to the MSFC In-Flight Experiments program. ✓
3. Experiments Coordination - A presentation on Gemini 3 & 4 experiments results was given at MSC on October 12, 1965. Such reports will be given in the future within 90 days after each flight. One general comment which was made by a number of the experimenters is that the astronauts are much better scientists and observers than had been expected. ✓ Of interest to MSFC was the discussion of the failure of experiment MSC-1 "Electrostatic Charge." Objectives were not accomplished because the probe device was affected by the on-board systems in the spacecraft. Mr. Capowski of R-S was the only MSFC representative at the meeting in Houston. ✓
4. ICD Meeting - R&DO will give a summary status report on the total ICD program on October 27, 1965. It is planned to conduct an all-day meeting; however, a management review of final conclusions will be presented at 2 p.m. During the meeting, the Boeing and Chrysler matrices will be discussed as well as future matrix needs and maintenance of these matrices. The R&DO management of the ICD program will be presented and it is hoped that management approval on this entire subject can be obtained during the meeting. ✓

NOTES 10/18/65 FELLOWS

B 10/19

Q8 10/18

1. Mission Support Contractor Evaluation: The Single Support Contractors for the MSFC laboratories and staff offices are completing their first six months of mission support work under CPAF controls. I am the Chairman of each Performance Evaluation Board and have scheduled technical and business performance evaluation reviews during the next two months' period. ✓

2. SATCON Operation: IO and R&D Operations agreed to transfer of responsibility for the administration of SATCON to R&DO effective October 1. A contract for the continued support of the SATCON operation through December 31 has been negotiated with Fairchild-Hiller. Contract administration will be transferred from IO Contracts Office to R&DO about October 31. Mr. Harvell Williams, R-RP, will be the Contracting Officer's Technical Representative. Funds to continue operational support through September 1966 have been committed from the Pegasus funding. Dr. Stuhlinger has agreed to assume responsibility for negotiating the extensions to the current SATCON contract as required. ✓

3. S-IVB Technical Review: A dry run of the S-IVB Technical Review was held last week with R&DO and IO representatives. The formal presentation to IO is scheduled for October 20. ✓

4. KSC Test Catalog and Test Procedures: The subject documents are still being reviewed by P&VE and ASTR Labs. Their comments and recommendations will be coordinated with the other labs prior to forwarding to IO. ✓

Scott F
Request
briefing
on this
subject B

B 10/19

KB 10/18

1. Crew Safety/Manrating Briefing: On October 13, 1965, several MSFC personnel and representatives from Martin/Baltimore met to exchange technical ideas and philosophies on crew safety and manrating. Basically, the major aspects of manrating the Gemini/Titan and Apollo/Saturn programs are identical. Likewise, the launch vehicle analyses in support of crew safety are based on similar approaches. One point of interest is the fact that the Gemini/Titan has manual abort capability, only. The requirement for automatic abort capability has been eliminated by having complete redundancy in the flight control, guidance, and hydraulic systems. ✓
2. Air Load Manual Discontinuation: Saturn Air-Load Manuals, which tabulated aerodynamic and related data, were originated before the panels and working groups had become effective. They served to manifest, reinforce, and preserve MSFC's lead role in vehicle aerodynamics. Though the manuals would still be "nice to have," the above purposes have diminished. In view of this, and our critical manpower situation, we have decided to discontinue them. ✓
3. 5th International Congress on Acoustics: Dr. F. Krause (Aero-MSFC) and Dr. M. J. Fisher (IITRI) attended subject conference in Liege, Belgium, September 7, 1965. They presented two papers which they had co-authored: (1) "A Technique for Measurement of Local Turbulent Properties in Supersonic Shear Layers." (2) "Optical Integration over Correlation Areas in Turbulent Flows." Discussions at the congress and visits at the University of Goettingen, Max Plank Institution, Goettingen, The Imperial College, London, and the University of South Hampton, showed that European scientists are very interested in exploring the fundamental research aspects of MSFC's acoustics development programs. They desire especially to explore and apply our newly developed method of measuring turbulent fluctuation through cross-correlation of optical signals. Professors at these institutions have been contacted in the past year by personnel from NASA's Office of Grants and Contracts and have discussed the attempted European/American Research Cooperation Program. They are frustrated because this program has never materialized. Upon Dr. Krause's return to the states, he visited the Office of Grants and Contracts, and determined that the office is not authorized to actually disburse the funds. Mr. William Green of that office strongly encouraged that MSFC initiate action such that the European/American Research Cooperation Program may be started. If it becomes impossible to obtain previously requested funds from OMSF or OART for this work, then a research grant cannot be arranged. In that case, possibly these European scientists could be introduced to our problems and experimental methods via a post doctoral resident research associateship. Names of seven scientists interested in such an arrangement have been given to the Office of International Affairs in NASA Headquarters which will contact them to discuss their participation in MSFC's acoustics and turbulence programs.

Jane
Shepherd
Please
see me
on this
B

201

9/18/19

B
10/19

1. IU-201: IU-201 was shipped to KSC with approximately 300 defects outstanding. A crew of IBM, MSFC and inspection agency personnel are on the barge working off as many of these as possible in transit to New Orleans. ✓

2. S-IB IU CHECKOUT: The proposal IBM submitted for accepting earlier responsibility for checkout would provide virtually no responsibility for IU-202, some for IU-203, and full responsibility only at IU-204. A counter proposal was presented to IBM which would increase the IU-202 responsibility with full assumption by IU-203. A decision on this is expected early this week. We are also hopeful of incentivizing, to some degree, the checkout of these three units. ✓

3. RL-10: A decision has been reached to discontinue the Q&RA Laboratory resident office at Pratt and Whitney Aircraft Corporation, West Palm Beach, Florida, based on the understanding that Lewis Research Center will assume management of the RL-10 program. ✓ We had previously requested delegation of the major portion of the quality and reliability assurance program to BUWEPSREP (Navy). BUWEPS' decision on this delegation is due October 22. Effectivity for the relocation of Laboratory personnel is November 21. We do not plan to abandon the program but will cover it by TDY until the Navy or other inspection agency can be phased in. ✓

B 10/23

NOTES 10/18/65 HAEUSSERMANN

96101B

URGENT

Keller H.

I am greatly interested in an increased MSFC activity in this area.

Please arrange a meeting on subject, include a detailed briefing

on outcome of your meeting with Badgley, et al.

ore B 10/23
he comes to Huntsville

1. OSSA MEETING AT MSC: Representatives of Astrionics will be at MSC on 10/18, 19, and 20 to meet with Dr. Badgley of OSSA and participate in his NASA/OSSA committee meeting regarding remote sensor activity. An evening session with Dr. Badgley will be held to discuss MSFC's (ASTR and RPL in particular) interest and capabilities to support current and future OSSA remote sensor projects. It is tentatively planned that Dr. Badgley will visit MSFC on 11/9 and 10 as a further step to discussing this technology with us and determining MSFC's potential role.

Bill be in town and want to participate B

2. TM DESIGN RESPONSIBILITY: (Reference Item 4 to Notes of 10/4 - copy attached*). This subject was identified as an action item at the 9/29 SIB Quarterly Review which resulted in James' memo of 9/30 to Hoberg. Meeting referenced in 10/4 notes took place 10/8 with Hoberg and three of his people participating along with James and his key people. Excessive time for processing change orders was the principal point discussed. A change procedure recently established (but not yet implemented) was reviewed and accepted by James. His stage managers are to work out details with Rorex, Chief, Telemetry Systems Branch. The group will meet with Chrysler and Boeing this week at Michoud to finalize the procedure. A similar procedure will be used for the IU and other IB stages. Saturn V IO people are also aware of the procedure. Weidner has advised Hoberg of your note to him on this subject. It is believed that this summary amply covers the status.

thru Bonnie

*Copies to DIR and R-DIR only.

B 1/23

9/18/18

S-IC

During first "automatic" firing of S-IC-T on October 8, 1965, 77 out of 80 pieces of the new ground support equipment were used. During next operation all 80 will be used and some computerized checkouts will be made as time allows. All programs and equipment will be de-bugged prior to S-IC-I operations. T/M data taken for first time indicates that system functioned satisfactorily. We had inquiries from five T/M ground stations asking to receive radiated data during firing. (2 R-QUAL, 1 R-ASTR, 1 BOEING-HIC Bldg., 1 R-COMP). Normally we ask for a back-up to primary station which is now in R-TEST. On future tests we propose that only R-TEST and R-COMP receive this raw data. Boeing System Test personnel (as planned from inception) will be pushed to the front for next firing with Test Laboratory still in control to pick-up ball. Because of training aspects next firing could possibly slip. Intent is to go only when ready. ✓

S-II

Battleship (Santa Susana) - All engine actuator systems have been delivered on site. Work is progressing on schedule for November 19, 1965, firing date. ✓

All-Systems (MTF) - S-II-T Vehicle arrived on site and is scheduled for installation on stand Tuesday due to last minute work on test stand required before installation. ✓

S-IVB 202 (SACRAMENTO)

All systems are on schedule for a November 3, 1965, firing. ✓

Karl H.
Please arrange for me an on-site review of the entire swing-arm facility, incl. status review of deliveries. Please contact Bonnie re time B

GSE RANDOM MOTION SIMULATORS

The acceptance test of the S-II Aft Position was successfully completed October 14, 1965. The S-IVB Aft and Forward Positions are still in checkout. Four out of eight positions have now passed the acceptance test. ✓

SATURN IB - COMMAND MODULE ACCESS ARM TESTING

Difficulties are being experienced coupling and uncoupling the Environmental Chamber to the capsule escape tower. Due to the tight schedule, only two days remain for testing prior to shipment to KSC. It will therefore not be possible to qualify this arm for flight use. Effect on SA-201? B

BARGE POSEIDON

On ~~September~~ ^{October} 17, 1965, at 3:50 p.m., 47 miles below Helena on the lower Mississippi river, the S-IC Barge Poseidon was struck by the tow vessel causing damage to the right side of the barge. The barge is in no danger and is proceeding to New Orleans. Mr. ~~Julian~~ ^{Guilian} is onboard the barge to handle all legal matters. ✓

REMARKS

10-18-65

Mr. Goodrum just called to say that Gen. O'Connor will have an up-to-the minute report on the barge accident by tomorrow morning, 8 a.m. for transmittal to Dr. von Braun. ✓

NOTES 10-18-65 HOELZER

B 10/23

908 12/18

1. ADP WORKLOAD CONTROL SYSTEM: On July 1, 1965, a system of budgeting for computer time by individual customers went into effect at MSFC. Initially, each customer is allotted money for his computation needs, and as each job is run the cost is calculated and subtracted from those monies. As of this date, at least two reports have come out with regard to monies used and left for expenditures. Each customer has been told that certain adjustments can be made to the funds from time to time to assure that adequate computation work is available to them. So far there have been neither complaints nor compliments; therefore, it is assumed that the system is working satisfactorily. ✓

2. REMOTE INQUIRY IN OPERATION:

The remote inquiry devices located in Astrionics Laboratory, Building 4487, and in Building 4723 are now operational.

With these devices, it is possible to query the central computer in Computation Laboratory, Building 4491, and retrieve data at the inquirer's location.

Currently, these remote inquiry devices are being used in the area of parts reliability data retrieval.

There are now three remote inquiry stations which are operational. ✓

B 10/23

NOTES 10/18/65 JAMES

(S) 10/18

S-IB-3: Short duration firing was successfully completed 10/12/65. The LOX and fuel wrap-around lines were instrumented for vibration data to be correlated with conditions experienced during a qualification test of these items. This data is being reviewed. ✓

S-IVB CONTRACT NEGOTIATIONS: We are in cost negotiations with DAC on the incentive contract. Our cost positions remain substantially apart. We are continuing negotiations and attempting to establish visibility of this dispersement. ✓

IU-201: The barge arrived at the Michoud dock Friday at 4:00 AM. Departure was delayed until 6:00 PM Saturday due to adverse weather conditions in the Gulf. All of the work planned for accomplishment on the barge was completed. At 7:00 AM this morning the barge was approximately 110 miles northwest of the Florida Keys, proceeding at 7 knots. It is estimated the barge will arrive at KSC at 4:00 PM on October 20. ✓

We are meeting with P&VE and Astrionics today to reach a final decision relative to the platform mounting vibration problem. The replacement ECS pump is due to be delivered to KSC on October 20. Also, a modification kit is available to be installed to permit flying without the pump, if this should become necessary. ✓

GSE (SOFTWARE): Although we had placed the breadboard ahead of LC-34, as you know, the breadboard fell behind. The tapes are still pacing our operation at the Cape; both the operating system tape and the 8 test tapes. Dr. Gruene's work on the IBM preliminary tape will probably result in "power on" Wednesday. This is 10 days before our tape will be ready. The test tapes will be ready on about the KSC need dates except for the LVDC/LVDA tape. The LVDC/LVDA tape will be about 10 days late and will pace the schedule unless we can find a solution. ✓

NOTES 10-18-65 KUERS

QD 10/18

B 10/23

Negative reply.

10/18/65

1. SATURN IB STANDARD LAUNCH VEHICLE STUDY - Final report of this study has been distributed within Marshall. Contractor briefing to Marshall personnel is set for 9:30 a. m. , on October 21 in room 409. Two representatives from each of the contractors will attend to make the presentations. After the briefing by the contractors, R&DO will conduct a technical evaluation. Coordination within Marshall, prior to the briefing, was accomplished at your request in meetings on October 11 with Mr. Weidner and Col. Tier and on October 12 with Mr. Weidner and the lab directors.

Copies of this study, which were also forwarded to Dr. Mueller, have been passed to Norm Rafel for study. Norm's office indicated they would like discussions with the contractors the latter part of this month or early in November as proposed in your letter to Dr. Mueller. ✓

2. NASA/DOD MOL WORKING AGREEMENT - General Scriver and Dr. Mueller met in September to discuss the general agreements which will be required between AF and NASA on interfaces between MOL, Gemini-B, and AAP. Subsequent to this meeting, negotiations have been in process with the AF in order to review and refine the agreement items. The last meeting with the AF was planned on October 15 where the following agreement areas were scheduled for discussion:

- (1) AF and NASA focal points for interchange of data.
- (2) Gemini/MOL/Apollo hardware interfaces.
- (3) Interchange of NASA/AF personnel.
- (4) MOL vs AAP experiment programs.
- (5) Operational responsibility for utilization of tracking ships, mission control centers, recovery, etc.
- (6) Inter-agency (NASA/DOD) financial transactions (fund transfers).

3. CONGRESSIONAL STAFF VISIT - Mr. Craig Voorhees, Staff Member of the Senate Committee on Aeronautical and Space Sciences, will visit MSFC on October 20, Michoud on October 21, and MTF on October 22, to review MSFC programs and activities. Ray Kline is coordinating. ✓

4. APPOINTMENT OF DEPUTY DIRECTOR FOR EXECUTIVE STAFF - Mr. J. N. Foster has been appointed Deputy Director for Executive Staff effective October 18, 1965, replacing Mr. C. E. Andressen, Jr. , who has transferred to Industrial Operations. ✓

Haus Weidner
Request briefing on outcome of October 21 meeting.
How did our labs react?
I attended first half of meeting, but not discussion & conclusion
B

URGENT →

Haus Maus
Who can give me an updated briefing on the status of all this?
B

Mr Gorman was at Ames Research Center.

Haus Maus How do we plan to feed the new Sat IB cost data to DOD? R

B0923

NOTES 10/18/65 REINARTZ

RS 10/18

SATURN IB/CENTAUR PROCUREMENT ACTIONS: On October 15 I was informed by Colonel Russell that he is sending a TWX requesting that all procurement actions be terminated except those actions which will be directly applicable to the Saturn V/Voyager Program. ✓ I will make recommendations to Colonel Russell this week on those actions which I think should be completed. ✓ This will include conducting honeycomb panel separation tests. I assume Headquarters will withdraw the balance of the Saturn IB/Centaur funding. The TWX should be received early this week. ✓

B1922

NOTES 10/18/65 RUDOLPH

S&ID 10/18

1. Labor Dispute at S&ID/NAA - The potential strike was averted by the United Auto Workers acceptance of the NAA offer by vote on October 10, 1965. ✓

2. Incentive Contract Conversion:

S-IC Stage - The pre-negotiation position was presented to Dr. Mueller on Saturday, October 16, 1965 and approval for go-head obtained with one major change in position directed. Dr. Mueller directed that we place an incentive on delivering the S-IC Stages six weeks in advance of the present schedule. Two thirds of the schedule incentive fee dollars to be applied to this early delivery. Dr. Mueller and General Phillips stated that all Saturn V Stage and Engine contracts shall support the six week early delivery.

A.R.
I just hope we really want S-IC's that early in view of our S-II and ESE dilemma!! B

S-II Stage - In view of the substantially increased program cost requirements by S&ID, we have advised S&ID management that MSFC is not ready to proceed with conversion under existing unrealistic conditions. Review of Technical Requirements in continuing. ✓

3. S-IC Dynamic Stage - Arrived on dock at MSFC on Thursday, October 14, 1965, and was delivered to R-ME on that date. ✓ The S-IC-D Stage is currently in Bldg. 4705 (R-ME Laboratory) where engine simulators are being installed. After this work is accomplished, the S-IC-D will be stored in Bldg. 4705 until approximately January 1, 1966, at which time it will be moved to the Dynamic Test Stand for installation, instrumentation, and limited tests. ✓ R-ME has indicated that storage in Bldg. 4705 is not a problem. ✓

4. S-II Stage:

S-II-S/D Stage - Catastrophic Failure Evaluation Team performed their evaluation during the period October 1-8, 1965. A rough draft of the final evaluation report (including 64 photographs) has been completed. The final report is scheduled to be published on Monday, November 1, 1965. ✓

Common Bulkhead Test Tank (CBTT) - Limited pressure cycle tests on CBTT successfully completed on October 10, 1965. No evidence of increased stresses on bulkhead. ✓

5. S-IVB Facility Checkout Stage - is scheduled to depart Seal Beach, Calif., today, Monday, October 18, 1965 and should arrive at KSC on Tuesday, Nov. 2, two weeks ahead of schedule. ✓

6. Instrument Unit Ground Test Program:

S-IV-500V - Incorporation of late EO's is continuing and test is expected to commence on October 26, 1965. ✓

S-IU-200F/500F - was damaged by NAA personnel at Complex 34 while handling the payload for SA-200F. Extent of damage and impact is being evaluated. ✓

NOTES 10/18/65 SPEER

B 11/23

ADD 10/19

1. AS-201 LAUNCH MISSION RULES: The MSFC inputs to the KSC Launch Mission Rules were submitted to KSC today (10/18). The list of mandatory inflight flight measurements was drastically reduced from our original input. Approximately 50 launch vehicle redline parameters including their applicable time periods and limit values were incorporated into the rules. At the request of Gen. Bolender (AS-201 Mission Director) the MSFC requirement for a day launch was thoroughly reviewed. The MSFC requirement for photo coverage by ground and onboard cameras on one end coupled with the MSC recovery requirement (4 hours of daylight) on the other resulted in a launch window of only $2\frac{1}{2}$ hours. The MSFC position is that a day launch is mandatory. Gen. Bolender indicated acceptance of this position. However, the times will be adjusted that a longer launch window results. ✓
2. GT-3, GT-4 EXPERIMENTS SYMPOSIUM AT MSC: Mr. Casey (MSFC Flight Control Office at MSC) attended this all-day symposium on 10/12. A similar presentation will be made at Headquarters this week. ✓
3. GT-6 LAUNCH: The GT-6 launch is now scheduled for 8 AM October 25. Four MSFC personnel have been approved for viewing the operation at MCC-H. These four are Dr. Hueter, Mr. Bramlet, Mr. Chase and Mr. von Tiesenhausen. ✓
4. AS-201 OPERATIONS SUPPORT: A series of final reviews of data delivery, telemetry formats and support plan implementation is scheduled between 10/20 and 11/8 at KSC. All centers, OSRO and ETR will participate. ✓

B 10/23

1. PEGASUS: No change in status. ✓

KS 10/18

Is that the latest?
B

2. LUNAR SURFACE EXPERIMENTS: As the definition of the SASU (Saturn Apollo Systems Utilization) program proceeds, it begins to appear that the first lunar surface extended mission may be conducted without an LSSM or other mobility aid. A mission without vehicle mobility would eliminate most of the geophysical reconnaissance measurements and put more emphasis on moderate depth drilling, the Emplaced Scientific Station, and perhaps some modest astronomical measurements.

There is an increasing interest and enthusiasm on the part of Goddard concerning the SASU lunar surface experiments. The GSFC team is well qualified indeed; furthermore, GSFC seems to be able to hire top scientists in GS-15 and GS-16 slots with no supervisory responsibilities. With Dr. Clark as Acting Director, I believe GSFC will strive to become deeply involved in the manned space flight experiment business, and I further believe GSFC can make a very valuable contribution to the area.

E.S.
Let's discuss this.
Please arrange thru Bonnie. Inform Weidner, please.
B

3. AEC COMMITTEE: As a member of the AEC Isotope Committee, I spent two days on a meeting in Germantown, Maryland. Our recommendations to the AEC included: (1) establish joint government-industry projects to develop isotope applications; (2) increase patent rights for industry; (3) enhance use of isotopes through education and information; (4) initiate the development of means for isotope capsule protection during abortive re-entry and impact; (5) be prepared for large isotope needs in medicine; (6) initiate and implement a long-range plan (at least 10 years) for the production of isotope space power supplies, without waiting for a set of detailed requirements from spacecraft designers. (This may sound familiar to you! It was very readily accepted by my committee colleagues.) ✓

KS 10/18

B 10/23

1. ADVANCED SYSTEMS OFFICE STATUS:

- a. The revised office charter (including organizational breakdown), sub-office element charters, and staffing plan for the office have been concurred in/or approved by Mr. Weidner and forwarded to Center staff for appropriate action. ✓
- b. Administrative paperwork is being initiated to transfer the personnel presently detailed to the office (all 54 of us) to ASO. Before the transfer can be finalized, "a" above must be completed. ✓
- c. Over this past weekend (October 16, 1965), several elements of the advanced system operation were moved into our new quarters in 4202. ✓ *Frankly, when can I visit you? B*
- d. The remaining elements will be moved next weekend (October 23, 1965). ✓ *B*
- e. The location of the various groups in 4202, along with telephone numbers and office chiefs, are as follows. (In general, the telephone numbers used in the past will be carried with the individuals to the new location in 4202.)

<u>Organization Element</u>	<u>Location</u>	<u>Telephone</u>	<u>Name</u>	<u>Occupancy Date</u>
Director, Advanced Systems Office	641	876-1503	Williams	October 23
Chief, Resources Management Office	640	876-8977	-	October 23
Chief, Systems Analysis and Office	626	876-3414	Huber	October 23
Chief, Vehicle and Mission Office	343	876-2658	Ruppe	October 23
Chief, AAP Office	332	876-4711	de Fries	October 16
Chief, Advanced Studies Office (R-P&VE)	543	876-8976	Goerner	October 16
Chief, Advanced Studies Office (R-AERO)	529	876-6543	Thomae	October 16
Chief, Advanced Studies Office (R-ASTR)	517	-	Digesu	October 23 ✓

2. EARTH ORBITAL AAP ORIENTATION: The MSFC internal meeting on Earth Orbital AAP, held in Morris Auditorium on October 14, 1965, was well attended and from the comments I have received to date, it accomplished the objective; namely to inform the Center personnel as to what is going on in AAP (or one facet of it). We are considering another meeting for those who could not attend, as well as one covering the overall AAP activities and plans. ✓

3. COORDINATION OF AAP ACTIVITIES WITH MSC PERSONNEL: A group of us, about 18 in all, will visit MSC this week to review our AAP activities and to discuss efforts of mutual interest and involvement. There are three major meetings to be covered, and representatives from IO, ASO, EX and various labs will be in attendance. The meetings are:

- (a) Orbital Sensing - Earth and Lunar (called by Dr. Badgley) Monday/Tuesday/Wednesday,
- (b) Space Station Studies - MSC Review Tuesday, and (c) MSC/MSFC - Overall AAP Review (called by Mr. Stony and myself) Wednesday. ✓

URGENT → *Frank W. So far, we reviewed only the non-technical aspects of this visit. Suggest we cover the tech. aspects too, possibly prior to GEN's visit here. B*

OCTOBER 25, 1965

MSFC ROUTING SLIP

	CODE	NAME	INIT.	<input type="checkbox"/>	<input type="checkbox"/>
				A	I
				C	N
				T	F
				O	O
				N	R
1	DIR	Mr. Shepherd			
2	DIR	Dr. von Braun <i>B 11/7</i>			
3		<i>direct 11/4</i>			
4		<i>direct 11/4</i>			

REMARKS

- The attached letter is in reply to your query on my October 25 NOTES, copy attached.

File

Roy Godfrey concurs in the reply.



CODE R-OM-DIR	NAME <i>W.S.</i> W. S. Fellows	DATE 11/4/65
------------------	--------------------------------------	-----------------

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO Dr. von Braun, DIR DATE NOV 3 1965

FROM Director, Operations Management Office, R-OM-DIR

SUBJECT S-IVB LOX probe problem (My notes to you October 25, 1965)

I understand that I-V-S-IVB is preparing a briefing to you on the S-IVB LOX probe problem. Meanwhile, the situation is as follows:

a. Non-linear electrical response characteristics of the present LOX probe are cyclic in nature with a period which causes large thrust level oscillations. Analysis shows that this will cause guidance inaccuracies and lower payload capability, which is marginally acceptable for Saturn IB but unacceptable for Saturn V. ✓

b. For Saturn IB, it is felt that modifications to the electronic packages to properly time the gain and damping circuits will allow use of the present LOX probe. ✓

c. For Saturn V, a modified LOX probe is mandatory. ✓

In order to determine and qualify the modifications required, the following actions are being taken:

a. R-TEST, by December 15, 1965, will proceed with tests on the present probe in MSFC battleship using electronics modified to provide adjustments in gain and damping of feedback circuits to minimize effects of anomalies in probe response. ✓

b. Minneapolis-Honeywell, probe supplier to DAC, is cognizant of the problem and will provide a modified probe to R-TEST by January 1, 1966, for tests on S-IVB battleship at MSFC with modified electronics.

c. A modified probe, with modified electronics, is expected to go on S-IVB-204 and subsequent, and on S-IVB-501. ✓


W. S. Fellows

NOTES 10/25/65 FELLOWS

B10/31

Q10/25

1. 10% Cut in Saturn Funds for R&D Operations: A critical review is being made of this cut from IO (about \$12,000,000) to determine the impact on R&D Operations. About half the money will come from our single support contracts. Some may have to come from state-of-the-art effort, which could cause long-range damage to our technical capability. A revised initiation will be developed as soon as cuts are identified.

Scott F. He should be able to get some compensation, at least in FY67, out of AAP-related inhouse work B

2. S-IC Parts Shortage: A shortage of S-IC-1 parts is delaying R-QUAL stage checkout. R-QUAL, R-ME, and Boeing are expediting parts deliveries. ✓

Please keep an eye on this trend. B

3. Project Support Agreement (PSA): With one or two exceptions, progress in establishing these agreements is slow, due to IO's concentration on SA-201. ✓

4. S-IVB Technical Review: This MSFC internal review will be completed on October 25. The LOX probe non-linearity problem, as well as other identified problems, is being resolved. ✓

How? Effective when? B

5. S-II CPIF Conversion: R&D Operations contribution to contract conversion has been slowed down because Book 2 of the cost proposal has not yet been received from IO. ✓

There's a delay due to the S-II overrun situation. B

6. Hazardous Gas Detection System: P&VE, in response to an IO request, is studying the application to Saturn V of the Saturn IB gas detection system, using a common manifold. Decision is expected very soon. ✓

7. Government Furnished Property (GFP): For Saturn V, R&D Operations is reviewing its commitments for GFP to align realistic need-dates with availability-dates, assuring also that GFP lists are complete. Expected completion date of this review is November 21. ✓

8. Use of Helium for Leak Detection: R&D Operations and S&ID are in tentative agreement on the use of helium to detect leaks in S-II pressurization, engine, and propellant systems. S&ID is expected to submit a formal proposal. ✓

9. Procurement Initiations: The laboratory procurement initiations are lagging behind the plans they proposed to follow. We are taking steps to review laboratory procurement planning for the remainder of the year in order to correct this situation. ✓

10/25

B 10/31

1. S-II-T arrived at Michoud on Point Barrow at 2 p. m. Saturday, October 16. Protective cover was installed and stage transferred to river barge "Little Lake" for trip to MTF, arriving at 1 p. m. Sunday, October 17. Depackaging and receiving inspection were completed on Monday, October 18, at the S-IC Booster Building and stage was reloaded on barge "Pearl River" for move to Test Stand A-2 Monday night. MTF towboat "Clermont", operated by GE/MTSO, made the canal tow and stage was in stand at 8 a. m. Tuesday, October 19, and is presently undergoing detailed physical inspection. Total operation well covered by press. ✓

2. Phase I Technical System is presently getting priority attention to insure timely completion within presently negotiated funds. The continued concurrency of activity in the S-II complex results in interferences which will cause further overruns unless this priority is observed by all parties. Delivery to Aetron of the data handling system by Consolidated Systems Corp. has been delayed to such extent that it presently appears not to support the S-II-T firings. Work-arounds are possible and will be implemented as required. ✓

3. Phase II Technical Systems management plan is still in process of restructuring and should be finalized in the next two weeks. Award of installation contract is being held in abeyance pending finalization. ✓

4. S-IC Test Stand Position B-2 Expediting. Notice to proceed was issued by Corps on October 20, 1965, to be incrementally funded with presently uncommitted S-IC funds until reprogramming can make available total required funds. Meeting is scheduled in NASA Headquarters on this subject on Wednesday, October 27. ✓

B 10/31

AS

F-1 ENGINE

Part I of NASw-16 incentive feature of Engine Stability Demonstration has been completed. Part I consisted of three predeclared bomb induced instabilities on three different injectors. All instabilities damped well within Model Specification requirement for the Qualification II Configuration. ✓

Three performance incentive demonstration tests on one engine system have been performed with the average Isp above Model Specification. This series consists of nine predeclared tests on three different engine systems (3 tests per engine). ✓

Engine F-4023 (1st S-IC-3 engine) arrived at New Orleans on October 21, 1965 via Cuppy I Aircraft. ✓

The F-1 Engine Production incentivization prenegotiation presentation was presented to OMSF at Washington on October 21, 1965. Dr. Mueller agreed with our position and recommendations and verbally approved commencing formal negotiations. All present appeared pleased with our plans and efforts. ✓

J-2 ENGINE

The J-2 production contract incentive conversion package has been at NASA Headquarters since September 16, awaiting final approval. We recently received some unofficial questions on the contract from Headquarters Legal Office and are currently preparing answers.

Development testing to correct engine deficiencies found during the FRT demonstration has resulted in adding a delay of 50 milli-seconds in opening the gas generator valve. This prevents a temperature spike from occurring in the gas generator during transition and eliminates the possibility of back flow of gas generator combustion products into the gas generator LOX inlet line. It also aids the ramping of the main LOX valve from its initial position to full open. FRT "make-up" testing should be completed by the end of this week and QUAL I demonstration testing underway by November 1. Possible retrofit to delivered engines is being coordinated with the using stage offices. ✓

RL10 ENGINE

The third and fourth prototype RL10A-3-3 engines are presently being installed on AC-8.

The engines for Atlas/Centaur Vehicle AC-9 will be delivered in November, approximately two (2) months early. ✓

GENERAL

At the direction of Dr. Silverstein, the Resident NASA Office at Aerojet, Sacramento, California, is to be closed by December 31, 1965. Present plans are to reorganize the M-1 Program Office at LeRC and call it "Large Advance Engine Technology Office." All phases of the M-1 Engine Program are being cancelled with the exception of the thrust chamber and injector effort.

Lee B
 Do we communicate
 with Lewis re
 criteria for an engine
 for next generation
 launch vehicle?
 If not, what action
 do you propose?
 B

(B) 10/25

B 10/31

1. 201 S-IVB FLIGHT WORTHINESS REVIEW: An MSFC task force, headed by Mr. Kroll, reviewed in detail the flight worthiness of all 201 flight critical components 10-4/14-65 at Douglas Aircraft Company. Twenty-five flight critical components have not yet passed formal qualification testing. Every possible effort is being made to complete the remainder of the flight critical qualification tests by 12-1-65. P&VE has a full time representative at the contractor's plant to track these components. A weekly progress report will be published. ✓

2. MSFC S-II AD HOC TECHNICAL REVIEW TEAM: The team completed an investigation of the status of critical and less critical components in subsystems presently installed on the S-II-T vehicle at MTF. Twenty-one critical and six less critical components were reviewed by P&VE. Results of the review were ten hardware modifications, six items identified for additional instrumentation and inspection after each test, and three recommended for retest. Resident personnel are following up on the results of the review. ✓

NOTES 10/25/65 CONSTAN

9/28/10/25

B 11/31

VISIT OF STAFF MEMBER OF SENATE SPACE COMMITTEE

Mr. Craig Voorhees, Staff Member of the Senate Space Committee, visited the Michoud Assembly Facility on October 21, 1965, and was given orientation briefings by NASA, Boeing and Chrysler and a tour of the facility. ✓

CONTRACT NAS8-5608

Dr. Mueller approved the prenegotiation position for incentive conversion of Contract NAS8-5608 with The Boeing Company. ✓

NOTES 10-25-65 DANNENBERG

B10/21

9/18/25

1. ICD Management - A proposed R&D Operations Management Directive on the subject "Interface Management," will be discussed at the October 27, 1965 ICD meeting. Also, the Saturn V Configuration Management Manual (proposed), covering Interface Management and associated flow charts, will be reviewed as well as the Boeing ICD Matrices. ✓

2. POP 65-4 submission for In-Flight Experiment funding - MSFC requested \$10,280M for FY 66, \$22,818M for FY 67, and additional amounts for later FY's, to support 48 proposed experiments. Of these, three have been approved by the MSFEB for flight and eleven for feasibility study. The other 32 will be submitted to the ERB prior to presentation to MSFEB. No funding has been made available yet by Headquarters to support any of the MSFEB approved line items. ✓

What action has been initiated to get funds for these experim?

3. Experiments Coordination - Apollo Experiments Pallet Project - Apollo Program Directive No. 1, assigns MSC the responsibility for the development of pallets to be carried on Apollo missions. ✓ The first pallet is to be delivered to KSC ready for flight by August 1967. ✓ MSC has sent out RFP for a four month, R&D (Phase I) study contract in the amount of \$375,000; Two study contracts will be awarded. ✓ One of the Phase I contractors will be awarded the Phase II implementation. R-S proposes to investigate the possibilities of developing a "standard experiment support module" for the IU in the same manner. ✓

Makes sense. Let's make this a topic

4. Re your comment on 9-13-65 Dannenberg Notes (attached) - The Historical office, Mr. David S. Akens, was informed of the availability of the KSC flight tapes. A joint review of the material (magnetic tapes and associated calibration and interpretation data) resulted in the decision that these data are unsuitable for purposes of the MSFC Historical Office. ✓

NOTES 10/25/65 FELLOWS

B10/31

Q10/25

1. 10% Cut in Saturn Funds for R&D Operations: A critical review is being made of this cut from IO (about \$12,000,000) to determine the impact on R&D Operations. About half the money will come from our single support contracts. Some may have to come from state-of-the-art effort, which could cause long-range damage to our technical capability. A revised initiation will be developed as soon as cuts are identified.

Scott F. We should be able to get some compensation, at least in FY67, out of APP-related inhouse work.

Please keep an eye on this trend.

2. S-IC Parts Shortage: A shortage of S-IC-1 parts is delaying R-QUAL stage checkout. R-QUAL, R-ME, and Boeing are expediting parts deliveries. ✓

3. Project Support Agreement (PSA): With one or two exceptions, progress in establishing these agreements is slow, due to IO's concentration on SA-201. ✓

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*How?
Effective
When? B*

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9. Procurement Initiations: The laboratory procurement initiations are lagging behind the plans they proposed to follow. We are taking steps to review laboratory procurement planning for the remainder of the year in order to correct this situation. ✓

B 10/31

9/18/10/25

1. Incentive Contracts: Work to develop flight performance criteria is progressing on schedule in all areas except the S-IC stage. This stage presents many difficulties in developing a workable flight performance incentive because so many of the components are GFE (more so than for other stages); sub-system approach appears most promising for this stage. Assistance has been requested from Astrionics and P&VE. Greatest emphasis is being put on S-IVB since negotiations on its' incentive plan are to begin within two weeks. Prospects for producing an integrated R&DO proposal for S-IVB stage, by October 29 deadline, are good at this time. ✓

2. AS-501 Control System Selection Meeting: Final joint R-AERO/R-ASTR control system selection meeting for AS-501 is scheduled for Nov. 2, 1965 at 1:00 in room 513. Result of this meeting is to be a decision as to what type control system will be used during first stage flight of AS-501. Possibilities under consideration are: (a) load relief using body fixed accelerometers; (b) load relief using platform mounted integrating accelerometers; and (c) load relief by reshaping of first stage trajectory. This may require part or full-time closed loop guidance for the first stage. The reduction of structural loads in either case is expected to be \approx 5-10 % of the presently calculated loads. Agenda will be published soon. ✓

3. AS-201 Operational Trajectory: The final nominal launch vehicle operational trajectory has been completed for AS-201 using the final S-IVB acceptance firing propulsion data. End conditions will be transmitted to Astrionics and MSC this week. Documentation of the results for the nominal trajectory should be completed by next week. A comparison of the state parameters at S-IVB cutoff between the first and final operational trajectories is as follows: ✓

<u>Parameter</u>	<u>Oper #1</u>	<u>Final Oper</u>
Time (sec)	601.4	592.6
Altitude (km)	260.44	260.54
Range (km)	1632.4	1592.4
Path Angle (deg)	82.070	82.073
Propellant Reserve (lbs)	8000	6245

The thrust oscillations have been taken into account in the above trajectory calculations, and we have incorporated a fix in the guidance scheme implementation to minimize the effect of the oscillations on guidance accuracy. ✓

B 10/31

10/25

1. S-IVB PROGRAM: The S-IVB 202 stage is undergoing prestatic operations at Sacramento. A satisfactory prestatic test operation has been conducted to date. According to the schedule a single full duration static firing will be attempted about November 1, 1965. With some relaxation in the schedule, the prospects for a satisfactory post static checkout on this stage have improved. The S-IVB 203 stage is undergoing modification for the LH₂ experiment. Some of the abbreviated manufacturing checkout will be invalidated by these modifications. Approximately 2500 manufacturing hours will be transferred to Sacramento; shipping date is presently October 29, 1965. The S-IVB 204 stage is presently about three weeks behind schedule in the final assembly-manufacturing checkout phase at Huntington Beach. Approximately ten sub-system tests have been accomplished in checkout. To improve the schedule and accomplish as much testing as possible before shipping, DAC is rearranging the schedule to operate two, ten hour shifts six days a week. ✓

2. F-1 ENGINE PROGRAM: F-1 engine 4023 has been accepted at Rocketdyne for shipment to Boeing, Michoud, the first of Boeing's F-1 engines to be delivered. This engine was the first accepted by the Government at Rocketdyne without any deviation being recorded. We are planning to have representatives of the Government Agency, Rocketdyne, and this Laboratory monitor the pre-installation test to be conducted by Boeing.

The last S-IC-F-1 engine, S/N 4020, was received at MSFC on October 14, 1965 and routed directly to Manufacturing Engineering Laboratory to incorporate modification of the calip pressure switch and liquid level detector bosses. The normal procedure of performing receiving inspection before accomplishing modifications was waived, in this case, in order to allow the team of Rocketdyne welders to complete this modification and return to Canoga Park. The welding was completed October 18, 1965 and the engine installed in the receiving inspection test stand October 19, 1965. This engine was the first to be shipped from California by truck. ✓

3. TUBE FLARE INSPECTION: A gage has been designed, by personnel of this Laboratory, to check the 37° internal angle of production tube flares through the use of two precision steel balls of different diameters which contact points of predetermined extremities of the flare angle, and a dial indicator to measure the seating relationship between the two balls. This measurement can then be calculated into an angle from charts prepared with each combination of balls. A prototype gage has been manufactured and checked out with repeatability of 0° 3' maximum deviation and production tubes can be checked within a time frame of a few minutes compared with approximately one hour to check ten flares under the old method of preparing a mold and checking the angle on an optical comparator. ✓

NOTES 10/25/65 HAEUSSERMANN

B (1731)

No submission this week.

9/28/20

B/10/31

10/25

S-IC-T

The fuel exclusion riser was inspected and found in good condition. The pre-test checkouts are progressing slowly due to problems associated with the GSE and partially, as expected, from operating with Boeing personnel for the first time in certain areas. Approximately 550 telemetry channels will be active for the test scheduled for this Thursday, 10/28/65. ✓

S-II

Battleship (Santa Susana) - Engines No. 1, 4, and 5 are installed. Engines No. 2 and 3 are scheduled to be installed next week. All high pressure bottles have been ultrasonically inspected for cracks by a Rocketdyne team with only one bottle out of specification limits. S&ID will send their recommendations for resolution of this problem by 10/25/65. ✓

S-II-T (MTF) - The vehicle has been installed in the test stand A-2 and covered with a tarp and by plywood around the sides for protection while on stand. No stage checkout has begun. ✓

S-IVB-202 (Sacramento)

The integrated systems checkout has been completed and the automatic loading tape has been run. If a successful check on the tapes is completed, a hot firing will be scheduled for 10/29/65. ✓

GSE RANDOM MOTION SIMULATORS

The acceptance test of the S-IVB Fwd position was successfully completed 10/22/65. The S-IVB Aft and Service Module positions are in checkout. Five out of eight positions have now passed the acceptance test. ✓

SATURN IB - COMMAND MODULE ACCESS ARM TESTING

The difficulties experienced in coupling and uncoupling the Environmental Chamber to the capsule escape tower have been eliminated. The chamber will be tested (coupled and uncoupled) with random motion through tomorrow (10/26/65). On 10/27/65 preparations will begin for shipment to KSC. ✓

NOTES 10-25-65 HOELZER

B 10/21

9/25/25

1. DATA REDUCTION SYSTEM FOR THE MICHLOUD OPERATIONS: The Computation Laboratory has completed the installation and acceptance of the Data Reduction System for the Michoud Operations. This system consists of a computer controlled Telemetry Ground Station that will process PCM, PAM, and FM for presentation to large scale digital computers. Included in the system are subsystems for vibration analysis, strip-chart recordings, and microfilm generation and processing. This system is planned to be used on a "relaxed" schedule by Chrysler Corporation in the reduction of flight data from SA-201 in order to gain operational experience. ✓
2. MSFC TRAJECTORY PROGRAMS: A Trajectory Systems Coordination Group has been organized within the Computation Laboratory for the purpose of coordinating, standardizing, training, and dissemination of information of trajectory language development and implementation. Four MSFC trajectory programs have been developed by this group utilizing the Vectran Engineering Simulation System (VESS) as supplied by General Dynamics/Convair. The group, in cooperation with General Dynamics/Convair, will now formulate and implement modifications to VESS to improve its application. ✓

SA-201: Power was applied to the S-IB Stage Thursday and is scheduled to be applied to the S-IVB Stage today. The I. U. was erected this morning. The ST-124-M platform mounting bracket was replaced at KSC and aligned prior to erection. The ECS pump has been reworked and installed. ✓

The GSE software delivery dates have been established and reviewed with Headquarters and KSC. These delivery dates support the new launch date. Emphasis is being placed on the LVDC/DA tapes which are scheduled for delivery on 11/27/65. KSC originally requested these tapes by 11/17/65. ✓

SATURN IB REVIEW AND ASSESSMENT PLAN: We are currently making a series of presentations to the R&DO laboratories to familiarize laboratory personnel with the requirements of the MSFC Pre-Flight Review and the followon Headquarters Flight Readiness Review. Particular emphasis is being given to the support required of R&DO for these reviews. ✓✓

AS-202 PAYLOAD CHANGE: The Service Module propulsion system Isp for this mission is approximately 6 seconds low. There will be an impact on our trajectory work and an additional spacecraft weight increase over the referenced trajectory. We are not payload critical for this mission. ✓

AS-206 INCREASED PAYLOAD REQUIREMENT: We received a call from MSC requesting an additional 900 lbs. payload for this mission due to full-up LEM weight increase. MSC is preparing a letter formally documenting this request. Presently, we have 1500 lbs. reserve for experiments which we feel cannot be fully utilized by the experiments, therefore, the additional MSC requirement should not impact our design reserves. ✓

SATURN IB WIND TEST: In a recent meeting to review structural design loads, the desire for actual data on vehicle response to ground winds to correlate to wind tunnel data was expressed. We originally had a wind test scheduled using the Saturn IB facility vehicle at KSC, however, due to schedule problems, it was necessary to cancel this test. We had a meeting last week with R&DO and have identified flight instrumentation available on the vehicles to use to collect wind response data on SA-201 and subsequent vehicles at any time during the normal launch preparation period when the tower is back. We will continue coordination with KSC and will levy official requirements on KSC within the next few days. ✓

IBM MANAGEMENT REVIEW: We had a meeting with Art Cooper and other IBM management personnel last week. In summary, IBM validated our concern that they are becoming the pacing item for the Saturn IB program. It is quite evident that projected delivery dates for computers, data adapters and Mod II switch selectors are critical and any additional slips may have direct schedule impacts. We will conduct a continuous review of this problem. ✓

B 10/31

10/25

S-II-501 Status Assessment: On request of the S-II Stage Manager, Industrial Operations, our ME personnel are making an assessment of the status of the development of the first flight stage, -501. In order to arrive at a true assessment and a realistic forecast for completion of manufacturing of the stage including check-out, all existing problem areas and facts have to be considered. Here are some of the major constraints--among many others--which prevent a completion according to the present schedules:

- a. A redesign and beef-up of Lower Lox Bulkhead requiring new tooling and processes development for dollar-piece weld.
- b. Failure of this bulkhead in hydrostatic test due to bad welding techniques.
- c. Beef-up of Forward Skirt, requiring out-of-sequence operations with interference with systems installation.
- d. Hydrostatic test facilities for complete tank have never been used before and will have some delays due to facility corrections and problems.
- e. More than 1100 structural brackets are short, probably due to late releases and changes. Without brackets, systems installation cannot occur.
- f. The status of engineering releases and EO's is not thoroughly controlled by manufacturing. Therefore they do not know when all EO's are complied with.
- g. Organizational problem: There is a central planning and schedule department at Downey--remote from the actual manufacturing activities--but there is no central production control in existence.
- h. Over-optimistic estimates for flow times at different assembly stations.

i. Major parts shortages--due to late engineering releases, changes, delays in qualification testing, etc. Preliminary results of this review indicate a delay status for -501 in the order of 25 to 35 weeks. We have our best planning people out at Los Angeles for this exercise. Mr. Maurer and Mr. Franklin are working closely together with S&ID manufacturing and corporate management to establish better controls, better visibility, and concentration and direction of total efforts of the whole organization in order to minimize the delays. The goal is to complete this assessment by November 4, 1965 for the visit of Dr. Mueller.

$\frac{1}{2}$ to $\frac{3}{4}$ year!
B

Is it that bad! 1/2
Please keep me posted.
B

I guess you're right!
B

It appears to me that S&ID has been organized for an airplane or weapon systems production job and does not provide the necessary flexibility required for our big R&D project.

NOTES/10/25/65/MAUS

B 10/31

10/25

1. ADMINISTRATOR'S PROGRAM REVIEW - The next Administrator's Program Review, covering Communications, Advanced Technological Satellites, Meteorology, Physics and Astronomy will be held at NASA Headquarters on October 26 and 27, 1965. J. C. Taylor, Chief, Applied Research Branch, Astrionics Lab, is planning to attend the October 26 session. ✓
2. FY-67 CONGRESSIONAL HEARINGS - Bob Freitag will hold his annual meeting with MSF offices and Field Centers on Wednesday, October 27, to discuss preparations for the FY-67 Congressional hearings. Ray Kline will attend this meeting. ✓
3. TRADE-OFF NOMOGRAPHS - The nomographs developed by Bill Hagen, of this office, and used by IO for the S-IC incentive contract presentation to MSF were received favorably by Dr. Mueller. Mr. Linn, of the Procurement Management office requested that similar charts be applied to other Saturn V contracts. ✓

NOTES 10/25/65 REINARTZ

B 10/31

No submission this week.

10/25

B10/31

NOTES - 10/25/65 - RICHARD

Q1510/2

Saturn IB Standard Launch Vehicle: We are developing an assessment of the contractors' proposals wherein we will provide an evaluation of each cost reduction item and add a few of our own. This assessment is being done through the Technical Systems Council with contributions from all systems engineering elements of MSFC. We should have an output by the first week of November. We intend to recommend a baseline vehicle with and without AAP considerations. ✓

Fina. Hope its not too plush.

Panel Review Board 65-5 was held on October 18, 1965 in Washington, D. C. We had routine reports from the Electrical, Mechanical, and the Flight Mechanics Panels. The difficulty MSC has had in meeting panel commitments was discussed and General Phillips has taken action on an EDS wiring item. We are separately resolving the redundant "Q-Ball" item with MSC. As a result of this discussion and to avoid future similar problems, an action was assigned the Panel Secretariat to clarify the relationship between the panels and the Program Managers/CCB's. We will also improve internal operations in this regard. ✓

B

AS-201 Software: We are working daily with all concerned parties to meet the software schedule now required for the AS-201 launch. The new schedule gives little relief in this area and will need almost hourly attention from everyone involved to meet the commitments we have for Cape delivery of verified programs. This verification will be, by necessity, one of verifying the system hardware as well as software. The total schedule is extremely tight. ✓

B 10/31/65

10/25

1. A Meeting with Prime Contractors is planned for Wednesday, November 10, 1965. Purpose of this get-together will be to discuss mutual problems, interfaces, working relationships, etc. Our objective is to develop a better understanding among our contractors concerning their working relationships and the need for "team work". ✓

2. Labor Disputes:

S-IC Stage - Wallace and Tierman of Bellville, New Jersey, a subcontractor for Boeing, engaged in manufacture and repair of pressure control gages is on strike. Strike involves total work stoppage resulting from contract renewal negotiations. Duration of strike cannot be estimated at this time. No impact on S-IC Program is anticipated providing the dispute is settled in the near future. ✓

S-II Stage - South West Welding Company of South Gate, California, a subcontractor for S&ID, went on strike Thursday, October 14, 1965. A settlement was reached on Sunday, October 24, 1965. No impact to the S-II Stage Program. ✓

3. S-IC Stage:

S-IC-T Stage - By Memo of Agreement, Friday, 15 October 1965, between R-TEST and Boeing, pre-firing and firing operations for remainder of program at MSFC will be performed by Boeing under direction of R-TEST. The next firing is expected to occur on or about Thursday, October 28, 1965. ✓

4. S-II Stage:

S-II-T Stage - Arrived at MTF on October 17, 1965, and placement of the stage in the A-2 Test Stand was accomplished on October 19, 1965. ✓

S-II Stage Ad Hoc Team - A team of key MSFC personnel headed by Colonel Yarchin is conducting a review of S&ID operating processes. Purpose of the team is to determine improvements or changes which can reduce avoidable constraints. Completion of this activity is expected by November 15, 1965. ✓

S&ID FY 66 Fund Requirements - A team of NASA personnel will visit NAA/S&ID during the period October 26-29, 1965, for the purpose of validating S&ID FY 66 fund requirements. ✓

5. S-IVB Stage Common Bulkhead Tests - The test article was installed in the converted S-IV stand in early October as scheduled. Instrumentation and hookup for checkout are presently on schedule, however, cable shortages can cause a delay in start of testing scheduled for Wednesday, November 10, 1965. ✓

6. Reorganization within IBM Corporation - A new "Space Systems Center" will be established at "Federal Systems Division", Rockville, Md., with Mr. Art Cooper as Vice President. Under him, as separate organizations, will be IBM-Huntsville, IBM-KSC, and part of IBM-Owego. ✓

Fain or loss? B

7. Additional Manpower in Saturn V Vehicle GSE Office - Four persons have been detailed from the IB/Centaur office to the Saturn V Vehicle GSE Office for a period of six months to assist in monitoring the GE/ESE Contract. This brings the total Saturn V Program Office effort applied to the ESE up to seven full-time personnel, plus a large percentage of the time of S. E. Smith, Saturn V Vehicle GSE Manager, and J. T. Murphy, Deputy Manager, Saturn V. ✓

10/25/65

1. AS-202 MISSION RULE GUIDELINES: A meeting between NASA Hqs. (Gen. Bolender), MSC, KSC and MSFC was held at MSC on 10/22/65 to review the first draft of AS-202 Mission Rule Guidelines. All MSFC comments were essentially accepted. Launch vehicle aspects of the revised guidelines are quite similar to those for AS-201 and appear satisfactory to MSFC. The final draft will be returned to MSFC for review and formal Center concurrence by November 5 before submission to Dr. Mueller for Approval. ✓
2. AZUSA/GLOTRAC: Based on an MSFC recommendation Gen. Phillips made the decision that Azusa/Glotrac support would continue through AS-212 and AS-515. The data is required for range safety, flight control and post flight guidance analysis. 32 of the Type C transponders will be procured from the Air Force. ✓
3. AS-203 REMOTE TV REQUIREMENTS: The details of the MSFC requirement for remoting of the onboard TV from the Texas and MILA receiving sites to MCC-H and HOSC for the LH₂ experiment were transmitted to MSC. Our present position is that TV transmission to the Control Centers for AS-203 is required and would cost less than \$50,000 and nominally (assuming no holds or scrubs) about one-half that amount. MSC has been questioning our requirements based on their own incorrect cost estimates. We are waiting for the MSC response to our letter. ✓
4. LIEF STATUS: A status review of the Huntsville Operations Support Center implementation was held with R-COMP on 10/21/65. The facility is essentially complete except for some minor items, and all required voice and data communications will be operational by 12/1. There are problems in developing on time the full software system capability desired for AS-201. However, adequate displays are expected to be available for our operations support to KSC and MSC. ✓
5. FLIGHT CONTROL OFFICE AT MSC: An agreement has been reached with MSC whereby MSC will provide all necessary administrative support to the MSFC Flight Control Office at Houston. It is expected that this agreement will take effect 10/24/65. No charges will be incurred by MSFC for the MSC administration of our people; the sub-allotment will cover travel and salary requirements. ✓

ND 10/25

B 10/31

1. PEGASUS: No significant change. Evaluation of recorded data has been slow during past weeks. Five Civil Service personnel at Computation Laboratory who were concerned with Pegasus computer programs have resigned recently to accept higher paying jobs in industry.

A very interesting possibility became apparent during analysis of Pegasus data. In two or three cases, a puncturing meteoroid seems to have penetrated both sensors, and the intermediate foam layer, of a panel. If these cases can be sufficiently verified, they will give us a most valuable data point on our penetration frequency versus thickness curve at an equivalent thickness of about 1.5 to 2 mm Al. ✓

2. SUPPORTING RESEARCH AND DEVELOPMENT:

FY-66 Program Status:

	<u>Annual Plan</u>	<u>Program Authority</u>	<u>Processed To FMO</u>	<u>Obligated</u>
OART	\$15,951,000	\$12,921,000	\$1,963,505	\$155,750
MSF	8,000,000	6,700,000	365,758	150,000
OSSA	5,903,000	400,000	200,000	0
OTDA	1,500,000	600,000	140,000	0
Totals	<u>\$31,354,000</u>	<u>\$20,621,000</u>	<u>\$2,669,263</u>	<u>\$305,750</u>

3. AAP: Dr. Peter Badgley, OSSA, held a Remote Sensors Meeting at MSC at which the Principal Investigators of his experiment groups (photographic imaging; radar imaging; infrared sensing; etc.) reported the progress of their work. Dr. Badgley is about to formally assign "subsystems management" for radar imaging to MSC. Also, MSC is preparing a request to assume management of the infrared sensing and photographic areas, and Dr. Badgley seems ready to accept this offer. These activities will probably come under Leo Childs who has just been transferred to Bob Piland's Experiment Programs Office. ✓

Let's put our own best foot forward in these areas when he visits MSFC on 9/10 Nov. B

I have assigned responsibility for the scientific portion of the Emplaced Scientific Station task to Russ Shelton and his branch; overall responsibility for lunar scientific experimentation, including resources planning, scheduling, and coordination with ASO and Headquarters Program Offices, will remain with Jim Downey. ✓

B 10/31

10/25

1. Meeting with MSC Personnel. The meeting at MSC on October 20, which was mentioned in last week's NOTES, was very productive. The three major points covered were: S-IVB Workshop, EVEA experiments and activities, and the Mission Planning Task Force activities. ✓

a. On the Workshop, MSC has agreed to join forces with us and participate in the development of a preliminary program definition package tentatively scheduled for completion by February 1966. ✓

b. We received very little reaction from them on our EVEA experiments presentations. I feel that they were surprised at the data and the vigor with which we were working in that area. ✓

c. One of the major efforts of the MPTF is to provide direction to S&ID/Grumman who are working on mission plans for the early flights (211, 507, 509, and 511) under a MSC contract. It was agreed that in view of the revised thinking on 211 that they would not work toward a mission plan document on that vehicle, and for flight 509 they would concentrate on the system capability for the synchronous orbit flight rather than the payload/mission definition or mission plan. ✓

How will these MSC contracts to S&ID and Grumman interface with our new RFR's?

We will continue having joint meetings and attempt to do more mutual planning and work between the Centers so that we are not continuously reacting to MSF, but rather providing them with joint "positive planning". ✓

2. Occupation of Building 4202. The move to 4202 has been delayed due to unavailability of material to install the required walls for the following groups:

Director, ASO	Williams
Systems Analysis & Program Planning Office	Huber
Vehicles & Mission Analysis Ofc	Ruppe
Advanced Studies Ofc, R-ASTR	Digesu

The new move date is scheduled for November 13. ✓

B