

Nov. 6, 1967

NOTES  
MR. GORMAN'S COPY

NOV 6 1967

*With comments*

*(none directed to DEP-A)*

S-II-3 Testing - Removal of stage from stand has been rescheduled from 11/16/67 to 11/12/67. Stage will be placed in Vertical Checkout Building for completion of modifications and inspection of welds and insulation. Scheduled date for shipment to KSC is 12/25/67, but current assessment is that this schedule cannot be met unless utilization of premium resources is approved. ✓

S-II-4 Stage - Delivery of stage to MTF is still scheduled for 11/26/67. ✓

S-IC Activities - Program for performance of anti-vortex test on S-IC-D stage has been approved, and stage is expected to be placed in the B-2 position of the S-IC stand by 11/10/67 for this purpose. Date for delivery of S-IC-6 to MTF is still indefinite. ✓

NASA/GSA Transportation Study - NASA/GSA study to determine feasibility of assigning transportation responsibilities at MTF to GSA has been completed, and findings will be forwarded through channels to NASA Headquarters after analysis at MTF. ✓

Emergency Planning - MTF emergency planning procedures were placed in effect on a standby basis on the morning of 10/30/67 because of tornadoes, which were occurring along the Gulf Coast at that time. MSFC Emergency Planning was kept informed of developments. ✓

Public Affairs - Mr. William E. Galbraith, National Commander of the American Legion, and several other key members of the national and state American Legion organizations visited MTF on 11/2/67 in connection with a visit to the Bay St. Louis, Mississippi, Legion Post. ✓

B 11/10

ORBITAL WORKSHOP (OWS) NEUTRAL BUOYANCY STATUS REVIEW: An informal status review of the in-house neutral buoyancy testing indicates that the neutral buoyancy component evaluation will be completed in December 1967. Neutral buoyancy systems evaluation activities will begin about April 1968.

note. 11/12

FLAMMABILITY: It is planned to review the OWS flammability situation with MSC at MSFC on November 15. This meeting was canceled for November 8 due to no MSC travel authority.

L.B.

I would like to sit in on essential part of this B

ATM EXPERIMENT FUNDS: The lack of authority to obligate funds is a severe problem in the HAO, American Science and Engineering, and Naval Research Laboratory programs. In all cases, all current obligations have either been costed or committed. All contractors have been asked to deobligate from their subcontractors to pay salaries for mainline personnel currently working on their programs.

L.B.  
And  
Chuck  
Matthews  
still wants to  
advance  
delivery of  
ATM to RSC  
by several  
months!!?  
3

ATM TIME LINES: During a meeting at Headquarters on November 1 and 2, five options were discussed in an effort to achieve compatibility between allowable AAP 3/4 mission time and the times required by medical and ATM experiments. None of the options satisfy the ATM Principal Investigator stated requirements. The highest allowable ATM time for any of the five options was achieved by reducing the medical times by 75 percent, dropping the 25 percent contingency rule for ATM experiments, and operating in the flare mode during astronaut eat cycles. Mr. Mathews requested that both MSFC and MSC study the impact of the different options in detail and plan to sit with him again by December 1. Apparently, he also plans to ask Dr. Mueller, Dr. Newell, and Jesse Mitchell to participate in the December 1 meeting. There appears to be a real problem in satisfying both science (ATM) and medical experiment requirements on the 56 day mission. MSC is pushing the medical experiments rather hard. This goes as far as their program people suggesting decoupling the ATM from the OWS. (This will give even less ATM time.) This would allow a full 56 day mission for medical (long duration) experiments. I feel this approach will de-emphasize the OWS and will lose much support for the ATM and will not be in keeping with building toward a future capability. (Space station for astronomy, etc.)

L.B.  
I'm  
strongly  
opposed to  
this.  
Maybe a  
second  
resupply  
flight,  
making the  
56-day  
mission  
again  
open-ended  
would be  
superior B

MEETING WITH OAO PROJECT PERSONNEL AT GSFC: At the suggestion of Dr. Seamans, we are arranging a meeting with GSFC OAO personnel to discuss experience and problems on astronomy type payloads. It appears there may be several areas where their experiences on OAO could be applicable to ATM. The meeting is tentatively set up for November 9 at GSFC. We expect to go with about twelve people.

ATM CONTROL AND DISPLAY REVIEW: A meeting has been scheduled with MSC at this Center on November 15 to select the ATM controls and display configuration. The review will include a detailed evaluation of mockups of the various control and display concepts.

GENERAL: Depending upon your availability, it is planned to review the overall AAP status on November 29. It is proposed that this review will cover overall status of AAP, selected highlights, typical examples of how key areas are functioning (panels, etc.), (technical) assessment, interfaces (internal and external), resources, schedules (overall), and others as desired. It is suggested the meeting be in general to update the Center Board and other key members such as panel chairmen, lead lab engineering managers, etc., on the Apollo Applications Program.

9-12-15,  
Nov. 29.  
sh

OK sh  
Bonnie

Yes, by all means. Schedule me for this

L.B. Suggest you include answers to the list of questions I recently sent you B

H-1 ENGINE Reference my Notes of 10/23. The program of six bomb tests to evaluate stiffening members bolted to the actuator support members of Neosho Stand 1-2 was expanded to ten tests. Thrust on the first two tests was less than desired. The seventh test damped, but was marginal in that the damp time was 103 milliseconds. A number of the support member bolts were found to be loose. After all bolts were retorqued, two satisfactory tests were conducted. The tenth test was conducted with the support member bolts loosened. It damped satisfactorily. An eleventh bomb test was then conducted with an additional resonating test stand member (thrust calibration yoke) disconnected. This test was unsatisfactory. The results from the tenth and eleventh tests have introduced an element of doubt into our evaluation. Data are being evaluated prior to further tests. ✓

F-1 ENGINE All open engine work on the F-1 engines on AS-501 has been completed and the engines are ready for flight. However, there is an unresolved question concerning a seven square foot panel of thermal insulation which is added to the skirt of the center engine by Boeing. We have recommended that this panel be vented in the same manner as the Rocketdyne supplied panels. The S-IC office and Dr. Mrazek have this recommendation under advisement. ✓

ECP F-1 573 was approved for modification of F-1 engine thermal insulation on vehicle SA-502. This modification consisted of scalloping the bottom edges of the thrust chamber TIS panels and drilling 5/8" vent holes in the cocoon and instrument tunnel panels. ✓

J-2 ENGINE All open work on the J-2 engines on AS-501 has been completed and the engines are ready for flight.

AEDC Testing - One J-2 test was conducted at AEDC on October 31, simulating S-II Stage operation with low fuel pump inlet pressure (27 psi) at engine start. Subsequent testing was cancelled due to an abnormally long closing time of the main oxidizer valve. The trouble was found to be an improperly adjusted poppet in the restrictor check valve in the closing control pneumatic line. The condition has been corrected and the next test is scheduled for November 8. Because of the suspected anomalies in engine performance resulting from nitrogen dilution, ARO is converting the LOX transfer system (storage tank to run tank) from nitrogen pressurization to helium pressurization. ✓

GENERAL Supplemental agreements are being prepared to reduce the J-2 and F-1 delivery rates from two per month to one per month beginning in January and February 1968 respectively. These schedule revisions are necessary to make deliveries compatible with vehicle requirement resulting from the Apollo Program Director's TWX MAP-1/138, dated 10/10. It appears that these production rates approach the minimum rate which will sustain separate production lines and/or continuous production of these engines. Further stretches in the vehicle schedule will necessitate basic changes in our mode of operation such as build and store or use of a single line to produce "batches" of F-1 engines followed by "batches" of J-2 engines. ✓

NOTES 11/6/67 CONSTAN

B 11/10

POTENTIAL UAW STRIKE AGAINST CHRYSLER AT MICHLOUD

Information has been received that the United Auto Workers (UAW) may call a strike against the Chrysler Corporation at the Michoud Assembly Facility effective 12:01 a. m. , Wednesday, November 8, 1967. If this strike materializes, Michoud management will follow the practice of assigning one gate to the facility for the exclusive use of Chrysler employees. Mr. Hueter and Mr. Styles are being kept informed by telephone of all developments as they occur. ✓

MSFC SAFETY COMMITTEE - As a result of the MSFC Safety Committee meetings with the Laboratory Directors, the following actions have been instituted:

- a. Revise Support Contract Manual pointing out the responsibility of the Laboratory Director for the safety of personnel and facilities in the laboratory area.
- b. Strengthen the safety clause in all contracts for contractors providing stronger management controls, (support contractors).
- c. Memo from R-DIR to the labs reminding them of their safety responsibilities.
- d. Schedule safety meetings with local support contractors, Boeing and Chrysler to stress safety awareness and advise them of proposed additional safety contractual provision. ✓

BOEING COMPANY AUDIT EFFORT - Dr. Leslie W. Ball from Boeing Company visited Mr. Neubert on October 31, 1967. He is on a special assignment from William M. Allen, and the purpose of his assignment is to perform an audit of Boeing Company activities to identify program risks and reduce hazards in such categories as manufacturing deficiencies, user deficiencies, design deficiencies, system specification deficiencies and others of a general nature, i. e., motivation of employees, etc. within the Apollo/Saturn System. From October 30, 1967 to including November 2, 1967, the Boeing System Engineering Group was reviewed by Dr. Ball and his committee. ✓✓

#### UNIFORM NASA STANDARDS TO COVER SAFETY

The MSF Safety Office is undertaking the task, in conjunction with the Centers, of developing a NASA Standards program to cover all areas of safety. Mr. Huth has been named the MSFC point of contact for this project to work with Mr. Bill Gold, MSF Safety Office. ✓

NOTES 11/6/67 FELLOWS

B 11/10

Critical Procurements: Last week, we found ourselves in the extremely unusual circumstance of having no continuing resolution and no FY-68 obligation authority. As a result, two high priority programs, Damper Arms and S-II Structural Test, were faced with schedule impacts due to apparent hold-up in completing procurement actions. However, to keep these programs going, arrangements were made with Messrs. Hardeman and Buckner to process essential actions using some FY-67 unobligated funds. ✓✓  
A few other critical procurements are also being processed against those FY-67 funds. ✓

B 11/10

NOTES 11/6/67 GEISSLER

1. Development of Advanced Guidance Concepts: Our Astrodynamics and Guidance Theory Division is directing considerable effort toward developing new guidance schemes which will be adaptable for future missions. At present, two different approaches are being pursued and both appear attractive. One approach is similar to the IGM in that it assumes a simplified gravitational model in order to simplify the guidance equations. However, fewer assumptions and restrictions are inherent in the new approach, and, consequently, it is more flexible in terms of the allowable terminal conditions. This will allow the scheme to be applicable to a wide variety of missions and will allow a short mission turn around time. The second approach is based on a numerical solution of the equations of motion, and, thus, no approximations of the gravitational model are made. Basically, it is a rapid numerical solution of the optimum trajectory problem (the problem of finding the trajectory that satisfies all the mission constraints while simultaneously maximizing the payload), and results in an optimum guidance signal. The exact onboard computer requirements for handling these new guidance schemes are not known at this time, but it is felt the launch vehicle digital computer may be sufficient. ✓
2. Discussion with Mr. Harper (OART) on Laser-Doppler Funding: Dr. Johnson and Mr. Miles, R-EO, and Mr. Dahm and Mr. Huffaker, R-AERO-A, visited Mr. Harper, OART Deputy Administrator for Aeronautics, to discuss potential financing of our Laser-Doppler program. Mr. Harper showed very lively interest in this program as a step to an on-board CAT warning system. He promised funds, and expressed interest in a quick development. We intend to pool forces with OART-Aeronautics for the period where our mutual interests coincide; someone else will have to develop the final operational on-board system. ✓
3. OWS APS Redesign: Recent decisions concerning the OWS orientation during Mission A require that the OWS APS be redesigned to include more tankage and a change in engines. The external APS envelope is not firm at this time, but will be generally that of a Saturn V APS. Each APS module will have six engines - three primary and three redundant. Engine selection has not been made, but the two most favorable candidates appear to be the R-IE, a 22# thrust engine planned for the MOL Program; and the R-4D, a 100# thrust engine used on the Apollo Service Module. Both engines are radiation cooled and must be open to the atmosphere. We shall provide aerodynamic loads and heating data for P&VE's structural and thermal analyses. Aero. and P&VE met on November 2, 1967, to establish study groundrules. ✓
4. S-II External Insulation: X-15 test of S-II spray foam insulation was attempted 10/31/67, however, bond holding sample to X-15 speedbrake failed after  $\approx$  30 minutes of B-52 mother ship flight, with X-15 still attached. Spray foam did not properly adhere to Inconel-X speedbrake, however, this does not necessarily indicate a bonding problem between foam and S-II stage. Aerodynamics around sample location is highly unsteady, with  $\approx$  156 db existing at speedbrake. X-15 was not launched due to engine problems. Flight was rescheduled for 11/7/67, and North American Rockwell is attempting to reapply spray foam sample in time for next flight. ✓

1. QUALIFICATION CERTIFICATION PROGRAM: All Certificates of Qualification for flight critical components have been signed for the AS-501 vehicle, making this Qualification Certification Program 100% complete. ✓ The Log Books containing all flight critical certificates have been submitted to KSC-DG, I-V-Q, I-V-SIC, I-V-SII, I-V-S-IVB, and I-V-IU as required by Saturn Program Directive. ✓
2. S-II PROGRAM: The North American Rockwell/Space Division Saturn S-II Workmanship Manual has been evaluated. The manual was found to be well organized and indicated that NAR/SD has begun an effective effort in the area of workmanship control throughout all facets of their operation. ✓
3. LIQUID CRYSTAL DEVELOPMENT: A special exhibit showing application of liquid crystals for evaluation of bonded structures was prepared for Dr. Johnson of R-EO. The exhibit will be presented at NASA Headquarters along with five other NASA/MSFC supporting research projects. The exhibit consisted of the final report from the development contract, various color photographs of defects in test panels of adhesive bonded honeycomb structures, and swatches of black Mylar film coated with encapsulated liquid crystals. These films change color when touched, thus showing the dynamic thermal sensitivity of the material. ✓

B 11/10

1. ATM Solar Array. Several problem areas have been recently resolved with respect to the ATM solar array. These include the following design features:

- a. Deploy the array at 90° instead of canted 10° forward. With the array canted forward a large amount of solar heat was reflected on the front end of the canister; at 90° the thermal problem of the canister is simplified. The cant was required for line of sight clearance for the star tracker to track Canopus. The star tracker will be modified to be able to also track at least one other star, e.g., Acherner, which will alleviate the line of sight clearance problem and provide more operational flexibility. ✓
- b. Reduce the number of panels from 20 (5 panels per wing) to an 18 panel array. This was primarily made possible due to the new baseline time between the ATM revisit from one year to two months. This also has allowed each panel to be electrically connected to only one battery/charger/regulator module. ✓
- c. Reduction in the number of panels allows the removal on each wing one-half of a panel closest to the ATM rack. This helps to reduce the heat sink temperature for the ATM components; thereby simplifying the thermal control problems. ✓
- d. Elimination of the LM/ATM free fly mode eliminates the primary reason for the array to be retractable. We have not made a final decision on whether we should retain the retractable capability or not. There are several trade-off areas which are being assessed.
- e. Physical interference of the solar array with the SLA, the LM Ascent Stage Work Platforms and the LM Umbilical Cable will be "eliminated" by dropping the array hinge point approximately 12 inches. Since this is a very critical interface area, we are arranging to have a detailed working level session with the cognizant organizations (Astrionics, P&VE, MSC, North American-Rockwell and Grumman) to establish a high level of confidence that the interface has been properly defined. Early in the program, a mating/fit test of the hardware elements is also to be accomplished. ✓
- f. The LM-end film camera accessibility in the stacked condition appears possible through the back-up structure of the solar array. However, we also must find a means of rolling the canister while in the stacked condition to achieve the film/camera accessibility.
- g. Efforts are underway for the use of a light weight design of the modules which support the solar cells. The ME Lab is fabricating these super light weight modules and we will perform vibration tests and others to determine the adequacy of these modules. ✓

2. ATM Design Review. Design reviews of each of the ATM subsystems were initiated last week and are to be finished this week. There was a limited participation by MSC and Headquarters personnel at the reviews. These reviews are the predecessor to the formal PDR (Preliminary Design Review) which will be held early next year. ✓

URGENT  
↓  
W.H.

*Gibbata is still awfully unhappy about the need for multiple EVA for ATM. Can't we make that film cassette larger, so we can live with 1 or 2 EVA's for the duration of the entire ATM flight mission? Is there any other possible alternative? MSC seems to severely criticize the entire ATM approach (to FEM) because of this EVA situation. They say: "Look at AAP 42! How much simpler in operation!"*

S-1C STAGE (MTF)

Boeing is making preparations for installation of S-1C-D in the test stand, Position B-2, for the purpose of conducting full-scale tests in order to determine the performance of the fuel tank anti-vortex assembly and a modified anti-vortex assembly when subjected to full-scale tank drain conditions. ✓

S-11 STRUCTURAL TEST PROGRAM

The facility construction is progressing on schedule. R-ME has a problem in obtaining procurement action on Hi-Loc fasteners used in attaching the S-11 tank section to the S-1C Lox tank forward bulkhead. The delay already incurred will effect the delivery of the stage to R-TEST and extend the end test date accordingly. ✓

MODERATE DEPTH LUNAR DRILL

Meeting was held with Northrop to discuss the forthcoming test program on the slave valve hammer. We continued support to the Space Science Laboratory at the Howell, Tennessee Drilling Site. ✓

S-1VB (MSFC)

O<sub>2</sub>-H<sub>2</sub> burner test number S-1VB-H10 was conducted on October 30, 1967, for a duration of 250 seconds. The primary objectives were to test with one igniter out and to start in the cold corner of the "start box". The objectives were met successfully and the system operated properly under the above conditions. ✓

S-1B

Stage S-1B-11 was installed in the STTE on November 1, 1967. The short duration test SA-48 is scheduled for November 29, 1967. ✓

NOTES 11-6-67 HOELZER

B 11/10

NEGATIVE REPORT.

NOTES 11/6/67 JOHNSON

B 11/10

Nothing of significance to report.

1. Visitors to Building 4755: The various AAP mock-ups and models in Building 4755 have attracted many visitors both as individuals and in groups. Over the past three months, more than 2000 visitors have been escorted through the building by Public Affairs and frequently by members of our staff. We have shown the exhibits to military, industrial, and civic groups; e.g., Manufacturers, sponsored by the Chamber of Commerce, St. Louis, 17 people; Defense Contracts Administration Services, 25 people; Maxwell War College Faculty and Students, 25 people; National Science Foundation Institute, High School Teachers, Birmingham Southern College, 60 people; and Conference on Molecular Radiation, 150 people. ✓

2. Mechanization of Expediting Work in our Shops: In order to improve and facilitate expediting of the many hundreds of work orders in our present job-shop operation we have now an automatic transmitter system being installed in our shops. The system consists of 14 transmitters located in various shops and a receiver station for central control. The work order status including causes for delays are in this manner recorded on the spot, transmitted by use of a code system and printed out in the central control station. This system does not use a computer for its operation but is designed in such a way that it can be used later in a complete computerized "Management Information System" which will provide for visibility and control of all the data pertinent to manufacturing, tooling, and procurement. ✓

1. X-15 AIRCRAFT TEST: The X-15 flight scheduled for 10-31-67 was aborted due to engine malfunction of the X-15 aircraft just prior to drop. However, the spray foam insulation that had been bonded directly to the upper speed brake (made of inconel) had already come off before scheduled launch from the mother ship (B-52). Since the bonding of the foam to inconel is not acceptable, North American Rockwell Corporation (NAR) is investigating the possibility of mechanically fastening an aluminum panel, which has been spray foamed, to the speed brake. Next test for the X-15 aircraft with spray foam installed on speed brakes is scheduled for 11-21-67. ✓
2. PULSE ARC MIG WELD: A meeting is scheduled here on 11-7-67 to make a decision on use of Pulse Arc MIG welds in S-II-8 and subs. Participants will be R-ME, NAR, I-V-S-II, and P&VE personnel. ✓
3. S-II-4 STRUCTURAL FASTENERS: Fasteners (Hi-lock H-22) of 7075-T6 aluminum alloy material have failed in stress corrosion on the S-II-4 aft skirt test article located in Building 4619. Rumors that similar failures have occurred at NAR/Tulsa are being investigated. S-II-1 through S-II-3 do not have these fasteners. ✓
4. TRIP TO MSC: Mr. J. Potter (R-P&VE-P) went to MSC to discuss leakage problems of Service Module Propulsion System Engine Bi-Propellant Valve. Cooperation was good and preliminary recommendations were made to Mr. Townsend, MSC. A joint trip (MSC & MSFC) to the vendors' facility (Aerojet/Sacramento) is targeted for 11-27-67, at which time firm recommendations to reduce leakage will be made. ✓
5. LANCE FEED SYSTEM PROBLEM: As a result of discussions between you and General Eifler, AMC, Herbert Fuhmann, James Kingsbury and I went to the Army Missile Command on 11-2-67 for a briefing on the problem. We will send our recommendations to you early this week. ✓
6. ORBITAL WORKSHOP - MOCKUP UPDATING: Fabrication of the mockup at McDonnell Douglas Company (MDC) is on schedule; one-half of the crew quarters floor (4.2-inch grid pattern) has been completed. The floor is being installed almost two weeks ahead of schedule to accommodate a visiting Congressional team (Teague committee members). ✓
7. ATM CONTAMINATION STUDIES: As mentioned in previous notes, plans were being made to measure contamination levels in the Houston Space Chamber. Our test equipment is ready, but MSC has indicated that the chamber is unavailable due to Apollo tests. We could run our tests simultaneously and would, in fact, like to get data on the outgassing from the Command Modules since it will be part of the Cluster. MSC objects. We are considering if other government chambers could support more timely tests. ✓
8. NUCLEAR GROUND TESTING MODULE: A review of the nuclear vehicle technology previously identified for FY-68 is underway. Several areas of effort originally identified will probably be changed. Tentative indications by SNPO representatives are that about 2.1 million dollars will be provided MSFC for nuclear vehicle technology in FY-68.
9. AEDC TESTING: Testing to verify the capability of the J-2 engine to start with a minimum of 27.0 psia ullage pressure in the S-II LH<sub>2</sub> tank has been started. A meeting held at Rocketdyne on the week of 10-23-67 finalized the test matrix through January 1968, which would be required to complete the S-II testing. ✓

B.L.

What  
would  
this funding  
level  
provide for?

B

STATUS OF LEGISLATION AFFECTING NASA

Appropriation Bill

President has until tomorrow mid-night to sign or veto. ✓

Continuing Resolution

Conference is scheduled to meet again on Wednesday.

It appears there is an absolute impasse between House and Senate on including language requiring President to make drastic cuts.

The impression is that the Congress has given up on getting an agreement, and the Congress is concentrating on passing the Appropriation bills. ✓

Pay Raise

The Senate Committee has finished its hearings on the bill, and is scheduled to go into executive session today to formulate its bill. It could issue its report late this week.

The Congress is beginning to act as though it wants to go home, and from this standpoint it is within the realm of possibility that no pay raise bill at all will be passed.

Best guess, however, is that the Senate will pass a bill changing the House Bill to make January 1 its effective date and make July 1, 1969 rather than April 1969 the effective date for the final raise increment to keep from having two raises in one fiscal year.

Macy of CSC gave the Senate Committee the President's feelings last week. The President still favors equal raises for Post Office and Classified, and is against the timing of the raises in 1968 and 1969. ✓

NOTES 11/6/67 RICHARD

B  
11/10

Cluster System Verification: A meeting was held on Friday, Nov. 3, with R&DC and IC personnel which outlined the deficiencies in AAP system verification as it is today. In the meeting we presented a concept to be investigated to determine if it will provide an adequate verification program. The laboratories appointed people to work with this office to investigate this concept and others. Our plan is to have a position established by the end of November or the first of December. This position will then be coordinated with the other centers to agree to a test baseline which we can recommend to AAP Program Management. ✓

R&DO AS-501 Flight Program Review: An R&DO review of mission engineering and flight programing for AS-501 was held with AERO, P&VE, and ASTR on Friday, Nov. 3. We waited until after the Flight Readiness Test to be sure we have covered all possible areas of program problems. We reviewed the updates and changes to the flight program and the many techniques and activities we have used to verify the final program. The result of this review is a flight readiness statement to Dr. Rudolph from R&DO which says the program is ready for flight. ✓

Billio

AS-501 Launch Vehicle:

o Launch window for AS-501 is between 7:00 am and 11:55 am, EST, on Thursday, 9 November 67; however the window may be extended an additional hour if the ocean is calm in the spacecraft recovery area.

o My Launch Vehicle Manager, (Bill Frye) is now publishing a daily report on the problems and pre-launch checkout status of AS-501. At this moment there is only one major open item on the vehicle, as follows:

- The S-II-1 Camera Package Batteries - the nickel-cadmium batteries which are used to eject and deploy the recovery system for camera packages, are leaking; and the electrolite could possibly cause a premature ejection of the camera package into S-II interstage. We are now reviewing the alternatives:

- (1) Fly without camera packages
- (2) Fly as is
- (3) Replace batteries - KSC and Cook Electric Company, manufacturer of the batteries, are investigating the possibility of replacing these batteries ✓

o Overall status of AS-501 launch vehicle as of 8:30 am, CST, today, Monday, 9 November 67, is as follows:

- RP-1 loading was completed Friday, 3 November 67.
- Launch vehicle heavy ordnance installation to begin 11:00 am, EST, today, Monday, 6 November 67.
- Scheduled to pick up the count at T-49 hours at 10:30 pm, EST, today, Monday, 6 November 67. ✓

1. AS-501 LAUNCH: (a) Launch Release Wind: MSC has agreed with our position that only the peak wind limit (28 knot) should be used as launch constraint; the steady state limit has been removed from the Launch Rules. Re-evaluation of S/C wind limits by MSC indicates that the present 28 kn peak wind limit for launch release corresponds to a factor of safety of 1.32 for winds from South. Going to a safety factor of 1.25 (as the L/V) would permit 30 kn winds from South and somewhat higher from other directions; however, the Mission Director decided not to change the present limit. (b) LIEF Support: Instructions have been issued to all Support Engineers here and at KSC; modifications based on CDDT experience have been implemented; new phones have been installed in the problem conference room adjacent to Firing Room #1; you will have a LIEF phone in the OMR; we have run into intermittent problems with our HOSC 224 display computer and are putting in every effort to have it in satisfactory condition. (c) Mission Failure Planning: The OMSF plan is not yet approved; we are sending a draft plan to key MSFC personnel for information and to be prepared to operate under these general guidelines if the need should arise. (d) Malfunction Reporting: As you requested, letters have been sent to all prime contractors regarding the release of sensitive information on launch and flight malfunctions. (e) Support Conflict with Surveyor F: Surveyor F is now scheduled for launch on 11/7 at 02:22 EST or any following day until 11/12; non-interference with Apollo 4 support is assured if the two launchings are two days apart; however, it may be possible to turn around in one day. (f) Command and Communications (CCS) Test: Last minute change requests from MSC on our CCS test program have been worked out and agreed to in conjunction with R-ASTR-I. (g) Viewing of Launch from 10th Floor Conference Room: Arrangements have been made to have TV and voice commentary available at T-3 hr in this Conference Room. Access is being established by Mr. Judge, MS-CH. ✓

2. REMOTE SITE DATA PROCESSOR REQUIREMENTS: We have evaluated the launch vehicle flight control requirements on the Remote Site Data Processors (RSDP) for the contingency mission AS-503/BP 30. The original MSFC requirement for AS-503 was based on a manned configuration and identifies 27 RSDP output changes from AS-502 (i. e. 27 new flight control parameters). However, we have agreed that the AS-502 launch vehicle RSDP output program can be used without change for AS-503/BP 30. It was also reconfirmed that the AS-204/LM1 launch vehicle RSDP output program can be used identically for the AS-206/LM2 contingency mission. This exercise pointed to the need of a more formal control on flight control measurements, including their onboard telemetry channelization. We are preparing steps to implement adequate controls in this area. ✓

AS-204 FLIGHT PROGRAM CHANGES: We held a meeting the past week with the cognizant MSFC personnel to verify that all known changes to the AS-204 program have been identified. According to the information we have now we are currently making what we hope to be the last change to the AS-204 program. ✓

PROPOSED UNITED AUTO WORKERS STRIKE AGAINST CHRYSLER CORPORATION: The effect of the strike proposed for this week is not known. We have been in contact with Mr. Lowrey and, as of November 3, he said Michoud is not exempt from the proposed strike but he thinks that most likely the Chrysler-Michoud people would only strike for one day, if at all. ✓

S-IB STAGE FOLLOW-ON: We received Headquarters' approval for negotiation of a sixty-day extension (through January 1, 1968) on the S-IB stage follow-on long leadtime procurement. ✓

UPDATE OF SATURN IB ATOLL SYSTEM: In furtherance of the implementation of the Automation Plan we are currently updating the Saturn IB ATOLL System to the latest version of Saturn V ATOLL for use at KSC. It is estimated that approximately 8 hours and 50 minutes of major test time can be saved per vehicle at KSC by using the updated ATOLL, and the time saved in many support tests will be over and above this figure. ✓

1. STABILIZED PLATFORM FOR EMR: Your question on Notes of 10-16-67 (copy attached).

About three years ago, ASTR initiated design studies of a simple stabilized platform with modest accuracy, as requested by OSSA (Dr. N. Roman). When the EMR project began to take shape in early 1966, this platform was the best available answer to the requirement of a pointing and holding capability during the exposure periods for the two ultraviolet experiments on EMR. These two experiments, a UV spectrograph and a UV imaging system, require modest stabilization. The platform planned by ASTR will provide + 15 degrees of freedom in yaw and pitch and + 110 degrees in roll. This inertially stabilized unit will hold the cameras on preselected positions with an accumulative error not exceeding 45 arc seconds during an exposure period of twenty minutes. The design philosophy employed was that of using present state-of-the-art techniques requiring no development of components. A complete platform has not yet been developed; this phase will not begin before approval of EMR as a flight project. ✓

2. GAMMA-RAY EXPERIMENT BALLOON FLIGHT: Our second balloon flight with the EMR gamma-ray experiment developed by Dr. Gibbons at Oak Ridge took place on November 4. Apparently it was completely successful. The package was recovered near Atlanta. ✓

During this flight, we displayed the data directly on scopes, and we also recorded them on magnetic tape. According to our present information, the data are very good. Data were taken by the launch station in Palestine, Texas; our mobile station at Jackson, Mississippi; and our Green Mountain station. ✓

3. FLIGHT TEST OF SPECTROGRAPH FOR EMR: Dr. D. Morton (Princeton) successfully tested an all-reflecting spectrograph on an Aerobee 150 at White Sands. This instrument is an incumbent for flight on EMR. Spectra will be taken of hot stars (such as Zeta Puppis) over the wavelength range 1000 to 1800 Å. Two members of SSL assisted Dr. Morton in the Aerobee flight test. ✓

4. IEEE CONFERENCE PLANNING: Dr. Hale of SSL has been appointed by the Public Affairs Office to be the Center representative to an IEEE committee for the planning of an intersociety meeting on Space Experimentation or a Space Congress to be held in Huntsville. ✓

E.S.

What's that?

B

NOTES 11-6-67 WILLIAMS

Negative report.

B  
11/10

Nov. 13, 1967

H

NOTES  
MR. GORMAN'S COPY  
NOV 13 1967

*No comment marked for DEPA.*

Dr. Johnson & Mr. Foster

12:00 - 12:30

12-20

B 11/20

NOTES 11/13/67 JOHNSON

OART FY 68 Guidelines for SRT Effort - We have been maintaining frequent contact with the Programs and Resources Division of OART in an effort to establish as firm as possible budgetary guidelines for the OART FY 68 Programs. So far as can be determined, the guidelines issued us on September 22 are now firm except for two areas - - the Nuclear Rocket Systems effort has not yet been completely defined; therefore, firm budget estimates have not yet been established. However, it is apparent that the MSFC effort will be "technology rather than stage directed" and best estimate of resources is now about \$1.4M. The Space Vehicle Systems effort appears to be in for a \$900K increase to about \$4.1M total. The best estimate of OART resources for FY 68 is now \$17.M. ✓

OSSA FY 68 Guidelines for SRT Effort - Attempts to ascertain similar guideline information from OSSA have been marked with lack of success. Because of the method of handling resources in OSSA (each Program Office handles its own budget fairly autonomously) no firm overall OSSA plan has yet been established.

The work which we are currently undertaking for the various segments of OSSA has a promised support price tag of about \$900K (of which we have received \$285K). The required MSFC investment could be appreciably higher than that. In addition to the problems which normally accrue from a lack of firm central planning and budgetary control in OSSA, it also appears that we may be victims of our own misinterpretation of what OSSA means by Supporting Research. This is an area which needs discussion, locally, in order that we develop, possibly within the "work package planning" framework, some methods for protecting ourselves against over investment of local resources. Such programs as EMR, ASTRA, ATM-follow-ons, Communication Satellites, Voyager, individual experiments payload packages, etc. are involved. I would like to discuss this with you sometime.

Sheep  
Pierce  
arrange  
machine  
B

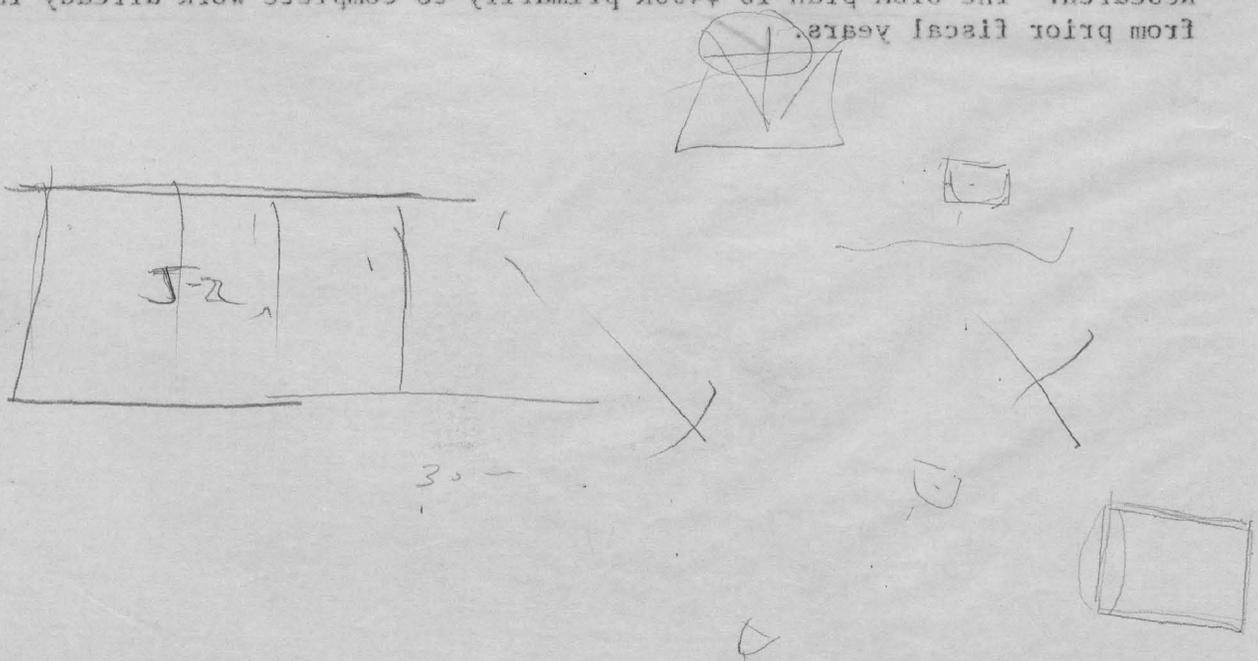
OMSF and OTDA Guidelines - The OMSF guideline now appears firm at \$16.7M (including \$12.5M J-2 improved engine and associated engineering effort), with a stated potential "overceiling" of \$1.6M for Advanced Manned Mission Supporting Research. The OTDA plan is \$400K primarily to complete work already in progress from prior fiscal years. ✓

OART FY 68 Guidelines for SRT Effort - We have been maintaining frequent contact with the Programs and Resources Division of OART in an effort to establish as firm as possible budgetary guidelines for the OART FY 68 Programs. So far as can be determined, the guidelines issued us on September 22 are now firm except for two areas - - the Nuclear Rocket Systems effort has not yet been completely defined; therefore, firm budget estimates have not yet been established. However, it is apparent that the MSFC effort will be "technology rather than stage directed" and best estimate of resources is now about \$1.4M. The Space Vehicle Systems effort appears to be in for a \$900K increase to about \$4.1M total. The best estimate of OART resources for FY 68 is now \$17.1M.

OSSA FY 68 Guidelines for SRT Effort - Attempts to ascertain similar guideline information from OSSA have been marked with lack of success. Because of the method of handling resources in OSSA (each Program Office handles its own budget fairly autonomously) no firm overall OSSA plan has yet been established.

The work which we are currently undertaking for the various segments of OSSA has a promised support price tag of about \$900K (of which we have received \$282K). The required MSFC investment could be appreciably higher than that. In addition to the problems which normally accrue from a lack of firm central planning and budgetary control in OSSA, it also appears that we may be victims of our own misinterpretation of what OSSA means by Supporting Research. This is an area which needs discussion, locally, in order that we develop, possibly within the "work package planning" framework, some methods for protecting ourselves against over investment of local resources. Such programs as EMR, ASTRA, ATM-follow-ons, Communication Satellites, Voyager, individual experiments payload packages, etc. are involved. I would like to discuss this with you sometime.

OMSF and OTDA Guidelines - The OMSF guideline now appears firm at \$16.7M (including \$12.5M J-2 improved engine and associated engineering effort), with a stated potential "overriding" of \$1.6M for Advanced Manned Mission Supporting Research. The OTDA plan is \$400K primarily to complete work already in progress from prior fiscal years.



NOTES 11/13/67 BALCH

B  
11/20

S-II-3 Testing - Stage was <sup>11/13/68</sup> removed from stand on 11/12/67 and is being installed in the Vertical Checkout Building for completion of modifications and inspection of welds and insulation. Shipment to KSC is expected to slip from 12/25/67 to 1/3/68 because of added requirement to inspect interior of LH<sub>2</sub> tank. ✓

S-II-4 Stage - Stage is still expected to arrive at MTF about 11/26/67. ✓

Anti-vortex Tests with S-IC-D - Stage was installed in the B-2 position of the S-IC test stand on 11/10/67, and modifications to stage and facility are in process. Start of anti-vortex tests is currently scheduled for 11/28/67. ✓

GE Service Contract - Comments have been received from NASA Headquarters on amendment covering second through fourth quarters of Fiscal Year 1968, and a meeting between MTF and MSFC representatives is scheduled for today at MSFC to discuss resolution of these comments. Request for proposal covering extension from 7/1/68 through 9/30/69 has been forwarded to MSFC for review and is still expected to be submitted to GE on 12/1/67. ✓

Public Affairs - Mr. Harumitsu Tomiyama, Chief Researcher, Space Research Laboratory, Tokyo, Japan, visited MTF on 11/8/67, and 11/9/67, to discuss Saturn V test facilities and to study large liquid test systems. ✓

Reaction to 501 Flight - Both Government and contractor personnel at MTF, as well as the people in surrounding communities, seem genuinely elated over the success of the flight, and I think it will give a tremendous boost to our morale. ✓

B 11/20

ATM-B OPTION STUDY: A review of the <sup>11/13/68</sup> ATM-B Option Study has been scheduled by J. Mitchell at Headquarters for November 22 in preparation for a presentation of cost, scheduling and technical approach to the Astronomy Mission Board on December 1. A short presentation to you and others on November 21 is suggested. ✓

LUNAR MOBILITY SYSTEMS: The Group for Lunar Exploration Planning (GLEP), chaired by Dr. Hess of MSC, is scheduled to meet at Houston on November 13 and 14. ✓

CREW QUARTERS REVIEW: MSFC participated in an Orbital Workshop Crew Quarters Review last week at MSC. The review was conducted utilizing the MSC plywood crew quarters mockup. Various groups of MSC personnel participated, including medical and astronauts. The location of experiments and equipment in the crew quarters was finalized to the extent that the OWS engineering mockup may be updated for the delta-PDR. ✓

FLAMMABILITY MEETING POSTPONEMENT: MSC requested that the flammability meeting scheduled for this week be delayed again due to travel cutbacks. ✓

MDA SUBSYSTEMS REVIEWS AND PDR: MDA Subsystems Reviews are being held this week in preparation for the Preliminary Design Review in December. These reviews consist of a detail analysis of the design requirements and preliminary design of each subsystem. ✓

PAYLOAD INTEGRATION CONTRACT: Authority from MSF to extend the current Phase C contract with Martin is anticipated. The extension is planned for two months (through January 31, 1968). ✓

ATM INHOUSE SUBSYSTEMS DESIGN REVIEW: The inhouse Subsystems Design Review was completed last week by Astrionics and provided an indepth penetration of systems requirements and design. ✓

LM-A SYSTEMS REVIEW: An LM-A systems review will be held at MSC November 16 and 17 to freeze the LM-A design configuration. The baseline agreed too will be pursued by Grumman as the design approach for the LM-A PDR. ✓

SOLAR SIMULATOR: The solar simulator that will be used for MSFC acceptance testing of the solar cell modules is presently undergoing tests at the vendors facility. Shipment to MSFC is expected within the next two weeks. ✓

NOTES 11-13-67 BROWN

11/13/68

B 11/20

AS-501 FLIGHT Based on information available to date, performance of the F-1 and J-2 engines was completely satisfactory. ✓

J-2 ENGINE Simulation of S-II stage operation with low pump inlet pressures continues at AEDC. Two hot firing tests (inlet pressures of 25.6 psia and 26.0 psia respectively) and one blow down test were conducted on 11/7. Additional tests were cancelled due to failure of the reusable ignition detector probe. (The probe is a ground test item.) These were the first tests after conversion of the LOX transfer system from nitrogen to helium pressurization. Nitrogen dilution in the run tank was about 0.01%. ✓

NOTES 11/13/67 CONSTAN

11/13/67

B 11/20

AGREEMENT REACHED BETWEEN CHRYSLER AND UAW

The Chrysler Corporation and the United Auto Workers (UAW) are in accord on the new labor contract and the strike scheduled for 11:59 p. m. Wednesday, November 8, 1967, has been averted.

Local management of the Chrysler Corporation Space Division has advised that although all local agreements have not been finalized, no serious problems are anticipated at Michoud. ✓

NOTES 11/13/67 - EVANS

11/13/67

B  
11/20

MSFC FIRE PREVENTION PROGRAM - Management Instruction, NMI 1700.1, Subject: Fire Prevention Program, was revised October 31, 1967. The revision includes rules for test operations with hydraulic and electrical systems, provisions for requesting approval to use a coffee making appliance within the employee's work area, fire prevention rules for instrumentation trailers, and other minor changes.



NOTES 11/13/67 FELLOWS

11/13/67

B 11/20

MSFC/KSC Mutual Assistance Program: Last week, we received the first 18 KSC Supervisory Evaluation Reports on MSFC people who had worked on AS-501 tasks at the Cape. Each of those reports is favorable to the performance and cooperation the supervisors received, and they would like to see this type of assistance continue. Copies of the 18 KSC reports have been furnished to Jim Shepherd. ✓

→ Please make them available to Haus  
Haus also B

B 11/20

11/13 JVS

1. Mission Requirements Panel: The Fifth Meeting of the Mission Requirements Panel took place at MSC on November 3, 1967. Among the items covered included a review of the October 12 and 13 Mathew's Baseline Meeting, further discussion of 2 1/2 stage to orbit and SLA/nosecone jettison, status of AAP-1A mission planning, and rendezvous and docking for the AAP 3/4 mission. Payload margins estimates of 2900 to 4000 lbs presently exist on the AAP-1A mission (assuming SA-207) for northerly launches into orbital inclinations of 50 deg and 40 deg respectively. ✓ Payload margins for the AAP-1/4 cluster were shown to be 2,792 lb, 4,151 lbs. - 1,409 lbs, and 2,956 lbs respectively. ✓ Prime candidates for improving the AAP-3 margin include 2 1/2 stage to orbit on RCS only for the CSM. At present, the AAP-3 deorbit impulse is baselined to be provided by the service propulsion system with two solid motors on the CM as backups. Eliminating the two solid motors and going to the RCS only mode will not provide as much improvement as the 2 1/2 stage concept which is estimated to improve the payload performance by 2500 lbs. ✓

2. Guidance and Performance Sub-Panel Meeting: The thirtieth meeting of this sub-panel was held at MSC on November 2, 1967. Topics of interest follow. (1) AS-205 Mission Summary: Propulsion sequence for orbital venting and orbital safing portions of 205 flight are not yet finalized due to demands on MSFC manpower by 501 flight preparations. Need for detailed sequence is not urgent, since sufficient details are now available to establish software logic. Orbital attitude limits for 204 propellant dump sequence are also valid for 205 orbital safing sequence. These include thrust vector control to maintain stage attitude during initial portion of propellant dump, with APS controlling stage attitude when attitude error > 12 in pitch or yaw. (2) AS-206 Mission Summary: MSC planning shows 206 as backup to 204, using LM-2 hardware. No primary mission for 206 is presently defined, and if 204 is successful, 206 mission will be reevaluated. If 204 is unsuccessful, 206 will fly about 3 months after 204, using 204 flight program and profile. Propellant dump simulating 205 orbital safing sequence will be included in 206 profile, (3) AS-503 Mission Summary: MSFC presented results of 503 mission profile analyses conducted by Aero-Astro dynamics Laboratory. Analyses include a second S-IVB burn of 70 seconds duration occurring at end of 3 revolutions in earth parking orbit, with no spacecraft attached, and a third S-IVB burn occurring no sooner than 80 minutes after second burn. Two options available for third burn are: (A) leave S-IVB/IU in long lifetime elliptical earth orbit, or (B) impact S-IVB/IU at a predetermined location in Atlantic Ocean. Either option can be accomplished with acceptable tracking and communications coverage. MSC had no comments or objections to profiles presented ✓

E.F. →  
 This refers to the 3rd burn, not the second one. Correct?  
 B  
 If I'm wrong please explain latest thinking for AS-503 mission profile.



11/13 JTB

1. IU PROGRAM: Instrument Unit 503 cable inspection has been completed. Twenty-seven discrepancies (2 critical, 5 major, and 20 minor) were found. This will possibly be reduced upon further review of non-conformances. ✓
  
2. CRITICAL WELDS: At the request of Dr. Mrazek, this Laboratory has completed a study of all engineering critical components on the S-II stage to determine which critical components incorporate welds. Based on this data, we have initiated the appropriate action to determine which of the vendors are accomplishing pre-production and in-process welding qualification tests. In addition, an analysis of all weld defect data compiled by NARC on the lox and LH<sub>2</sub> tank assemblies is being made to determine the effectiveness of the weld inspection that was performed at the various phases of manufacturing assembly, post-manufacturing testing, and post-static firing tests. ✓
  - o In compliance to a Program Office requirement, a list of welding critical components, piping assemblies, and flex hoses with welded or brazed joints including the names and addresses of the vendors has been compiled on the S-IVB stage. The purpose is to investigate vendor's manufacturing inspection and test procedures to make sure that everything is done to assure acceptable quality of the welds on these critical items. ✓

B 11/20

11/13/67

1. Inertial Platform (AS-502). Reference Notes 10/30/67 Haeussermann. In answer to your question on reference notes, the platform system has been qualified to the environmental conditions. The problem of the noisy servo loop and its sensitivity to temperature was a result of the solder rework. Analysis of the hardware showed that an intermittent short caused the problem and the short was "built-in" the hardware during the "repair" of the cracked solder joints at the KSC Labs. During the initial testing, the hardware did not function satisfactorily due to the existence of a short but when the unit reached thermal equilibrium the shorted connection would open and the unit functioned properly. Visual inspection could not detect this improper solder connection. ✓

! Wtf.  
Disturbing  
B

2. ATM Displays and Controls. A joint review of the ATM Displays and Controls is being held this week with MSFC and MSC personnel. Each agency has more than one approach and it is the objective of this review to jointly agree on the best overall design. ✓

3. ATM Principle Investigator Meeting. A PI meeting is scheduled at the end of this week to discuss the time lines, ATM thermal control and resolution error budgets. ✓

NOTES 11/13/67 HEIMBURG

11/13/67

B 11/20

S-IVB (MSFC)

O<sub>2</sub>- H<sub>2</sub> burner test No. S-IVB-011 was conducted on November 6, for a duration of 250.168 seconds. The primary objectives were to test with one igniter out and to start in the hot corner of the "start box". The objectives were met successfully and the system operated properly under the above conditions. This test has concluded the series of burner testing ✓

NOTES 11-13-67 HOELZER

11/13/67

B 11/20

NEGATIVE REPORT.

OART FY 68 Guidelines for SRT Effort - We have been maintaining frequent contact with the Programs and Resources Division of OART in an effort to establish as firm as possible budgetary guidelines for the OART FY 68 Programs. So far as can be determined, the guidelines issued us on September 22 are now firm except for two areas - - the Nuclear Rocket Systems effort has not yet been completely defined; therefore, firm budget estimates have not yet been established. However, it is apparent that the MSFC effort will be "technology rather than stage directed" and best estimate of resources is now about \$1.4M. The Space Vehicle Systems effort appears to be in for a \$900K increase to about \$4.1M total. The best estimate of OART resources for FY 68 is now \$17.M. ✓

OSSA FY 68 Guidelines for SRT Effort - Attempts to ascertain similar guideline information from OSSA have been marked with lack of success. Because of the method of handling resources in OSSA (each Program Office handles its own budget fairly autonomously) no firm overall OSSA plan has yet been established.

The work which we are currently undertaking for the various segments of OSSA has a promised support price tag of about \$900K (of which we have received \$285K). The required MSFC investment could be appreciably higher than that. In addition to the problems which normally accrue from a lack of firm central planning and budgetary control in OSSA, it also appears that we may be victims of our own misinterpretation of what OSSA means by Supporting Research. This is an area which needs discussion, locally, in order that we develop, possibly within the "work package planning" framework, some methods for protecting ourselves against over investment of local resources. Such programs as EMR, ASTRA, ATM-follow-ons, Communication Satellites, Voyager, individual experiments payload packages, etc. are involved. I would like to discuss this with you sometime.

Shep  
Please  
arrange  
meeting  
B

OMSF and OTDA Guidelines - The OMSF guideline now appears firm at \$16.7M (including \$12.5M J-2 improved engine and associated engineering effort), with a stated potential "overceiling" of \$1.6M for Advanced Manned Mission Supporting Research. The OTDA plan is \$400K primarily to complete work already in progress from prior fiscal years. ✓

NOTES 11-13-67 KUERS

11/13/67

B 11/20

Out-of-Vacuum Electron Beam Welding: According to a recent report from the Annual Welding Congress in Hannover, West Germany, automobile producers in Germany are welding push rod heads by electron beam techniques with the workpiece in normal atmospheric pressure. The report emphasizes that high voltage acceleration (150KV) and close proximity in the order of a few millimeters of the workpiece to the beam exit are the most important parameters for this technique. In the reported application, an output of 3,000 pieces per hour has been achieved. In this system and similar techniques using a partial vacuum in the order of 0.3 Torr all the previous advantages of electron beam welding are retained: relative stability in the workpiece, depth of weld and speed, and high weld efficiency. This adds emphasis and impetus to our own non-vacuum electron beam welding development and further confirms the potential practicality of the system. Welding engineers from Germany may visit MSFC in early 1968. ✓

11/13/67

1. SUPPORT TO MSC: In response to a request by Dr. Rees, we have sent Mr. F. LaIacona to AirResearch Corporation (ARC) to provide assistance on a brazing problem with the spacecraft water evaporation system. They apparently have about a 90% rejection rate because of brazing problems. We may not be able to do much for them since they apparently don't really want our help, but have agreed to explain their processing to us anyway. ✓
2. PULSE ARC MIG (PAMIG) WELDING AT NORTH AMERICAN ROCKWELL/SPACE DIVISION (NAR/SD): After review of the pulse arc MIG data, we agree with the NAR/SD conclusion that they are not ready to use this process in production. In conjunction with R-ME and R-QUAL, we have developed a minimum program which the laboratories involved require before we would agree to the change to the PAMIG process. It is our desire to complete this program in the next 2-3 weeks so that a decision as to the use of PAMIG on the S-II-9 cylinder 6 to bulkhead weld can be made. ✓
3. ATM CREW STATION MOCKUP REVIEW: The ATM Control and Display Mockup Review will be held in building 4619 (MSFC) on 11-15-67. The purpose of the Mockup Review is to select one of four panel concepts (2 MSFC concepts and 2 Grumman concepts) to be used for the LM/ATM mission. A team of astronauts and other MSC personnel will participate in this review. ✓
4. ORBITAL WORKSHOP NEUTRAL BUOYANCY DEMONSTRATION FOR MSC: Simulation activities covering the S-IVB Aft Dome area are scheduled to be completed 11-13-67 in the R-ME 25-foot facility. Prior to removal of this aft dome mockup to allow testing of the crew quarters area, a demonstration is scheduled for 11-14-67 to inform MSC of preliminary simulation results and to demonstrate the simulation methods used. Astronauts Lousma and McCandless will attend, although it has not been established whether they will be permitted to participate in the water. ✓
5. AS-501 REAL TIME BENDING MOMENT AND AXIAL LOAD MONITORING: During the prelaunch activities, ground winds bending moments and axial loads were monitored at vehicle station 790 (S-IC intertank) on a real time basis at the HOSC. The bending moments and longitudinal loads were also monitored on a real time basis during first stage flight. The peak bending moment occurred at approximately 78 seconds with a magnitude of 66 million in-lbs. The maximum design bending moment at station 790 is 200 million in-lbs. Therefore, the vehicle experienced approximately 33% of design bending moment at this station. ✓ The bending moment is higher than this value in the S-II stage; flight evaluation will reveal that value. ✓ The real time bending moment and longitudinal force readouts were very accurate and the system worked exceptionally well both during prelaunch activities and after lift-off to cutoff. ✓ Retro-fire of the S-IC stage was recorded and a longitudinal force of approximately 1.7 million pounds was experienced. The bending moment was still being recorded after separation. ✓
6. SPUTTERED TEFLON FILMS: We have been able to produce thin sputtered teflon films with properties which appear to be very promising for capacitors or for Printed Circuit (PC) board conformal coatings. We believe that our results are unique, and we are continuing to develop controls and to study process variables to characterize the form of teflon. Success in this venture would go a long way toward eliminating any fire hazard with PC boards. ✓

1113 JSD  
ADMINISTRATIVE OPERATIONS DEFICIT - We are preparing a letter to Dr. Mueller for Mr. Gorman which requests increased FY-68 AO funding to cover overtime and travel. The \$5,379 M cut which was recently imposed leaves the Center short by:

1.311 M travel and  
1.439 M overtime  
\$2.750 M total

The letter supports this request by the following items which have increased our requirements:

- (1) KSC support and launch related travel ✓
- (2) Dr. Rees assignment at MSC and support of this effort by MSFC & MSC technical personnel. ✓
- (3) Liaison to support APD 4H and the alternate schedule will increase travel needs. ✓
- (4) The impending RIF will increase travel requirements due to reduced contractor coverage in permanent personnel at contractor locations. ✓
- (5) Renegotiations of contracts to revised program schedule APD 4H will increase overtime and travel. ✓
- (6) Maturing AAP increases travel to establish many complex interfaces. ✓
- (7) Pure science activity involved in experiment definitions, payload development, experiment development will require increased travel to scientific work sessions. ✓
- (8) Compensatory time now approximately 40% as high as paid overtime and must be discontinued to assure continuous coverage of vital activities. (Key personnel cannot use accumulated leave because of compensatory time backlog.) ✓

TASK WORK PACKAGE - Mr. Kubat, special assistant to Dr. Mueller, will be here November 14 for discussions of development activities on the Task Work Packages and to review the non-programmatic effort in depth. ✓

Mr. Kubat will report to Dr. Mueller by November 30, 1967 on the following:

- (1) needed changes to center effort on TWP's to provide uniformity and maximum visibility
- (2) in depth examination of one major area
- (3) team assessment of each center's progress and
- (4) a schedule for completion of the work package management system throughout MSF. ✓

B 11/20

NOTES 11/13/67 RICHARD

11/13/67

Review of Saturn V Sequencing, Interlocks, and LUT Environment:

On Tuesday, Nov. 7, 1967, we held a meeting with George Hage and Mike Ross at KSC to review the circuitry, its environment and operational procedures, that control the launch from -8.8 seconds to plus six seconds. We were supported by Astrionics (Mr. Fichtner and other), KSC, and Bellcomm. We identified single point failures, procedural mistakes, and potential environmental effects which might cause early cutoff. While we did find several things we want to change, all of the failures we could conceive were of such low probability that the risks were considered acceptable. General Phillips has asked that we continue this activity and make it a part of the DCR for our first manned flight. ✓

11/13/67

B 11/20

AS-501 Launch Vehicle:

- o Gone --- but never, never to be forgotten. ✓✓
- o Launched on time. ✓✓✓
- o All primary and secondary objectives achieved. ✓✓✓
- o Flight Evaluation Working Group is reviewing launch and flight data, and the preliminary report will be sent to MSF later today (Monday, 13 Nov 67).

Congrats  
to the  
Sat. V  
Program  
office  
and the  
entire Saturn V  
team! B

AS-502 Launch Vehicle on LUT-2 at KSC:

- o Vehicle checkout is proceeding on schedule. ✓
- o Spacecraft (CSM 020) is due on-dock KSC on Wednesday, 22 Nov 67, with erection scheduled for Saturday, 9 Dec 67. ✓
- o Rollout is scheduled for 24 January 68 (Wednesday). ✓

NOTES 11/13/67 SPEER

1113 96b

B 11/20

1. AS-501 LAUNCH AND FLIGHT OPERATIONS: AS-501 was successfully launched on November 9, 1967. A preliminary assessment of the mission will be given at the Staff and Board meeting today. ✓

NOTES 11-13-67 Stuhlinger

B 11/20

111396b

1. VISIT AT MARTIN-DENVER: Jesse Mitchell has requested Jack Waite, (IO), Jim Downey and me to meet with Roland Chase of OSSA, Bill Green and other members of Headquarters at Martin-Denver on 11/16 to discuss payload integration possibilities in conjunction with our ATM Follow-on study. As you may recall, this study concerns a second ATM solar type payload, two EMR payloads and a stellar ATM. Main emphasis at the Martin meeting will be on the second ATM solar and the first EMR payloads. ✓

2. OART SUPPORT FOR OUR SRT/ART WORK: Mr. Art Reetz, OART, discussed details of SRT/ART work which SSL wishes to continue in the areas of thermal control, thermophysics, and radiation physics. Of particular interest is our work on solar wind effects and UV effects on thermal control coatings, and our studies of the radiation environment in low and in synchronous earth orbits. OART is greatly interested in tasks which support Apollo and AAP. It seems that funds for such tasks can be made available. ✓

3. PROGRESS OF INHOUSE PROJECTS: After the Green Mountain site was vetoed for SSL's radio astronomy antenna, Dave Newby helped us to obtain access to a new site on the Wildlife Preserve near Mooresville, Alabama. ✓ We hope to move our equipment within a few days, and to start operations soon after. ✓

Work on our solar observatory ("Little Kitt Peak") has progressed to the point of equipment installation. We expect to be in operation in about two weeks. The work program includes (a) testing of ATM components, such as filters, TV cameras, and displays; (b) practicing ATM operational procedures, such as identifying check marks on the solar image, moving spectrometer slits, adjusting reference grids, etc.; and (c) initiating original solar physics studies.

E.S.  
Request a 1 hr briefing on this  
B

4. MR. WEBB'S FY 69 "ABOVE THE LINE" BUDGET SUBMISSION (SENSITIVE): It was gratifying to realize that Mr. Webb has listed about 20 space science type projects as "hard requirements" in his FY 69 budget submission, but it is distressing to see that not one of these projects will be for MSFC. I still believe that we have a fighting chance to participate in ASTRA and other space astronomy programs if we make an appropriate effort. The discussion between you, Hermann Weidner, and others on this subject, which you requested on Notes of 10/30, will be most useful, in this respect.

E.S.  
Do you think we should do anything in addition to what we are presently doing?

5. REDUCTION-IN-FORCE: This week terminated in the strangest dichotomy we have ever experienced at this Center: jubilation over the wonderful success of our first big Saturn, and gloom over the pending reduction-in-force which threatens our capability to develop payloads for the Saturn which we have been so successful in building. ✓

Fet in touch w/ Jack Clark?  
B

UNITED AUTO WORKER'S STRIKE AGAINST CHRYSLER CORPORATION:

There have been reports of some strike activity at various locals throughout the country against Chrysler but we have had no indication of any strike activity at Michoud and none is anticipated. ✓

SA-204 PRE-FLIGHT REVIEW: We have scheduled the Pre-Flight Review for SA-204 for December 11 and 12. ✓ We plan to hold to these dates even if there is a slippage in schedule in an attempt to force a ferreting out of any potential problem areas at an early date. Now that AS-501 is successfully out of the way, we need to focus the collective MSFC attention on SA-204 to insure that any open items, hardware problems, etc. are promptly surfaced and resolved. ✓ All of us should be aware that because Manned Space Flight networks have become the pacing item between launches, any slippage on AS-204 will likely cause a day-for-day slip in AS-502 and AS-205. ✓

B.T.  
Can I  
be of  
any  
assistance?

CANCELLATION OF ALTERNATE AS-206 RESTART MISSION: Because of the successful demonstration of S-IVB restart on the AS-501 mission, we are dispatching a memorandum terminating all in-house and contractor effort on the alternate restart mission for AS-206. ✓

B

1. Lunar Mobility:

It was planned that we present our "proposal" on the Lunar Roving Vehicle (Mini-LSSM) to Chuck Mathews on 11/8; however, due to conflict in his schedule, the meeting did not take place. We were, therefore, requested to make the presentation at the November 13-14 meeting of the Group for Lunar Exploration Planning (GLEP) in Houston. This is a MSC run activity (Dr. Hess).

In short, we feel that we have an attractive proposal with three options:

- a. a 3-day manned vehicle with no "EXTRA" communication and navigation systems
- b. same as a. except with communication and navigation systems for over the horizon traverses
- c. this option - as presented - would be used by the astronauts for three days and then converted (simple) to an unmanned system - controlled from earth - for a 1-year operation on the surface. ✓

The only thing we ask for is that Chuck express an interest in the system and request that MSFC continue to work on the activity (which we plan to do unless Management says "Stop"). ✓

Nov. 20, 1967

NOTES  
MR. GORMAN'S COPY

NOV 20 1967

*With comments*

*(none for DEP-A)*

11/20/67

NOTES file

cy sent to R-AS-DIR

988  
3-468  
2275  
7.3/4

div 97A  
2/6

GEORGE C. MARSHALL SPACE FLIGHT CENTER  
HUNTSVILLE, ALABAMA

B 2/17

# Memorandum

TO Dr. von Braun, DIR

DATE JAN 17 1968

FROM Deputy Director, Advanced Systems Office, R-AS-DIR

SUBJECT Georgia Tech doctoral program

In answer to your question on my memo (attached) of December 13, 1967 on the above subject, Georgia Tech did drop the original earth resources plan and has adopted the synchronous orbit meteorological satellite project for their Complex Systems Design course. We are continuing to assist them in this project with the concurrence of and in cooperation with Frank Smith and are planning follow-up discussions with Leonard Jaffee.

Georgia Tech is also working directly with Smith's office and Jaffee's office lining up lecturers from NASA and other government agencies for topics itemized in their attached revised lecture schedule. The course began on January 9, 1968. MSFC will furnish lecturers for January 23 (myself and Mr. Carter of our office) and for February 8 and 13 on items 6 and 8 respectively. We hope to get someone from Astrionics for item 6 and possibly from ASO, P&VE, or AERO for item 8. We anticipate no problems. We are keeping Jim Shepherd informed.

As a result of this assistance to Georgia Tech, I have been asked by them to participate in a panel to plan their NASA doctoral grant program for 1968-1969. The panel will consist of Frank Smith; a representative from Langley; Mr. Frisbee, Chief Engineer, Lockheed, Georgia; and the Dean of Engineering and faculty members of Georgia Tech. Georgia Tech anticipates that the group will act as a board of advisors and a review board which will also help evaluate the doctoral program project and the doctoral theses. The Headquarters University Affairs Office has approved this approach by Georgia Tech.

H. S. Becker

Enc:  
as stated



GEORGE C. MARSHALL SPACE FLIGHT CENTER  
HUNTSVILLE, ALABAMA



*direct 12/18/67*

# Memorandum

TO Dr. von Braun, DIR

DATE DEC 18 1967

FROM Deputy Director, Advanced Systems Office, R-AS-DIR

*← Hal B*  
*See page 2*  
*attached*  
*B117*

SUBJECT Georgia Tech doctoral program

The delay in answering your question (on our weekly notes of 11/20/67) concerning the selection of earth resources for the Georgia Tech doctoral program was related to our concern also. Before answering, we wanted to visit Leonard Jaffe in Washington, which we did last week, to discuss the subject, including our relations with Houston. We were also aware of Jaffe's general feeling of sensitivity regarding the program. During the initial phases of our discussions with Tech, we were in contact with Jim Shepherd about the various subjects that were evolving and the program in general. The topics for consideration included overall launch vehicles systems design and unmanned planetary spacecraft in addition to the area of earth resources. Jim made an excellent suggestion to include for consideration the area of space centered activities (e.g. astronomy and physical sciences). We discussed this with Tech including aspects of manned versus unmanned activities and total system integration into earth orbital space station concepts, in addition to the other subjects. They were highly enamored with "earth resources" and elected it as their desired topic and general model problem for lecture and study purposes. We discussed our concerns with them at the time, including the same concern you had regarding our relations with Houston. Areas such as the space station problem were too big, complex, etc., in their estimation and they felt uncomfortable with that area.

During our discussions with Jaffe, he stated unequivocally that he would rather not have Georgia Tech use earth resources as its model in establishing the new graduate program. He felt he, and NASA, could not give Tech counsel, advice, support, etc., as a result of the extremely "sensitive nature" of the subject, which he has gathered from his work in this area. He would not elaborate on the nature of his concern over this sensitivity. He recommended, as an alternative, the subject of synchronous orbit meteorological satellites. He pointed out that this subject area would also lend itself to providing Tech, through the series of invited lectures (see attached copy), with the ability to include more realism as a result of actual experience in the area of meteorological satellites as opposed to the area of earth resources which is still highly speculative. I discussed this substitution, which I considered acceptable, with

Frank Smith, Assistant Administrator for University Affairs, who has been working with us. He also felt it was satisfactory, and he said he could appreciate and understand Jaffe's concern. We recognize that, in manned operations, the subject area of meteorology is also in Houston's area of authority, and unmanned activities are in Goddard's area. Our discussions with both Jaffe and Smith do not indicate that this will be a major problem in our continuing relations with Tech. In fact, Frank Smith offered the services of his office to invite and obtain lecturers from the other NASA centers, as appropriate (again, see attached list which incorporates Jaffe's recommendations for lecturers).

I hope this answers your question and concern. We will keep you informed as the program continues to evolve. Please do not hesitate to contact us in the event you should have other questions.

*Sal*  
H. S. Becker

2 Enc:

- 1 - Copy of Williams' Notes dtd 11/20/67
- 2 - Potential Lecture Series

cc:

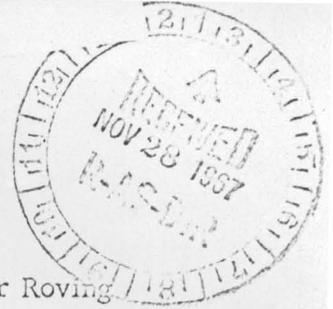
- DIR, Mr. Shepherd
- R-DIR, Mr. Weidner
- R-AS-DIR, Mr. Williams

→ Except one!

Do we continue with Georgia Tech on the original earth resources plan, in spite of Jaffe's and Smith's concern, or have we convinced Georgia Tech that we should select another topic, such as synch. orbit meteorological satellites? B



R-AS-DIR, Mr. Williams  
Room 641, Building 42



circulate  
FW/3

NOTES 11/20/67 WILLIAMS

W.C. Gads

B 11/26

1. Lunar Roving Vehicle:

Mr. L. Bradford presented on November 13, 1967, at MSC, the Lunar Roving Vehicle (LRV) to the Group for Lunar Exploration Planning (GLEP). The presentation was well received. As a result, the GLEP is to re-evaluate its earlier stand of recommending the flyer as number one priority. A group of scientists from the GLEP will re-examine the proposed AAP sites and then recommend to the GLEP which mode of mobility they prefer for initial flights. The recommendation should be made in early February 1968, and we will probably be asked to help/contribute to the effort. ✓

2. Personnel Changes in OSSA:

We learned Friday that Joseph B. Mahon (formerly Agena Program Manager) has replaced Vince Johnson as Director of Launch Vehicle and Propulsion Programs (SV), effective November 19, 1967. Vince was promoted to Deputy Associate Administrator, Engineering (SE), the position formerly held by George Hage.

F.W. He has/consult please prepare reply by 12/8 to learnings? B

3. Assistance to Georgia Tech:

As a result of a letter, dated September 22, 1967, to you from Dr. Arthur G. Hansen, Dean of Engineering of Georgia Tech, we have been working with Georgia Tech to assist them in establishing and defining a graduate systems design course with a specific project assignment which will acquaint their graduate students with "real world" systems engineering problems. We, ASO, are acting on behalf of NASA, working with Frank Smith of the University Affairs Office in Headquarters, who in Mr. Webb's name, has offered Georgia Tech aid, advice, assistance, lecturers, documents, and facilities. We have discussed this with Jim Shepherd and all responsible MSFC people in the University Affairs area. ✓

To date, we have met on three occasions with the Georgia Tech people, including Dean Hansen. We have helped them to focus in on their project for this year, a systems design study of an earth resources satellite system. We have completed a preliminary reference search and established a bibliography for their benefit; we have, in conjunction with them, prepared a proposed list of appropriate lecture subjects for their consideration; and we will assist them in securing NASA lecturers where desired.

The 2-quarter design study is in some ways similar to the Summer Faculty Fellowship Program completed here this summer. It is a multi-disciplinary systems engineering activity involving not only all appropriate schools within Georgia Tech, but also possible disciplines from other neighboring institutions. In addition to a practical completed system design, desired results of the project include derivation of specific doctoral thesis areas for NASA grant doctoral candidates, and a pattern for government/university cooperation in such joint projects.

We plan to include in our coordination loop various NASA elements, such as Headquarters, MSC, and Langley with the full concurrence of Frank Smith. ✓

Why not a space station?

F.W. → Area? We running the risk of hurting our MSC relations with that topic? B

Had please work up reply FW

Tentative Lecture Schedule  
 Complex Systems Design  
 Georgia Tech Graduate Program

<u>No.</u>	<u>Date</u>	<u>Topic</u>	<u>Organization &amp; Lecturer</u>
1.	1/16	Benefits of Synchronous Orbit Environmental Satellites	ESSA - J. Gordon Vaeth
2.	1/18	Conceptual and Preliminary Design Systems Studies	Lockheed - Georgia - Dr. Garrard
3.	1/23	Techniques of Systems Engineering and Systems Analysis (including Phased Project Planning, Contracted Studies & Use of Contracted Study Data)	MSFC - H. Becker and J. Carter
4.	1/25	Viewing Characteristics from Synchronous Earth Orbit	GSFC - not named yet
5.	2/1	Why Synchronous Orbit Meteorological Satellites and NASA's Program on Meteorological Satellites	NASA Hdqs - Tepper
6.	2/8	Attitude Control and Station Keeping	MSFC - not named yet
7.	2/10	Telecommunications, Data Handling, Processing, and Transmission with Earth Satellites	GSFC - not named yet
8.	2/13	Launch Vehicle Capabilities and Characteristics	MSFC - not named yet
9.	2/20	Sensors Characteristics and Capabilities	University of Wisconsin - Dr. Sumi
10.	2/22	EROS Satellite Program	Dept. of Interior - Dr. Fisher
11.	2/27	Cost and Development Schedule Estimating	JPL or Rand - open
Open		Operational Characteristics of Resources Satellites	MSC - open

# R&D OPERATIONS

2249

CODE	NAME	INIT.	<input type="checkbox"/> A <input type="checkbox"/> C <input type="checkbox"/> T <input type="checkbox"/> I <input type="checkbox"/> O <input type="checkbox"/> N
DIR	Dr. von Braun		
UEC DIR	<del>B</del> 12/11		

REMARKS

Subject: NOTES 11/20/67 EVANS, MSC Criteria and Standards Manual, (Copy attached)

The MSC Criteria and Standards Manual was reviewed by the laboratories to determine whether or not the Manual could be utilized by MSFC, either as an additional design manual or modified to permit use as a safety manual.

The general consensus of the laboratories was that the MSC Manual would not serve in place of our existing design manuals, which contain much more detail than the MSC Manual, nor would it be economical to maintain the MSC Manual in a current status where our design manuals and the MSC Manual would have to be continually cross checked for accuracy.

We do, however, plan to have P&VE review the MSC Manual for material not presently covered by our own design manuals and specifications and issue for use by MSFC the applicable MSC Criteria and Standards that will provide complete current coverage for all areas of design and procedure specifications and criteria. P&VE will be on the

# R&D OPERATIONS

CODE	NAME	INIT.	<input type="checkbox"/>	<input type="checkbox"/>
	PAGE 2		A	I N F O R M A T I O N
			C	
			T	
			O	

REMARKS

mailing list for future MSC issues so that we can continue to maintain a current and complete coverage in this area.



CODE R-DIR	NAME H. K. Weidner	DATE 12/1/67
---------------	-----------------------	-----------------

★

NOTES 11/20/67 WILLIAMS

1. Lunar Roving Vehicle:

Mr. L. Bradford presented on November 13, 1967, at MSC, the Lunar Roving Vehicle (LRV) to the Group for Lunar Exploration Planning (GLEP). The presentation was well received. As a result, the GLEP is to re-evaluate its earlier stand of recommending the flyer as number one priority. A group of scientists from the GLEP will re-examine the proposed AAP sites and then recommend to the GLEP which mode of mobility they prefer for initial flights. The recommendation should be made in early February 1968, and we will probably be asked to help/contribute to the effort.

2. Personnel Changes in OSSA:

We learned Friday that Joseph B. Mahon (formerly Agena Program Manager) has replaced Vince Johnson as Director of Launch Vehicle and Propulsion Programs (SV), effective November 19, 1967. Vince was promoted to Deputy Associate Administrator, Engineering (SE), the position formerly held by George Hage.

3. Assistance to Georgia Tech:

As a result of a letter, dated September 22, 1967, to you from Dr. Arthur G. Hansen, Dean of Engineering of Georgia Tech, we have been working with Georgia Tech to assist them in establishing and defining a graduate systems design course with a specific project assignment which will acquaint their graduate students with "real world" systems engineering problems. We, ASO, are acting on behalf of NASA, working with Frank Smith of the University Affairs Office in Headquarters, who in Mr. Webb's name, has offered Georgia Tech aid, advice, assistance, lecturers, documents, and facilities. We have discussed this with Jim Shepherd and all responsible MSFC people in the University Affairs area.

To date, we have met on three occasions with the Georgia Tech people, including Dean Hansen. We have helped them to focus in on their project for this year, a systems design study of an earth resources satellite system. We have completed a preliminary reference search and established a bibliography for their benefit; we have, in conjunction with them, prepared a proposed list of appropriate lecture subjects for their consideration; and we will assist them in securing NASA lecturers where desired.

The 2-quarter design study is in some ways similar to the Summer Faculty Fellowship Program completed here this summer. It is a multi-disciplinary systems engineering activity involving not only all appropriate schools within Georgia Tech, but also possible disciplines from other neighboring institutions. In addition to a practical completed system design, desired results of the project include derivation of specific doctoral thesis areas for NASA grant doctoral candidates, and a pattern for government/university cooperation in such joint projects.

We plan to include in our coordination loop various NASA elements, such as Headquarters, MSC, and Langley with the full concurrence of Frank Smith.

*M. Lorman*

*1. a  
why  
not*

11/12 JS

NOTES 11/20/67 BALCH

B 11/26

S-II-3 Testing - Stage was installed in the Vertical Checkout Building on 11/13/67. Modification work is progressing, and dye penetration tests on the LH<sub>2</sub> tank cylinders were started on 11/18/67. Shipment to KSC is still set for 1/3/68. However, there is a possibility that final inspection of the LH<sub>2</sub> tank interior may be deferred to KSC, which would permit an earlier ship date.

↳ Undesirable practice B

S-II-4 Stage - Stage is still expected to arrive at MTF about 11/26/67. ✓

S-IC Activities - Anti-vortex tests with S-IC-D are now expected to start on 12/1/67. Completion of tests and removal of S-IC-D from stand will be planned to avoid any conflict with S-IC-6 test program. ✓

GE Service Contract - MTF and MSFC representatives met at MSFC on 11/13/67 to discuss resolution of NASA Headquarters comments on amendment covering second through fourth quarters of Fiscal Year 1968. Approval of the amendment is expected this week. ✓

Hancock County Airport - On 11/16/67, the Hancock County Port and Harbor Commission readvertised for bids on the construction of their proposed airport. Specifications call for runways 4500 feet long and 150 feet wide, as before. Bid opening is scheduled for 12/12/67, with contract to be let shortly after the first of the year. ✓

Visit by Representative of Senator Stennis - Mr. Bill Spell, Assistant to Senator Stennis, accompanied by Mr. Harry Finger, NASA Headquarters, met with me on Thursday, 11/16/67. ✓

Visit by Japanese Aerospace Representative - Mr. Teikichi Otsuka, Chief of Liquid Propellant Rocket Section, National Aerospace Laboratory, Tokyo, Japan, was at MTF on 11/15/67 and 11/16/67, primarily to study our methods for testing propellants. His visit was coordinated through the NASA Office of International Affairs. ✓

Public Affairs - The MTF Public Affairs Chief spoke at a quarterly meeting of the Air Force Association at Brookley Air Force Base Saturday night, 11/18/67. U. S. Representative Jack Edwards (Democrat-Alabama) was in the audience, and after the meeting, he told our speaker that he enjoyed the talk and indicated that it furnished him a very thorough understanding of the program. ✓

11/12, JFD

GENERAL: An AAP status and assessment meeting was held by Dr. Mueller on November 18 and 19 with attendance by all OMSF Center Directors and other key personnel. The executive session on the nineteenth was held at MSFC following a tour of P&VE and ME by the entire group. I believe Dr. Mueller and others left with the favorable impression that MSFC was fully committed to the AAP program and was producing as evidenced by the test accomplishment and planning and hardware that was demonstrated. I want to thank R&DO and all their people involved (particularly Dr. Lucas and Mr. Kuers) for a fine demonstration of MSFC's progress in AAP even with a very short notification. There are still a few open areas that came out in the executive session. We will be working to finalize these understandings with MSC and Headquarters in the next few months.

INTEGRATION COMPATIBILITY REVIEWS (ICR's): ICR's for M051, Cardiovascular Function, and M018, Vectorcardiogram, which were scheduled for November 15 and 16, were postponed indefinitely at the request of MSC. They have no contract for the equipment because of the recent MSC experiment funding freeze; therefore, definition of interfaces is not practical at this time. All biomedical Experiment Integration Requirements Documents have been prepared but these ICR's will not be rescheduled before January.

ICR's and planning meetings on other AAP-2 experiments are still being scheduled in November and December. No change is anticipated in these schedules.

32-INCH SOLAR TELESCOPE (PHOTOHELIOGRAPH): Two important points covered in the Study Review of the 32-inch Photoheliograph held at JPL on November 15 (Dr. Pickering attended) were: (1) There is no significant scientific impact on the experiment in reducing the telescope size from 32-inch to 26-inch so that it may be installed in the cruciform with minimum modifications. (2) Professor Zirin prefers to replace all photography in favor of TV telemetered to the ground. JPL was proposing that this experiment could be available for a mid-71 flight with immediate go-ahead, but this schedule looks very optimistic and the experiment probably would not be ready until a year later.

AAP CONFIGURATION BASELINE AND MISSION MEETING: A meeting is scheduled with MSC on November 27 to review action items and preparation for the MSF Baseline Meeting on December 4-5. Major items to be considered in this session are as follows: (a) Studies underway to resolve the negative payload experiment on AAP-3, (b) Payload weight control and reporting, (c) The technical content and level of detail of the revised Headquarters Baseline Document (Mathews proposes to derive the Headquarters specification from this document).

DATA PACKAGE REVIEW FOR DELTA PRELIMINARY DESIGN REVIEW: Favorable results were obtained in the review at McDonnell this week. A schedule was established for delivery of the packages to the various locations. Names of the sub-board participants are being received. The rework of the mockup is on schedule.

LM-A CONFIGURATION FREEZE: We attended the LM-A Configuration Freeze Meeting at MSC on November 16 and 17. Grumman presented the LM-A configuration that they recommend be frozen to allow an orderly completion of the final design efforts which will culminate in a preliminary design review in the second quarter of 1968.

B 11/26

F-1 ENGINE In a recent cost savings move, the mode of shipment of the F-1 engines from Canoga Park, California, to Michoud was changed from the Guppy air transportation to truck transportation. Using the truck mode, however, difficulty has been encountered with the engine shipping cover, which is made of textured, rubberized fabric. Difficulties encountered include: (1) Water inside the cover on most shipments. (2) One cover was damaged en route which detained the shipment until an additional shipping cover could be provided. (3) On engine F-6066, receiving inspection checks at MAF found 26 discrepancies due to rust. (The rusting is not severe and can be removed with routine procedures.) Various approaches which will protect the engine and not represent an excessive investment are being evaluated. ✓

J-2 ENGINE Five successful tests were conducted at AEDC on 11/14 at a fuel pump inlet pressure simulating an S-II stage center engine inlet pressure of 27.0 psia. No anomalies have been noted in the engine performance for these tests.

All S-II-503 post stage acceptance test engine modifications have been completed at MTF and the engines readied for shipment to KSC. ✓

Bill B.

If I remember correctly, that would enable us to lower the LH<sub>2</sub> tank pressure in the SII by 2 psi, thus "closing the fracture mechanics credibility gap". Right? What are the SII people actually doing? B

NOTES 11/20/67 CONSTAN

11/20/68

B 11/26

Nothing of special significance.

11/20/67

B 11/26

MSFC Safety Board Meeting Number 11: The Safety Board met on November 14, 1967. Dr. Mrazek was named the Chairman for the safety review activities for SA-502. ✓

Safety Activity Information Exchange: Mr. Lederer at MSF has established a plan to conduct a conference telephone meeting between MSF, MSC, KSC and MSFC each Tuesday morning at 9:00 a. m. The purpose is to exchange information on safety activities between the different groups. ✓

MSC Criteria and Standards Manual: This manual has been reviewed by the different elements at MSFC at the request of the Safety Board. R&DO does not feel MSFC should adopt this manual. The Board has requested that R&DO arrange to receive and review this manual and all subsequent releases for the purpose of extracting any information that may be considered applicable to MSFC's needs.

→ Herbert Weidner  
Request comment.  
B

NOTES 11/20/67 FELLOWS

11/20/67

B 11/26

Neutral Buoyancy Equipment: The operating organization for this equipment in ME Laboratory will be the Space Simulation and Experiments Office. This all-civil-service operation has a planned personnel strength of 34. To get the new office staffed and operational, arrangements have been made with the Personnel Office for detailing 23 people to the office immediately. (Requests for official details have been submitted to TSO for 1 person; to Test Lab for 6; and to other elements of ME Lab for 16.) The Personnel Office will detail people to the Space Simulation and Experiments Office for the time being, with permanent transfers to be made after the overall personnel picture (RIF) has been cleared up. ✓

B 11/26

1. Astronaut Communications during Lunar Operations: During the November 3 dry run of the Lunar Roving Vehicle Presentations, you asked Mr. O. H. Vaughan of our Aerospace Environment Division, to look into the feasibility of a small light-weight rocket device that could be used on either the lunar flying vehicle or the lunar roving vehicle to provide the astronaut with emergency communications capability whenever he is out of line of sight with the LEM shelter, particularly on a long range (30 km or longer) roving or flying traverse. A quick look preliminary study revealed that a small CO<sub>2</sub> powered rocket could propel a 200 gram transponder (or similar device) to an altitude of at least 8000 meters. The system could provide 195 seconds of transmission time, assuming the signal can be received as long as the rocket is 300 meters or further above the lunar surface (assuming a smooth lunar surface, an object 300 meters above the surface should be visible 32 km away). By using other types of propellants with larger packages, then longer transmission times are possible. We understand that Advanced Systems Office is continuing to work on Lunar Roving Vehicle concepts. ✓

E.G.  
Suggest you pursue this further with ASO and Astionics so we can present Matfleets with a hardware package proposal (attachment to LFV and mini LSSM)

2. S-II External Insulation (X-15 Test): The X-15 carrying our S-II spray foam insulation test, was lost on November 15, 1967, due to an aircraft control failure. The cause of the accident (and loss of the pilot) has not been determined; however, it is not felt that our insulation sample was the cause. ✓ Mr. Taylor of P&VE was at Edwards for the flight and will be there today to aid in the investigation of the cause, if necessary. It is not known yet whether the on-board recorder containing our data was salvaged. As soon as the details are learned you will be informed. ✓

3. Apollo 4 (AS-501) Flight Evaluation: The post-flight evaluation of Apollo 4 (AS-501) by the Flight Evaluation Working Group is proceeding on schedule. No major launch vehicle malfunctions or anomalies have been identified. Several deviations have been identified and are being investigated. (1) S-II LOX ullage pressure was at the red line value of 39 psia just prior to liftoff. Conditions were in the start box at engine ignition. (2) S-II LOX ullage pressure dropped slightly below the control value towards the end of S-II burn. (3) S-IVB LH<sub>2</sub> ullage pressure was low at restart. It is presently believed that the continuous vent system was properly closed during second burn. (4) S-IVB pneumatic control system decayed more than expected during parking orbit. Subsequent pneumatic operation was satisfactory, however. (5) A longitudinal mode oscillation of 4.3 to 5.6 cps has been identified. The maximum amplitude noted on the launch vehicle was 0.3 g's peak to peak in the IU at inboard engine cutoff. A similar frequency was noted in F-1 engine chamber pressure measurements and also in the spacecraft.

Preliminary tracking data indicates the orbital insertion conditions after S-IVB second burn were: space-fixed velocity 9391.0 m/sec, 7.5 m/sec greater than predicted; flight path angle 14.993 deg, 0.295 deg less than predicted. ✓

E.F.

Pogo? What should be do about it if anything?

B

11/20/67

B 11/20

1. S-IB PROGRAM: Receiving inspection of the S-IB-11 stage produced only 77 minor discrepancies, with special inspection of the 9-A1, 9-A2, and 12-A1 distributors revealing no discrepancies. All aluminum 'B' nuts and tubing were inspected with an eddy current detector, resulting in replacement of five pieces of tubing. In addition, Marshall and Rocketdyne personnel jointly inspected five turbine blades on each H-1 engine with an eddy current detector and did not discover any flaws. It was decided to static fire S-IB-11 prior to storage so that P&VE could conduct engine "bomb" tests to determine the effect of rough combustion by one or two engines on the remaining engines. The stage is now in static test operations, and the engine "bomb" tests, originally intended as five 15-second firings, are being re-evaluated in that two starts at Rocketdyne, seven at static test, and one at launch would be very near the eleven start limit on the stage. It was also decided that S-IB-12 would be fired prior to storage, thus allowing closing of the S-IB stage static test facility by March 1968. ✓
2. ATM: We reached the decision last week to locate the ATM Clean Room and Checkout Facility in the building 4708 pressure test cell. While this gives us some problems with relocating engine test facilities, we can utilize existing sources of power, hydraulics and pneumatics, existing control rooms, and air conditioned checkout areas. This approach provides an economical ATM checkout complex, and at the same time provides a facility with the potential for cluster testing with a minimum of modification.
3. ELECTRICAL CABLE INSTALLATION: The "Apollo Saturn Stage Electrical Cable Installation Inspection Criteria" document has been distributed to a wide selection of MSFC management, to other NASA Centers, to NASA Headquarters, and to MSFC stage project offices. This document provides guideline inspection criteria and should be most influential in formulating a singular base for all stage electrical cable installations. (Document Number SR-QUAL-67-26) ✓

11/20/67

B 11/26

1. ATM Controls and Displays. Our meeting with MSC and Headquarters on the ATM Controls and Displays produced an agreement on the general configuration. Two major factors which determined the selection of the configuration were:

Lee Belew

a. The ingress/egress through the docking port as well as through the LM front hatch in a suited condition and with the life support back pack. The exit from the front hatch is necessary for the CSM/LM-ATM docked mode.

Are we preparing a neutral buoyancy mockup to verify feasibility?

b. The removal of the docking probes without cramping the astronauts working volume.

→ also →

Think we should!!

B

If you are further interested in this subject, seeing the mockups in Building 4619 will give you the best appreciation of the problems involved and the reasons for the selection of the particular configuration. ✓

2. ATM Principle Investigators Meeting. The most significant subjects covered at the ATM Principle Investigators meeting were:

a. In support of an NRL request from Dr. Tousey, Astrionics proposed to implement an XUV/TV downlink system using the existing hardware configuration which will give a video display of the total sun in XUV light at the PI ground data center during ATM mission. Transmission time will be for approximately 5 minutes per orbit. ✓

b. The MSFC fluid controlled thermal system was defined and the PI's will return a rough impact estimate within 10 days. ✓

NOTES 11/20/67 HEIMBURG

B 11/26

11/20/67

F-1 ENGINE

Test FW-073 was conducted on the West Area F-1 Test Stand with F-1 Engine S/N F-5038-1 for a mainstage duration of 45 seconds on November 16, 1967. Primary test objectives were to evaluate engine performance during lox depletion utilizing GOX pressurization, and to evaluate the thrust vector control system with modified Hydraulic Research actuator springs. The next test is scheduled for November 28, 1967, to allow time to instrument the S-11 forward skirt attached to the Mobile Acoustics Research Laboratory (MARL). ✓

S-1VB (MSFC)

On November 16, 1967, engine J-2060 was removed from the S-1VB Test Stand and J-2S was installed in preparation for firing within the next two months. ✓

S-1B (MSFC)

A simulated flight test, with fuel tank pressurization, was conducted on November 17, 1967, with stage S-1B-11. A propellant loading test was performed on November 17, 1967. Both tests were successful and no problems were encountered. Test SA-48 is scheduled for November 29, 1967. ✓

NOTES 11-20-67 HOELZER

11/20/67

B 11/26

NEGATIVE REPORT.

11/20/67

B 11/26

Sterilization Technology Group Meeting: MSFC was host Nov. 15 & 16 to the Sterilization Technology Review Group, which is composed of the Centers, Headquarters, Industrial and University elements engaged in research to establish means of producing and assuring sterile space hardware systems meeting quarantine requirements imposed on planetary entry vehicles. While MSFC has been limited primarily to the development of manufacturing and handling criteria and techniques, with only limited activities in the development of sterilizable materials and components, the Center has played a leading role in developing coordinated agency-wide research program and in assuring information exchange among the researchers participating. Our position of leadership is due primarily to the efforts of Mr. Beyerly of ME, Mr. Coons of my staff, and the interest and support of Mr. Kuers. Information for use by the designers and fabricators of planetary hardware is now becoming available. ✓

OSSA Senior Council Meeting: I attended the OSSA Senior Council meeting (vice you) at JPL on November 14. A more extensive report is in preparation and will be available to you by mid week. Highlights of the meeting were: (1) Naugle announced re-organization plans as: he replaces Newell, Nicks replaces Cortright, Vince Johnson replaces Hage, Hearth replaces Nicks. No announcement on Johnson's replacement. Naugle's replacement not yet picked, position may be vacated. (2) A number of planned "small" new starts are now to be delayed until FY 70. (3) Some programs are being stretched out; some deferred. (4) Emphasis in next two years to developing supporting research and technology base. (5) Current major emphasis on Astronomy and Earth Resources programs. (6) Lunar and Planetary Science program being de-emphasized pending generation of Congressional (and public) support. (7) Biology program being carefully integrated with OART-OMSF efforts and continued at about planned level with perhaps some change in structuring of flight program. (8) Major problems faced by all Centers were reduced A/O and manpower levels. OART Centers have been planning some joint and interim activities to avoid formal RIF actions. Mr. Bob Marshall of P&VE attended part of afternoon session and narrated the 501 launch film. He did an excellent job. ✓

Materials to Support OART FY 69 Congressional Presentations. Materials were assembled and forwarded to OART on November 17. Again this year we were faced with an extremely short response time between request date and due date. However, some pre-request information on what might be desired had been developed through personal contacts between members of the Experiments Office Staff and OART Staff; therefore, we feel that a reasonably good package of material was assembled. Our effort was conducted in cooperation with Mr. Tockley of Executive Staff. ✓

B 11/26

1 1/2 x 1/2

1. S-II Structural Test, "A" Structure: Preparations for joining the S-IC Lox Cylinder and Bulkhead to the S-II lower portion of the LH<sub>2</sub> container have been started. The first operation, i.e. the removal of the paint from the S-IC structure, has now been accomplished after late receipt of the necessary chemicals (procurement problem). The receipt of the S-II portion is now expected by Dec. 4. We have still to finalize the process and tooling for application of the spray foam insulation for this "A" structure because a different type of foam and a much thicker insulation than for the S-II flight stages are required to meet the specific needs of this structural test. ✓

2. Neutral Buoyancy Testing: On Wednesday afternoon Astronauts Cooper, McCandless and Lousma reviewed the S-IVB Aft Dome hardware in our Neutral Buoyancy Tank. They performed in scuba gear the tasks of installing the penetration seals, the same tasks as you performed the previous day. Their comments will be beneficial in obtaining optimum hardware design.

W.K. Misleading!

With scuba gear it's a cinch. The pressurized suit is what makes it difficult!  
B

W.K. Request demonstration I saw it only in the very early stage B

3. Serpentuator Test: On Thursday Astronauts McCandless and Lousma "flew" the five-link Serpentuator hardware. They felt that the concept has merit and that it has potential for many applications. ✓

4. Neutral Buoyancy Simulation Tank in Building 4706: All seam welding on the tank itself has been completed this week, and the installation of the gutter at the top of the tank and of the platforms around the tank has begun.

Apart from the erection of the steel work of the tank, a considerable amount of electrical lighting and power equipment and cabling has to be provided and, of course, pumping, heating and other equipment has also to be installed. ✓

In a meeting with Mr. Newby, Mr. Foxworthy, Mr. Dykes and representatives of R&DO, we agreed to detail six or seven men to TS-M for a period of two months to help in the installation of these items. In the same meeting, we discussed several items of auxiliary equipment which have also to be installed in order to make the tank operational. These items include a two-ton hoist, a breathing air system, a scuba cylinder filling system, a new recompression chamber, the installation of the instrumentation in a trailer to be located between Buildings 4706 and 4705, the procurement and the installation of a diving bell and airlock and the design, procurement and installation of an elevator to operate between ground floor and the upper platform and to be used for the movement of both people and equipment; this elevator is also necessary from a safety point of view to allow us to transport rapidly disabled personnel and medical assistance. ✓

B 11/26

1. SATURN V IMPEDANCE TESTING: <sup>11/20/67</sup> Configuration II (Saturn V vehicle excluding the S-IC Stage) impedance testing of the 1/10 scale model Saturn V vehicle has been completed. A data transmittal report with a complete test history of Configuration II testing will be completed by 1-15-68. Work has begun on Configuration I (complete Saturn V vehicle) buildup. Testing will begin 11-27-67, one week ahead of schedule. ✓

2. ATM CONTROL MOMENT GYRO MOTORS: The 56-day qualification test of the Bendix CMG torque motor was terminated on the 29th day because of failures in the niobium diselenide-silver brushes. Bendix personnel now agree that the brush design is deficient, and they wish to use our recommended molybdenum disulfide-tantalum brushes. We shall supply the brushes and reinitiate the qualification testing as soon as Bendix changes the brushes and returns the motors. ✓

3. AAP MECHANICAL PANEL MEETING NUMBER 4: This meeting is scheduled for 11-21-67, 8:30-4, building 4610, room 5045. Major topics are: LM/ATM RCS deflector design status; LM/ATM withdrawal envelope from SLA; Cluster coordinate system standard; LM/ATM-MDA probe installation; LM "dual purpose docking" mode status; MDA rotation; LM/ATM mounting fasteners; CSM to MDA "clocking"; and Lateral load factors as a function of MDA weight. ✓

4. ORBITAL WORKSHOP (OWS) PRELIMINARY DESIGN REVIEW: A review of the OWS advanced data package material for the Delta PDR was held at McDonnell Douglas Company on 11-13-67 and 11-14-67. Copies of data packages and sets of drawings will be distributed to NASA Headquarters, KSC, MSC, and MSFC prior to the PDR. ✓

5. EXPERIMENT INTEGRATION FOR M053, "HUMAN VESTIBULAR FUNCTION": An experiment integration meeting for M053, "Human Vestibular Function" was held on 11-15-67. M053 will now utilize MSFC-furnished multiplexes in the Orbital Workshop for telemetry instead of the Experiment Data Acquisition System. Physical data to be returned was reduced from 17 pounds to 1 pound. In attendance at the meeting were the Principal Investigator, Dr. Miller of the Naval Aerospace Medical Institute, Pensacola, Florida, and personnel from the Applied Physics Laboratory of Johns Hopkins University, MSFC, and MSC. ✓

B.L.  
Whatever that means B

6. SPRAY FOAM INSULATION: Problems persist in the development of spray foam insulation. Recent tests of the joint configuration intended to eliminate the cryopumping of air that was observed during the 8-foot tank test did not meet expectations; thus, additional work is necessary to find a satisfactory joint configuration for closeouts and repairs. North American Rockwell Corporation (NAR) personnel have also expressed concern over the recent poor results of tests on their modified "Chem-Seal" overcoating. The recent overcoat test specimens blistered, peeled, and dripped off. We are working closely with NAR in investigating these problems.

B.L.  
Let's make sure that we don't get ourselves in a schedule fix with

SII - 508 FF  
without a capability of backing out of the spray foam insulation and returning to what we have!  
Let's pursue spray foam with all we've got, but let's keep the escape hatch open! B

11/20/67

B 11/26

FY-69 BUDGET MARK FROM BOB - We have received word informally from MSF that BOB has provided a "mark" to the NASA FY-69 budget which reduces Apollo by \$137 M and AAP by \$86 M from the NASA request. The AO request for \$628 M was not revised. We expect to receive additional information early next week.

H.M.

Looks bearable, doesn't it.

What are the total figures, requested and marked?

B

TASK WORK PACKAGES - After a one day preliminary visit (November 14) Jerry Kubat advised us that Dr. Mueller's Work Package Review Team (Kubat, Disher, Stevenson, Lord, White, Gorman, Hjernevik, Siepert) would visit MSFC during the week of December 4 or December 11. He proposed that a review of the Apollo Application's Program work packages might prove more beneficial than the Apollo or non-programmatic areas.

A parallel effort to develop and install a uniform work package system for MSF is being initiated under Norm Rafel. MSFC will be asked to name a member to this committee.

NCTES 11/20/67 RICHARD

11/20/67

B 11/26

AS-501 Liftoff: To clarify the situation that has resulted from different discussions on liftoff, the following times are significant:

Holddown Arm Release (Commit)	12:00:00.346 GMT
Cne Inch Liftoff Switch	12:00:01.106 GMT
I. U. Umbilical Disconnect	12:00:01.252 GMT
Range Zero	12:00:01.0 GMT
Launch Vehicle Time Base #1 Start	12:00:01.263 GMT
Spacecraft Guidance System Liftoff	12:00:01.5 GMT

True liftoff occurred with holddown arm release, and on AS-501 it was not synchronized with GMT. We are making a modification which will synchronize this event. The flight system does not require a precision liftoff indication. The post flight evaluation process accounts for the minor variations. Because of these differences, there seems to be a one second discrepancy in press release, etc., on when liftoff actually occurred. All hardware worked as precisely as could be expected.

11/20/67

B 11/26

1. AS-501 Flight Evaluation:

The AS-501 flight evaluation is continuing with the 10-day report due to be forwarded to Washington by close of business today (Monday, 20 Nov. 67). Action items are being identified for AS-502 as each anomaly is identified. A preliminary list of actions is being published today and a more complete list will be published by 1 Dec. 67. You will be furnished copies of these actions. ✓

2. Eagle Picher Battery Problems:

As you recall, during AS-501 launch preparations in both the CDDT and Countdown, we encountered Eagle Picher battery problems. To ensure that we do not face these problems in the future, we have established a series of actions to be taken to correct known deficiencies. This includes a visit to Eagle Picher on Thurs., 30 Nov. 67, with R-ASTR, R-QUAL, Dr. Mrazek and Up-rated Saturn I in attendance. We will inform you of final actions taken as a result of this effort. ✓

3. Boeing TIE Meeting at MSFC:

We have been requested by the Apollo Program Director (Gen. Phillips) to provide an in-depth briefing on the Boeing TIE activities at MSFC. This meeting is being held today, Mon., 20 Nov 67, in the Saturn V Program Control Center. This team from Washington is headed by Lee James. He is to review Boeing TIE activities at Houston and KSC, subsequent to this visit, and will give a final report on the outcome to Mr. Webb later this month. ✓

4. S-II-4 Stage: Is now aboard the AKD Point Barrow enroute to MTF and is forecast to arrive MTF, Sun., 26 Nov. 67. ✓5. Saturn V Program Review:

The December Saturn V Program Review will be held on Tues., and Thurs. (Dec. 12 and 14, 1967) in the Saturn V Program Control Center. ✓

NOTES 11/20/67 SPEER

11/20/67

B 11/20

1. KRAFT VISIT: Chris Kraft, some time ago, has asked me to arrange for a meeting here to give him an opportunity to explain his activities and responsibilities to MSFC and, in turn to improve his personal knowledge of MSFC personnel and facilities (In all these years he hasn't seen much of MSFC yet). We had agreed to wait until after launch of Apollo 4. The two-day meeting is now scheduled for Dec. 12 and 13. The discussions will be almost entirely on AAP systems and management interfaces. An agenda has been worked out and all arrangements are being prepared in close coordination with Leland Belew and the R&DO elements involved. The following MSC personnel are expected to accompany Kraft: Hodge, Kranz, Brooks, Kovitz (Flight Operations), Astronaut Cooper and T. McElmurry (Crew Operations), Evans (AAP Program). Agenda/invitations will be issued this week.

Shep  
Let's have a nice buffet luncheon on 10th Floor with some of our other key people present.

I think it's very important that we improve our relations w/ Chris.

( "Red" carpet )  
B

F.S.  
I'm all for it!  
B

2. HOSC BACKUP POWER SUPPLY: After an extended study by R-COMP and F&D, agreement has been reached on a plan to protect the HOSC against power failure from our primary source (Guntersville Dam) and power transients (such as have occurred in the past during thunderstorms with resultant damage to equipment). A project is being initiated to provide the protection at an estimated cost of \$60,000. This is less than half the amount anticipated when the studies were initiated last winter; however, it will now require OMSF approval. ✓

3. AS-501 RECOVERY ACTIVITIES: MSFC personnel participated in the successful retrieval of the camera cassettes, photographic coverage of the S-IC ballistic flight and recovery of certain components of the S-II interstage. The MSC Landing and Recovery Division has expressed special thanks for the very competent, efficient, and cooperative manner in which Mr. Roach of P&VE conducted his assignment to these recovery activities. ✓

11/20/68

B 11/26

1. ATM FOLLOW-ON: Jesse Mitchell, Roland Chase, and members of MSFC attended a presentation at JPL on a large solar telescope (50 to 80 cm mirror), possibly to be incorporated in ATM-B. It appears that a telescope up to 60 cm mirror size could be accommodated in one quadrant without substantial changes in the cruciform and can. The integration contractor (Martin-Denver) will include this proposal in its present study. ✓

In a subsequent meeting at Martin-Denver, the status of the ATM-Follow-On Study was reviewed for OSSA and MSFC. MSC has proposed a "carrier" manipulated by the CSM, and attachable to the CSM or the MDA, designed to accommodate the earth resources instruments and other experiments on the AAP-1A flight. Approval is sought for this project by January 1968. In the Follow-on study, Martin is considering several versions of the EMR payload including the possibilities of integrating the six highest priority EMR experiments in the AAP-1A experiment carrier. ✓

E.S.

Before  
or after  
our  
2-day  
AAP meet  
with  
GEM,

Mathews  
and  
Filtuth?

B

2. VISITORS FROM LOS ALAMOS SCIENTIFIC LABORATORY (LASL):

On 11/16, Dr. Keith Boyer of LASL and seven of his associates met with members of SSL and EO to discuss the procedures, paperwork, etc., necessary to propose a space flight. Subject flight would be an infrared (0.2 cm wavelength) astronomy flight to help validate the theory that space temperature is  $\approx 2.7^\circ\text{K}$ . Visitors were escorted to IO for an AAP briefing, to R-EO for a briefing by Mr. Robert Lake, to the AAP mockup area, and then to the Test Laboratory to look over the S-IC booster in its static firing test stand. ✓

3. BALLOON FLIGHT OF EMR EXPERIMENT: Further evaluation of the balloon flight of the Oak Ridge gamma ray detector from Palestine, Texas, on 11/4 indicates that about six hours of useful data were obtained from an altitude of 117,000 feet. They were recorded at Palestine, on a truck-mounted mobile station, and at our Green Mountain station. The expected line at 511 key (electron-positron annihilation) is clearly visible. The test was made primarily as a verification of the detector shielding. ✓

B 11/20

AS-204: At this time the launch vehicle appears to be tracking on schedule, however, the LM has been running approximately 5 days behind the checkout schedule. Gen. Phillips has been particularly concerned with making any changes in the checkout schedule which would assure that the present launch schedule date is met. One of these changes has been the rescheduling of CDDT from mid-December to immediately prior to launch. When this change was discussed at KSC the latter part of October, we were asked to review the advisability of running a cryogenic propellant loading test prior to LM/LV mate. Based on a review by R&DO and the propulsion stage contractors, we recommended in a TWX to Gen. Phillips and Adm. Middleton that such a test be run to minimize the probability of a launch delay. KSC stated that this test would impact their schedule. Gen. Phillips in considering our recommendation stated that he realized that there is a slightly greater chance of a late launch hold by not conducting a wet test earlier in checkout but the risk is acceptable compared to being able to save 4 or 5 days in the schedule. On Thursday he approved the schedule with the CDDT just prior to launch. ✓

In our review of the launch vehicle posture, one of the areas receiving emphasis has been the changeout of any critical time and cycle components whose life will be marginal around the launch date. This past week the coolant pump and the gas bearing regulator were changed out on IU-204 due to life considerations. Also, consideration has been given to the requirement to change out the ST-124 due to the cyclic lifetime limitations, but due to the fact that all the gyros have been changed out, the current posture is not to change out, and to continue testing and fly with the current unit. This position is supported by Astrionics. ✓

AS-204 ICD STATUS: ICD implementation now appears to be one of the most critical documentation problems relative to AS-204. The recent emphasis on AS-501 revealed that in some areas in R&DO it appears that manpower is sufficiently critical to preclude the required ICD support on two high priority programs at the same time. In view of the above, I have obtained concurrence from the Saturn V Program Manager on AS-204 ICD's being given top priority for the next thirty days. ✓ Our target is having all AS-204 ICD's implemented by the Preflight Review scheduled for December 11 and 12, 1967. ✓ I am preparing a memorandum to the applicable laboratory directors requesting they follow this priority. ✓

1/2 GFD

B 11/26

1. Lunar Roving Vehicle:

Mr. L. Bradford presented on November 13, 1967, at MSC, the Lunar Roving Vehicle (LRV) to the Group for Lunar Exploration Planning (GLEP). The presentation was well received. As a result, the GLEP is to re-evaluate its earlier stand of recommending the flyer as number one priority. A group of scientists from the GLEP will re-examine the proposed AAP sites and then recommend to the GLEP which mode of mobility they prefer for initial flights. The recommendation should be made in early February 1968, and we will probably be asked to help/contribute to the effort. ✓

2. Personnel Changes in OSSA:

We learned Friday that Joseph B. Mahon (formerly Agena Program Manager) has replaced Vince Johnson as Director of Launch Vehicle and Propulsion Programs (SV), effective November 19, 1967. Vince was promoted to Deputy Associate Administrator, Engineering (SE), the position formerly held by George Hage.

F.W. → What are his leanings? B

3. Assistance to Georgia Tech:

As a result of a letter, dated September 22, 1967, to you from Dr. Arthur G. Hansen, Dean of Engineering of Georgia Tech, we have been working with Georgia Tech to assist them in establishing and defining a graduate systems design course with a specific project assignment which will acquaint their graduate students with "real world" systems engineering problems. We, ASO, are acting on behalf of NASA, working with Frank Smith of the University Affairs Office in Headquarters, who in Mr. Webb's name, has offered Georgia Tech aid, advice, assistance, lecturers, documents, and facilities. We have discussed this with Jim Shepherd and all responsible MSFC people in the University Affairs area. ✓

To date, we have met on three occasions with the Georgia Tech people, including Dean Hansen. We have helped them to focus in on their project for this year, a systems design study of an earth resources satellite system. We have completed a preliminary reference search and established a bibliography for their benefit; we have, in conjunction with them, prepared a proposed list of appropriate lecture subjects for their consideration; and we will assist them in securing NASA lecturers where desired.

The 2-quarter design study is in some ways similar to the Summer Faculty Fellowship Program completed here this summer. It is a multi-disciplinary systems engineering activity involving not only all appropriate schools within Georgia Tech, but also possible disciplines from other neighboring institutions. In addition to a practical completed system design, desired results of the project include derivation of specific doctoral thesis areas for NASA grant doctoral candidates, and a pattern for government/university cooperation in such joint projects.

We plan to include in our coordination loop various NASA elements, such as Headquarters, MSC, and Langley with the full concurrence of Frank Smith. ✓

Why not a space station?

F.W. → Area't we running the risk of hurting our MSC relations with that topic? B

Nov. 27 1967

H

NOTES  
MR. GORMAN'S COPY  
NOV 27 1967

*With Comments*

*(none for DEP.A)*

NOTES 11/27/67 BALCH

11/27/67

B 11/30

S-II-4 Arrival - Stage arrived at MTF on 11/26/67 as scheduled. Receiving and depackaging has been completed, and installation of the stage in the A-2 test stand is now in progress. Upon completion of installation in stand, expected by noon today, connection of umbilicals and instrumentation will be started. ✓

S-II-3 Modification and Inspection - Stage is still in the Vertical Check-out Building. X-Raying of the LOX tank was completed on 11/26/67, and closeout of the tank is expected today. Modification work is on schedule, and if final inspection of LH<sub>2</sub> tank interior is deferred to KSC, as is now planned, the stage is expected to be shipped to KSC on 12/25/67. ✓

S-IC Activities - Date for start of anti-vortex tests with the S-IC-D stage has now been changed from 12/1/67 to 12/4/67 because of late delivery of parts. Tests and removal of S-IC-D from test stand will be scheduled to avoid any conflict with S-IC-506 test program. ✓

GE Service Contract - A letter has been given the contractor to recognize precontract costs incurred prior to 12/3/67, by which time it is expected authority will have been obtained to issue the amendment covering the second through fourth quarters of Fiscal Year 1968. MSFC comments on request for proposal covering extension from 7/1/68 through 9/30/69 were received on 11/22/67. ✓

Public Affairs - Representatives from U. S. Department of Interior, Atlanta Office, visited MTF on 11/16/67 to gather general information and photographs of the area in connection with a feasibility study for a proposed recreational area. ✓

B 11/30

Notes 11/27/67  
L.B.  
Could someone give me a strictly technical briefing on this problem, preferable with actual hardware or mock-ups.  
B

11/27/67

MECHANICAL PANEL MEETING NO. 4: The fourth meeting of the AAP Inter-center Mechanical Panel was held at MSFC November 21. Agreement was reached on docking loads for design purposes.

It was also agreed by both MSC and MSFC that the dual docking (probe or drogue) design for the LM is the best solution to the problem of LM/ATM docking to the MDA. MSC is baselining this approach to Grumman Aircraft Engineering Company pending Headquarters approval.

AIRLOCK MODULE PRELIMINARY DESIGN REVIEW (PDR): The technical review portion of the AM PDR has been scheduled for November 29 and 30. We received an invitation to participate in this review and the PDR board on December 6. We are in the process of securing attendees to the technical review.

LM-A DESIGN CHANGES: As a result of the Baseline Configuration Freeze Meeting at MSC on November 16 and 17, Grumman was instructed to make the following changes to the LM-A baseline: (1) incorporate a dual purpose docking adaptor, (2) provide for an additional pressurized crew provisions area and beef up the docking structure, (3) eliminate separation capability between the LM-A and the ATM, (4) provide two-wire single point ground system in LM-A for cluster operation, and (5) route LM-A data through ATM TM system.

ATM H-ALPHA TELESCOPE NEGOTIATIONS: Negotiations for the H-Alpha telescope and the ATM pointing telescope system were completed November 17. A CPFF contract for \$999,535 was negotiated with Perkin-Elmer.

EXPERIMENT COORDINATION MEETINGS: An Experiment Coordination Meeting with ATM P.I.'s was conducted at MSFC on November 16 and 17. Significant results of the meeting included: (1) XUV Downlink: Dr. Tousey stated a MSFC proposed technique for satisfying his long standing request for transmitting to earth a TV picture of his XUV disc monitor was acceptable.

(2) Fluid Thermal Control System: All P.I.'s stated that the new fluid thermal control system will satisfy their experiment requirements but certain impacts will be felt, particularly in the area of volume, power, costs, and possibly schedule. A request for an impact statement has been placed on all P.I.'s with a suspense date of December 8.

CHRIS KRAFT'S VISIT TO MSFC: The visit of Chris Kraft to MSFC concerning AAP has been changed to December 13 and 14. Dr. Speer's office has put out a tentative agenda which includes systems briefings the first day and we have agreed to coordinate with R&DO for the briefings on the Cluster, OWS/MDA and ATM.

SOLAR ARRAY AND ACS ACTIONS: MSFC presented preliminary design plans to MDC on the OWS solar array and attitude control system and suggested possible interfaces for study by MDC and further discussion in early December. MDC will present their proposed interfaces and associated test requirements.

MSFEB MEETING ON NOVEMBER 20: The Board approved the following AAP-2 assigned experiments (related to the study of potential contamination problems) pending the availability of funds: T025, Coronagraph Contamination Measurement (MSC), T027, ATM Contamination Measurement (MSFC), and S073, Gegendstein/Zodiacal Light (MSC).

NOTES / 11-27-67 BROWN

11/27 JS

B 11/30

No significant items to report this week.

NOTES 11/27/67 CONSTAN

11/27 gfs

B 11/30

Nothing of special significance.

NOTES - 11/27/67 - EVANS

B 11/30

SAFETY BOARD

No items of interest to report this week

NOTES 11/27/67 FELLOWS

B 11/30

11/27/67

1. Neutral Buoyancy Equipment: Last week, Jeff Hamilton (MSFC liaison man at MSC) provided Mr. Weidner with a copy of an MSC Management Instruction which prescribes the requirements and the committee for operational readiness inspection for facilities and equipment used for testing in which the astronauts will participate. Hamilton also advised that Dr. Gilruth was expected to sign a letter to Marshall, requiring similar readiness inspection for our Neutral Buoyancy Equipment because the astronauts may participate in underwater tests here. (That letter was signed on November 21 and has been received at MSFC.) Based on Hamilton's advance information, a draft MSFC procedure has been prepared for readiness inspection of the Neutral Buoyancy Equipment, along the lines of the MSC Management Instruction, and is in circulation for acceptance. ✓

2. Work Packages: A meeting is being held in Washington to establish a common understanding of the content and intended use of the task work packages. Don Messer, R-OM, has been invited by the Executive Staff to represent R&DO to broaden the Center's representation in the NASA Headquarters meeting. ✓

1. Updated Saturn I Performance for AAP: Performance has been generated for all combinations of S-IB and S-IVB stages using vehicles AS-206 through AS-212. R&DO launch vehicle payload commitments for AAP-1 thru AAP-4 based on this data have been forwarded to Col. Teir for Center adoption. Commitments for AAP-1A and AAP-5 will be forwarded when all mission requirements have been established. Included in the commitments were the following performance improvements baselined by Mr. Mathews in a recent meeting at NASA Headquarters: (1) Eliminate conservatism from all performance inputs such as engine parameters, weights, etc., (2) Lower AAP-2 and AAP-4 insertion orbits to 230 n.m. and 210 n.m. respectively, (3) Jettison nose cone/SLA at ~ 180 seconds flight time (AAP-2 & 4). Weight reductions to the payloads which did not affect the commitments but improved the cluster performance situation were baselined as follows: (1) ATM electrical power system reduction (AAP-4); (2) OWS solar array vs fuel cell power (AAP-3), (3) LM free flight removal (AAP-4), (4) AAP-2&4 orbit changes reduce CSM propellant (AAP-1&3). When combined, the performance gains baselined by Mr. Mathews provide fairly comfortable payload margins for all of the cluster vehicles except AAP-3 which still has a negative margin of ~ 2,000 pounds. The following efforts are currently being pursued with MSC in an attempt to alleviate this problem: (1) 2 1/2 stage to orbit (suborbital burn of SM) or RCS only for spacecraft (no SPS or solids), (2) Relocation of expendables from AAP-3 to AAP-4 and possibly AAP-2, (3) Short SLA, (4) Further weight reductions.

2. AAP-3/4 Dual Rendezvous: The dual rendezvous nominal mission planning accounts for the nodal regression rate differences between the OWS, CSM and LM/ATM orbits. If the LM/ATM is not launched on the nominally planned day, there will be orbital plane alignment discrepancies. The payload penalty associated with these discrepancies is quadratic in time, hence contingency planning must account for delayed LM/ATM launches. Several alternatives have been investigated and presented to the AAP program manager. The alternative chosen as best for any delay of LM/ATM was: If a delay in the LM/ATM launch occurs, then as soon as this is known, the CSM maneuvers into an equi-period orbit with respect to the OWS, hence freezing all geometrical rendezvous relationships until the LM/ATM is launched. The CSM then maneuvers into its proper rendezvous geometrical relationship. This contingency plan minimizes the payload penalty for all reasonable delays of LM/ATM.

11/27/67

B 11/30

1. METROLOGY SURVEYS: A recent metrology survey of CCSD/MAF revealed no contractual or procedural discrepancies. We did offer a few suggestions which CCSD accepted and plans to implement by January 15, 1968. The survey of Boeing/Michoud's metrology lab did not reveal any discrepancies, and discrepancies noted during the January-February survey had been corrected. ✓
2. KSC SUPPORT: Personnel from this Laboratory will conduct a course in Quality Program Management at KSC the last week of this month and the first week in December. This arrangement resulted from a suggestion made by Dr. Condon at the KSC-KR survey. KSC is paying for the TDY. ✓
3. KR SURVEY OF MSFC QUALITY & RELIABILITY ASSURANCE: The survey, which was scheduled to begin November 27, 1967 has been postponed until January. ✓
4. S-II PROGRAM: NAR/SD S-II Program Management has approved the company Quality and Reliability Control Center, and assigned responsibility of operations to the Quality and Reliability Assurance organization. In the past NAR/SD had only tracked failures and some non-conformances. The Control Center is being expanded to track any significant problem. ✓
5. LEAK DETECTION IN SPACE: Melpar, Incorporated, successfully demonstrated a prototype leak detector which utilizes a cold cathode pressure gage for a sensor. The detector was demonstrated in a vacuum chamber at a pressure of  $6.1 \times 10^{-8}$  mm hg. A calibrated  $O_2$  leak of  $1 \times 10^{-6}$  CC/sec could be readily detected and located. The pressure was raised to approximately  $1 \times 10^{-6}$  mm hg. and the leak could still be located. The detector was also successfully demonstrated as a pressure gage at pressures ranging from  $6.1 \times 10^{-8}$  to  $1 \times 10^{-5}$ . Work will be initiated in the near future to prepare manufacturing drawings for procurement of qualification and flight hardware. ✓
6. CRITERIA AND STANDARDS BOARD: The Laboratory Criteria and Standards Board which was established to provide a focal point for problems concerning specifications, standards, and procedures, continued to be a fruitful effort for the Laboratory. Recent efforts have resulted in the preparation of a procedure for potting and molding to replace seven existing, and somewhat contradictory and redundant, procedures. This procedure is now ready for Center-wide coordination. Also, a new Standard for Marking of Electrical and Ground Support Equipment has been prepared to replace four other existing outdated standards. Included in the effort by this Board is the initiation of an update of numerous standards and procedures. ✓

11/27/67

1. ATM Rack. Use of the rack for the ATM was originally based on the rack being an established design for the Mapping and Survey System Module and it was never considered an optimized design for ATM. As the ATM system developed, several modifications became necessary to the rack design. NASA Headquarters has recently questioned why the rack weighs so much. With the active cooling system being incorporated for the experiment package, design restraints are changed with respect to the rack components. In view of these facts, it seems prudent to consider a more optimized rack design. The P&VE Laboratory is exploring this and will advise of the impact within a few weeks. ✓

2. LM/ATM Separation. MSC had required the emergency separation capability of the LM from ATM primarily due to the free flight mode. With the elimination of this mode, MSC has apparently taken the position that this requirement is not needed. Elimination, and therefore simplification, of this interface is welcomed by MSFC. ✓

3. R&DO ATM Management Review. The monthly review was held last week and will be completed this week. ✓

11/29 954

S-11 STRUCTURAL TEST PROGRAM

The S-11 "A" Structure is scheduled to arrive at the MSFC dock December 3, 1967. The facility construction is progressing on schedule. ✓

F-1 ENGINE

Test FW-074 is scheduled for November 29, 1967, on the West Area F-1 Test Stand. Primary test objectives will be to evaluate engine performance during lox depletion utilizing helium pressurization, and to evaluate the thrust vector control system with modified Hydraulic Research actuator springs. ✓

S-1B (MSFC)

Preparations are underway this morning to conduct the first test on S-1B-11 on November 29, 1967, in accordance with standard acceptance test procedures for S-1B flight stages. Use of a flight stage for R&D tests to study the stage/engine dynamic coupling effects (instability study) has been approved by the Stage Office. The contractor is also awaiting instructions from Michoud. The first S-1B-11 test could, therefore, be delayed as much as two weeks to install special instrumentation for baseline data. ✓

S-1VB (MSFC)

Engine HT6-B was fired Wednesday, November 22, for a duration of 15 seconds. This engine is being calibrated and checked out for use in the Saturn 1B (211) instability program. ✓

SATURN V GROUND SUPPORT EQUIPMENT

Admiral Middleton was at Test Laboratory on Tuesday, November 21, for discussion with Mr. Weidner, myself and others about performing additional modifications to the Service Arms. As our future capability is unknown, we could not guarantee that we could do the job. It was resolved that Boeing would do the work in the Test Lab facility and we will help them on an as requested basis if we have the capability. ✓

NOTES 11-27-67 HOELZER

11/27/67

B  
4/30

NEGATIVE REPORT.

NOTES 11/27/67 JOHNSON

11/27/67

B 11/30

Negative report.

11/27/67

B 11/30

S-II Pulsed Arc MIG Welding Development

A decision has been made by NAR/SD to postpone again the application of the Pulsed Arc MIG (PAM) welding technique on S-II stage hardware. We, at ME Lab, believe that we have all evidence that the PAM technique will produce LH<sub>2</sub> dome to cylinder #6 welds with a substantially lower number of defects than the present process. The engineering data for the PAM technique have been thoroughly evaluated by P&VE, and the results of this evaluation have been summarized by Dr. Lucas in a memo to Dr. Rudolph, July 5, 1967, as follows: "The analysis of the enclosed data demonstrates that for all properties considered, and at all temperatures considered, the PA MIG welds are equivalent or superior to the TIG weld used currently in the S-II stage circumferential welds." The NAR/SD manufacturing management has repeatedly stated that the shops at Seal Beach are fully prepared with their equipment and training of personnel to apply the new technique and that they also believe that they can make higher quality welds by use of this process. The NAR/SD engineering support group has been engaged since June in an engineering evaluation program of this process. This group has repeatedly demonstrated their unwillingness to perform an objective and unbiased evaluation of the PAM technique in support of the hardware program. As evidence of this lack of support, we can cite adverse reports based on test results which were later found to have been obtained on faulty test equipment or on tests performed to determine material properties not called out as engineering requirements; further evidence lies in the fact that the efforts of the engineering support group are clearly not scheduled in support of the hardware program.

For these reasons, which can be summarized as our inability to get through the system, I recommend that we give up any further attempts at introducing improvements in the welding of the S-II structure and that we direct NAR/SD to stop the PA MIG welding development program.

Bill Lucas

Do you share this view?

Ref. par. 4 Lucas NOTES c.k. 11-27-67

↓ B

What do you recommend?



1. NUCLEAR GROUND TEST MODULE: Reference comments to Notes 11-6-67 Lucas, item 8: The \$2.1M of FY-68 nuclear rocket system funds would be used to investigate basic problem areas peculiar to the nuclear vehicle, e.g., radiation effects on liquid hydrogen, materials, components, and equipment. A program to obtain large scale experimental test data on LH<sub>2</sub> heating and stratification by nuclear radiation will be continued. The experimental data will be obtained from a 105-inch diameter surplus tank, with the tests to be conducted by the contractor at the company operated reactor. Also, the contractor will perform irradiation tests on a ground test insulation system, structural materials, cryogenic seals for valves, seals for high pressure quick disconnects, etc., at the LH<sub>2</sub> temperature. The plan within MSFC is to continue the development and verification of computer codes for predicting the nuclear radiation environment and shielding criteria. Sponsored studies to establish a nuclear propulsion module flight system definition considering the new thrust level are proposed. The total funding needed for FY-68 will slightly exceed the \$2.1M; however, a significant and meaningful program can be realized at this funding level. ✓
2. LANCE COORDINATION (ARMY): Herb Fuhrmann and James Kingsbury met again with personnel from the Lance Project Office on 11-17-67. They were most enthusiastic about Fuhrmann's proposal and indicated that they would pursue it with haste. ✓ They also indicated a desire to use MSFC specifications for selecting materials which come in contact with strong oxidizers (MSFC-SPEC-106B) and MSFC methods for cleaning components used in the oxidizer system (MSFC-SPEC-164). We have provided them all necessary information. Furthermore, we agreed to test their existing seal material (butyl rubber) in a gaseous oxygen environment. They have contracted with Rocketdyne to test their seal in IRFNA\* They are most anxious not only to fix their existing problem but to get some data which indicate what the problem was. ✓
3. AAP MECHANICAL PANEL MEETING: The following significant technical agreements were made in the 11-21-67 Mechanical Panel Meeting: (a) MSFC will provide an MDA complete with all structural and functional subsystems installed. MSC will define their requirements for components, systems, etc. for MSFC design and/or installation. (b) Present location of ATM solar arrays was accepted; MSC will modify platforms and umbilicals; (c) Recommend the LM dual purpose docking as a baseline approach with drogue in MDA port 1 and with this modification use 500,000 in/lb bending moment as design limit value for MDA design. (This would solve two of our big problems.); (d) Accepted the 45° rotation of the MDA. Approximately 20 action items were accepted. ✓
4. S-II PULSE ARC MIG WELDING PROGRAM (PAMIG): As a result of an NAR/SD presentation at MSFC on their PAMIG welding program, representatives from P&VE, QUAL, and ME went to NAR/SD to establish additional work necessary to complete the program. After discussing these additional items, NAR/SD personnel stated that they did not believe PAMIG could be used successfully on the S-II stage regardless of additional effort. That conclusion was based on the low elongation of welds made with this process. NAR/SD plans to submit this position officially to the stage manager. They reportedly will propose an opposed nugget TIG study in lieu of the PAMIG. ✓

Bill Lucas

See my  
remarks on  
Kivers NOTES  
of 11-27-67\*B  
means inhibited Red Fuming Nitric Acid

NOTES/11/27/67/MAUS

11/27 955

B  
11/30

Nothing of significance to report.

NOTES 11/27/67 RICHARD

11/29/68

B<sub>11/30</sub>

No submission today.

11/27/67

B 11/30

1. AS-501 Longitudinal Accelerations ("Pogo" effects):

- o During the S-II-4 lightweight structural review held Tues., 21 Nov. 67, you commented on the longitudinal accelerations ("Pogo" effects) that were reported in the MSC AS-501 flight data. MSFC records for AS-501 show similar conditions and are reported in the MSFC 10-day report issued Tues., 21 Nov. 67. Also, this subject is covered in the Saturn AS-501 Evaluation Bulletin #2 dated 21 Nov. 67, issued by the Flight Evaluation Working Group. The statement is: "Quick-look accelerometer data in the spacecraft, instrument unit (IU), and S-IC stage show evidence of first longitudinal mode oscillation of the vehicle structure. The rough frequency range is from 4.3 cps at liftoff to 5.6 cps at first stage cutoff as expected. The maximum amplitude recorded for the IU accelerometer at inboard engine cutoff was approximately 0.14 Grms. Small F-1 engine combustion chamber pressure oscillations were noted within this range but oscillations at these frequencies were not noted in the pump inlet pressures."
- o The P&VE position as to the seriousness of the "pogo" implications is not yet established; however, verbal discussions indicate the measurements are within predicted levels. ✓

2. Apollo Technical Integration and Evaluation (TIE) Contract:

Lee James and other MSF personnel reviewed the MSFC portion of the Boeing TIE contract on Mon., 20 Nov. 67, at MSFC. We are preparing a separate report to you summarizing this review. ✓

1. AAP FLIGHT OPERATIONS: Starting in April this year we had a series of correspondence and discussions on the question of MSFC's AAP flight operations support to MSC. A support mode which appears to be acceptable to all involved is the establishment of an MSFC staffed AAP Systems and Experiments Section within the Experiments Systems Branch of MSC's Flight Control Division. The ultimate strength is estimated at four engineers. After reaching principal agreement, attempts have been underway to identify one or two engineers to form the nucleus of such an activity. The possibility of personnel reductions have brought these efforts to a standstill. In view of the importance you place on supporting the entire MSF family I would like to bring to your attention this particular area where a relatively small investment of a few good engineers (supported by some contractors) would not only help us in our general supporting role to other Centers but - even more important - would substantially aid MSFC in establishing a leading role in spacecraft design and operations and set a precedent for future programs. When you see Chris Kraft on 12/13, this subject is very likely to come up. MSC is moving out strongly in AAP Flight Operations and they will expect us to make a firm commitment soon or proceed on their own. ✓

F.S.  
Suggest you avoid this particular term, which may sound highly provoking to MSC  
P

F.S. Please make specific recommendations before we see Chris

2. AS-501 DATA DELIVERY: Data delivery from the support agencies has now been essentially completed. To summarize, the Command and Communication System experienced a few operator problems with minor losses of data, the network radar and telemetry support was good, on-board cameras recovery and film delivery was very good, the KSC camera coverage suffered a major malfunction, and delivery of some KSC recorded data has been slow due to KSC lack of a cataloging system. The KSC 100-day clock system at PAD "A" opened the camera power source at T-0 causing camera slow down and timing reference to be lost for 0.7 sec for approximately 70% of MSFC's engineering cameras. KSC has taken the appropriate action to correct this system error. Film delivery to MSFC was good. ✓

B

11/27 KA

NOTES 11-27-67 Stuhlinger

B 11/30

1. SEISMIC EFFECTS DURING 501 LAUNCH: Mr. Dailey, Dr. Dalins, and Dr. Gregory of SSL, and Mr. McCarty and Mr. Eglitis of the University of Alabama in Huntsville monitored the 501 launch at KSC with three seismographical stations arranged in a straight line array pointing in a northwest direction away from Pad 39A. Each station had a 3-axis seismograph and a low frequency microphone. All stations recorded data which has not been analyzed in sufficient detail at this time. Preliminary analysis of these data indicate, however, that there is a considerable similarity between data obtained locally and at KSC. The ground vibration from shock propagation by the atmosphere was of considerably greater intensity than observed in Huntsville. The pure seismic disturbance is also larger but is due to sandy soil conditions at KSC. ✓

2. ATM FOLLOW-ON STUDY PRESENTATION: A presentation was made last week to OSSA and OMSF on the ATM Follow-On Study. Some of the persons in attendance were Mr. Mitchell, Dr. Roman, Dr. Smith, Dr. Glaser, Mr. Chase, and Mr. Forsythe of OSSA; Dr. Meredith of GSFC; and Mr. Culbertson and Mr. Green of OMSF. The main purpose of the presentation was to provide material to lead to a Headquarters decision on the experiments for ATM-B.

It was decided that for the immediate future the Follow-on Study should concentrate on the following payload possibilities for the ATM-B payload on the second cluster:

a. The original versions of the HCO and NRL experiments proposed for ATM-A, along with approximately a 65 cm aperture version of the Zirin experiment, which would fit into one quadrant of the present ATM canister. ✓

b. The version of the EMR concept presented by SSL which depicts orientable platforms for the X-ray and gamma-ray experiments and a stabilized platform for the UV experiment. Reorientation of the cluster to acquire celestial targets is not required in this concept. ✓

c. A version of the large aperture celestial optical telescope. It was suggested that the GSFC proposal by Ken Hallum be used as the experiment for this study effort. ✓

During the meeting Phil Culbertson took the position that stellar astronomy on an ATM-B mission would require significant changes to the ATM-A hardware, even if the changes were mostly deletions. He made the point that a second solar mission, such as version "a" above, would reuse the spare systems hardware left over from the ATM-A mission, e.g. the ATM-A canister gimbal system, etc.

Mr. Mitchell made the point that, from the science standpoint, it might be more desirable to fly a stellar experiment on ATM-B. His comment was along the lines that the stellar astronomers should have their day also. Dr. Roman and Dr. Meredith also indicated the need to pursue the stellar astronomy. Dr. Meredith made the point that if HCO and NRL flew on ATM-B this selection would in essence be rewarding HCO and NRL for not meeting the ATM-A schedule. If the concept for a ground-fitted Saturn V launched workshop for the second cluster is pursued, we should be able to do both the stellar and solar astronomy. This was, of course, not discussed in the meeting in Washington. We will now begin to consider an orientable structure to provide a pointing capability for large telescopes without reorienting the cluster. ✓

NOTES 11/27/67 TEIR

11/27/67

B 11/30

SA-204: Both the launch vehicle and the LM are on the new schedule which places the CDDT just prior to launch and supports the official launch date. The inspection of the S-IVB aft skirt and aft interstage stringers was completed last week. No stringers were found milled below the .0050" limit and all were acceptable for flight. Mating of the LM-1 with the launch vehicle was completed on November 20. Only three shims were required. The mating surface was very smooth in comparison to the last SLA mate. ✓

H-1 ENGINE COMBUSTION STABILITY TEST ON S-IB-11: We had a meeting Wednesday, November 22, with representatives from P&VE lab, Test lab, and Qual lab to discuss the requirement for a H-1 engine combustion stability test (Bomb test) on S-IB-11. From the data presented it appears quite clear that the stability of the H-1 is effected by the configuration of the fuel/LOX lines and the characteristics of the engine mounting structure, and that such a test is necessary to give us increased confidence with the uprated H-1 engines. Since we have no other ready way to obtain data for the clustered stage configuration, we decided to use two R&D engines on S-IB-11 and bomb them in a series of five tests. ✓ P&VE has verified that these tests will have no adverse effect on the stage and has stated they would have considerably more confidence in the stage after these tests. ✓

11/27 JS

B  
11/30

Reorganization of "Trimble" Office in Headquarters: I learned from Doug Lord on Tuesday (November 21) that they plan a major reorganization of the office of Advanced Manned Missions in OMSF (the Trimble/Ed Gray shop).

Ed Cortright will act as head of the office and Doug Lord as his deputy. The office will be divided into "functional groups" as opposed to the present arrangement of mission groups (i.e., Launch Vehicle, Lunar, Earth Orbital, Planetary, etc.). The functional groups are:

Systems Engineering - Run by Bellcomm

Propulsion - headed by Dan Schnyer

Manned Systems - headed by Frank Dixon

Operations, Test & Reliability - headed by Maurey Raffensperger

Experiments - headed by W. Armstrong

Program Control - headed by Merle Waugh

Supporting Development - headed by Eldon Hall

There will be a major shift in emphasis as to what the nature of the office is and does, but Doug couldn't be more specific at this time.

I feel that the evolution which we in the Advanced Systems activities have undergone during the past six to nine months puts us in good shape to interface with and work closely with whatever type of operation/organization they come up with.

✓