

9-26-68

NOTES
MR. GORMAN'S COPY
JUN 3 1968

with comments

*one for DEPA (Grau notes)
has been answered by
Mr Gorman 6-24-68)*

June 3, 1968



ELITE

BEST QUALITY

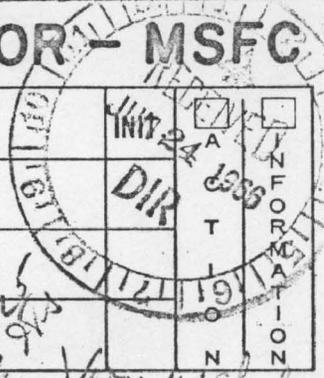
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10/11/2

NOTES file

OFFICE OF DIRECTOR - MSFC

CODE	NAME	INITIALS	DATE	STATUS
DIR	Wernher	DIR	6/29	INFORMANT
	Dr. Wernher von Braun			



REMARKS

B 6/29 Thanks. Very useful
 re. your note - we have
 planned a similar trans-
 ferring program for the
 Wage Board groups which
 are "exempted" from the
 formal reduction-in-force
 However, they are now
 almost completely occupied
 with the testing etc associated
 with Pogo. So that he has
 deferred for the time being
 However in view of
 the "freeze" conditions which
 will be a way of life for

CODE	NAME	DATE

OFFICE OF DIRECTOR - MSFC

CODE	NAME	INIT.	<input type="checkbox"/> ACTION	<input type="checkbox"/> INFORMATION

REMARKS

The next year we are planning a much more comprehensive program to include "refreshers" for engineers. We believe this is the only way we can expect to keep the place in balance. — Since we can't hire we will select an individual from within for a job that must be filled; either before or after retirement.

CODE DEP-A	NAME H. H. Gorman	DATE 6-24-68
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NOTES 6-3-68 GRAU

B 9/5

TRAINING FOR MANNED SPACECRAFT CENTER; As you will probably recall from previous NOTES, the Quality Technique Applications Group of our Programs and Resources Office initiated a sixty-day training course for those MSFC "technicians" who accepted employment at MSC during the recent RIF. The group was composed of one Supervisory Equipment Specialist, an Equipment Specialist, and three Production Controllers. Some apprehension existed from the onset of this training due to the circumstances which necessitated the affected personnel attend, the diverse background of the trainees, and age and length of experience of the individuals in fields other than quality assurance. The training has now been completed, and preliminary results indicate that the time and effort were well spent. The group displayed an excellent attitude, good initiative, and ready cooperation in all respects. Of course, the proof of the pudding will be their performance on the job. We plan to follow-up with MSC to determine this. Assuming good results, as we expect, MSFC may wish to consider retraining some of our own people in this manner. There are a number of contractor operations in this Laboratory which could be staffed by such a process.

HANK G.

Yes. Please
 set up a
 suitable program in
 conjunction with past &
 present personnel retraining
 activities

RECEIVED DEP-A
 1968 JUN 14 AM 10 54

B
6/5

NOTES 6/3/68 BALCH

S-II-3 - Cryogenic proof pressure test was successfully accomplished on 5/29/68, with no major problems encountered. Stage is currently scheduled for removal from test stand on 6/7/68 and for shipment to KSC on 6/22/68. ✓

S-II-5 - Activities have continued to be limited because of priority being given to the S-II-3 stage. Engine removal is tentatively scheduled to start on 6/5/68 in preparation for ASI line rework. Static firing is still scheduled for 7/10/68. ✓

S-II-6 - Stage is still expected to arrive at MTF from Seal Beach on 6/9/68. ✓

S-IC-6 - The S-IC Stage Manager requested that we work with Boeing in an attempt to better their proposed 8/23/68 static firing date. Preliminary indications are that the following schedule will be adopted: Power up on 7/1/68; propellant loading on 7/12/68; and static firing on 8/8/68. ✓

GE Service Contract - Negotiations of the statements of work, estimated costs, and fee for continuation of general support services at MTF during the period from 7/1/68 through 9/30/69 were concluded on 5/29/68. It is anticipated that the open items, namely, the Schedule Articles and General Provisions, will be resolved today. ✓

Legal Affairs - We have received a letter from Senator Stennis inquiring about a claim by Mr. Archie McQueen, Route 1, Picayune, Mississippi, for damages from the S-IC-5 static firing at MTF on 8/25/67. This claim was initiated by a telephone call on 8/31/67, and claim forms were sent to Mr. McQueen with instructions for filing a formal claim. The completed forms were never returned, and it was assumed that Mr. McQueen had decided not to file a formal claim. ✓

BOMEX - The survey for ESSA on the Barbados Oceanographic and Meteorological Experiment (BOMEX) is about 75% complete. Instrumentation aboard aircraft and ships lags the state-of-the-art considerably. ✓

Death of MTF Employee - Mr. Paul V. Kennedy was drowned Thursday morning, 5/30/68, in a boating accident while on a fishing trip. Mr. Kennedy came to MTF in mid-1965 from the MSFC Test Lab, where he had been employed for several years. ✓

Point to ↑
Please prepare condolence letters
to Mr. Balch
It was sent on same day, signed by Mr. Harman.
PLH
6/1
B

CONTROL MOMENT GYRO AND INVERTOR ASSEMBLY: The first CMG and Invertor Assembly has been received from Bendix. The units are presently undergoing tests in Astrionics. They will become a part of the three axis simulator when it becomes operational in the last quarter of 1968. ✓

PRELIMINARY DESIGN REVIEW (PDR) FOR H-ALPHA TELESCOPES: The Preliminary Design Review of the H-Alpha telescopes was held here at MSFC on May 27-28. The review indicated the designs to be in reasonably good shape. ✓

MODIFIED HARVARD "A" INSTRUMENT: The impact for substituting the modified Harvard "A" instrument for the HCO-C instrument on the first ATM flight has been initiated. The study should be completed July 8, with a report to Headquarters. This is in response to a Headquarters' request resulting from Dr. Goldberg's reaction to Dr. Newell's statement that the ATM will not fly in 1971. ✓

AAP-4 EVA SIMULATION AND TESTING PROGRAM: Zero "g" aircraft mockups for ATM Lunar Module (LM) end film retrieval tests are available and Zero "g" aircraft tests will start June 4 and 5, to verify the design of camera doors, lock mechanisms, extraction mechanism, etc. ✓

LM end-to-sun-end translation will be simulated in the neutral buoyancy simulator starting in mid June. The details of the placement of hand rails, translation of camera and film, and astronaut translation are still being defined. The Operational Readiness Inspection (ORI) on the neutral buoyancy simulator should be completed by June 7. ✓

The design of a new ATM neutral buoyancy test article has been started and it will be available on or about the first of August, as well as the LM-A test article, along with EVA hardware to allow simulation of EVA from the cluster. ✓

NOTES 6-3-68 BROWN

30/5

H-1 ENGINE - In response to an action item from the AS-205 DCR, Rocketdyne is reviewing data and preparing a test program to reaffirm the flight worthiness of all engine lines that incorporate a bellows section. The results from these tests will be available by July 1, 1968. ✓

F-1 ENGINE - As reported in last week's Notes, Rocketdyne has completed the planned series of six helium injection tests at the Edwards Rocket Engine Test Site (RETS). In this series of tests, helium injection appeared to trigger gas generator oscillations. However, in engine system testing at Marshall no gas generator oscillations were noted during helium injection. Investigations to better define this phenomenon are continuing. ✓

Additional tests by Rocketdyne in support of POGO are:

(1) Engine pulse tests using a modified J-2 PU valve installed in the LOX suction duct. Helium was injected at the rate of 0.15 to 0.30 lb/sec (about 1% to 2%) at 20 feet and 31 feet above the inlet. A shift in the resonant frequency of the suction duct was noted with the change in injection point.

(2) Engine pulse and turbopump tests while injecting GOX into the LOX duct at a point 3.5 inches above the pump inlet. No effect on feed system frequency with GOX injection was observed.

Evaluation of data from these tests is continuing. ✓

J-2 ENGINE - Five J-2 Engine test firings have been completed at AEDC to investigate the structural integrity of the new ASI propellant lines. Strain gage data is being analyzed. No problems are indicated to date. The next test period at AEDC is scheduled for 6/5/68; same objective. ✓

Instrumentation requirements for the engines on the S-II-503 stage have been resolved between Rocketdyne, Space Division and MSFC. An expected impact assessment from MDC should permit final resolution of S-IVB stages for AS-205 and 503 instrumentation requirements early this week. ✓

NOTES 6/3/68 CONSTAN

B 6/5

Negative Report.

3/15

MSFC SAFETY DIRECTOR

The announcement that Mr. James Murphy is to be the MSFC Safety Director has been circulated. His appointment is effective June 3, 1968; but, it will be July 1, 1968, before he assumes the responsibilities on a full-time schedule. A copy of the announcement is attached. ✓

AEROSPACE SAFETY ADVISORY PANEL

The chairman of this panel is Dr. Charles Harrington. The current plan is for the Panel to visit MSFC on June 11. During the three day visit - June 10, 11 and 12 - to MSC, KSC, and MSFC. Mr. Lederer's office will supply any specific instructions for the visit. In the meantime, preparation is in progress to give the Panel a presentation similar to the one given Dr. Egger's interim Working Group Panel last September 20, 1967. ✓

NASA SAFETY MANUAL, NHB 1700.1

The manual was circulated internal MSFC for review. It is considered to be an acceptable basis on which to develop our Safety Program. A reply with our comments has been addressed to Mr. Helgeson through Mr. Lederer. ✓

NOTES 6/3/68 FELLOWS

2/5

ASTRONAUT PARTICIPATION IN NEUTRAL BUOYANCY TESTING:

The Operational Readiness Inspection (ORI) Committee Activities are being coordinated with the interested organizational elements at Manned Spacecraft Center. When the ORI of the MSFC Large Neutral Buoyancy Simulator is completed, the MSC requirements will also be satisfied. Then the astronauts can be given clearance by Deke Slayton to perform neutral buoyancy experiments in the MSFC tank in a pressure suit environment. ✓

AS-502 LAUNCH: Various problems were experienced by the Data Reduction Branch in processing all the data required to evaluate the anomalies which occurred on AS-502 launch. These problems were as follows:

a. Failure to follow through with coordination of total data requirements as specified in the Flight Evaluation Working Group contingency plan for failure investigation. The Data Reduction Branch - Flight Evaluation Working Group schedule as depicted in the Processed Data Requirements Document is based on a success schedule. Contingency plans need to be enforced more rigorously for future flights.

b. Failure of Slidell to deliver error-free FM/FM data from S-IC stage. The problem occurred with an analog tape from TEL IV, Eastern Test Range, which had a very strong two cycle/second WOW. Slidell had problems with tape speed compensation and after two unsuccessful attempts to reduce the data, Data Reduction Branch, employing tape speed compensation, reduced the data locally. The erroneous data at two cycles/second had a very pronounced effect on the real five cycle/second data. Slidell will correct their problems.

c. Failure of North American Rockwell (NAR) to provide reduced data from the S-II stage in a timely fashion. After notification of from 48 to 72 hours delay, Data Reduction Branch produced all the data locally, making many expanded oscillograms and highly expanded digital plots around the anomaly areas. NAR claimed time decoder problems and computer problems. These problems need to be resolved.

d. Failure of a concerted effort to provide coordinated data requests to Data Reduction Branch for oscillogram data of the "133 second" phenomena. Data Reduction Branch has supplied local contractors and laboratories several thousands of feet of expanded oscillograms over this time period. In addition, MSC has requested many records of IU and SIVB data as well as data from their own instrumentation. For instance, Data Reduction Branch made oscillograms from the MSC Constant Band Width system as well as from FM/FM data.

This extraordinary effort, not completely finished yet, has required many hours of civil service and contractor compensatory time and overtime. The contractor overtime for this fiscal year is almost exhausted. The experience also points out the continued need for a strong MSFC data reduction capability.

*Feedback
See
for
reference
See Scissles
NOTES
6/3/68
B
Please
straighten
this out
for
503.*

B 6/5

1. Launch Vehicle Real Time Target Update: Based upon an MSC request we are evaluating the practicality of updating targeting, if the L/V arrives in earth parking orbit with insufficient propellant to complete our portion of the preplanned Lunar Landing Mission. This could also have merit if the S/C for some reason cannot complete its portion of the mission. Our position might prove embarrassing if we found ourselves in the above situation with sufficient propellant to accomplish a meaningful alternate, but unable to pursue alternate mission (such as circumlunar or lunar orbit with or without LM etc.) because of lack of target update confidence. ✓ It should be understood that target update would be used in contingency cases only and it will not have the thorough wringing out that the primary mission has and hence will have lower or reduced confidence. ✓ Study approach will consider the maximum possible use of primary targeting (i.e., where possible, burn towards primary targeting and either intentionally cutoff or burn to depletion as best satisfies the alternate) and evaluate through mission reoptimization where real time target update should be used. Simultaneously it is intended to devise a method to verify a range of targets acceptable to the L/V. This consideration is important enough for us to divert manpower to this effort at the expense of other pressing projects. ✓

2. AS-502 Flight Evaluation Data Problems: Re: Dr. Hoelzer's notes 5-13-68, copy attached. We must expect a certain number of data problems when we have a flight with significant malfunctions like we had on AS-502. It must also be said that P&VE with the support of Computation Laboratory did an outstanding job on identifying the engine failure mode. However, as mentioned in Dr. Hoelzer's note, the total vehicle investigation could have been handled more efficiently if established contingency plans of the Flight Evaluation Working Group (FEWG) had been followed. Management decisions were made during the first two weeks after the flight on handling the investigation of the engine problems which effectively cut the FEWG out of the loop until after the presentation to Dr. Mueller. Many of the personnel involved in the investigation did not know the potential of the FEWG and chose to conduct their activities independent of the FEWG. If the FEWG had been allowed to stay in the loop effectively, we could have eliminated some of the data problems and speeded up the total evaluation. The problems with the support to the MSC investigation of the "133 second" anomaly can also be partially blamed on not following organized procedures through the Flight Evaluation Panel. MSC does not like working through formalized channels. Another very influential factor, though, was the existence of real data problems which had to be worked.

Eberhard Bass

FYI and possible action, re MSC.
(Along the line of our telephone discussion
and Sam Phillips' request of 8/24).

See also Aschres NOTES

5-13-68,
attached.

B

Advance copy
given to Russ 6/14/68
PHE

TRAINING FOR MANNED SPACECRAFT CENTER; As you will probably recall from previous NOTES, the Quality Technique Applications Group of our Programs and Resources Office initiated a sixty-day training course for those MSFC "technicians" who accepted employment at MSC during the recent RIF. The group was composed of one Supervisory Equipment Specialist, an Equipment Specialist, and three Production Controllers. Some apprehension existed from the onset of this training due to the circumstances which necessitated the affected personnel attend, the diverse background of the trainees, and age and length of experience of the individuals in fields other than quality assurance. The training has now been completed, and preliminary results indicate that the time and effort were well spent. The group displayed an excellent attitude, good initiative, and ready cooperation in all respects. Of course, the proof of the pudding will be their performance on the job. We plan to follow-up with MSC to determine this. Assuming good results, as we expect, MSFC may wish to consider retraining some of our own people in this manner. There are a number of contractor operations in this Laboratory which could be staffed by such a process.

Harry G.

Yes. Please set up a suitable program in conjunction with past & present personnel reduction actions

Mr German answered 6-24-68

advance copy given 6/10/68
pc

B_{6/5}

1. Stratoscope II. Stratoscope II was launched at 8:55 P.M. on May 18, 1968 for its 6th flight. The balloon system and the mechanical and electronic equipment of the telescope functioned perfectly. The photographic image of night objects is somewhat degraded, apparently by air turbulence in spite of the rarity of the atmosphere at 84,000 feet. Final evaluation is not yet done. The accomplished pointing accuracy of 0.02 to 0.04 arc sec, which held up to nine (9) minutes of exposure time, represents a technological first. Our review committee has essentially contributed in establishing the flight worthiness of Stratoscope II. Mr. Boehm, who chaired the review team, several other team members and I were in Palestine, Texas for the launch event. ✓

2. Harvard College Observatory (HCO) Telescope. Reference Notes 5/20/68 Haeussermann. The preliminary review of the HCO-A modifications proposed for the first ATM mission in lieu of the HCO-C design was concluded between Ball Brothers, HCO and MSFC personnel on May 29. A gross impact report by MSFC is planned for June 7 with Dr. Reeves of HCO. The more detailed impact statements involving schedules and manhours will be available by July 21. ✓

My most cordial personal
congratulations! I know you
deserve much credit for this
fine success. Could I get a
briefing on the scientific results
when available? B

Advance copy sent
Mr. Boehm 6/14/68
BHU

F-1 TURBOPUMP POGO TESTING

Heimburg

3/5

An F-1 Turbopump POGO test was successfully conducted on 5-29-68 which completed the test requirements on the first turbopump. This test was run at a LOX pump inlet pressure of 110 psia with helium injection into the LOX preclude cavity of 0.02 lb/sec (no overboard venting). Preliminary data indicated that the natural frequency of the LOX suction line was reduced to approximately 2.8 CPS. The preclude cavity temperatures were monitored during LOX tanking with no gas injection into the cavity. These data verified that the cavity bubble collapsed during tanking when the static head pressure in the preclude reached approximately 45 psig.

We will begin change-out for the second turbopump this week. Approximately 2 weeks will be required to make the change-out and resume testing. For the test series on the second pump the pulsing system will be changed from a discharge line pulser to a suction line pulser; also, high pressure discharge ducts (502 configuration) will be used in lieu of the soft ducts (501 configuration).

ACCESS ARM (NO. 9) TESTING

Completed Environmental Chamber subsystem testing Wednesday, May 29. Chamber did not completely satisfy test criteria. KSC is aware of all deficiencies and will waive test criteria. Most discrepancies are concerned with tracking and vehicle stacking tolerances. Start of arm swing tests and system tests are dependent on delivery of Control Console from KSC. Was initially scheduled for delivery on May 24, but now scheduled sometime this week. Late delivery will impact test completion date.

F-1 ENGINE

A modified S-1C LOX preclude will be installed in the West Area F-1 Test Stand prior to the next test to investigate utilization of the LOX preclude cavity as an accumulator for another potential POGO fix. Next firing Wednesday June 5, 1968.

S-II STRUCTURAL TEST PROGRAM

The LN₂ cold shock of the cryogenic systems was successfully accomplished on May 27 and 28, 1968.

S-II-3 (MTF)

The cryogenic proof pressure test was successfully performed at MTF on May 29, 1968. A malfunction of the LH₂ fill and drain valve micro-switch was experienced, but after several cycles the indication was received and the test continued. After the test, while in the LH₂ de-tanking mode, a bad helium leak in the S7-41* was noted by the abnormal rate of depletion of helium battery pressure. Because of fear of losing stage valve control pressure, the remaining LH₂ (about 60%) and all the LN₂ were emergency dumped.

* Pneumatic Console

36/5

1. IMPORTANT VISITORS: Astronauts Dr. Ed Gibson, Dr. Owen Garriott, and Mr. Paul Weitz, and MSC officials, Dr. Glen Smith, Dr. McElmurry, and Mr. Frank Coe visited the ATM mockup in the Simulation Branch of the Computation Laboratory on May 15, 1968. They operated the manual vehicle attitude control, the manual gravity gradient momentum dump, and performed experiments scheduled for the ATM mission.

Considerable effort and substantial extra working hours were spent by civil service and contractor personnel in order to have the facility operational in time for the visit.

2. DIGITAL SIMULATOR FOR LAUNCH COMPUTER TESTING FOR ASTRIONICS LABORATORY:

A review meeting between Computation Laboratory and Astrionics Laboratory personnel was held on the progress of the development of a software simulator for real-time testing of RCA 110A Launch Computer programs. This software simulator, being developed by Computation Laboratory and Astrionics Laboratory, simulates time-dependent on-off functions of discrete networks and certain analog functions within the Space Vehicle and its Ground Support Equipment utilizing a SDS-930 computer which is connected via a special SDS interface to the two RCA 110A Launch Computers of the Saturn V Breadboard in Astrionics.

Special programs for the diagnostics of the complex system which consists of three interconnected computers were developed by Computation Laboratory and successfully used as standards during the acceptance test of the hardware interface equipment and its integration into the Breadboard Simulator System.

The software simulator programs have been nearly tested by running a test model furnished by Astrionics, and they have been implemented to such a degree that the feasibility of this promising new approach will soon be demonstrated.

Most problems regarding the intricate intercommunications of the three computers and the critical timing requirements within the software simulator seem to have been overcome. This was possible only by the close and responsive cooperation of personnel of both laboratories.

1. Open Work on AS-504 Stages: ASI line mods, additional instrumentation requirements, and other changes, coupled with long hardware lead-times, have caused a considerable amount of open work to be scheduled for accomplishment at KSC, provided the current June 30 delivery for S-IC-4, S-IVB-504 and S-IU-504 is maintained (S-II-4 was delivered to KSC in mid-May). Rocco Petrone and I both prefer that as much of this work as practicable be accomplished at the MSFC manufacturing and test sites rather than at KSC. Mr. Petrone is, therefore, re-evaluating the vehicle checkout schedules, stack dates, etc., to determine how much delay in delivery KSC can give without jeopardizing the launch date. Conversely, we are determining the maximum amount of work that can be accomplished if a delay is granted by MSF. This item will be discussed further in the Management Council Meeting on Tuesday, June 4. ✓
2. S-II-3 Stage: The cryogenic proof pressure test on S-II-3 was successfully completed at MTF on Wednesday, May 29, 1968, approximately one week ahead of schedule. ✓
3. North American-Rockwell, S-II Organization: We were advised by Mr. Greer that Mr. Harold Dale, Chief Engineer on the S-II Program, will retire from the Corporation. He will be replaced by Mr. Hal Raiklen, who we consider to be very capable. ✓
4. Sanders Claim: After several weeks of negotiating with Sanders Associates on a claim of \$2.8 M for constructive changes to the Saturn V display equipment at LC-39, a settlement of \$1.8 M was finally reached. ✓
5. Crew Safety Board: The Crew Safety Board report presented to General Phillips on 27 May 68, identified seven problems pertaining to AS-503 mission; three of which were for the launch vehicle: POGO, F-1 control engine out capability, and loss of platform attitude reference (these items are already receiving full attention at MSFC). The remaining four items dealt with the spacecraft software, spacecraft to ground communication, etc. The findings of the Board will be summarized on Thursday, 6 June 68 to Dr. Mueller as a part of the DCR agenda at KSC (see Teir's notes for similar items). ✓
6. Failure of S-II Thrust Structure Test Article ("C" Structure): The "C" Structure which failed on May 21, 1968 (failure discussed in our 5/27/68 Notes) will be restored to its pre-test condition by June 15, 1968; and prepared for the final 2 engine out ultimate tests. Analysis is continuing to determine whether hardware mods or a change in testing parameters will be required. ✓

NOTES 6/3/68 JOHNSON

Surface Thermal Characteristics Measurement Experiment - The OART Experiments Board formalized acceptance of sponsorship of this MSFC experiment in a meeting on May 29. Mr. Bill Snoddy, SSL, presented background information to them. The experiment is being performed by the Thermal Physics Division of SSL with Astrionics Laboratory support.

Project THERMO - During the ARTEB meeting referenced above, Mr. Wood, et al of P&VE gave a "for information" briefing on a proposed set of experiments to obtain engineering data on the behavior of fluids (cryogenes) in low gravity. OART essentially acknowledged a responsibility for conducting such research. Several helpful suggestions for "re-orienting" future presentations of the briefing were made. They did not volunteer financial support. The senior men present were Tischler and Ginter. The briefing was well done, constructively received, and probably, ultimately, will prove to have been very beneficial for us.

In-Space Processing - Messrs. Kuers and Wuenscher presented a briefing on a proposed program for "space manufacturing" to OMSF personnel on May 29. Messrs. Matthews, Lufkin, and Lord were scheduled to attend. Lord was able to attend part time. The briefing was essentially the one by Mr. Wuenscher which you have heard. The Center was encouraged to go ahead with the program as outlined. OMSF will support us as they can.

Meeting with Dr. Adey on Primate Experiments - The Center has been requested by OSSA (Orr Reynolds' Group) to provide engineering and manufacturing support to Dr. Adey and his group at UCLA in defining an experiment involving reactions of the nervous system (on brain) of chimps to a low "g" environment. On May 28, Dr. Hilchey (ASO), Mr. Dishman (ME), and I spent the day with Dr. Adey, his co-worker, and Mr. Jenkins (Headquarters) at UCLA reviewing the experiment for the purpose of determining whether, how, and to what extent MSFC support was required and desired. It is an extremely interesting experiment. A more extensive report on our findings is in process and a copy will be provided to you.

OART FY 70 Planning Cycle: Guidelines needed to evaluate OART plans were received May 28 with an initial written response by June 14 requested. Estimates of funding and direct manpower required are provided for eight SRT programs for FY 68, 69 and 70. Increase in funding is projected as: FY 69 -- 246.8 M an increase of 7% over FY 68, and FY 70 -- 352.3M an increase of 43% over FY 69. Guidelines do not reflect impact of recent decision for a 6.0 billion reduction in government spending. I will discuss impact with OART officials June 5 in Headquarters. New guidelines may be issued as a result of this decision.

NOTES 6-3-68 KUERS

P 6/5

No significant items to report.

B 6/5

1. S-II "C" STRUCTURE TEST FAILURE: (Reference Notes 5-27-68 Lucas)
 - a. Failure Investigation and Repair: Stress, materials and design personnel from North American Rockwell (NR) are in residence at MSFC working with R-P&VE counterparts to define the causes and origin of the failure and develop rework procedures. Preliminary assessment of the failure indicates the main thrust ring outer cap and web basically experienced a stress level greater than their capability. Although fatigue is not being ignored, there is no evidence at this time that fatigue caused the failure. Repair hardware and personnel to install it are due at MSFC today. ✓
 - b. Flight Stage Mods: A NR task team is reevaluating the mods previously designed and manufactured for the flight stages (S-II-4 and subs) and assessing changes required to those mods as a result of this failure. Design and stress specialists from R-P&VE participate in these efforts and remain in residence at NR through completion of the activities. The S-II-3 fastener problem previously mentioned to you does not appear to be as serious as stated since preliminary metallurgical evaluation of the "C" structure failure indicates that the subject fasteners did not fail first (appears to be a secondary effect rather than the primary cause of failure). No significant impact to AS-503 or AS-504 vehicle programs is anticipated as a result of the "C" structure failure. Completion of the structural rework to the test specimen is planned by the end of June and testing of the remaining two ultimate conditions will be finished by the end of August 1968. ✓
2. S-II-3 CRYOPROOF TEST: Successful test was accomplished at MTF on 5-29-68. ✓
3. POGO STATUS: A separate status review on the POGO studies has been provided to you. A full-size working group meeting will be held tomorrow. ✓
4. FLIGHT EXPERIMENTS: We presented our proposed flight experiments in the areas of fluid mechanics and cryogenic storage (formerly Project Thermo) to the OART Advanced Research and Technology Experiments Board, chaired by Mr. Ginter. The requirements for such experiments were strongly endorsed by Mr. Del Tischler, Chief of Chemical Propulsion Technology Division, OART, and Mr. D. Gilstad of the Space Vehicle Structures Division, OART. The sole question was how to establish a program which requires extensive funding. The only guidance provided was to slant the presentation more to supporting unmanned small vehicles rather than the large manned interplanetary modes discussed and to team with Lewis Research Center (actually getting Lewis personnel to make portions of presentation) in an effort to get official OART backing. OART could then negotiate with OMSF for funding and possible launch vehicle assistance. ✓
5. PERSONNEL APPOINTMENT: Mr. H. G. Paul has been appointed a member of Commission I (Cryo-physics and Cryo-engineering) of the International Institute of Refrigeration for the period January 1968 to December 1971. ✓
6. HAZARDOUS GAS DETECTION SYSTEM: Last month, CCSD had proposed to add more sampling ports to the S-IB boattail to enhance leak detection. We opposed this redesign as unwarranted and unnecessary. To prove their claim that the Hazardous Gas Detection System (HGDS) sensors were not configured properly, CCSD ran a special test on S-IB-211. Oxygen gas was introduced at various locations and in various concentrations in the boattail and, through a special valving and plumbing arrangement, gas samples were taken throughout the volume. Preliminary results corroborate the original design assumptions since the injected oxygen diffused rapidly throughout the volume and was detected in the anticipated concentration on all sensors. It is our understanding that KSC may raise the HGDS issue at the AS-205 Phase II DCR since KSC does not like the CCSD requirement for visual inspection for leaks after LOX load; the S-IB-211 tests do not support the necessity for any visual inspection as we have maintained all along. ✓

Dr. Debus
FYI
B 6/5

NOTES 6/3/68 MAUS

RIF STUDY - At the request of Mr. Gorman, we have completed an analysis of the Marshall reduction-in-force in concert with the Manpower Utilization & Administration Office. A report of study results has been completed and provided to DEP-A for distribution to Mr. Webb, Dr. Mueller, other Centers, and the Civil Service Commission and a copy has been provided to Mr. Shepherd for your review. A brief summary of the findings is as follows:

MAUS
B/15

In the latter half of 1967, Congress enacted a NASA appropriation bill \$511 Million below the administration request. Of that reduction, \$43 Million was in the AO appropriation. NASA management decided that approximately \$5 Million would have to be taken from personnel costs. As a result, MSFC was directed to reduce its staffing by 700 effective January 13, 1968.

The Marshall reduction-in-force plan was designed to preserve the Center's Apollo and AAP capability with minimum disruption of other ongoing efforts. The plan was developed in coordination with Local 1858 - AFGE, NASA Headquarters, and the Civil Service Commission.

After formal announcement of the RIF, the union petitioned the Federal Courts to enjoin NASA from executing the RIF action. The Court granted the injunction and, as a result, Marshall lost its ability to control execution of the RIF according to plan.

Consequently, the Center lost 787 personnel during the RIF period, only 417 of whom held any kind of RIF notice. Although the total loss was close to that planned, the intended skill mix was compromised by 47%. Losses in the engineering/scientific area were five times as great as planned and represented 755 years of accumulated technical experience on MSFC programs. The losses were also heavy in the younger and lower grade employees of the Center. Additionally, there were 195 reassignments required to carry out the RIF after the injunction was lifted, resulting in a loss of approximately 585 man-months of productive effort during employee re-orientation.

The effects of civil service employee morale was predictably severe, but the effects on support contractor morale were more extreme than anticipated. The Union emerged in a position of increased stature and experienced a membership growth of 58%.

We cannot predict whether future reductions-in-force in this or any other agency of the government would be controllable, or whether outside influence would again cause the mechanism to go awry. Neither can we predict what the actual results of the Marshall RIF would have been if effected under controlled conditions. We can conclude, however, that the precedent has been set for viable union involvement in the process, and for intervention by the Courts. Planning for future reductions-in-force should not overlook these vital factors.



NOTES 6/3/68 RICHARD

No notes this week.

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NOTES 6/3/68 SPEER

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1. ALSEP GROUND CONTROL: General Stevenson has extended our deadline on the Apollo Lunar Surface Experiment Package until 6/12. We have made substantial progress in our efforts to understand all requirements for the ground control of ALSEP. It appears to me that MSC's proposal is significantly more expensive than necessary and that a utilization of the HOSC/Comp Lab facilities would be technically feasible. MSC seems determined to resubmit the same proposal; intelligence from the other potential bidders is still incomplete. ✓

NOTES 6-3-68. Stuhlinger

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1. BALLOON FLIGHT: A successful balloon flight of the ORNL Gamma-Ray Experiment was made Tuesday night from Palestine, Texas. The data system had been built by SSL, with support from ASTR. A first look at the data received looked good as to format and quality. ✓
2. CONVAIR 990 EXPERIMENT: All the major testing of the Solar Constant Experiment has been concluded; preparations for packaging and shipment to Ames have begun. The Convair 990 flights are set to begin on July 17; Roger Linton will arrive at Ames on June 25 to allow sufficient time for recalibration of the heliometer and mounting of the equipment. An extensive preflight test program has been developed. ✓
3. NEW QUARTERS FOR SSL: Dr. Shelton's Division (Nuclear and Plasma Physics) moved into the northwest section of Building 4481. This section had been under renovation and modification for laboratory use during the past nine months, as the first step of the planned renovation of 4481 for SSL. ✓

NOTES 6/3/68 TEIR

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AS-205 STATUS: CM-101 arrived at KSC the afternoon of May 30. There are no known problems at this time that would cause delay of launch beyond the normal prelaunch checkout time requirement. ✓

MDC has defined the hardware and system changes required to implement the DCR Board's decision to reduce the LH₂ tank ullage pressure. The modification kit with pressure switch and valves is scheduled to be delivered to KSC the last week in June which should be consistent with the AS-205 launch schedule. ✓

The tightest areas in the launch vehicle schedule will be the hardware availability for the S-IVB instrumentation change required to evaluate the performance of the J-2 ASI line and the S-IB instrumentation change required for the H-1 engine LOX seal and drain line temperature interlock. ✓

George Low has informed KSC that he needs the SLA (non-flight hardware) that is presently being used on 205 at MSC in the near future. KSC has scheduled the SA-205 pull test for June 10 prior to removal of the SLA. ✓

SINGLE FAILURE POINT MEETING: Saturn V, Engine Office, and our office met with George White, MAR, Headquarters, Wednesday to discuss the approach to be used to conclude our single failure point action from the SA-205 DCR. We plan to have the top ten items discussed at a pre-meeting with Headquarters Staff Offices the week of June 21, 1968, and then Headquarters (probably George White) will generally summarize that meeting at the July DCR. Additionally, we were requested to re-do our addendum to include all items that could or would cause a Category I or II loss: this means we will consider piping, wiring, etc., as Saturn V is now doing. This new listing is to be provided to Headquarters (George White) at some later date prior to the PFR. We have moved out to implement these new guidelines. ✓

NOTES 6-3-68 WILLIAMS

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1. Nuclear Systems: The RFQ for the "Nuclear Propulsion Module Flight Systems Definition Study" was scheduled to be released May 24, 1968, by Purchasing Office. However, at the very last minute, SNPO at Dr. Mac Adams' direction asked that the RFQ be placed in a "hold" status pending further clarification of the NASA budget and the nuclear program in particular. There is no indication at this time how long the "hold" will last. (Probably until Congress completes NASA's authorization hearings and the bill is signed.) ✓

2. Subsystems Activities: AiResearch made an excellent presentation on an inhouse study of "The Impact of Maintainability on the Design of Long Duration Life Support Systems" to more than 20 MSFC personnel.

AiResearch claimed their Sabatier System has worked for 60 days in the recent DAC/MOL simulator test. The development time for an R&D 4-man flight design life support system as described in the presentation, AiResearch estimates will require 5 years before it can be flown. ✓

June 10, 1968



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BY COTTON
ADIS FREE

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NOTES
MR. GORMAN'S COPY
JUN 10 1968

*With comments.
(none marked for DEP-A)*

NOTES - 6/10/68 - BALCH

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S-II-3 - The cable on the main derrick of the A-2 Test Stand failed while undergoing a proof-load test on 6/6/68 preparatory to removal of the S-II-3 stage from the stand the following day. Repairs to the derrick were completed last Saturday, 6/8/68, and proof-loading was accomplished on 6/9/68. The S-II-3 stage will be removed from the stand today and placed in the stage service building for LH₂ tank entry and inspection. Shipment to KSC is still scheduled for 6/22/68. ✓

S-II-5 - Work is still limited because of higher priority being given to the S-II-3 stage and also because of hardware shortages. Lowering of engines in preparation for ASI line rework has been deferred until modification hardware is available. Static firing is still set for 7/10/68. ✓

S-II-6 - Stage arrived at MTF on Friday, 6/7/68, at approximately 8:30 p.m. It is to be stored in the S-IC storage building until the S-II-3 stage has been shipped to KSC. ✓

S-IC-6 - Work schedule and static firing are still indefinite pending resolution of plans for mods to effect POGO solution. ✓

Legal Affairs - We have again sent claim forms to Mr. Archie McQueen after receiving an inquiry from Senator Stennis about his claim for damages from the S-IC-5 static firing at MTF on 8/25/67. In our letter transmitting these forms, we have assured Mr. McQueen that upon receipt of the completed forms from him, an investigation of his claim will be made. ✓

Representatives of the Boeing Safety Office and Boeing's insurer, the Hartford Insurance Company, visited MTF regarding the claims received by the insurance company and the suit filed against them by Mr. M. P. Pigott for damages from the S-IC-5 static firing on 8/25/67. ✓

GE Service Contract - Negotiations for continuation of contractual coverage from 7/1/68 through 9/30/69 were completed on 6/5/68. The estimated cost for the 15-month period is \$30,340,300.00, with a base fee of \$465,000.00 and award fee of \$2,350,000.00. ✓

A supplemental agreement is being prepared to the GE service contract which will provide contractual coverage for GE MTSD to furnish supplies and services to U.S. Army Electronics Proving Ground ECM LORAN-D station to be located at MTF for a period of approximately 90 days. Reimbursable authority for this support has been received. ✓

Visitors from NASA Headquarters and MSFC - Dr. Homer Newell and party of four from NASA Headquarters, accompanied by Mr. Hans Hueter from MSFC, visited MTF on 6/6/68. ✓

NOTES 6/10/68 BELEW

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HARVARD COLLEGE OBSERVATORY (HCO) EXPERIMENT CHANGE

IMPACT: A meeting was held June 7 with HCO to discuss the first rough assessment of the impact of HCO proposal to substitute a modified "A" instrument for the current "C" instrument. Plans are to have the magnitude of the impacts determined by June 21 and be prepared to make a presentation to Headquarters the second week in July. ✓

ATM ZERO "G" TESTING: The zero "g" tests planned to verify ATM film cassette removal and replacement were not performed because of KL-135 aircraft malfunctions. The tests are now scheduled for the week of June 17, at Houston. ✓

WASTE MANAGEMENT SYSTEM: A meeting was held with representatives of Fairchild Hiller, Republic Division, to discuss how some of their waste management system concepts, as developed for the Air Force, could be utilized in the Saturn I Workshop. Also, we discussed the possibilities of utilizing this modified system for installation into the MDA. It appears as though the complete Saturn I Workshop proposed system could be functionally installed into the MDA before launch to support the early biomedical experiment operation. ✓

SCHEDULE ADJUSTMENTS RESULTING FROM MDA DESIGN CHANGES:

Design changes which were recently authorized by Mr. Luskin, as a result of the MDA Task Force effort, will impact MDA Structural Test Article milestones. The design changes are:

- a. Removal of Ports 2 and 3
- b. Removal for forward bulkhead windows
- c. Removal of Scientific Airlock over Port 1
- d. Addition of remote docking view window over Port 1

These schedule changes affect the MDA Structural Test Article only. There is no impact to the Flight Article. ✓

APOLLO LUNAR MODULE BRIEFING: MSFC has been invited to participate in a briefing on the Apollo LM at MSC from June 4 to June 27. These briefings are being presented by Grumman under the Apollo LM contract. Approximately three (3) individuals from MSFC are expected to attend each briefing. ✓

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H-1 ENGINE - The first H-1 engine has been assembled at the Canoga Park facility since the transfer of production capability from the Neosho facility. This first engine (H-163) has been assigned to the Production Support Program and was satisfactorily tested at the reactivated Santa Susana Test Stand on June 5. It appears that the transfer of the H-1 production capability to Canoga Park is completely satisfactory. ✓

F-1 ENGINE - Rocketdyne's activities in support of POGO at RETS (Rocket Engine Test Site, Edwards) are now directed toward: (1) Evaluation of an S-IC type LOX pre-valve as a helium accumulator. (2) Better definition of the gas generator oscillations which were noted during previous helium injection tests (threshold, etc.). Testing and evaluation is continuing. ✓

In addition, at SSFL Rocketdyne has conducted turbopump tests in which helium was injected at 3.5 inches above the LOX pump inlet. No adverse effect on pump operations was noted. ✓ After the test series is complete, Rocketdyne plans to disassemble the pump to inspect for mechanical damage (cavitation, etc.). ✓

Three tests were conducted at MSFC on engine F-5038-1 to evaluate the use of the pre-valve as the helium accumulator. Test objectives were to: (1) determine the time required to charge the accumulator during mainstage, and (2) evaluate the start, cutoff, and operating characteristics with an accumulator charged prior to LOX tank pressurization with no additional helium flow. The test results are being analyzed. Since the engine used for this testing (F-5038-1) has now been hot-fired for about 3460 seconds duration, it is to be pulled and replaced. (Present limit on the turbine manifold and LOX impeller is 3500 seconds.) Engine F-2009-1 has been released to Test Laboratory for continued testing. ✓

J-2 ENGINE - Four J-2 engine tests were conducted at AEDC on June 5, 1968, to verify that the performance of the new Augmented Spark Igniter (ASI) assembly is compatible with flight requirements. This completes the AEDC testing of the first sample of the new ASI assembly. Subsequent tests will be conducted on engine J2036-1 currently being installed in the test cell. Testing of the new ASI propellant line will be conducted concurrently with other objectives (second sample of reduced S-II fuel inlet pressure and 80-minute restart). The next tests at AEDC are scheduled for the week of June 16. ✓

Three ASI assemblies were delivered to the S-II Battleship for cluster testing June 5 to support the June 13 firing. Also, one ASI assembly is scheduled for delivery to MSFC June 10 where it is to undergo a hot firing this week. ✓

6/10/68

VISITORS TO MICHOU D

Dr. Homer E. Newell, Assoc. Administrator, Messrs. Charles W. Mathews, .
Dep. Assoc. Administrator MSF, Arnold D. Schnyer, Director (Space)
Transportation Systems MSF, Arnold W. Fruikin, Asst. Admin. for International
Affairs, accompanied by Mr. Hans Hueter of MSFC, visited the Michoud Assembly
Facility on Thursday, June 6, 1968. The group was briefed by Chrysler and
Boeing management after which they were given a tour of the facility. ✓

Mr. Frank Weitzel, Asst. Comptroller General of the United States, accompanied
by a group of local GAO executives, visited Michoud on Tuesday, June 4, 1968.
The group was given an orientation briefing by Mr. Stamy, Deputy Manager, and
was conducted on a tour of the facility. ✓

Mr. R. A. Abersfeller, Commissioner of Federal Supply Service, GSA, with
Messrs. G. W. Dodson, Asst. Commissioner for ADP and E. D. Dwyer, Special
Asst. to the Asst. Commissioner (all of GSA Washington, D. C.), Mr. Ralph
Hoffman, Regional Interagency ADP Coordinator, GSA Fort Worth, and Col. M.
E. White and Mr. James Costantino of OMSF NASA Headquarters, accompanied
by Dr. Hoelzer of MSFC, met at the Michoud computer facility in Slidell, La.,
on Wednesday, June 5, 1968. The NASA briefing included statistics on computer
support rendered and pointed up the advantages of a centralized facility. At
the conclusion of the briefing, the group was conducted on a tour of the computer
facility. The only item of significance proffered by Mr. Abersfeller was the
suggestion that Slidell computer facility become a Federal Data Center. NASA
maintained a neutral position in this matter; however, it is believed Mr. Abersfeller
will pursue this subject further, particularly in view of the GSA responsibilities
under the Brooks Bill. ✓

S-IC QUARTERLY REVIEW

The Boeing/Michoud Program Control Center was the location of the S-IC/ Boeing
Quarterly Review held on Thursday, June 6, 1968. ✓

USE OF MAF FOR "OTHER WORK"

NASA Headquarters has awarded a study contract to the Chrysler Corporation
Space Division, New Orleans, La. Contract NASw-1741 has a face value of
\$48,600 and covers a contract for Radiation Protection Study for Photographic
Space Film. MSFC awarded a CPFF contract, NAS8-21385, to CCSD for
Electrostatic Zero-Gravity Worktable; the contract value is \$41,670 of which
\$38,944 is estimated cost and \$2,726 is fixed fee. ✓

FIVE F-1 ENGINES ARRIVE ON POINT BARROW

The SII-506 and Five F-1 engines and seven skirts arrived at the Michoud
Assembly Facility on Friday, June 7, 1968, on the Point Barrow. ✓

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NOTES 6/10/68 EVANS

6/10/68

Nothing of special significance to report - Safety

NOTES 6/10/68 FELLOWS

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NEGATIVE REPORT.

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6/10/63

1. Condensation in Vacuum Rocket Plumes: Our involvement in orbital jet plumes and their laboratory simulation has led to an increased interest in condensation phenomena in both full scale and laboratory jets. Equilibrium expansion of all gaseous discharges in space is bound to lead to condensation. Low density prevents attainment of equilibrium, though, and the non-equilibrium effects increase with decreasing size of the jet. Thus our small-scale laboratory jets are further from equilibrium than the full scale jets, and pin-prick jets may slip by without any noticeable condensation. In general, however, we have to expect vehicle parts touched by the jet plumes to be "snowed-on" as well as "blowed-on." Condensation may strongly affect impingement forces (since the heavy particles tend to stay closer to the plume axis), and it affects contamination and surface deterioration (sand blasting). Our present primary concern is the validity of our attempted laboratory impingement force tests, where as a first step we use CO₂ jets in our Low Density Chamber. We plan to turn later also to hot jets of correct chemistry in our short duration base heating tank. We need capabilities for analytical prediction and experimental measurements. On the analytical side we are working with homogeneous condensation methods developed for hypersonic wind tunnels, which give us at least a partial answer; we may also have to draw from approaches developed for molecular beams, where conditions are somewhat closer to ours. In general, both homogeneous and heterogeneous nucleation can occur. Heterogeneous nucleation is as yet a pretty dark horse, but fortunately it appears to be restricted to higher densities. Quantitative measurement of condensation is a very difficult task. The molecular-beam-physicists use mass spectroscopy, something quite unwieldy in our engineering environment. We will have to search for something more suitable. We are busily searching the literature for pertinent information. ✓
2. AS-502 POGO, Flame Fluctuations, and Air Scoop Removal: In a recent AS-502 Flight Review an unidentified Boeing Representative remarked on the fluctuations of the flame backwash that is observable on some motion pictures of the vehicle, brought these into potential connection with POGO oscillations, and speculated that they were perhaps influenced by the removal of the S-1C air scoops (see e.g. R-P&VE-DIR-68-30). We have tried to track down the source of these comments, but neither Boeing/Huntsville nor Boeing/Michoud can identify it, and they believe now that the remark was made by one of the administrative representatives. No work on this suggestion is going on at Boeing, and we agree. We consider these fluctuations to reflect the transitional (turbulent to laminar) character of the separated flow. They have no noticeable effect on the vehicle, due to the low dynamic pressure at these altitudes. The air scoops in turn, by that time deeply submerged in the separated flow, have become ineffective, and their presence or removal would produce no difference in the picture. We recommend, therefore, that the issue be closed. ✓
3. AAP Orbital Mode Model: The AAP Orbital Mode Model, which you requested at the Lusk AAP Review, May 15, is being designed and built by our Aerophysics Division. It will depict each of the known modes for the AAP missions and will have the capability of adapting to other modes and other vehicle configurations. The model will show variable inclinations and the relationship between the orbital and ecliptic planes for any launch date or at any time during the missions. It will be as simple as possible and will also be readily transportable. Upon completion of model fabrication, we shall schedule a briefing for you, and then you can decide whether you desire to keep the model. ✓

A

6/10/68

1. 063 MATERIAL PROBLEM: NR/SD has been in the process of retrieving all parts made of 063 material except for 24 quarter panels that were located at Seal Beach. They are currently welding these quarter panels into cylinders one through six which will be used for a test structure tank. To date, NR/LAD has not been able to account for three bolting ring segments and two elbow rings that were fabricated from the 063 material. NR/LAD will generate a final accountability report following the location of these missing parts. ✓

2. DEVELOPMENT OF SOLID STATE RADIOGRAPHIC IMAGE AMPLIFIER, DIRECT VIEWING: This Laboratory has the subject amplifier under development as a high-quality, direct-viewing replacement for film which would otherwise be required in radiographic inspection in the space environment. It also has potential in medical applications, in replacing both X-ray film and fluoroscopy, and in oceanographic underwater evaluations. The Phase A contract on this project has been concluded with the delivery, by Westinghouse, of an image amplifier panel meeting all contract objectives. An image retaining panel will be delivered later. The final presentation by Westinghouse was attended by representatives of several Laboratories, Experiments Office, Advanced Manned Missions Program Director's Office (NASA Headquarters), U. S. Army Medical Research Laboratory, and Bendix Corporation. Informal radiographic tests of the delivered panel on a one-fourth inch aluminum plate showed ability to resolve a 2% penetrometer to the next largest hole. This meets MSFC requirements for film radiography on a one-fourth inch thickness. It is planned to present a research achievement paper on this project to the NASA Headquarters OMSF Quarterly Review to be held at MSFC on July 10. ✓

3. STAGE CABLING: As you are probably aware, we have concentrated for the past year in cleaning up and improving the cabling and electrical harness installations on all stages. Harnesses are subject to damage and stress in almost all applications. There are many methods of making harnesses, such as, open wire laced, metallic conduit, braid, molded, etc., each having an application on our stages. We have been introduced to a new system of harnessing called Conflex made by INCORE, Inc. It consists of Teflon convoluted tubing and light weight end fittings that attach directly to electrical connectors. The wiring is slipped into the convoluted tubing. We think this system could give us an order of magnitude improvement over our older methods with few disadvantages. If this system proves acceptable it would eliminate cable lacing, potting, molding, entrapment of foreign material, between wires, and provide protection against damage. We have discussed this system with Astrionics Laboratory and ME Laboratory and test programs are being set up to prove it out prior to incorporation in our programs. ✓

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NOTES 6/10/68 HAEUSSERMANN

6/10/68

1. Harvard College Observatory Telescope. A meeting with Dr. Reeves of HCO was held at MSFC on June 7 and the MSFC impacts were outlined as follows:

- a. Telescope mounting provisions on the ATM spar.
- b. Addition of a 410 telemetry multiplexer and minor modifications to the amplifier and switch assembly of the telemetry subsystem.
- c. Rearrangement of the Control and Display Panel for the HCO experiment.
- d. Changes to the electrical networks and the distributors.
- e. Changes to the ATM aperture door arrangement.

None of these impacts were considered major and we are gathering the details of schedules and costs for a presentation to NASA Headquarters on or before June 21, 1968. ✓

2. ATM CMG. The first production CMG has been received from Bendix. The unit was subjected to an incoming inspection and underwent various laboratory tests to check that it was functioning properly. Extensive frequency response tests are being conducted in an attempt to compare its theoretical data to actual performance data. We have previously advised you of a bandwidth problem with respect to the commanded rates to the gimbal servo torques and tests are being conducted to isolate the causes of this problem. The CMG will be installed in the thermal vacuum chamber at P&VE to check out functioning under extreme temperature conditions at space pressure conditions for the next 10 days. Also, an attempt will be made to install a mass spectrometer to determine outgassing properties and to determine vaporization loss of the bearing lubrication. ✓

6/10/68

B
6/20F-1 ENGINE

Tests FW-083 through FW-085 were conducted with F-1 engine S/N F-5038-1 on the West Area F-1 Test Stand on June 6, 1968. Primary purpose of these tests was to investigate utilization of the LOX prevalve cavity as an accumulator for a potential POGO fix. Data from these tests are being evaluated.

F-1 engine S/N F-5038-1 will be removed from the test stand and replaced with engine S/N F-2009-1. This engine will be utilized to further investigate potential solutions for the POGO problem. A LOX interconnect line pulser will be utilized during this series of tests. ✓

F-1 TURBOPUMP POGO TESTING

Started change-out to second turbopump last week and should complete change-out as well as other modifications (suction line pulser, high pressure discharge ducts) this week. Checkout tests scheduled to commence 6-18-68. ✓

ACCESS ARM (No. 9) TESTING

Control Console delivery from KSC initially scheduled for May 24, has not been received. Console controls all arm related functions and testing cannot proceed without it. Late delivery has already impacted test completion date two weeks. KSC is aware of problem as well as our concern for no decision making KSC Engineering Manager in Huntsville. Hope to resolve this latter problem with Dr. Debus this week. ✓

NOTES 6-10-68 HOELZER

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NEGATIVE REPORT.

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1. S-II-3 Stage at MTF: The removal of the S-II-3 Stage from the test stand and move to the horizontal bay of the Vertical Checkout Building for post cryogenic proof tank inspection was planned to occur on Friday, 7 June (eight days ahead of schedule). On Thursday, 6 June, during main derrick proof loading operations (in preparation for stage removal), the main hoisting hook cable snapped, dropping the 90 ton test weight into the barge canal and snarling the cable around the boom. Preliminary estimates range from three to seven days to remove the broken cable, inspect the derrick for damage, obtain new cable, re-thread booms and proof load. Planning is underway to incorporate all modifications which are possible during the time the stage must remain in the test stand. The MSFC/KSC Stage Turnover Meeting is scheduled for Thursday, 13 June 68, at MTF. ✓

2. Change Activity: We now have over 30,000 hours of open work of KSC on AS-503, as a result of recent change activity. Each individual change was accepted without impact but as a result of our changes and MSC changes, KSC has announced another impact of a week. I recognize there will be changes we will still need to make. Hq, however, has proposed moving all change approval involving KSC to Hq. Since this would move program management to Hq, we must exercise responsible control of changes incorporated at KSC. ✓ Further, when change activity becomes intense, I question if we are improving vehicle quality by improvement changes. ✓

3. Open Work on S-IVB-504 Stage: I indicated at the Management Council Meeting on 4 June 68 that if the S-IVB-504 Stage had to be shipped to KSC by the end of June 68 (as currently required by the Apollo schedule), then KSC will have the task of completing approximately 8,500 manhours of open work on the stage (primarily from modifications required as a result of the AS-502 flight). Since KSC could delay stacking AS-504 without impacting the launch date, General Phillips authorized a delay in shipment of the stage, the extent of the delay to be determined after a study. ✓

In view of the delay, MDC is working mode on a three shift per day basis. We have requested, and MDC management is authorizing, a 504 expediter who will concentrate on accelerating the release of engineering and delivery of parts for mod kits. ✓

4. FOGO: We had several meetings last week with George Hage and representatives from MSC, TRW, Aerospace, R&DO and others concerning the analysis of POGO. One very noticeable item has been the tremendous degree of cooperation that has developed between all parties working the POGO problem. ✓✓

5. AS-503-4-5 Instrumentation Changes: General Phillips is highly concerned with the extent of instrumentation changes and has been considering deleting the whole package. I met with him in Washington on Friday, 7 June, and believe we have agreed to go ahead, but allow no further changes. ✓

NOTES 6/10/68 JOHNSON

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Nothing of significance to report.

NOTES 6-10-68 KUERS

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6/10 JKS

1. S-II Welding Problem: The cylinder #6 to LH₂ bulkhead weld on S-II-10 had to be cut off because of offset and excessive porosity. The cause for the excessive porosity was a leak in the manifold of the shielding gas bottles. ✓
2. Boeing Support to NAR: Replacement of 063 skin material by the old 021 material has created some schedule problems at Seal Beach. In order to minimize schedule impact, all possible sources for the manufacture of skin panels are being utilized. Using the Boeing-ME relationship, NAR has obtained agreement from Boeing, Wichita, to mill 12 additional skin panels. The first four panels of previous order of eight were completed by Boeing entirely to specification. ✓
3. Pogo Test Support: In support of Pogo tests at MSC we have modified 11 black boxes and fabricated 17 dummy boxes simulating weight and C.G. requirements in the IU. All the boxes have been completed and the last ones were shipped June 6. ✓
4. Status of Dummy Payload BP-30 for AS-503: The schedule for fabrication of new ballast containers for this payload is getting extremely tight, if not impossible. The major problem is the procurement of bulkheads. Delivery of the first bulkhead from G & G Metal Spinners, Inc., is now scheduled for July 8 and the last one for July 29. Target date for delivery to KSC is at present August 1. ✓
5. S-II Mini-Stage: Because of improper marking of strain gage wires by Boeing personnel, identification of wires was lost in 25 places during rainy weather. We had to remove the insulating foam in these places for re-identification of wires and had to bond foam blocks in these areas. The job has been completed. ✓
6. Neutral Buoyancy Simulator (large tank): Refinement of the operating procedures and proficiency training of available test personnel were completed last week. We hope to have the ORI completed in the beginning of this week and be operational for the visit of Mr. Webb. Lack of adequate staffing continues to be a major problem. ✓

B 6/20

6/10/68

1. POGO WORKING GROUP: The second meeting of the full POGO Working Group was held on 6-4-68, followed by splinter meetings among specialists the next day. Major conclusions reached were as follows: (a) Test results indicate that GOX as gas for either the accumulator or as LOX feed line injectant is not feasible. Helium injection into the LOX feed line and the accumulator continues to merit investigation. (b) The feasibility of alternate fixes such as "lossy" suction line and a suction line restriction will be studied by Martin/Denver. (c) In addition to the "short stack" dynamic test, MSC is planning to conduct a static loads test on the S/C, LM, SLA, and S-IVB forward skirt. Tentative plans are to test first stage cutoff and q_{max} conditions. (d) To investigate the gas generator instability condition noted in the Rocketdyne tests (this situation has not occurred in MSFC tests), start and shutdown transients, and engine transfer functions, 14 additional F-1 engine tests on two engines at Rocketdyne are planned to be completed before 7-15-68 when a decision on the POGO fix is required. A POGO Management Review will be conducted on 6-18-68, using the Boeing TIE network facilities. ✓
2. AAP MECHANICAL PANEL: A meeting was held at MSC on June 5, 6, 1968. All old action items were closed except three. One of these concerning location of fluid, electrical, ECS lines across the interfaces of CSM to MDA, LM-A/MDA, will be resolved at a meeting at North American Rockwell (NR). NR, Grumman, MSC and MSFC will participate. MSC agreed to our ATM (Rack) movable strut concept (automatic motor driven and manual back-up). It appears that steady technical support from MSC in the AAP area is diminishing due to Apollo main line demands. Interface problems will probably have to be settled by special Ad-Hoc groups rather than long term support of Panels and Sub-Panels, at least in our area.
3. ZERO "G" TESTING: Aircraft simulation tests for the ATM/LM end film retrieval planned for last week had to be postponed due to aircraft problems. ✓
4. HIGH PRESSURE HYDROGEN EMBRITTELEMENT OF MATERIALS: In a materials study with Rocketdyne, funded by I-E-MGR and technically directed by our Materials Division, it was determined recently that Inconel 718 is somewhat degraded in notched strength and ductility by high pressure hydrogen gas. The full extent of this degradation is not clear because of limited tests to date. However, the initial results are of considerable concern to MSC people since they use some small pressure bottles of Inconel 718. We are attempting to arrange for Rocketdyne to conduct some more detailed experiments on the material which will evaluate the suitability of the MSC vessels. It is our understanding that the MSC safety people have taken the position that a full assessment of the suitability of the vessels for gaseous hydrogen must be made before they can be used for flight hardware. ✓
5. LOX PURITY INCREASE: The Linde Company has proposed to supply LOX of increased purity. Studies to determine the performance improvement realizable on the Saturn V vehicle by changing from 99.7% to 99.9% pure LOX indicated that payload increase for a 100 n.m. circular earth orbit would be approximately 600 lbs. From a cost effectiveness viewpoint, this change would not be advantageous.
6. ATM POINTING SYSTEM: The 56-day vacuum test on the ATM Inertial Guidance Gimbal System has been completed successfully. Disassembly and inspection by Bendix and Astrionics personnel will begin this week; the system appears to be operating satisfactorily. ✓

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NOTES 6/10/68 MAUS

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VOTE ON TAX RAISE/EXPENDITURE CUT POSTPONED - House Democrat Leader Albert of Oklahoma announced on June 6 that the House vote on the Conference Report, scheduled for June 12, has been postponed until June 19 or later. A variety of considerations contributed to the decision. The language of the Conference Report was not finalized, the death of Senator Kennedy created an unfavorable atmosphere for budget cuts that might impact on welfare programs, the leadership is still not certain of enough votes for passage of the bill, and New York State Democrats do not want to vote on the bill until after the state's June 18 primary election. Since the June 19 date coincides with the mass Poor People's March on Washington, the vote may be further delayed. ✓

REQUEST FOR HISTORICAL CONTRACT DATA - In response to a GAO inquiry, we received a request this week from Jerry Kubat for the history of contract value for major Saturn IB contracts. In addition, Mr. Kubat requested a statement of the reason for the change and the value of the change for significant contract changes. Significant changes have been defined as being of value greater than 10% of the value of the contract at the time of the change. ✓

AAP INTERIM OPERATING PLAN - We have been requested by MSF to prepare an Interim Operating Plan to conduct the Apollo Applications Program through November 1968 utilizing FY-68 program authority. Information is requested on each in-house and out-of-house end item or service to be delivered which totals \$100K or more in contract value. Development schedules for each time critical system and subsystem through delivery of flight articles as well as a Procurement Action schedule is also to be submitted. This information is requested to be at MSF by June 14, two weeks from the date of the letter. In view of the detail requested and the effort required for the next two weeks in preparation for Mr. Webb's visit, IO has determined that a minimum of four weeks is required to prepare the data. We have informed Headquarters of our schedule and they have advised us that MSC is also asking for more time. A Center Review of the data prior to submission will be scheduled on or about June 28, 1968. ✓

NCTES 6/10/68 RICHARD

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Runaway POGO Sensor: MSC has assumed the lead in developing a runaway Pogo sensor to be used in abort actions. MSFC is active in a consultant role. Mr. Milton Silveira has been appointed development manager for the Pogo sensor.

Three courses of action are being followed:

- a. A purely mechanical sensor with mass, spring and dampers which would trip a switch at predetermined Pogo levels, and lights the caution and warning lights.
- b. Accelerometers, level sensors and filters to accomplish the same result as (a).
- c. A breakwire system to monitor structural failure at specific stations along the spacecraft.

A report is due in one week on each of the above courses of action.

The acceptable Pogo limit is probably not a "hard" limit. Therefore, the MSC people are currently planning to have two discrete limits, a caution limit and a warning limit with spacecraft lights for each. The mission rule then would probably state "if the caution light appears during the flight period of 50 to 150 seconds and is followed within three seconds by the warning light - ABORT." ✓

In other words the delta time between the caution and warning limits will be used as an indication of the rate of onset of Pogo. ✓

The limits for the sensor will be about .25 to 2.0 g's in the frequency range of 3 to 10 cps. The sensor will be capable of being set within these limits within 30 days of launch. The axis of measurement can also be selected within 30 days of launch.

MSC is currently assuming that the latest hardware delivery date for 503 without a launch schedule impact is August 15 at KSC. ✓

NOTES 6/10/68 SPEER

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1. ALSEP Proposal: Briefing material and recommendations with regard to ground control facility selection for the Apollo Lunar Surface Experiment Package has been forwarded to you on June 7 since we could not get on your meeting schedule prior to the MSF deadline (June 12). ✓

2. AAP Ground Commands: We have been requested by MSC, Director of Flight Operations (Kraft) to identify, in conjunction with the MSC Flight Control Division (FCD), preliminary ground command requirements for AAP modules. This listing is required to assess the adequacy of the command system(s). We are undertaking, in coordination with the Labs and AAP Program Office, as well as MSC, to generate the required material by the July 15 due date. It is interesting to note that Kraft pointed out in his request (jointly addressed to I-MO and MSC FCD) that all work should be thoroughly coordinated with MSFC in view of our pending assumption of hardware responsibility for LM-A and airlock in addition to the ATM, MDA and OWS. ✓

3. Satellite Communications for AAP: The use of the synchronous-orbit ATS satellite currently in orbit has been suggested for a voice relay test between the Mission Control Center and the AAP-2 Orbital Workshop. This coverage would not be planned for in the execution of the flight plan. However, should the test prove successful, consideration would then be given to further use of the ATS to complement voice coverage throughout the remainder of the mission. A preliminary test plan has been prepared by MSC. ✓

4/10/68

1. ATM AND MOL CONTAMINATION STUDIES: On Wednesday, June 5, Mr. Eugene Borson with the Aerospace Corporation visited with various members of SSL. Mr. Borson is involved with the Air Force's MOL Project and is concerned about the problem of contamination. He was brought up-to-date on SSL's contamination program with the ATM and was shown the lab facilities of the Optical Physics Branch. On Thursday, June 6, Mr. Ray Hembree and Mr. John Williams of SSL met with Mr. Borson and Messrs. Anderson, Williams, Cox, and Smith of the Aerospace Environmental Facility at the Arnold Engineering Development Center at Tullahoma, Tennessee. Mr. Anderson is directing contamination tests concerning rocket plumes for the MOL. Mr. Hembree and Mr. Williams inspected the equipment and set-up for an optical contamination test being conducted in one of AEDC's large environmental chambers. Lab areas for the evaluation of contaminated optical samples were inspected and discussions about contamination problems for both ATM and MOL were held. A working relationship was established with these people so that information concerning contamination could be exchanged. It is obvious that the problems concerning contamination are the same for both the ATM and the MOL, so it was agreed that close contact be maintained in order to coordinate the contamination work being done for the MOL with SSL's Contamination Program for ATM. ✓

2. HYPERVELOCITY LABORATORY: Meteoroid simulation shots are continuing on the meteoroid bumpers in cooperation with P&VE. The goal is to determine the optimum bumper configuration to be used for the Orbital Workshop. ✓

3. SPACE POWER: On Wednesday, June 5, Mr. Dailey and Mr. Byrd of SSL attended a presentation by Mr. Bill Woodward, OART, on Space Power Systems. Subject meeting was hosted by Dr. Haeussermann, R-ASTR-DIR. Dr. Fred Schulman and Mr. Arvin Smith also of OART accompanied Mr. Woodward. Mr. Woodward briefed the group on OART efforts and budgets for all on-going contracts. He further requested that those in attendance apprise him of any changes, such as de-emphasis of certain systems, they deemed desirable based on future missions power requirements.

Woodward and Schulman stated that as a matter of policy they want to keep the user centers such as MSFC, as well as the research centers, involved in the development aspects of space power systems. ✓ This means we should continue to get some OART programs here in both the near-term and the advanced nuclear systems. ✓

NOTES 6/10/68 TEIR

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OPEN WORK ON S-IVB-205 AT KSC: As you were informed at the Management Council meeting, the SA-503 and SA-504 stages have a considerable amount of open work at KSC. Our latest review of the SA-205 vehicle stages shows that we are in good shape except for the S-IVB stage. We do have more open work than desirable on the S-IVB stage but it is well within schedule time available. Total hours remaining are approximately 2675 versus approximately 3600 available in the present schedule. We expect to closeout about 2200 hours prior to spacecraft erection. The above indicated open work includes the J-2 engine ASI line change and the recent instrumentation change. ✓

S-IVB-205 ADDED INSTRUMENTATION: During a meeting with the Engine Program Office and Rocketdyne on May 29, Rocketdyne asked for additional measurements on the J-2 engine. We have reviewed the impact with R&DO and MDC and have concluded that the Rocketdyne request can be accomplished except for the ASI LOX line strain measurement and eight additional engine area temperature measurements that were requested. We will increase the sampling rate of two pressure measurements, add two temperature measurements, and delete one pressure measurement. In summary, the total S-IVB-205 instrumentation change due to the SA-502 anomalies consists of the following: Sixteen total measurements (4 temperature, 4 pressure, and 8 vibration) and one deleted pressure measurement. The eight vibration measurements are routed to the I. U. for transmission over the I. U. FM/FM link. In addition to the new instrumentation, seven changes in measuring range are being made. ✓

June 17, 1968

9-26-60

NOTES
MR. GORMAN'S COPY
JUN 17 1968

With comments

None for DEP-A

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NOTES 6/17/68 BALCH

S-II-3 - Stage was removed from A-2 Test Stand on 6/10/68 and placed in the S-II stage service building for LH₂ tank entry and inspection. X-ray of the LH₂ tank weldments was completed this morning, with no major discrepancies noted so far. Inspection of LH₂ tank is expected to be completed today, and close-out of the LH₂ tank is targeted for 6/19/68. Stage is expected to be ready for shipment to KSC on 6/22/68 as planned. ✓

S-II-5 - The first set of ASI lines is expected to arrive at MTF today, and the remaining sets are to be delivered by 6/20/68. Work on the S-II-5 stage is still limited due to shortage of modification hardware. Static firing is still scheduled for 7/10/68. ✓

S-II-6 - Stage is presently stored in the S-IC booster storage building. It is to be moved into the low bay of the S-II stage service building as soon as the S-II-3 is moved, which is now set for 6/20/68. LH₂ tank entry for inspection of the Propellant Utilization probe will be accomplished prior to installation of stage in the A-2 Test Stand. Based on expected delays due to hardware shortages, it is planned to install the stage in the stand sooner than previously scheduled (6/28/68 instead of 7/3/68) so that some of the work on the stage can be completed to reduce the impact of the work expected to be delayed. ✓

S-IC-6 - Stage processing plan transmitted to the Stage Office by Boeing on 6/13/68 calls for "power-up" on 6/25/68, propellant loading on 7/9/68, static firing on 8/6/68, and shipment to Michoud on 8/22/68. Incorporation of POGO modifications is planned for the period between propellant loading and static firing. ✓

Legal Affairs - Information and documents relating to the suit of M. O. Pigott for damages from the static firing of the S-IC-5 on 8/25/67 were forwarded to the Justice Department on 6/14/68. ✓

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LM/ATM INTEGRATED CHECKOUT: The first meeting concerning LM/ATM integrated acceptance test prior to shipment to KSC was held on June 13, with attendance from MSFC, MSC, KSC, Headquarters and Grumman. Using current schedules, a basic flow diagram was established which will be used to determine impacts including facilities, GSE, and cost. The second meeting is scheduled for the week of July 8. ✓

ATM EVA TASK TEAM MEETING: The first meeting of the ATM EVA Task Team was held at MSFC on June 10. In summary, a general status was given on the ATM areas which require EVA support and current status of the EVA concepts. MSFC will prepare an EVA requirements document which will be hardware oriented and MSC will prepare a baseline of EVA equipment and crewman capability (to the extent this can be documented). These are to be available at the next meeting, which is to be at MSC during the week of June 24. ✓

LM-A TRANSFER MEETING: We meet with MSC (AAP) in Houston on June 10, to discuss aspects for the transfer of management of AAP lunar module modifications and Airlock Module to MSFC. MSC appears to take the same approach and to agree in general with our proposed groundrules for implementation of the transfer. Dr. Gilruth has indicated that the GFE items such as the LM guidance control and navigation system and its related software changes should be managed by MSFC, as well as other LM-A modifications. ✓

H-1 Engine - The gas generator on S-IB-5 engine H-4063 was inadvertently flooded with freon solvent during an approved cleaning operation at KSC. Contamination of the gas generator injector is suspected. The assembly will be removed and shipped to MAF for thorough cleaning. There will be no impacts in vehicle preparation/launch schedules. ✓

F-1 Engine - The 24th F-1 Program Review is scheduled for June 20, 1968, at Rocketdyne, Canoga Park, California.

POGO - On June 7, 1968, engine F-4028 (the engine which has exhibited gas generator oscillations under helium injection) was tested at RETS with helium injection at 20 ft. above the turbopump inlet utilizing flow rates of 0.2 to 1.0 lbs/sec. A 12K loss in thrust resulted due to dilution. On June 11, helium was injected over the flow rate range of 0.17 to 0.31 lbs/sec at the 20 ft. point. On June 12, engine 107-1 was tested with helium being injected into the bootstrap line at a flow rate of 0.02 lbs/sec (equivalent to 1.6 lb/sec at the pump inlet). No abnormal gas generator oscillations were noted on any of these tests.

The only known difference between the first series of helium injection tests on engine F-4028 where oscillations were experienced and the above tests was that the gas generator ball valve seal retainer was found to be under-torqued on the first tests. In an effort to duplicate the conditions of the previous test series, a test was scheduled for June 13, 1968 in which the torque on the gas generator ball valve seal retainer was to be reduced. This test was postponed because pieces of the LOX Pressure Volume Compensator (PVC) liner was found in the LOX pump impeller. This PVC manufactured by Arrowhead, is of the S-IC flight configuration and has 2192 seconds of engine system testing. The significance, if any, of this failure is being pursued. The PVC is being replaced and testing is to be resumed this week.

Initial study of the data from helium accumulator tests at MSFC indicates that the helium bubble induced prior to LOX tank pressurization and without additional helium flow, was maintained but decreased in size. The decrease is likely to have been caused by the increase of LOX tank pressure during the 40-second test. Oscillation frequencies were reduced to 2.5 - 3.0 cps and amplitudes appear to have been reduced.

The turbopump test series at SSFL has been completed. There were no adverse effects noted on the turbopump operation with GOX injection or with helium injection flow rates up to 0.4 lb/sec. The turbopump is being disassembled to inspect for mechanical damage (cavitation, etc.). ✓

J-2 Engine - The augmented spark igniter (ASI) assemblies for S-IVB-506 and S-IVB-205 were delivered June 10 and June 15, respectively. The ASI assembly for S-IVB-506 has been installed. ✓

NOTES 6/17/68 CONSTAN

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Nothing of Special Significance.

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The Aerospace Safety Advisory Panel: Members of this Panel which is chaired by Dr. Charles D. Harrington, President, Douglas United Nuclear, Inc., including Dr. Harold M. Agnew, University of California; General Orval R. Cook, USAF, Ret; Major General Carroll H. Dunn, USA, Director of Military Construction; Dr. John A. Hornbeck, President, Sandia Corporation; Mr. Bruce T. Lundin, Associate Director for Development, Lewis Research Center; and Dr. Henry Reining, Jr., Dean, von KleinSmid Center of International and Public Affairs, Univ. of Southern California, visited MSF on Tuesday, June 11, 1968. Presentation (all day): The theme of the presentation was the MSFC missions; how we are organized; the program activities in which we are involved; and how we execute these programs. The organization for safety and some selected activities were highlighted. Tour (90 minutes): Tour included the AAP Mock-ups and the Neutral Buoyancy Test Simulator. Those who accompanied the Panel included: Dr. William Mzarek, Consultant to the Panel; Mr. Carl Praktish, Executive Secretary of the Panel; Mr. Emerson Hams, Assistant Director of Systems Safety; and Mr. Charles McGuire, MSF Safety Office. The indications are that they were pleased with the information they received. ✓

Personnel Certification: NASA Headquarters has a contract agreement with TRW at the Cape to identify existing certification requirements for personnel in the Manned Space Programs, evaluate these requirements and prepare a report which would include recommendations. We are now preparing to brief the TRW representatives - Messrs. Wentzell and Lewis - on Thursday, June 20th. The briefings will include certification requirements at MSF and MAF. ✓

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Operational Readiness Inspection: The Operational Readiness Inspection (ORI) of the Large Neutral Buoyancy Simulator is about complete. MSC has a requirement that an ORI must be completed before an astronaut will be given clearance to participate in operational testing in a pressure suit. Lou Richards, who is in charge of the MSC Neutral Buoyancy Simulator, has been a member of and advisor to the MSFC ORI Committee on the small simulator as well as the large simulator. However, other organizational elements of MSC have responsibilities with respect to astronaut participation so, to make sure people in all those interested elements are fully satisfied with the MSFC ORI and MSFC procedures, an operational demonstration is planned as a final wind-up of the ORI. MSC observers will be invited. When the demonstration has been completed, the MSC requirements will be considered to have been fulfilled. ✓

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1. Orbital Workshop Experiments Compatibility: Mission Compatibility studies of earth resources experiments are being continued by a group formed at the last Mission Requirements Panel Meeting. The study group is headed by Mr. John Sims of our Systems/Projects Office and Mr. A. Thompson of MSC. A series of group meetings will culminate in a final presentation to Dr. Mueller, in late June or early July, on the feasibility of performing earth resource experiments on Orbital Workshop flights. ✓
2. KSC Ground Winds - Tropical Storm "Abby:" During tropical storm "Abby," NASA's 150 meter meteorological tower at KSC experienced peak winds of 40 m/sec at the top and 20 m/sec at the 18 meter level. These data slightly exceeded the MSFC 99.9 percentile reference design wind profile envelope peak speed values. Personnel of our Aerospace Environment Division took advantage of this opportunity and obtained several hours of magnetic tape records. The data will be of considerable value in our turbulence and gust studies for high wind conditions. ✓
3. Planetary Environments: Mr. O. H. Vaughan of our Laboratory and Messrs F. B. Tatom, P. B. Deshpande, and F. T. Hung of Northrop - Huntsville have co-authored a paper "The Prediction of the Martian Thermal Environment." This paper will be presented at the AIAA Third Thermophysics Conference in Los Angeles, California on June 24-26, 1968. ✓
4. Visit By ETV Team: This laboratory was visited by a camera team from the Educational TV network of the State of South Carolina, shooting material on the general subject of "Mathematics in the Space Program." Two of our mathematicians, Messrs. Rowland E. Burns and Schuyler S. Sampson of our Astrodynamics and Guidance Theory Division, gave brief lectures on some fundamentals of optimization theory and celestial mechanics as applied to our work. The lectures involved discussions of solutions to mathematical problems related to the space program, and at the request of the ETV people, several unsolved problems in the field of space mathematics were mentioned. The filmed material is intended for high school students, not to "teach" them mathematics but to provide a challenge and an impetus to the talented individual to go on to a college education in mathematics. ✓

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1. MEETING OF THE NASA QUALITY AND RELIABILITY ASSURANCE DIRECTORS:
On June 11 and 12, Dr. John Condon (KR) held the biannual meeting of the Q&RA Directors of all NASA Centers here in Huntsville. This meeting was held in a completely informal way--with no structured agenda, an approach which provided all Centers with the opportunity to bring their problems or points of view forward in an unrestricted and uninhibited manner.

The meeting resulted in a number of action items, predominantly for KR, which should help to further streamline the quality and reliability assurance activities all over NASA. It was interesting to notice that the difference in thinking which existed between the various Centers so many years ago has disappeared, that the approach outlined in the NPC 200 and 250 series document has been accepted and is being implemented everywhere, and that the view points and proposals of this Laboratory have found almost unanimous support by the other Centers. ✓

Based on the experience made with this unstructured meeting it was decided to reserve a substantial part of the time in the next meeting again for an informal exchange of view points and experiences while the follow-up of the established action items will require to run a part of the meeting in a formal way. ✓

2. MSC POGO TESTING: Upon request of the Saturn V Program Manager, three Laboratory personnel are on TDY to MSC in support of "Short Stack" dynamics testing. We are providing one man per shift to maintain configuration records and to accept for the Government any work performed on the S-IVB skirt or the IU by the prime contractors. Coordination with P&VE and MSC is complete. ✓

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1. Extra Vehicular Activity. The first EVA Ad Hoc Working Group meeting was conducted at MSFC on June 10, 1968. This meeting was devoted largely to definition of scope of activity of the EVA Group. Four or five splinter groups will be formed in order to take a closer look at astronaut EVA in particular regions around the clustered vehicle in orbit. ✓

2. Stratoscope II Project. Dr. Schwarzschild would like to give the Stratoscope II Project to MSFC and he would then only retain the astronomy responsibility. I informed him that we would be very interested in accepting if we did not have presently more work assignments than we can handle within our manpower, budget and schedules limitations. In case the ATM Project would be reduced, I told him that I believe I could reconsider his offer. He informed me further that on the last flight of Stratoscope II an average pointing accuracy of .02 arc seconds and in one particular case of .015 arc seconds has been obtained over exposure times of .5 to 5 minutes.

met. 6/18
Hess
Seidner
Let's discuss this.
I don't quite see how we can handle that too (unless ATM were cancelled)

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6/25

F-1 TURBOPUMP POGO TEST

Test preparations on the Number 2 turbopump and installation of a LOX junction line pulser are continuing on schedule. We plan to conduct the first checkout firing on 6/18. ✓

F-1 ENGINE

F-1 engine S/N F-5038-1 was replaced with engine S/N F-2009-1 on the West Area F-1 Test Stand. This engine will be utilized to continue the POGO evaluation tests. ✓

ACCESS ARM (No. 9) TESTING

Control console delivery originally scheduled 5/24 from KSC has still not been received although it is promised 6/17. Late delivery has impacted scheduled test completion date by 24 days. KSC did send an engineer to Huntsville for two days last week to coordinate Boeing modification/refurbishment activities and the test program. A different engineer will be here for two weeks starting today. I'm afraid this approach will not solve the engineering management problem. ✓

K.H.

This Arm No. 9 is rapidly becoming the pacing item for the 503 launch.

S-IV B (MSFC)

Received all parts necessary for the new (design) ASI assembly, June 12, 1968. The ASI assembly has been installed on J-2 engine S/N J-2050, and testing is scheduled to begin June 19, 1968. ✓

Please leave no

S-II STRUCTURAL TEST PROGRAM

The initial test, Phase IIA Proof Test, is presently on target for the schedule date of June 19, 1968. ✓

stone unturned to leave the job completed on time.

S-1B (MSFC)

The short duration test SA-55 on stage S-1B-12, is scheduled for June 25, 1968. ✓

Keep close touch with

APOLLO TELESCOPE MOUNT

Agreement has been reached with R-ASTR and Sperry Rand for R-TEST to assemble and publish the AMT Deployment Test Plan. They will submit their inputs to us. ✓

Debus, please

MODERATE DEPTH LUNAR DRILL

Still no contracts on either concept. The best guess now is for the contracts to go to the contractors for signatures next week. As yet no bids on the electric motor or the concentric hose (Percussive Concept) contracts. We may have to pull bids and re-submit in FY 69. ✓

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NOTES 6-17-68 HOELZER

NEGATIVE REPORT.

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1. S-II-3 Stage at MTF: The A-2 Stand crane cable which failed on June 6, 1968, has been replaced. Proof testing was completed on June 9, 1968, and the S-II-3 was removed from the stand on June 10, 1968. No impact on delivery of S-II-3 to KSC is anticipated. The MSFC/KSC Turnover Meeting has been ^{relatively} rescheduled to June 17, 1968 (was June 13, 1968). ✓

2. Stage Deliveries to KSC: We are recommending to General Phillips that AS-504 and AS-505 stage deliveries to KSC be delayed as follows:

<u>Stage</u>	<u>Recommended on dock KSC</u>	<u>Delay from APD 4I</u>
S-IC-504	August 31, 1968	60 days
S-II-504	August 31, 1968	60 days
S-IVB-504	September 30, 1968	90 days
S-IC-505	October 31, 1968	30 days
S-II-505	October 31, 1968	30 days
S-IVB-505	November 30, 1968	60 days

This will enable us to incorporate all changes approved as of June 1, 1968, including S-IC distributor and POGO changes, before shipment. Since open work on S-IU-504 and S-IU-505 is insignificant, we can ship them as required to be compatible with the stages. ✓

3. General: On Friday, June 14, 1968, you participated in a rough cut at FY-69 budget reductions. I am sure a great deal of refinement will be required during the coming week to establish a firm Saturn V FY-69 reduction position. I believe one of the essential items that needs to be obtained out of this exercise is the reschedule of vehicles through 515 to establish approximately one year deferral of delivery from present schedule. It is my feeling that once this reschedule is established then other management actions can be initiated in a more logical manner. ✓

NOTES 6/17/68 JOHNSON

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Nothing of significance to report.

Boys

1. Neutral Buoyancy Simulator: All demonstration test runs requested by the ORI Committee have been completed. These demonstrations included a full systems checkout, a typical test run, and emergency procedures which are used at all depths within the simulator and use of the recompression chamber. In order to obtain better TV pictures for the underwater operations, an improvement of the lighting system was very desirable. The safety committee has now also approved using the 110V mercury vapor lamps underwater which have been developed by the Navy for deep sea diving. ✓

2. NASA Semi-Annual Sterilization Review: The NASA Sterilization Review meeting was held at Cape Kennedy, Florida, this week to provide oral reports and discussions on both contract and work in Government laboratories. Mr. F. J. Beyerle served as Co-Chairman and Mrs. A. N. James, Jr., Hayes International, presented a paper on the in-house ME Laboratory Sterilization Program. In general, it can be stated that much of the work to date has been in development of processes, equipment and facilities to properly conduct studies for sterilization of large space vehicle assemblies. A large amount of research has been conducted in establishing basic data sufficient to fully define the space vehicle sterilization problems. It appears that they have been successful. Some math model studies are producing predictable results and documented basic groundrules have been established for analyzing the acceptability of a given process. ✓

B 6/25

1. POGO MANAGEMENT REVIEW: POGO Management Review is scheduled on 6-18-68 using the Boeing TIE network facilities. A dry run of MSFC's portion of the presentation will be conducted this afternoon, building 4610, room 5045. Final coordination of the POGO test schedule and events logic diagram has been completed between MSFC and MSC. The schedule and event logic diagram will be maintained at both Centers and Headquarters by the Boeing TIE organization. Lack of test data for the 8-8-68 DCR continues to be a schedule problem. Discussions with Headquarters have not relieved this schedule incompatibility. A preliminary POGO analysis of the AS-205 has been completed with updated POGO model including damping from dynamic test results. Results show the vehicle to be very stable in first mode with second mode showing marginal stability during the last second of first stage flight. ✓
2. J-2 ENGINE-TO-STAGE ATTACH BOLTS: One of the six engine attach bolts on stage S-IVB-506 was found to have a thread failure; MDC conducted tests and analyses to determine the cause of the failure. The results show that the bolt threads yield due to an excessive torque. (Specification based on dry bolts and bolts were installed with lubrication.) MDC assumes bolts on all stages yielded. These bolts will be replaced with lower torque requirements at the time the redesigned ASI fuel lines are installed. ✓
3. IU CRACKED SLEEVE: A cracked 7075-T6 sleeve was found in a component removed from IU 501 for some other purpose. The sleeve was procured from Teledyne under a specification requirement for 7075-T73, however, the sleeve was not in this temper. We are informed that this sleeve was one of approximately 50 purchased by IBM from a production lot of approximately 1700. Of the 50 sleeves, 25 were shipped to KSC as spares. R-QUAL is presently checking where these are. ✓
4. ORBITAL WORKSHOP (OWS) SOLAR ARRAYS: At the direction of I-S/AA, we have initiated a feasibility study to increase the size of the Solar Arrays from the present 1200 ft² to 1600 ft² area. A minimum weight approach is to be followed, which excludes the use of the present ATM modules. Each wing will carry 14 panels instead of the present 10 panels. We are trying to incorporate this increase without changing the beam fairing. The baseline solar array development will probably slip as a result of the requirement to look at an entirely new system. Unfortunately, the whole matter of AAP's actual power requirements is still in a state of flux. ✓
5. AS-205 PULL TEST: The AS-205 pull test was completed on 6-10-68. A quick look at the data indicates that load distribution for the center LOX tank and the outer LOX tanks differ by approximately 40% from AS-204. This difference is partially explainable by modifications to the S-IB forward skirt and a slightly different direction of pull. A complete assessment will be made upon receipt of the data tape from KSC. ✓
6. S-IVB/IB RETROMOTOR IGNITERS: The motors presently planned for use on SA-205 have igniters that will have exceeded the two-year shelf life limitation. Thiokol has agreed to submit justification to support a recommendation that the igniter shelf life be extended to three years. We will review with MDC on 6-18-68. ✓

Method: 10/1/68

CRW

Suggest you ask Frazer to have a review on the possible effect of this oversight (dry vs lubricated torque not clearly defined in specs) on other elements of the Saturn program. Spacecraft and FSE may be affected, too.

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NOTES 6/17/68 MAUS

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Center Manpower Data Submission to Headquarters: The information requested by General Bogart, relative to Civil Service and Support Contractor manpower requirements as of April 30, 1968 and June 30, 1969 (as reviewed by you with Mr. Foster on Friday), was handcarried to Headquarters on Saturday. This data had consisted of a breakdown by program down to laboratory level. Immediately upon delivery of this data, General Bogart requested a Civil Service breakdown at division level and a more detailed project breakout in Advanced Missions and OART and a functional breakout of Indirect. This required weekend involvement of IO, R&DO, FMO, COMP, and necessitated reprogramming the computer manpower data. The request was satisfied late Sunday night and Mr. Foster handcarried the information to Headquarters this morning. We would like to express our appreciation to all of those involved. ✓

Degrees Earned by Personnel: Messrs Wyskida, Hagen and Landau have recently completed their requirements for a higher degree of education. Mr. Wyskida earned his Doctorate in Industrial Engineering and Management at the Oklahoma State University while Mr. Hagen received a Master of Science degree in Industrial Engineering from the University of Oklahoma. Mr. Landau received his Masters of Arts in Public Administration (in absentia) from the University of Oklahoma. ✓

NOTES 6/17/68 RICHARD

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LM/ATM Unmanned Rendezvous Review: A status review of the MSC and MSFC unmanned rendezvous and docking studies was held here June 12, 1968, at the request of Chuck Mathews. The MSC efforts are aimed at using LM systems for rendezvous, whereas MSFC is studying an S-IVB rendezvous. The docking scheme has been baselined to be by remote control from the MDA and is being studied primarily by MSC. It appears that a combined MSC-MSFC presentation to Messrs. Mathews and Luskin can be made in about four to six weeks. This will show the tradeoff between S-IVB and LM rendezvous. At this point we are showing a capability to perform the rendezvous with the S-IVB using a restart; however, payload is marginal and not all lighting and ground station tracking requirements are being met. It now appears that a better S-IVB rendezvous is possible without the restart by utilizing a new scheme MSC has developed. This is being studied, and the results will be presented to you when available. ✓

B 6/25

F.S.

1. Mission D Presentation: The briefing on Mission D Profile and Operations was given on June 13 to an audience of approximately 70 people. We are available at your convenience for a repeat of the briefing. However, it may be well to reschedule the repeat somewhat closer to the launch of AS-503, after incorporation of all applicable changes in the mission plan. ✓

I am reasonably well up to date B

Yes, please B

2. Nonoperational Utilization of AAP Communication Systems:

Reference is made to a question you asked about the nonoperational utilization of the AAP cluster communication systems in providing the crew with such things as music, news, and family conversations. The present system does not provide the capability for any significant utilization. A more elaborate system could be implemented within the following operational limitations: (1) All communication channels will be required for operational uses during most of the network contact time; (2) Only U.S. passes off sufficient network coverage for relaying significant uninterrupted news and music; (3) Voice circuit bandwidths from MCC to remoted sites would limit the fidelity of music. It is recommended that consideration be given to the following: (1) Install telephone interconnects, with priority interrupts, which would permit private conversations between the astronauts and their families; (2) Use the proposed teleprinter for transmitting news items from the ground, and (3) Use tape recordings which can be plugged into the cluster intercom system for music. ✓ MSC did provide to the crew, to a limited extent, both news and conversations with their families during the Gemini Program. ✓ Apparently MSC is intending to handle AAP in a similar fashion and as of now is not planning any special consideration. ✓

noted 6/18

NOTES 6-17-68 Stuhlinger

B
6/25

No submission this week.

X-RAYS OF S-IVB 205 STAGE WELDS: One of the actions resulting from the AS-205 DCR held to review the requirement for S-IVB propellant tank proof pressure test was to review the x-rays of S-IVB 205 propellant tank welds. During this review the x-ray film of a cylinder seam weld was found to be of such poor quality that another x-ray of this weld was required. The weld was re-x-rayed at KSC. The x-rays of all propellant tank welds have now been reviewed and found to be acceptable. ✓

COORDINATION WITH MSC ON AS-205 PROCEDURES REVIEW: As part of our Operational System Safety Review for the AS-205 mission, we will conduct a coordinated review of CDDT and countdown procedures with George Low's Apollo Program Office personnel (Mr. Simpkinson) to assure that we have no launch vehicle to spacecraft interface problems during CDDT or launch. The review will be done at KSC, will include all CDDT and countdown procedures with their associated subtask procedures, and will require about three to five days for completion. The date will be established as soon as all CDDT and countdown procedures have been released for both the launch vehicle and spacecraft. ✓

PRE-NEGOTIATION REVIEW OF CCSD S-IB STAGE FOLLOW-ON CONTRACT: Representatives from the Saturn IB Program office and the Contracts Office presented MSFC's recommended pre-negotiation position for the CCSD S-IB Stage Follow-on Contract (S-IB-213 thru S-IB-216) to Messrs. Luskin, Disher, Field, and others in Headquarters last Monday. Because of the Headquarters position concerning the commitment of AAP funds at this time, we were not given approval to proceed with contractual actions but in lieu thereof, it appears the S-IB follow-on effort will be extended by approximately five months. ✓

B
6/25

1. Nuclear Engine Testing: On Saturday, June 8, 1968, the Phoebus 2A Nuclear propulsion reactor was tested at intermediate power at the Nuclear Rocket Development Station (NRDS), Nevada. This reactor, designed and built by the Los Alamos Scientific Laboratory (LASL), was originally part of the program to develop the Nerva II nuclear engine (230,000 lb. thrust). Due to the redirection of the ROVER program to a 75,000 lb. thrust Nerva engine the Phoebus 2A has become a technology reactor.

The intermediate power test achieved 2000 MW thermal power for approximately 30 seconds. Operation of this test, from the point of view of the thermal system, was considered very successful and smooth. Difficulty was encountered neutronically in that the calculated control drum settings did not produce the predicted power level. It was necessary to rotate the control drums an additional 30° to reach the desired power. This difficulty was attributed to a lower effective reactivity of the hydrogen in the reflector region caused by an unexpectedly high absorption cross section for hydrogen at low temperature.

neutrons by B

A minor problem was encountered with the nozzle pressure vessel which ran hotter in some places than predicted. This was attributed to an inaccurate estimate of heating caused by secondary gammas. As a result of this problem the nozzle pressure vessel will very likely run close to red line temperature values during the full power test and might conceivably limit the maximum power.

As a result of the difficulty in achieving desired power, which caused deviation from the planned test procedures, it was not possible to do some of the mapping experiments planned for this test. These experiments will have to be accomplished during the full power run which was scheduled for June 19, 1968. However, it is necessary for LASL to calculate and familiarize the NRDS test personnel with a new run profile for the full power test, and it was felt that insufficient time was available before June 19. Therefore, the full power run has been rescheduled for June 26. This test will run for approximately 35 minutes, of which 5-10 minutes will be at the full 5000 MW power level. ✓

2. Nerva I Flight Missions: A meeting was held on Tuesday, June 11, 1968, with Col. J. Burke of NASA Headquarters and Mr. D. Miller of SNPO in which groundrules were established for BOB requested study on the Cost Effectiveness of the Nerva I System for lunar and unmanned planetary missions. Besides MSFC; Boeing, Douglas, and North American will also conduct parallel, independent studies to be completed by July 2. The contractors have assigned a sizable contingent of top level personnel to respond to this request. This study is one of many "Special Analytical Studies" (SAS) being analyzed by the Planning Steering Group in conjunction with the FY 70 budget planning. In order to influence the report to BOB, MSFC should respond with a credible job. ✓

June 24, 1968



ELITE
ASSOCIATION
ACID FREE

9-26-60

NOTES
MR. GORMAN'S COPY

JUN 24 1968

With comments

(none for DEP-A)

16
7/17
get
moh 7/22

Just
7/17/68

TO Dr. von Braun, DIR

July 8, 1968

FROM Dr. Hoelzer, R-COMP-DIR

gll

In response to your question on Notes, dated 6-24-68 (Hoelzer), here are some more data on "MARSYAS."

Besides the vulgar explanation Mar Thy Ass, there is a deeper underlying meaning based on Greek Mythology, i.e.:

- 1 LETHE: See Rivers.
- 1 LETO (LATONA): Mother by Zeus of Artemis and Apollo.
- LUCINA: Roman goddess of childbirth; identified with Juno.
- LYNCEUS: Son of Aegyptus; husband of Hypermnestra; slew Danaus.
- MAIA: Daughter of Atlas; mother of Hermes.
- MAIA: See Pleiades.
- MANES: Souls of dead Romans, particularly of ancestors.
- MARS: See Ares.
- MARSYAS: Shepherd; challenged Apollo to music contest and lost; flayed alive by Apollo.
- MEDEA: Sorceress; daughter of Aestes; helped Jason obtain Golden Fleece; when deserted by him for Creusa, killed her children and Creusa.
- MEDUSA: Gorgon; slain by Perseus, who cut off her head.
- MEGAERA: See Furies.
- MELEAGER: Son of Althaea; his life would last as long as brand burning at his birth; Althaea quenched and saved it but destroyed it when Meleager slew his uncles.
- MELPOMENE: See Muses.
- MEMNON: Ethiopian king; made immortal by Zeus; son of Tithonus and Eos.

H. H.

Save your
hide!
B

We dare to challenge Apollo insofar as we simulate the Apollo vehicle. However, our sense of respect for Apollo forbids us to simulate the roaring music of Apollo. Therefore, we hope our MARSYAS will stay alive.

This, hopefully, clarifies the situation.

H. Hoelzer
H. Hoelzer



ROUTING SLIP

MAIL CODE	NAME	ACTION
DIR	Mr. Shepherd	APPROVAL
		CALL ME
		CONCURRENCE
		FILE
		INFORMATION
		INVESTIGATE AND ADVISE
		NOTE AND FORWARD
		NOTE AND RETURN
		PER REQUEST
		PER TELEPHONE CONVERSATION
		RECOMMENDATION
		SEE ME
		SIGNATURE

Translation of Mr. William's note:

Jim:

The answer to your question is: It is possible, but we are aware of Duff's remarks and the situation and are doing everything we can to preclude trouble.

This area is one that could yield some good activities and experience in the future and I feel it is worth the chance we are taking.

Frank



MAIL CODE	NAME	TEL. NO.	DATE
R-AS-DIR		6-1503	7/8/68

OFFICE OF DIRECTOR - MSFC

CODE	NAME	INIT.	<input type="checkbox"/> ACTION	<input type="checkbox"/> INFORMATION
R-DIR	Mr. Weidner			
R-AS	WILLIAMS	fw 7/7		
DIR	Shepherd			

REMARKS

In view of Ginter's comments made to Joe Reed and the difficulties we have gotten in on some of our previous optical studies, are we getting into another area of difficulty with this new contract?

Note Sheeps question
J.T. 7/7

Jim:

The answer to your question is:
It is possible but we are aware of Duff's remarks & the situation & are doing every thing we can to preclude trouble.

This area is one that could yield some good activities & experience in the future & I feel it is worth the chance we are taking
fw 7/7

CODE	NAME	DATE
DIR	J. T. Shepherd	6-25-68

Central file 2391

NOTES 6/24/68 WILLIAMS

1. JOINT AIR FORCE STUDIES:

Milt Rosen, Senior Scientist for Office of Defense Affairs at NASA Headquarters, has established with the DOD three studies to be conducted jointly with NASA and the Air Force. The objectives of this activity are to (1) attempt to get better cost data on the Titan Family and (2) to get inputs for the FY'70 Budget exercise concurred in by both NASA and DOD. These studies are to be completed by mid-July - the same date as the MSFC studies for Rosen.

The studies are:

1. Unmanned Missions
2. Comparison of IB and T-III for space station logistics
3. Intermediate vehicles (50K to 100K)

NASA will assign two men to each study. For Study Number 1 it will be Bland Norris, OSSA, and a LeRC man; for Number 2 Frank Rosenberg, OMSF and Jim Sisson, MSFC; and Number 3 Les Fero, OMSF, and Luke Spears, MSFC. Rosen hopes to have a kick-off meeting with the Air Force next week.

2. D&F STATUS:

The Optical Technology Experiment System D&F has been released by headquarters Chief Counsel and has gone forward for Mr. Webb's signature. We hope it will be signed this week. The Advanced Studies D&F has cleared headquarters Legal Office and is in Vecchietti's shop, Director, Procurement Office. It should go to Mr. Webb shortly.

*1.4.
W. Williams
Notes
6/24/68*

SENSITIVE

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO Mr. H. Weidner, R-DIR

DATE July 1, 1968

FROM Director, Space Sciences Laboratory, R-SSL-DIR

SUBJECT Comments on interview of Joe Reed with Duff Ginter

The transcript of the interview of Joe Reed with R. D. Ginter, OART, on May 16 gives the impression that this Center has not yet struck it rich with Duff Ginter. Having known Duff for some time and having had several discussions with him similar to Joe Reed's, I would like to offer the following comments:

1. Mr. Ginter is correct in his observation that MSFC does not have a well defined organizational structure for the planning and managing of program-type work in science and advanced technology that comes from OSSA and OART. At present, several organizational elements are representing MSFC in this type work:

ASO: Vehicle and spacecraft planning for advanced missions.

SSL: Scientific laboratory and flight payload projects.

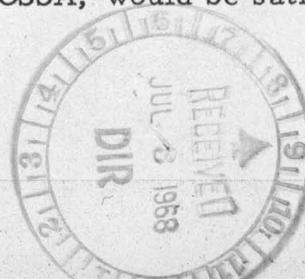
EO: SRT/ART and flight experiment program coordination.

AAP Office: Planning of post-Apollo flight projects.

Individuals and groups: Research tasks in science and advanced technology.

These organizational elements are in loose contact with each other, but their activities are not well coordinated by a guiding or leading force at MSFC. I believe that such a guiding and leading force should be established at our Center. We have an excellent and highly successful structure for our work with OMSF; a much smaller organizational structure would be sufficient for our work with OSSA and OART, but it should be capable of representing and committing the Center when OART and OSSA type projects are concerned. Several of Duff Ginter's complaints, which, by the way, have been expressed in the past also by other members of OART and OSSA, would be satisfied if such a structure existed.

SENSITIVE



2. Mr. Ginter had much to say about the "hard-nosed brute force Lab Directors" at MSFC who want to do things in their own way. I believe that we should not feel bad about these descriptive terms. After all, he wants some accomplishments out of MSFC, and he will not be able to get them without strong leadership on the part of the Lab Directors. His objectives will be met best by a capable, experienced, cooperative, and well organized work force within the labs, but not by a non-discriminating pool of slave labor. The vagueness of the concept of the optical technology program that Duff has developed so far indicates that he needs substantial help in the definition, implementation, and execution of this program. I believe that he can and will get this help from the laboratories, including their Directors, provided that a sound working relationship is established between OART and MSFC.

3. I feel that you should invite Mr. Ginter to come to MSFC, to have a meeting with all those who may become involved with the OTES project, and to give us a clear understanding of his opinions on the following topics:

What exactly is the "telescope job" that MSFC is invited to do?

How should this project be organized and executed?

What exactly should be MSFC's role?

What should be the roles of other Centers in this project?

What should be Headquarters' role?

How will OART coordinate with OSSA and OMSF for this project?

What should be our mode of cooperation?

What skills at MSFC will be required?

What exactly is wrong with MSFC's "same old way"?

What is Headquarters' way?

Which "different path" should we be willing to go down?

What corners should we cut?

In what respect do we lack guts, good judgment, and initiative?

SENSITIVE

3

I believe that an open discussion of these questions will go a long way toward a better mutual understanding between Duff and MSFC.

4. A subject of real concern to me is the proper coordination of Duff Ginter's project with the Astronomy Missions Board, the Optical Panel of this Board, and the Physics and Astronomy Directorate of OSSA. These groups are very keenly interested in projects of astronomical technology. Substantial work has been carried out under their auspices in the past, and considerable knowledge has been accumulated already. I believe that our Center should insist on careful coordination of Duff Ginter's program with the plans and programs of these groups before we identify ourselves with the OART program.

Ernst

Ernst Stuhlinger

cc:

DIR, Mr. Shepherd
R-DIR, Mr. Cook
R-ASTR-DIR, Dr. Haeussermann
R-EO-DIR, Dr. Johnson
R-AS-DIR, Mr. Williams
R-AS-VO, Mr. Olivier
R-ASTR-R, Mr. Taylor
R-ASTR-R, Mr. Reinbolt
E-DIR, Mr. Reed

SENSITIVE

B 6/26

NOTES 6/24/68 BALCH

6/24/68

S-II-3 - Stage departed MTF at approximately 12:30 p.m., 6/23/68. Stage departed Michoud 6/24/68 and is expected to arrive at KSC on Thursday, 6/27/68. ✓

S-II-5 - Static firing has been tentatively rescheduled from 7/10/68 to 7/17/68 due to shortage of modification hardware. Subsequent milestones have been rescheduled as follows: Off-stand 9/11/68; Ready to Ship 10/2/68. ✓

S-II-6 - Stage was moved from the S-IC Booster Storage Building and installed in the S-II Vehicle Service Building for LH₂ tank entry. Installation in the A-2 Test Stand has been rescheduled from 6/28/68 to 7/1/68. Remaining milestones have been scheduled as follows: Power-up 7/9/68; Cryo Proof Pressure Test 8/22/68; Static Firing 9/4/68; Remove From Test Stand 10/31/68; and Ready to Ship 11/19/68. ✓

S-IC-6 - Power-up remains scheduled for 6/25/68. Propellant load test has been rescheduled from 7/9/68 to 7/10/68 due to the July 4th holiday. ✓

Contracts - Prime Contract NASw-410, Modification MSFC-1, Amendment No. 143, for General Support Services during the period 7/1/68 through 9/30/68 was hand carried to MSFC on 6/16/68 for review. ✓

Legal - The complete file on the static firing test claim of Chester C. Lee of Picayune, Mississippi, has been forwarded to MSFC with the recommendation that the claim be denied. ✓

6/24/68

B 6/26

WORKSHOP ATTITUDE CONTROL SYSTEM (WACS) BRIEFING TO

MSF: A briefing on the mission and system requirements for the WACS was given to Mr. Luskin in Washington on June 19. This briefing was the oral report of the Cluster Ad Hoc Attitude Control Working Group. The report of this group will form the basis for WACS requirements to be reviewed at the WACS PRR scheduled at MSFC June 25-26. Mr. Luskin accepted the recommendations of the Working Group with one exception. The Group recommended that the system not incorporate manual control by the crew. Such a requirement depends on whether we design the cluster hardware and mission for cluster pointing for experiments as opposed to designing for several basic operational attitude modes. The latter satisfies earth-looking experiments, but does not satisfy solar, stellar and random pointing requirements without the use of the CSM RCS. Subsequent review by Mr. Luskin resulted in his direction to incorporate manual maneuvering capability. ✓

HARVARD COLLEGE OBSERVATORY (HCO) EXPERIMENT SUBSTITUTION:

Dr. Reeves of HCO and his staff were at MSFC on June 20, and presented their justification for the substitution of a modified HCO-A instrument for the current HCO-C. MSFC's final evaluation of total impact of this exchange will be presented to Headquarters on June 27. NOTE: We previously reported the meeting to be the second week of July. ✓

ESSA ATM SUPPORT AND EXPERIMENT COORDINATION MEETING:

Dr. Leinbach of ESSA was at MSFC on June 19 and reported status of the ESSA ATM scientific ground support study. Excellent progress has been made in assessing the PI's requirements and the available ground support facilities. The study, thus far, indicates the PI's requirement can essentially be met by utilizing present ground based facilities. Dr. Leinbach will present this material to the Principal Investigators at the Experiment Coordination Meeting at MSC on July 16-17. The agenda will also include the current cluster plans and description, fine sun sensor test plans and a tour of MSC mission control facilities. ✓

ATM FINE SUN SENSOR: The prototype unit of the ATM fine sun sensor, scheduled for delivery to MSFC in mid July, will be delivered the week of June 24. ✓ This unit underwent tests at the vendor's plant in March, wherein some minor development problems were encountered, which have subsequently been corrected. The sensor will undergo more extensive tests when delivered to MSFC. ✓

AMERICAN SCIENCE & ENGINEERING (AS&E) CRITICAL DESIGN

REVIEW (CDR): Preparations are complete for the AS&E CDR to be held in Cambridge on June 24-27, 1968. ✓

6/24/68

H-1 ENGINE - Two tests have been completed on H-1 engine 7053, the flight worthiness engine for S-IB-5. The flight worthiness verification program demonstrates that the H-1 engines are ready for manned flight. In this program, a spare engine that has been in the field as long or longer than those on the flight stage is returned to Rocketdyne. Tests are conducted to complete the service life of fifteen (15) starts and 2025 seconds. After the testing, the engine will be disassembled and inspected. The tests are scheduled so that the inspection will be completed approximately one month prior to launch. This provides the opportunity of correcting any discrepancy noted by the flight worthiness tests. ✓

F-1 ENGINE - Reference my notes of 6/17/68 concerning influx of the PVC liner into engine F-4028 at RETS. The bullet-nose of the turbopump was scored, the impeller and inducer were scratched; no other damage considered potentially detrimental to the engine was found. The bullet-nose and impeller were changed, and the inducer was honed. Arrowhead, the PVC manufacturer, is continuing analysis of the PVC failure. ✓

On June 19, engine F-4028 was tested with the torque on the gas generator ball valve seal retainer decreased to duplicate the condition of the valve during previous tests in which abnormal oscillations occurred in the gas generator. (Helium flow rate of 0.17 to .31 lb/sec. at the 20 ft. point.) Oscillograph data reveals no abnormal oscillations in the gas generator. Investigations of the gas generator oscillations are continuing.

The following are the preliminary 3rd estimates of engine shutdown characteristics based on the soft shutdown feasibility test program:

	<u>Existing</u> <u>Rmts</u>	<u>Vehicle</u> <u>501-503</u>	<u>Vehicle</u> <u>504</u>	<u>Improved</u> <u>Shutdown</u>
Thrust Decay in 0.075 Sec.				
K-LB (>40%F)	415 Max	440 ± 40	460 ± 50	370 ± 45
Cutoff Impulse - K-LB-Sec	300-600	504 ± 30	464 ± 25	567 ± 40
Shutdown Time - 4-way to 10% F-MSEC	350-750	585 ± 60	525 ± 25	525 ± 70
Start Time - 4-way to 90% F-SEC	5.50 Max	4.15 ± .81	4.22 ± .40	4.54 ± .8
LOX Suction Line Surge - PSI	335 Max	310	335	300

J-2 ENGINE - J-2 engine tests were conducted at AEDC on June 19, in support of the S-II low fuel pump inlet pressure program. The redesigned ASI assembly was used. The next test period is scheduled for June 26, 1968, in support of the same program.

The S-II battleship firing on June 18, (for ASI line verification) was shutdown prior to mainstage because a piece of protective tape which was inadvertently left on the lower ASI fuel line block prevented fuel flow to the ASI. The engine mod instructions have been revised to call out tape removal. The test was repeated on June 19; however, a fire originating near the stage pre-valve terminated the test after approximately 100 seconds. The engines reportedly performed satisfactorily. Considerable propulsion system wiring damage was sustained and electrical repairs were required before complete depressurization of the J-2 engine start system could be accomplished. ✓

NOTES 6/24/68 CONSTAN

6/24/68

B 6/26

Nothing of Special Significance.

NOTES 6/24/68 - EVANS

6/24/68

B
6/24

Nothing of significance to report - Safety

B
6/26

NOTES 6/24/68 FELLOWS

6/24 JS

Negative report.

Be/26

6/24/68

1. Meeting at NASA Headquarters on High Reynolds Number Facility and Research Needs: The Research Division of OART has called an internal NASA Meeting on High Reynolds Number Facility and Research needs. It will be held in Washington on July 9, 1968, and will be attended by representatives of the Research Centers. At the meeting, a representative of our Aerophysics Division plans to discuss our High Reynolds Number Test Equipment, and to re-iterate our research needs in this area. ✓
2. ASEE - NASA Summer Faculty Fellows Lecture: Mr. Rowland Burns of our Astrodynamic and Guidance Theory Division was invited again to give an instructional lecture to this year's ASEE-NASA Summer Faculty Fellows. The lecture, given on June 13, was titled, "A Review of Celestial Mechanics and Optimization of Rocket Powered Vehicles." ✓
3. Vehicle Related Ground Wind Activities: NASA's 150-meter Meteorological Tower at KSC has been operational about 2 1/2 years. It is providing us with a unique source of ground wind data for evaluation which is contributing to better interpretation of the aerodynamic and structural response characteristics of the Saturn IB/V. Tests to understand aerodynamic scaling techniques and structural response calculations in terms of actual ground wind profile characteristics are of major interest. The tower represents a cooperative KSC and MSFC endeavor under our Aerospace Environment Division's direction. Some examples of the contributions made include: (1) A revision of the design peak ground wind profile function used to establish wind constraints. (2) Provided profile data for use in vehicle structural response test (500 F, etc.) not otherwise available. (3) Cape thunderstorm wind gust analysis relative to operational constraints. (4) MSC and MSFC pad lift-off and abort analysis inputs. (5) Establishing the first design turbulence spectra specified in terms of mean wind speed which can be related to risk of exceedence levels. (6) Cooperative MSFC/KSC analysis of launch/service structural responses. (7) Improved KSC/MSFC prelaunch monitorship data. The facility has also produced interest and use by other agencies - AEC, ESSA, and the AF in particular. Dr. Panofsky, Penn. State University, (ground wind authority), said it was the best facility of its type in the country. We expect the tower's continued improvement, operation, and MSFC's analysis/study of the data, in conjunction with structural and aerodynamic data on the vehicle and KSC launch structures, will contribute significantly to understanding this rather complex interface area. ✓

6/29/68

1. MODIFICATION AND VALIDATION EVALUATION (MAVE) OF SA-205/503: This Laboratory has established evaluation teams for each of the SA-205/503 stages covering all field site activities including KSC. In addition to personnel of this Laboratory, personnel from MTF, Michoud Operations, and LVO-KSC are actively participating. The method of operations is for the prime stage contractor to provide all of the information concerning changes: installation, inspection, and retest for those changes closed out prior to shipment to KSC. Additionally, the prime will provide that data normally provided on changes transferred to KSC. The remainder of change data will be provided by the KSC operation's contractor; thus giving essentially two separate packages of data for each stage: (1) the upstream of KSC package, and (2) that portion of work transferred to or generated at KSC. Final packages on several stages are not yet received. In summary, review of SA-205 is approximately three weeks behind schedule with the S-IVB as the pacing stage, and review of SA-503 is approximately four weeks behind schedule with the S-II as the pacing stage.
2. EDS PROGRAM - Q-BALL TESTING: Qualification and reliability testing of the Q-ball assembly has been completed, and the item is considered qualified for flight application. The certificate of component qualification has been signed by this Laboratory. ✓
3. TECHNOLOGY UTILIZATION: Dr. R. Levy from Cook County Hospital visited recently to gather more information and follow-up on previous discussions. He will go to work for the Public Health Service (PHS) around the end of July, and already has his new boss interested in investigating NASA technology. As a result, it appears that we can expect a visit from PHS in August or September. ✓
4. FILTER CLEANING: The filter cleaning activity transferred from this Laboratory to ME Laboratory is operational. All future in-house cleaning of filter elements will be performed by the Special Processes Section, R-ME-DFP. Four filter elements have been cleaned and accepted, demonstrating R-ME's capability. ✓

DF.

This is a most worthwhile exercise. Any help desired?

B

Launch schedules affected?
B

6/24/68

1. Stratoscope II. As soon as the scientific data is obtained from Dr. Schwarzschild on Stratoscope II, we plan to arrange a briefing for you. ✓
2. ATM Rate Gyros. The original approach for CMG stabilization of ATM (and the cluster) on the dark side of the orbit was to use the rate gyros on the ATM experiment package spar with the spar locked to the ATM rack. With better definition of the structural resonance of the spar gimbal, through the gimbal lock to the rack, this approach is not acceptable and the rate gyros must be located on the rack. Such a change impacts the daylight stabilization scheme of the spar and, therefore, we are now assessing what scheme for the derivation of rate data is best for the spar during the daylight periods. The two basic approaches are to put another set of rate gyros on the spar or differentiate the position data from the fine sun sensor. The preferred rate gyro approach has the disadvantage of high cost impact (approximately \$300,000), whereas differentiation of the sun sensor may have problems due to the noise level of the sun sensor output. The additional cost for sun sensor differentiation is approximately \$100,000. We plan to come to a decision on which method to use by July 15, 1968. ✓
3. Flight Control Computer AS-205. During frequency response tests on Friday 21 June at KSC, the flight control computer showed anomalies. Further trouble-shooting over the weekend made it necessary to send the computer back to ECI, St. Petersburg, where presently IBM and ECI are investigating the failure mode. ✓

Hope no schedule impact

B

B 6/26

F-1 TURBOPUMP POGO TEST

The No. 2 turbopump was successfully tested last week with firings (without pulsing) on June 18 and 20. The installation of the lox suction line pulser was completed and tested on June 21. On June 22, the first two test conditions in the POGO program on the No. 2 turbopump were completed. For these tests the lox system was pulsed under static conditions (without turbopump firing) using the suction line pulser. The first static firing with suction line pulsing is scheduled for June 25. ✓

F-1 ENGINE

Preparations were made to continue the POGO evaluation tests with F-1 engine S/N F-2009-1. The lox interconnect pulsing system design was completed and the shop has started fabrication. ✓

S-II STRUCTURAL TEST PROGRAM

The S-II Structural Test, Phase IIA, has been rescheduled from June 24 to June 28. This delay is an R-P&VE instrumentation problem. Approval for first test series was obtained on Saturday, June 22, from MSFC Safety Office. ✓

ACCESS ARM (NO. 9) TESTING

The control console was delivered from KSC on June 18; a 25 day slip from the original schedule. At KSC request, we are now on a 7 day work week, although this can, at best, only recover 7 days, if no additional problems occur. We have told KSC that a full time engineering manager at Huntsville is required to prevent future delays by Boeing and Chrysler. ✓

S-1B (MSFC)

The acceptance testing of stage S-1B-12 is being delayed because blockhouse support is being required for POGO priority programs. ✓ The tentative S-1B schedule is for the propellant loading test to be conducted on July 3, 1968. ✓

MODERATE DEPTH LUNAR DRILL

The contract with Northrop Huntsville was signed and initiated. The Westinghouse contract was sent to Westinghouse on June 17, for signature. ✓

CIVIC ACTIVITY

William L. Grafton of Test Laboratory has announced his candidacy for the Huntsville City Council. ✓ He had obtained MSFC approval prior to his announcement. ✓

6/29/68

B6/24

1. REVIEW MEETING ON THE SIMULATION SYSTEM MARSYAS:

A review meeting was held on the Functional Specification Report of Marshall System for Aerospace System Simulation (MARSYAS) with the Contractor Computer Applications Inc. MARSYAS is a program system for the simulation of large physical systems on the UNIVAC 1108 computer and is being developed in cooperation with Quality Laboratory. This software system will make the costly mathematical models of any physical system widely available by using a central data bank and remote stations, so that the simulation can serve design engineers for analysis, check-out engineers for design evaluation, and test engineers for fast failure analysis. ✓

H.H.
Trying to
make an
ass out
of Marshall?
B

The functional specifications define the engineering-oriented language, the mathematical algorithms and the structure of the program system. The engineering-oriented language will allow the engineer to communicate directly with the computer in his technical terminology rather than in programming language. ✓

2. SATURN V CONFIGURATION INTEGRATION & TRACKING (SCIT) AND CONFIGURATION MANAGEMENT ACCOUNTING (CMA) PRODUCTION MILESTONE:

The first production milestone toward implementing a combined Saturn V Configuration Integration and Tracking (SCIT) and Configuration Management Accounting (CMA) computer system on August 1, 1968, has been accomplished. A master file containing data base information for the SCIT portion of this system has been created and is being updated daily.

When the total SCIT/CMA computer system is implemented, documents will be generated for Configuration Management of the Saturn V Launch Vehicle and Ground Support Equipment, and for complete and accurate configuration accountability of MSFC Project Office Contract End Items (CEI's) (baseline) and Engineering Change Proposals (ECP's) approval subsequent to baseline. ✓

6/24/68

1. Completed, Checked-out Stages to KSC: As you are aware from our Notes last week, we are striving to deliver completed, checked-out stages to KSC. The schedule delay we requested for AS-504 and AS-505, in order to work down the outstanding work prior to shipment, was not approved by Gen. Phillips for S-IVB-504 and S-IVB-505 which are required at KSC on August 30, 1968, and October 31, 1968, respectively 30 days sooner than we requested. He has essentially directed us to remove enough work, presumably instrumentation, to deliver them on time without open work.

LB1
I hope 503 will perform well enough so this won't bite us later. 3

We have advised MDC to plan abbreviated checkouts for S-IVB-506 and S-IVB-507 following static tests currently scheduled for July 10, and September 25, 1968. A full checkout will be conducted prior to shipment to KSC. By this approach, we hope to incorporate late modifications prior to checkout and thus ship these later stages clean with all systems validated.

2. POGO Management Review: A POGO Management Review was conducted on June 18, 1968, using Boeing TIE facilities. July 15, 1968, is the decision date for commitment to specific flight hardware. Analysis, testing and verification of design modifications and hardware will, of course, continue beyond that date to assure correctness of solutions and to qualify flight hardware. The AS-503 DCR, scheduled for August 8, 1968, will provide an opportunity to review actions taken to solve the POGO problem.

3. S-II-3 Stage: The stage left Michoud this morning (Mon., June 24) and will arrive at KSC on Wednesday, June 26, 1968; five days ahead of schedule.

NOTES 6/24/68 JOHNSON

6/24/68

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Interim AAP POP 68-2 - Data was submitted this week for an Interim AAP POP 68-2. This data is based upon experiment requirements for an extended FY-68 period out through November 1968. This, in effect, makes FY-68 17 months, while FY-69 funding would be utilized for the 7 month period of December 1968 through June 1969. Since the bulk of our current contract effort is planned to take place during the latter part of the fiscal year, the stretch out through November will not have a major impact on the plans. However, the large reductions in FY-69 funding currently being considered will seriously impact the program. ✓

MSFEB - July 22, 1968 - The next MSFEB meeting which will take place on July 22 will consider two experiments in which we are involved. These are M507 Gravity Substitute Workbench (MSFC 57) - M427 Strapdown Platform (MSFC 22). These and three other experiments will establish the method whereby the MSFEB handles experiments for which no vehicle is available. We have no advanced information as to which of the several alternative procedures which have been proposed the MSFEB is leaning at this time. ✓

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6/26

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1. Pulsed Arc MIG Welding of S-II J-Ring: Welding techniques were developed for joining the S-II J-ring to the LH₂ cylinder #1 by the pulsed arc MIG process. North American Rockwell (Mr. Oleksiak) had requested the ME Laboratory to develop this process to eliminate the continuing porosity problem with their TIG welds in this seam. The process developed at ME uses a combination of TIG welding for the first pass, followed by a fill pass using pulsed arc MIG. Radiographic evaluation shows the welds to be Class I. Metallographic examination, however, reveals presence of microporosity. Mechanical properties are not adversely affected. A technical report is being prepared and will be released shortly.

2. S-IC Support: Following this week's failure of a pressure-volume compensator (PVC) liner during F-1 POGO tests at Edwards AFB, the Engine Management Office has contacted us for possible support in the contracting of rework of the liners on PVC's furnished by us to Rocketdyne. Our Industrial Support Branch has been involved in the contracting for development and acquisition of ducting since 1962. Such emergencies are becoming increasingly difficult to handle because the people with suitable experience and know-how have either left or have had to be reassigned.

W.K.
I know, but I don't know any-thing we could have done about it. In-house retaining is the only tool left to us.
B

3. Damper Arms: At the request of Industrial Operations, an in-house documentation audit has been initiated in order to permit transfer of responsibility for the systems to KSC. We were able to maintain configuration control of these systems which, as you recall, were built on an accelerated schedule and were subject to many changes during and after construction. Changes are still being made at KSC and documented here. The audit is progressing satisfactorily. ✓

4. Fast Response Fabrication Activities: We have developed and are applying to an increasing extent quick response methods for fabrication support to other laboratories and to our own in-house ME activities. For example, many of the day-to-day requirements for R-AERO and R-SSL are being met on the basis of very sketchy, or even verbal information. Our AAP mock-up and model construction and modification activities for R-P&VE are also done in this way. Our own neutral buoyancy build-up and mock-up fabrication was and is performed in a similar manner. The ATM prototype cameras which we are building to R-ASTR designs are subject to daily changes which we are able to accommodate; here, however, it is necessary to keep somewhat more complete records. Additionally, we perform cleaning services for R-QUAL, R-TEST, and others on a quick-return basis: approximately one-third of our cleaning and surface treating work is performed without the generation of any paper in R-ME. ✓

B6/26

6/24/68

1. POGO: The POGO Management Review, conducted 6-18-68, resulted in ten action items, seven of which are prime responsibility of MSFC. Appropriate action is underway on the seven items in an attempt to reproduce the gas generator oscillation noted in four early tests. Another test was conducted by Rocketdyne on engine 4028 with helium injection on 6-19-68. No abnormal gas generator oscillations were noted during this test. The gas generator ball valve seal retainer was to have been loose during this test to duplicate earlier tests which resulted in abnormal gas generator oscillations; however, a post test inspection revealed that the retainer was tighter than desired. The retainer was loosened and another test conducted 6-20-68, with helium injection. Abnormal gas generator oscillations did not occur during the test. Thus, Rocketdyne still has not been able to reproduce in 10 additional tests the abnormal gas generator oscillations observed in early tests.

2. AAP MDA BASELINE DECISIONS: We have finally received direction on some major design decisions. Mr. Luskin baselined the Experiments M050 (Metabolic Cost); M051 (Cardiovascular Function); M018 (Inflight Vector Cardiogram); M055 (Time-Motion Study); M058 (Body Mass Measurement Device); the ESS (Experiment Support System); and the Fecal Drier for operation within the MDA after initial entry. Also baselined were the removal of docking ports #2 and #3, four MDA windows from the conical section and the sun-oriented scientific airlock. A viewport over MDA port #1 for LM/ATM unmanned rendezvous and docking was added. We had been proceeding along these lines since the MDA review, but official sanction was lacking. We have also been directed by I-S/AA to design port #1 to contain the docking probe and assume that the probe will be installed in orbit by CSM/AAP-3 crew prior to LM-A/ATM-AAP-4. We are proceeding with design even though this decision has not been officially received from Headquarters. ✓

3. ORBITAL WORKSHOP (OWS) ENGINEERING MOCKUP: The Orbital Workshop Engineering Mockup located in building 4755 will be used during the next three months for a series of acoustic and ventilation tests; consequently, it will not be available for group tours or for general display. ✓

4. ORBITAL WORKSHOP (OWS) POST LANDING VENTILATION FANS: A Post Landing Ventilation (PLV) fan had been operated for over 1000 hours in a 5 psia O₂ environment, then soaked in vacuum for 2 weeks and restarted in the same environment again. After 20 hours the current and voltage became erratic and the noise level increased. The fan was disassembled. Several significant failures were noted. The seals were destroyed, and the balls and races in the bearing were badly worn. Prior to disassembly, we made a noise spectrum on the motor and this showed that the fan noise from this one motor exceeded that of 3 motors which were new. We will attempt to refurbish this motor with new bearings, a better lubricant, and new seals. It is quite apparent that the Apollo PLV fan is neither qualified nor acceptable for the Workshop without some significant modification to the motor and possibly even the fan. ✓

5. FRACTURE MECHANICS: We have been told unofficially that in view of the two recent submarine disasters, the Navy is going all out on the use of fracture mechanics in submarine hull design. The major portion of the attendance at a recent course in Fracture Mechanics at Lehigh University consisted of Navy submarine hull designers. ✓

B.L.
What's that?
Food prices?
B

NOTES 6/24/68 MAUS

6/24/68

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6/26

CONTRACTOR OVERHEAD BEHAVIOR UNDER THE INDUSTRIAL BASE CONCEPT

As you know the 1968 Apollo Cost Study Update is in progress. This year we hope to incorporate the Industrial Base Concept within the Cost Update. The contractors' estimate for the "direct" costs of the Industrial Base is expected by 1 July 1968.

Last week a representative of our office accompanied Bob Dorn, NASA Headquarters Overhead Team Leader, to visit our West Coast contractors. This visit was to determine the impact of the Industrial Base Concept on the overhead behavior.

In the past NASA Headquarters has performed the overhead analysis more or less without center participation. However, since these overhead costs represent almost half of the vehicle costs, we are participating in the overhead analysis to a greater depth than in the past. In future Apollo Cost Study Updates, we recommend that the overhead analysis be combined with the direct cost analysis and be totally performed by MSFC. ✓

We are hopeful that the Industrial Base Concept will be incorporated into the Apollo Cost Study computer program by July 15, 1968. ✓

B 6/20

NC TES 6/24/68 RICHARD

6/24/68

Saturn V Performance: At the request of the Saturn V Program Office, a meeting was held with Bellcomm on 6/21/68 to discuss the Saturn V performance picture. As you know our commitment to General Phillips is for 100K lunar payload; however, we have known for sometime that a full-up spacecraft for the lunar mission will probably be about 101. K - 102. K. It seems that General Phillips has told Mr. Webb that we have more capability than we were currently showing and there is a day-of-reckoning at the next Management Council Meeting scheduled for 7/2/68. (Bellcomm has indicated that General Phillips is looking for a commitment of approximately 101.5K for AS-506.) Some mission constraints may have to be traded off in order to achieve the 101.5K. If this same payload is needed for AS-505, additional tradeoffs of about 1,000 pounds will have to be made. We are getting with laboratory representatives to outline some possible tradeoffs. This would include such items as 2 sigma versus 3 sigma reserves, one versus two injection opportunities, etc., and will contain comments on payload gains, lead times and desirability of tradeoff of the various items. This information will be supplied to Colonel James and may be used as information to Headquarters, but it is understood that it will not constitute any commitment. This activity must be followed by a realistic performance evaluation on AS-505 and AS-506 so that, if tradeoffs are really needed, we'll know what we have to do. ✓

6/24/68

F.S.
Where are they located?
What are they used for?
Why are they not available?
B

1. ALSEP: For your information, as of now only MSC and KSC have submitted proposals for ALSEP ground control. OTDA has not decided yet, but is very reluctant. KSC's proposal includes the utilization of some of our government-owned medium-size computers (they are not available). Bellcomm is now evaluating both proposals to prepare for a decision by Dr. Mueller on or about 1 July. ✓

2. AS-502 Data Problems: Reference your question to Notes 5-13-68 Hoelzer, subject: AS-502 Launch (copy attached).

a. The various failures quoted fall into two categories, flight data management (items a & d) and specific data system failures (items b & c). Due to the 502 malfunctions, the chairman of the Flight Evaluation Working Group (FEWG) initiated his malfunction contingency plan, published on March 15, 1968. This plan covered adequately all aspects of data management in the contingency situation and specifically authorized him to change data delivery and processing priorities in accordance with requirements. Based on the 502 experience, no major changes to the contingency plan appear to be needed. The principal improvement necessary is for the FEWG chairman to retain his responsibility for tight control of all data processing requirements. ✓

b. The data systems failures at NAR and Slidell did not cause any major impact because of the quick response by R-COMP to step in with in-house processing (this provision is a vital part of above mentioned FEWG Contingency Plan). Both failures are recognized and are being corrected. In this regard, ETR is to employ better quality control on magnetic tapes and Slidell will use tape speed compensation. Instructions to contractors on processed data are being reviewed by R-COMP. ✓

c. In general, I feel that the extraordinary effort which was required to perform the simultaneous analysis of several major malfunctions was very adequately supported by raw and processed data deliveries. A few shortcomings of the types mentioned above probably cannot be completely avoided. However, action is being taken to avoid repetition of these specific failures, and I would like to endorse the continued need for a strong MSFC in-house data reduction capability. ✓

F.S. I'm all for it. This is one of our most important functions in the forthcoming Apollo flight series! B

NOTES 6-24-68 Stuhlinger

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6/26

6/24/68

1. CONTACTS WITH UAH AND RESEARCH INSTITUTE: Drs. Shelton and Weber are making contacts with University of Alabama and Research Institute personnel to strengthen our working relationships with these institutions. The present discussions are to determine research effort under way at the Research Institute, to inform them of our current research effort and capabilities, and to explore areas of mutual interest for possible future research cooperation between MSFC and the Research Institute. Also, we hope that it will be possible to establish a more direct academic association for some of our young Ph. D's, who naturally seek this kind of professional development. ✓

2. METEOROID ENVIRONMENT MODEL: Mr. Naumann of Physics and Astrophysics Division has completed a proposed meteoroid environment model for inclusion in the MSFC Design Criteria Handbook published periodically by Aero-Astroynamics Laboratory. The model includes cometary, asteroidal, and shower contributions near earth, in deep space, and in the vicinity of other planets. The model correctly predicts the results of the meteoroid experiment flown on Lunar Orbiter. ✓

3. ATM RADIATION ANALYSIS: Mr. Burrell and others in the Nuclear and Plasma Physics Division are preparing to perform a more sophisticated radiation analysis on the ATM system. The required geometric data needed for the ATM radiation analysis are being supplied by P&VE. ✓

6/24/68

B 6/26

FLIGHT CONTROL COMPUTER (FCC): The FCC review has been scheduled for Thursday, June 27, 1968, at 8:30 AM, in the Center Conference Room, as a result of experiencing more than the normal number of problems with this component. One of the more recent problems is really a problem with a piece part used also in the I. U. Control Signal Processor and possibly in other Saturn hardware. During functional test of the I. U. -205 FCC at ECI, a relay failed to transfer to normal state. The relay, which is manufactured by G. E., was replaced and failure analysis revealed frictional interference between the actuator arm and the case. An R-QUAL alert has been issued recommending that all of this type relay be screened for clearance by X-rays. A Failure Effect Analysis is being conducted to evaluate the potential effect of this condition on the FCC during prelaunch and launch. Preliminary findings from both this analysis and a test program now underway at ECI on the present relay assets are expected to be available by July 1, 1968. ✓

R-QUAL is presently making a survey to determine other possible uses of this relay. ✓

METAL FLEX LINE FLOW INDUCED VIBRATION INVESTIGATION: A meeting was held on June 19, 1968, to initiate the subject investigation with all Saturn IB and Saturn V stage contractors. All the stage contractors will be here this afternoon for a meeting to finalize the guidance for a coordinated analysis test program. By the end of this week we should have a well defined, agreed upon program. ✓

AS-206/207 DUAL LAUNCH MISSION: Although we have not received a Program Directive which definitizes the requirement for the AS-206/207 dual launch mission, the preliminary POP 68-2 guidelines state that planning should assume that the dual launch decision might be made at any time from August 15, 1968, until the AS-504 launch. The response time on the launch is six months after the decision point. ✓

6/24/68

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6/261. JOINT AIR FORCE STUDIES:

Milt Rosen, Senior Scientist for Office of Defense Affairs at NASA Headquarters, has established with the DOD three studies to be conducted jointly with NASA and the Air Force. The objectives of this activity are to (1) attempt to get better cost data on the Titan Family and (2) to get inputs for the FY'70 Budget exercise concurred in by both NASA and DOD. These studies are to be completed by mid-July - the same date as the MSFC studies for Rosen.

The studies are:

1. Unmanned Missions
2. Comparison of IB and T-III for space station logistics
3. Intermediate vehicles (50K to 100K)

NASA will assign two men to each study. For Study Number 1 it will be Bland Norris, OSSA, and a LeRC man; for Number 2 Frank Rosenberg, OMSF and Jim Sisson, MSFC; and Number 3 Les Fero, OMSF, and Luke Spears, MSFC. Rosen hopes to have a kick-off meeting with the Air Force next week. ✓

2. D&F STATUS:

The Optical Technology Experiment System D&F has been released by headquarters Chief Counsel and has gone forward for Mr. Webb's signature. We hope it will be signed this week. The Advanced Studies D&F has cleared headquarters Legal Office and is in Vecchietti's shop, Director, Procurement Office. It should go to Mr. Webb shortly. ✓