

June 1 1964



Bc/1

7/2/64

*Jw J-2 ENGINE

Engine 2005, scheduled for the PFRT program, was damaged during its initial acceptance firings on May 25. The fuel pump stalled at the point in time when the main LOX valve starts to open from the 20° open position to full open. Cause of pump stall has not yet been determined. The thrust chamber will be replaced resulting in a delay of PFRT from two to four weeks.

A program review meeting is scheduled at Rocketdyne for June 2-3. ✓

F-1 ENGINE

The seventh F-1/S-IC interface meeting was held at Canoga Park, California, May 20-21, 1964, with participation from MSFC, Rocketdyne, and Boeing. ✓

The next meeting of the Turbopump Ad Hoc Team is tentatively scheduled to convene at Rocketdyne on June 17, 1964. Fretting between the LOX impeller spline and shaft spline is considered to be the most likely cause of our LOX pump explosions. It is believed the the other high suspect area (impeller fatigue) is of lesser importance, since oscillographs on both engines, 014 and 019, indicate the presence of the LOX blade wake frequency (blades going past the volute tongues) up to the time of blow. Severe pressure rises in the LOX outlet were noted starting 10 ms. prior to the pump coming apart, indicative of burning already going on. Had blades been breaking up, one would expect to have seen an affect on the blade wake frequency and amplitude traces.

Lee B.
Very interesting
Could you explain this to me with the help of a model or something making it better "visible"
B

RL10 ENGINE

Centaur flight AC-3 is now scheduled for June 16, 1964, depending on the outcome of additional insulation panel jettisoning tests. AC-4 is scheduled for September. ✓

We are releasing one RL10-3 mock-up (which is no longer needed in the S-IV program) to Boeing on a temporary loan basis for their company-sponsored program. Two fireable RL10A-3 engines will be shipped to Boeing late this summer in support of this program. ✓

H-1 ENGINE

Engine S/N H-2007 at position No. 8 (inboard) on SA-6 cutoff at approximately T + 117 seconds during flight. Preliminary analysis of flight data indicates a faster than normal cutoff. The turbopump speed decayed very rapidly, which is indicative of a turbopump gearcase failure, either a gear, bearing, or shaft. SA-6 engines are the last to contain the Mark III turbopump. SA-7 and subs will contain engines with Mark III H turbopumps which are heavier and ruggedized versions of the Mark III. Detailed analysis of the data is in progress and a full report is forthcoming. ✓

7/26/11

NOTES 6-1-64 CLINE

Bcl/1

1. J-2 PRELIMINARY FLIGHT RATING TEST ENGINE (J2005) DAMAGED DURING FIRST ACCEPTANCE TEST: Severe thrust chamber tube damage was sustained. Exact cause of the malfunction, which resulted in an excessive mixture ratio and burned tubes, has not been determined. The engine has been removed from the test stand for replacement of the thrust chamber. ✓

F.C.

Scheduling
Effect
on IB
IU's
anticipated?
B

2. COLDPLATES FOR SATURN IB AND V INSTRUMENT UNIT FAILED DURING TEST: Two plates received from the Avco Corporation did not pass vibration tests. Structural deficiencies require redesign. One bonded plate received from Hamilton Standard failed at operating pressure after three hours. Use of adhesives for bonding is under study. Fairchild-Stratos was unable to fabricate coldplates. } } }

3. SPECIFICATION REVIEW: At present, the Requirements and Procedures Section of this Laboratory is attempting to schedule reviews or obtain dispositions on 19 Douglas, 26 Boeing, 166 North American Aviation, Inc., and approximately 100 MSFC specifications. Although we are receiving some opposition to obtaining dispositions by the conference method, we are meeting the 15-day limit for Boeing S-IC-T work. Therefore, support is expected from the upper levels of management in case we inadvertently offend some MSFC activity that feels it has sole responsibility for the entire content of a specification. ✓

4. SNAP-10A: Mr. Tape, one of the Atomic Energy Commission's (AEC) commissioners, visited Lockheed on 5-25-64 to discuss the planned flight test of SNAP-10A from Pacific Missile Range next spring. During the visit, he expressed the opinion that AEC would consider the reinstatement of flight design objectives for NERVA based on the results of the reactor tests later this summer. He had no comment on reinstatement of a vehicle program. (Information from Lockheed.) ✓

NOTES 6/1/64 CONSTAN

Bell

Negative Report

7/6/1

7/6/64

Bu

NOTES 6-1-64 DANNENBERG

1. MORL Project - Midterm briefing was held at Langley Research Center and Headquarters on 5-26/27-64. A detailed summary of these meetings will be issued. *To us - Meeting is set up here (MSFC) to review MORL, Apollo-x etc on 16 June with you. ✓*
2. GE Annual Work Program - MSFC comments to the "Contract Management and Annual Work Program" for GE Contract NASw-410 were submitted to Headquarters on 5-23-64. ✓
3. Fabrication of ESE - Gen. Phillips approved our request for 20 additional GE personnel for R-ASTR. This approval, however, is contingent upon compliance with NPC-401 (NASA Policy and Procedures for Use of Contracts for Nonpersonal Services) and its phasing into the ESE fabrication mission. ✓
4. During the GE Review meeting in Daytona, Florida, Gen. Phillips requested that MSFC and KSC provide to him a functional system analysis to define the entire GSE to be utilized at the launch site. He expressed his concern that the individual efforts by various MSFC laboratories and KSC elements might not provide a complete launch control and checkout system. I assumed the responsibility to meet with the KSC personnel in Huntsville and provide to Gen. Phillips the necessary evidence to demonstrate completeness of all GSE efforts under way. ✓
5. Gemini Circumlunar Flight - During informal discussions in Houston, Dr. Kuettner cleared up your "Missiles and Rockets" interview. Mr. Mathews suggested under the present climate to keep technical discussions between Centers unofficially alive. ✓ It appears that direct IB/Centaur flight is not attractive because of necessity to inspect lunar front side closely and because of inadequacy of ejection seats for IB. ✓ Best technical approach would be an off-loaded Agena with standard docking equipment as IB/Centaur payload and a rendezvous with standard Titan/Gemini for circumlunar orbit. Present dilemma seems to be that payoff timewise is primarily based on a relative slip of Saturn V/LEM, etc., with respect to IB (which cannot be the official position). ✓ Dr. Gilruth still noncommittal on this. ✓
6. Dr. Mueller's Proposal for S-II Posigrade System - R&D is presently studying Dr. Mueller's suggestion to replace the S-IC retro-rocket and S-II ullage rockets by S-II posigrade rockets. Preliminary evaluation looks negative. Will keep you posted. *this item is on agenda for Mueller visit 11 June. ✓*

K.D.
 Please get together with Art Randolph and let him demonstrate adequacy to Phillips. But you should help him in pulling all R&D aspects together.
 B

7/29/11

B 6/11

NOTES 6-1-64 FORTUNE

1. Governor of Yucatan visited MTO Monday, May 25, 1964.

Bill F.
Shooting
a Saturn
is just
easier than
shooting
a Jag
B

In furtherance of State and Gulf Coast efforts to attract more commerce and shipping, Gov. Luis Torres Y. Mesias, his attorney-advisor, Carlos T. Goff and secretary, Rodrigo Rodriguez, were escorted around Mississippi early last week. Upon request of Gov. Johnson's representatives, we gave them a briefing on construction and tour of the building sites, strictly on an unclassified basis. Report to NASA Headquarters is being submitted through MSFC. The party knew of your trip to Central America, and it was jokingly suggested that exchange might be arranged of a Jaguar for a Saturn Model. (That's one way to get a Jaguar - Hz) fw

2. Attended Dedication of Aerojet-Dade Division, Tuesday, May 26, 1964

- Aerojet-General has invested some 14 million dollars in a new, automated, fully-integrated complex for development and testing of very large solid fuel rocket engines, on a 75,000 acre site adjacent to Everglades National Park. Two 260 inch motors, 80 feet long and of 3 million pounds thrust each, will be built for the Air Force and test fired there in 1965. Congressman George Miller participated in the affairs and Dr. Ed Welsh, Executive Secretary, National Aeronautics and Space Council, delivered the key address. (John Miller & Joe Pinkston from PRVE = also attended) fw

3. Useful Discussions with KSC Personnel - were held Wednesday and Thursday regarding construction schedules, progress, and reporting, support contracts, their administration, cost reduction, etc. Toured Merritt Island construction sites Wednesday also. KSC apparently has same difficulty as we in defining meaningful completion dates. (Our Activation Office has now initiated computerization of key aspects.) KSC personnel reported they experienced similar desire on GE's part for empire building, but they have been able to curtail this and reduce scope of GE's support efforts, transferring some to MSC (Pace). They promised to help in auditing MTSO financial data being maintained at Daytona Beach. ✓

* fw

4. Location of Interstate Highway 10 - will not deviate from original survey, State Highway Commissioner Smith reported Friday, May 30. We had hoped it could be located further south, along Highway 43 and 90, to give greater separation from Test Stand area. Since there was only 3 decibel differential in the two routes, the MTF Planning Board and NASA Headquarters (Diaz Office) felt it did not warrant relocation if this meant extra NASA funds. ✓

B41

7/1/64

1. Booster Recovery Experiment: Marshall is proposing an experiment which would utilize a deceleration balloon on SA-10's booster. The scaled down balloon would not recover the booster, but would demonstrate packaging, deployment, stabilization, deceleration, structural characteristics and destruction of the balloon during re-entry. Weight allowance and money are available for the experiment and CCSD is working on a firm proposal for the test. TV or Camera Capsules would be used for observation. The scaled balloon concept will be confirmed by wind tunnel tests to determine whether high Mach number booster flow fields will not completely encase the balloon in a separated wake.

E.G.
Suggest a briefing and an informal discussion before we go too deep into this!
URGENT.
B

2. Removal of LES on SA-9, 8, 10?: In view of the renewed attempts by MSC & KSC to remove the LES from all Micrometeoroid flights, we have again taken a critical look at the problem. Our reasons for wanting to fly a Q-ball are still the same as outlined in enclosed letter. Removal of LES would require a new adapter to CM and aerodynamic calibration of Q-ball which would pose schedule problems. However, our arguments for flying the Q-ball were not finally accepted by Dr. Mueller in the last PRB meeting and we have to take this item up again in the next PRB meeting June 10 at MSC. If the Q-ball should be eliminated for one or all of the Micrometeoroid flights, elimination of the LES tower would have the following effects:
 (1) A small increase in payload (≈ 100 lbs.). (2) It would change the structural dynamics. We will run a few check points without LES together with the total configuration during the dynamic test program to be prepared for both cases. (3) Based on the different structural dynamics without LES it will probably be necessary to design a different control filter network. This will present schedule difficulties and Dr. Haeussermann does not think he can accomplish this even for SA-8. (4) The effect on aerodynamic configuration will be: (a) to produce higher transonic buffeting loads on SM; but no gross bending moments on the booster of any importance, (b) the decreased aerodynamic damping for oscillations in bending is not considered to be a critical item any more, (c) it would probably increase the severity of ground wind oscillations, but a temporary fix for this could be provided should it get really critical, (d) changes in steady state aerodynamic stability are noticeable only at sufficiently high Mach numbers as not to influence the control system. In summary: while we need the LES if we want to fly the Q-ball on SA-9, 8, 10, we could possibly eliminate it, if a new control filter can be provided in time. This cannot be guaranteed today but requires more knowledge of structural dynamics. It would appear that using the LES on those flights would be a contribution towards the Apollo program also by raising the confidence in those devices.

Dead end engineering

E.F.
That's my view.
It's ALL UP!
B

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

E. R. Teague 876-4443

TO Dr. Mrazek, R-P&VE-DIR DATE December 12, 1963
See also Gessler's NOTES, 6/1/64 R-AERO-P-193
FROM Director, Aero-Astrodynamic Laboratory *par. 2 (with my remarks on same)*
SUBJECT Requirements for Q-Ball on SA-8, 9 and 10
REFERENCE "Requirements for Q-Ball on SA-8, 9 and 10", R-AERO-FF-63-20, dated December 5, 1963

1. Astrionics Laboratory has stated that for the Saturn I vehicle the Q-Ball instruments which have already been purchased probably will not be mandatory for backup control on SA-8, 9 and 10 due to the delation of the manned operational flights for Saturn I. However, the Q-Ball is still being considered as a backup on Saturn IB and V manned flights and it would be very valuable to obtain flight data by flying the Q-Ball on SA-8, 9 and 10.
2. It is mandatory from a flight evaluation view point to obtain measurements of the angle-of-attack with the Q-ball in order to properly evaluate all aspects of the flights of vehicles SA-8, 9 and 10. This is the only proven method for measuring angle-of-attack on these Saturn vehicles.
3. Angle-of-attack measurements are required to determine the center-of pressure and normal force coefficient from the flight. This information is required to gain the highest degree of confidence in these parameters for the clustered tank configurations which may be of value to the Saturn IB program.
4. Since vehicles are becoming increasingly more marginal with respect to structural capability, it is imperative to know with a reasonable degree of accuracy the actual angle-of-attack during flight in case a catastrophic malfunction should occur. If the vehicle should go into a rapid divergence, the attitude and tracking information would be inadequate to properly determine the angle-of-attack. Knowing this would be important in a post flight assessment of the actual strength capability of the vehicle and in analyzing the true source of catastrophic malfunction.
5. At this time, it appears that there is a definite requirement for an angle-of-attack sensor to be used in the emergency detection system (EDS) on Saturn IB and V. Therefore, it is mandatory to gain the highest degree of confidence possible in angle-of-attack sensors from flight tests. These sensors should be flown whenever possible.

(D)

December 12, 1963

6. SA-9 and 10 are carrying angle-of-attack instrumentation mounted on the fins to evaluate the feasibility of this location. However, unless these measurements can be correlated with a good standard on several flights, we can place little or no confidence in the flight test results to prove their feasibility. If the Q-Ball is cancelled on SA-9 and 10, we will have only one vehicle to correlate the measurements, SA-7.

7. Angle-of-attack may be obtained indirectly from accelerometer measurements and from Rawinsonde, Rocketsonde or Spherical Balloon wind measurements. This should give a fairly good measure for the gross wind and angle-of-attack (estimated ± 0.5 deg.). However, the dynamic measurements will be poor. It is estimated that this error contribution may be about 0.4 deg., giving a possible total uncertainty in the peak angle-of-attack of approximately 0.9 degrees. This may be a significant proportion of the total allowable angle-of-attack.

8. Angle-of-attack measurements are also required to obtain information on "high frequency" wind content for establishing future design criteria. Direct measurement of angle-of-attack is the best means of obtaining information of this kind. It was agreed in the Flight Mechanics Panel (December 3, 1963) that the Q-Ball may be installed either on the LES tower or an aerodynamic fairing on top of the command module, dependent primarily on effects of scheduling.

9. It is the position of the Aero-Astroynamics Laboratory that the Q-Ball should be flown on SA-8, 9 and 10, unless there are severe schedule slippage or cost increases.

E. D. Geissler

E. D. Geissler
Director, Aero-Astroynamics Laboratory

Distribution:

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Mr. Jean	R-AERO-DEP DIR
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Mr. Horn	R-AERO-D
Mr. Douglas	R-AERO-D
Dr. Speer	R-AERO-F
Mr. Lindberg	R-AERO-F
Mr. Vaughan	R-AERO-Y
Dr. Haeussermann	R-ASTR-DIR
Mr. Richard	R-ASTR-S
Mr. Moore	R-ASTR-N
Mr. Bridges	R-ASTR-N

Subject: Requirements for Q-Ball on SA-8, 9 and 10

December 12, 1963

Mr. Palaoro	R-P&VE-V
Mr. Rothe	R-P&VE-V
Mr. Faulkner	R-P&VE-V
Mr. Boone	R-P&VE-V
Mr. Kroll	R-P&VE-S
Mr. Verbal	R-P&VE-S
Col. James	I-I/IB
Mr. Fikes	I-I/IB
Mr. Vreuls	I-I/IB

BGI

JW 6/1

1. S-I-9 POST-STATIC CHECKOUT: Pressure and functional testing of the S-I-9 stage continues in the pressure test cell of building 4705. ✓

2. ESTABLISHMENT OF RESIDENCY CONTROL AND AUTHORITY: An effort is underway to establish local residency control and authority to respond to problem matters in the contract and hardware area at contractor plants. Discussions have been held with resident and contractor personnel concerning expeditious handling of these problem areas, and a request for establishment of the necessary mechanism at residency level along with our recommendations have been forwarded to the Systems Office. ✓

3. S-IV, S-IVB QUALITY PROGRESS REVIEW MEETING: The third S-IV and S-IVB Quality Progress Review Meeting was held recently at DAC, Huntington Beach. We were able to resolve many existing problems during the meeting due to the constructive attitude of the participants and their ability to commit their respective organizations. ✓ In addition, 20 action items, which were about equally distributed between DAC and MSFC organizations, were generated. These results reflect excellent communications and the meeting is considered the most successful of its type to date. ✓

Additional info on improved working relationship with DAC from Roy Godfrey in Separate Note to you. ✓

* JW 4.

QUALITY AND RELIABILITY POLICY COMMITTEE MEETING: The second meeting of the NASA/DOD Quality and Reliability Policy Committee was held at the Pentagon May 18, 1964. The meeting was devoted primarily to a presentation and discussion of NPC 200-1A, "Quality Assurance Provisions for Government Agencies." The DOD representatives had requested this in order to more clearly understand NASA requirements. Following the discussion, the DOD senior committee member agreed to give direction through DOD channels specifying that NPC 200-1A will be followed by personnel providing quality assurance support to NASA. This is considered a key step in permitting the most effective utilization of these personnel. ✓

5. RELIABILITY MATH MODELING: A representative from this Laboratory attended a meeting at Daytona Beach, Florida, with representatives of KSC, Reliability and Quality Assurance, NASA Headquarters (MAR) and General Electric Company personnel. MAR requested an advisory group be formed with members from each Apollo Center to assist MAR in directing the GE Daytona efforts in reliability math modeling. Further, MAR will request that the Centers furnish them with a "data package" for all GSE used between launch minus three (3) days and liftoff. The "data package" is to contain sufficient information for MAR to combine input from all Centers into an overall model of this phase of the mission. ✓

* JW 6.

ROCKETDYNE QUALITY PROGRAM EVALUATION SURVEY: The Survey of May 11 through 21, 1964 at Rocketdyne, Canoga Park, ascertained that Rocketdyne has made a determined effort to establish a quality control system to meet the requirements of NPC 200-2, and that the system is functioning properly. ✓ Outstanding features were observed in the areas of management, quality planning, inspection, training, stock room control and shipping. ✓ Deficiencies were found in areas of calibration, cleanliness control, quality control activities at test sites, material review and vendor surveillance. Steps are being taken to correct these deficiencies. ✓

NOTES 6-1-64 GRUENE

Be/1

7/26/11

Negative report.

NOTES 6/1/64 HAEUSSERMANN

B 6/1

Jw
6/1

1. SA-6 COMMAND GUIDANCE TEST: Interrogation was made by Ascension Island Station; all systems indicated proper operation. Final results will be available following evaluation of tapes during this week. PCM telemetry ground readout information was not provided by the Range at Ascension Island as requested; therefore, evaluation will have to be made at MSFC because of the availability of decoding equipment. Interrogation was also made by the Green Mountain Station but PCM link used for monitoring interrogation was out. Success of this interrogation will be determined following further evaluation of other telemetry data. We were advised this morning that the SA-6 Satellite "came in" during early hours of 6/1. GSFC Net advised exact details as to number of passes and time of reentry is classified at this time.

* Jw

✓

2. STANDARD SPACE GUIDANCE SYSTEM FOR TITAN III MISSIONS: The second phase of this project of the Air Force Space Systems Division was started with four presentations during the week of 5/25. The four companies who had study contracts and made presentations were: Sperry-Rand, Autonetics, IBM, and STL. All companies proposed to use a "core" with a digital computer, control system, and an inertial platform with various additional subsystems (optical, radar, etc.) added as required for various missions; such as, orbiting laboratory, shuttle, manned and unmanned inspection, etc. Mr. Weber attended the presentations. ✓

3. GUIDANCE TROUBLE ON SA-6 DURING COUNTDOWN: Investigation to determine the exact cause of the trouble with one servoloop power stage of the SA-6/ST-124 platform is continuing. The preamplifier which was replaced on the spare platform did not correct the malfunction. To date, the problem has not yet been determined. The platform will be returned to Astrionics and investigation of the problem continued. ✓

LVO is investigating the guidance computer indications which caused a delay in the firing procedure. As soon as a clear understanding of the malfunction has been obtained, LVO will report. ✓

W.H.

Hope next time you can give an overall appraisal of the path - adaptive guidance success with SA-6. That's a real milestone that should be brought to attention, higher up! B

NOTES 6/1/64 HEIMBURG

Bo/1

Jul 4/11

*fw 1. S-1-8:

A lox loading test was performed Monday, 5/25/64, to load check the center lox tank manhole cover with the newly installed gasket. Some difficulties with overloading were experienced in trying to meet the specified ullage of 2.2%.

Test SA-20 was conducted on 5/26 for a duration of 48.94 seconds. Five of the eight engines operated above the specified thrust, which is 188K +3%. The site thrust values for these engines are as follows:

No.	1	2	3	4	5	6	7	8
	186.8	194.6	194.3	196.9	188.2	199.2	197.2	193.7

A fuel leak was detected under fuel tank 4 after the test. This leak was caused by a 1/4-inch Benton hand valve from which the gland nut and stem came loose during the test.

Tentative schedule for the coming week is as follows:

- a. Continue post-test leak check and hardware inspection.
- b. Data evaluation.
- c. Preparation for test SA-21, which is scheduled for 6/11. ✓

2. S-1C TAIL SERVICE MAST:

Reference NOTES 5/18/64 HEIMBURG (copy attached). The vehicle umbilical housing and associated connectors and withdrawal mechanism were received from Boeing on 5/26 for the tail service mast (Dickey Bird) test. Boeing is still deficient in supplying a usable ground locking and disconnect mechanism. Delivery of this item is now scheduled for 6/9. ✓

3. MTF WORKING GROUP:

S-1C Test Stand. Reference NOTES 5/25/64 HEIMBURG (copy attached). NASA Headquarters did take issue on the apparent schedule slippage. A TWX was received from Dr. Mueller on 5/25 asking for clarification on this subject. An answer has been prepared for your signature, and will be brought to you today. ✓

- ATTACHMENT 1: NOTES 5/18/64 HEIMBURG (attached to Dr. von Braun's copy only.)
- ATTACHMENT 2: NOTES 5/25/64 HEIMBURG (attached to Dr. von Braun's copy only.)

1. S-1 STAGE TESTING (STATIC TEST TOWER EAST):

A short-duration firing of S-1-8 will be made on Thursday, 5/21.

2. S-1C-T:

During the week of 5/11, Messrs. Cline, Grau, and Heimburg, together with five Boeing personnel, visited seven subcontractors of Boeing in the Los Angeles area to survey problems. It was determined that the principal action required is in the area of quality. A discussion of the results of this visit will be conducted with Industrial Operations (and yourself if you have time). I recommend that similar surveys be conducted for the S-11 and the S-1VB stages.

|| *Bo Young*
fyi
B

3. S-1C TRANSPORTER:

(Reference NOTES 5/11/64 HEIMBURG (copy attached)). Pictures of the transporter during the tests described in the referenced NOTES are attached for your information.

4. MTF WORKING GROUP:

Messrs. Silverstein and Godman from Lewis Research Center and Sloop and Mahon from NASA Headquarters visited MTO on 4/23 to discuss facilities for Atlas vehicle tests using flox. The MTF Working Group furnished an analysis of the impact of such work to Dr. Silverstein on 5/8. We received word from Dr. Silverstein that this information had been forwarded to NASA Headquarters. A copy of the information transmitted to Dr. Silverstein has been furnished to Mr. Weidner for his information.

5. S-1C TAIL SERVICE MAST:

(Reference NOTES 5/11/64 HEIMBURG (copy attached)). The vehicle skin segments for use in the "Dickie Bird" test were received from Boeing on 5/15. The remainder of equipment for this test is still deficient.

6. F-1 ENGINE COMPONENT TESTING:

a. Gas Generator. This test facility is now back in operation following the incident which occurred in ~~10/16/63~~ ^{10/16/64}. The facility was out of operation longer than originally anticipated; however, we were unable to put the necessary people on it, due to higher priority projects. A prototype generator was operated for 5.4 seconds on 5/15 with essentially satisfactory results. This test setup will be used to evaluate improvements in the F-1 gas generator.

b. 17-inch Lox Prevalve. A test series was conducted on 5/12 to evaluate the modified visor lip seal for the AiResearch Corporation valve. The results indicate that the valve can be safely operated with a closing time of 1.6 seconds at 27,000 g.p.m. LN₂ flowrates. This modification will be incorporated into the F-1 R&D engine at the Static Test Tower West.

ATTACHMENT 1: 3 photographs (attached to Dr. von Braun's copy only).
ATTACHMENT 2: NOTES 5/11/64 HEIMBURG (to Dr. von Braun's copy only).

Attachment 1

NOTES 6-1-64 HOELZER

B6-1

1. HYBRID SIMULATION DEVELOPMENTS: The first large scale hybrid simulation program is in the final checkout phase. The first stage flight of a launch vehicle which uses an on-board digital computer for guidance and control is being simulated. Vehicle dynamics are simulated on an electronic analog computer (EAI 231-RV) and the guidance computer is simulated by a small digital computer (ASI 210). The two are coupled through a recently installed 12-channel conversion system (ADAGE).

The Packard Bell 440 Digital Computer which was installed last week will provide additional hybrid simulation capability. It is now being connected to the TRICE Digital Differential Analyzer, and will soon be connected to the analog computers through the ADAGE Conversion System.

2. AUTOMATIC CHECKOUT: Computation Laboratory has assumed a major role during the past few weeks in the area of support computer programming for automatic checkout. Many assignments have been accepted from Automation Sub Board #4 and from the laboratories involved, including LVO. The responsibilities of Computation Laboratory in this area have been defined and will be issued as a memorandum from the Chairman, Automation Board. A good sized task force has been organized and is currently working with ASTR, QUAL, TEST, and LVO. In addition to support programming, Computation Laboratory is making arrangements with Quality Laboratory to use General Electric (Phoenix) for checkout programming in their area. ASTR and LVO will primarily use IBM for checkout programming since IBM has the mission contract for the IU. Computation has offered to accept this responsibility in TEST which is now using GE Apollo. The transition from GE Apollo to GE Phoenix would be simple and is now under consideration by TEST.

NOTES 6/1/64 JAMES

B 6/1

6/1

*fw SA-7: S-I-7 and IU-7 were shipped May 28, 1964, to KSC on the barge Promise. S-IV-7 is scheduled to be shipped to KSC via the Pregnant Guppy on June 9.

S-I-8 Static Firing: A potentially serious fuel leak developed during the short-duration firing of S-I-8 on May 26. This leak occurred in the calibration valve (3-way hand valve) in the fuel line between the sump and the differential step pressure switch. The leak occurred when the stem and packing became loose. The plug holding the stem and packing in place was drilled for a lockwire but a lockwire was not installed. The drawings are being checked to see if a lockwire was called out. Also, a LOX seal leak developed on an inboard engine pump. This seal is being replaced prior to long-duration firing. Otherwise, quick-look data indicate a successful firing. ✓ *be: 5 engines too much thrust! B*

*fw S-IV-9: The first cryogenic calibration propellant loading is scheduled for June 13, 1964; second cryogenic calibration propellant loading is scheduled for June 23, 1964; and acceptance firing test scheduled for July 23, 1964. ✓

S-IVB PERT: A meeting was held May 27 with DAC scheduling and PERT personnel as a follow-up to the discussions with DAC top management during the May 11 Quarterly Review. Agreements were reached which will provide MSFC with a thorough analysis of program status and good visibility of DAC plans toward meeting schedule objectives. The expanded data is scheduled to be available in the "Time Now" report of June 19, 1964. ✓

S-IVB Procurement Plan: NASA Headquarters has approved the procurement plan for S-IVB/IB Stages 205 through 212. ✓

S-IVB/IB First Flight Stage (SA-201): The LOX tank has been joined to the LH₂ cylinder. Due to a weld porosity problem on the forward LH₂ dome DAC has recommended utilizing the forward LH₂ dome of the Facility Check-out Stage for the 201 Stage. This is subject to NASA approval. The MSFC-resident Office is reviewing the design and inspection documentation on this dome to insure complete compatibility with the 201 Stage. PERT indicates 17.1 weeks negative slack, however, DAC management action is expected to reduce this by the next report period. ✓

S-IVB Battleship Test Stage: DAC implemented a plan on May 19, 1964, which schedules actual hot firing on August 19. This plan calls for a continuous build-up of activities rather than stopping at an intermediate point for cold flow tests. Engine chill tests will begin on July 22 and will last four weeks. ✓

Saturn IB ESE Design Mission Contract to General Electric: The RFQ for the ESE design mission has been returned to MSFC with Headquarters' comments. MSFC has incorporated the Headquarters' comments and the RFQ is presently in P&C. The RFQ should be released by P&C to G.E. on or before June 2, 1964. We are presently 22 days behind schedule on the ESE design mission. The mission task finalization date of June 30, 1964, is now considered highly optimistic. This office is monitoring this action daily. If the ESE design mission cannot be consummated by June 30, 1964, the funds (\$1,085,000.) allocated for this action will be pulled back for prefinancing in other areas. ✓

B 6/1

7/6/1

1. LONG RANGE PLANNING (President Johnson Exercise): We are getting ready to study, in quite some detail, the following ten program alternatives, based on guidelines received from Dr. Mueller and the task group leader, Francis Smith.

TYPE OF DEGREE OF ACTIVITY	RICH ALL AROUND		VERY RICH		STRONG LUNAR		STRONG EARTH ORBITAL		STRONG MANNED PLANETARY	
	A	B	C	D	E	F	G	H	I	J
<u>ALTERNATIVE:</u>										
<u>Earth Orbital:</u>										
Small					X	X			X	X
Nominal	X	X								
Large			X	X			X	X		
<u>Lunar:</u>										
Small							X	X	X	X
Nominal	X	X								
Large			X	X	X	X				
<u>Planetary:</u>										
Small								X		
Nominal	X	X			X	X	X			
Large			X	X					X	X
<u>INVOLVED LAUNCH VEHICLES:</u> (in addition to present programs)										
Reusable Orbital Transport	X	X	X	X	X	X	X	X	X	X
Post-SATURN Global Range Transport	X	X	X	X	X	X	X	X	X	X
Solid Core Stage (250K)	X		X	X	X	X		X	X	X
Nuclear Pulse Orb. Launch Vehicle		X		X		X	X			X

Each of these 10 program alternatives has 50 to 70 individual projects which have to be defined with respect to hardware requirements, cost and mission yield. This information then will permit the following:

- a. Comparison of resources requirements with expected available resources. ✓
- b. Determination of relative standing (ranking) of these 10 typical programs with respect to "return on investment." ✓

fw
6/1

B6/1

NOTES. 6-1-64 KUERS

Negative Report

7/2/61

B0/2

NOTES 6-1-64 MAUS

- 1. CENTER DEVELOPMENT PLANNING - We are meeting with Capt. Freitag, Stan Smolensky, and E. Z. Gray Wednesday, June 3, for a one-half day discussion on Center Development Planning.

changed to June 15

E. Z. Gray will also discuss advanced mission planning.

Suggest you attend see attached agenda for

- 2. MANPOWER PLANNING - We have completed the package on FY66 preliminary budget estimates for Administrative Operations, and it is being sent to headquarters today. This submission contains no cost estimates, but does cover MSFC's specific civil service and contractor personnel requirements by project and function for FY65 through FY69.

I'm planning to B

The April Manpower Utilization Report for the second straight month shows a decrease in indirect (from 34.1% to 33.6%) and a decrease in overtime (from 8.8% to 7.7%). We are working with Financial Management Office to see what further reduction can be made in labor charges to indirect. Both our indirect and overtime are now lower than KSC and MSC.

H.M. Request 1 page list (Topic B location)

- 3. PROJECT SUPER MEETING - A Project SUPER (Support Programs for Extraterrestrial Research) meeting is to be held at Wright/Patterson Air Force Base June 9-10, 1964. There are now eleven tasks being performed by Air Force under the Project SUPER arrangement. The purpose of this meeting is to brief eleven MSFC people (Russ Bollinger, Chairman, and ten others from P&VE, AERO, RP, and Quality) on facilities and capabilities of Wright/Patterson AFB, and to discuss additional tasks which may be accomplished under Project SUPER.

- 4. DATA MANAGEMENT - The MSF Ad Hoc Committee on Data Management is to meet here June 3 and 4.

The first computer run of the Documentation Inventory was printed this morning. It contains some 8,000 plus data items. The review procedure is being prepared today and the review to identify omissions and duplications will begin tomorrow. Additional details and status of this effort are being furnished to you today in a third progress report from Chris Andressen, Chairman of the Data Management Task Team.

Mr. Andressen is working with Dr. Mrazek and Mr. Dannenberg to determine the interrelationships of Data Management and Configuration Management and to assure consistency of the Data Management Manual and the Configuration Management Manual. Neither of these manuals nor the related organizational relationships should be approved by Center management until this consistency is assured.

7w
6/1

B6/2

NOTES 6-1-64 McCartney

1. LOGISTICAL & MAINTENANCE PLAN FOR RCA-110 SATURN OPERATIONAL COMPUTER SYSTEMS: Late last month, my office began a study with IO to determine if Astrionics could be relieved of contracting responsibilities for logistic support of RCA-110 Saturn Operational Computer Systems. On May 22, IO agreed to assume the responsibility. The transfer is now underway. Overall responsibility for logistic support management is assigned to the Saturn V GSE Manager. The extent of required technical support will be negotiated between the Saturn V GSE Manager and user organizational elements. ✓

2. PROGRAM EXECUTION PLAN GUIDELINES: Last week, my Program and Contracts people worked with the Executive Staff in preparing R&D Operations guidelines for the forthcoming Program Execution Plan. We have agreed to submit the Program Execution Plan in two parts. The first part, due June 30, will form the basis for submission of the next Program Obligation Plan to NASA on August 1. For the second part, the laboratories will submit detailed plans, by August 15. ✓

3. FY-65 BUDGET PLANNING: (Refer to my 5-18-64 Notes, attached.) Industrial Operations has reinstated the \$7M Saturn I Vehicle Support funds (for mission engineering support) which had been deleted on May 12. ✓

4. SINGLE SUPPORT CONTRACTOR MANAGEMENT AND IMPLEMENTATION PLANS: Members of my office have been working with R-DIR and the laboratories in development of single support contractor management and implementation plans. To date, R-DIR has reviewed and approved plans for all laboratories except ASTR, RP, and P&VE. On June 3 and 4, project reviews are scheduled for Astrionics and Research Projects. Next week, the P&VE plan is tentatively scheduled for review. My staff is following up to assure timely submission of the support contract procurement requests to the Purchasing Office. Based on our current status and planning, all of the single support contracts should be fully operational before the end of calendar year 1964. ✓

Bc/2

fw 6/11

*fw 1. Boeing Mission Support - MSFC's recommendation concerning the proposed assignment of Saturn V Launch Vehicle Systems Engineering and Systems Integration to Boeing is still pending Mr. Webb's approval. This is causing a delay in filling the gap in the manpower shortage as per (the R&DO Newby) Report. The status of this proposal is checked daily. ✓ *replace in TWX with "OOR"*

2. Saturn V Brochure - The Saturn V Brochure is ready for publication. Final review has been conducted and concurrences for publication by all concerned MSFC elements have been received. *I approved for the Off. of the DIR. fw. (1B will be ready in 2 weeks)*

3. S-IC Stage GSE - The RCA 110 Computer arrived at Huntsville May 25 and is presently being installed at the Boeing HIC facility. Installation and check-out by RCA should be completed by June 1. This computer will be utilized by Boeing for GSE development while waiting for delivery of the RCA 110A systems. ✓

*fw 4. S-II-S Stage Common Bulkhead Status:

a. Forward Facing Plate:

- (1) Successfully hydrostatic tested May 23, 1964.
- (2) Surface measurement required for machining aft facing plate honeycomb core has been accomplished.
- (3) Manufacturing repair action to upgrade several "J" welds to Type II classification is being initiated.

b. Aft Facing Plate:

- (1) Repair of the distortion that occurred in one gore segment during core bonding cycle is complete.
- (2) Initial machining of honeycomb core required for fit-up is being initiated. ✓

5. S-IVB Stage Sectional Mockup - NASA Headquarters has approved the Procurement Plan for the Saturn V S-IVB Stage Sectional Mockup and during a DAC-MSFC preproposal conference last week, the Technical Work Statement was finalized. MSFC request for DAC proposal will be transmitted to DAC this week. DAC estimates that delivery of the mockup to MSFC can be accomplished by November 15, 1965, if contractual authorization is granted by July 1, 1965. Indications are that a Supplemental Agreement to NAS7-101 cannot be negotiated prior to August 1, 1964. Efforts will be made to improve this date. ✓

6. Instrument Unit Design - Necessary design changes to the I.U. structures are being completed to satisfy the new load requirements. Minor modifications are required to the top and bottom ring. A new structural Test Unit will be procured to this design. ✓

NOTES - 6-1-64 - SHEPHERD

B6/2

7/4/1

Hangar for Vehicle Components: A stop order was issued to the construction contractor, Sullivan, Long & Hagerty, on May 11 because of concern for the future use of such a facility. This concern was highlighted by the fact that the structure will be quite large (98'6" H X 348' 8" L X 189' 11" W). After issuance of the stop order the facility was studied in some detail in accordance with the following guidelines as issued by you:

(1) Application for Saturn I-B, particularly in regard to in-house work on this program (2) Application of the building for future OART missions in the area of spacecraft engineering research. (3) Applications in the area of space-environmental facilities. (4) Future utilization of this building should not carry with it an Manufacturing Engineering label. The analysis resulted in the following:

(1) The Manufacturing Engineering label has been dropped and the facility will probably be called Multipurpose Vehicle Technology Facility. ✓

(2) Utilization of the facility will be under the direction of Mr. Weidner, with Mr. Kuers acting in the capacity of building manager and coordinator. ✓

(3) Our future utilization could be some of the following:

- a. Payload/Vehicle Integration
- b. Upper Stage Development
- c. Saturn Vehicle Uprating
- d. Recovery System Development
- e. Orbital Launch Facilities
- f. Full Scale Mockups
- g. Tools & Fixture Development & Fabrication Techniques
- h. Handling and Erecting Equipment Development
- i. Spacecraft Fabrication & Assembly Techniques
- j. Manufacturing technology development

First use of the facility will probably be for the 3rd Stage Saturn IB and S-IC (S-IC-2 for major horizontal assembly and mockups of redesigned tail and redesigned intertank). These immediate usages may be changed to accommodate any of the above listed programs should they develop.

The stop order to the construction contractor was rescinded on May 28. ✓
It is considered that this facility is very justifiable and defensible and in addition to the present Saturn usage provides us with a capability to undertake programs in the future for which we are unprepared to-date. ✓

July

Belt

NOTES 6-1-64 Stuhlinger

1. METEOROID MEASUREMENT PROJECT: A recent problem of the MMC detector capacitors has apparently been solved. The problem was erratic behavior of the single layer mylar dielectric in that its resistance would deteriorate in an unpredictable manner during exposure to a vacuum of 10⁻³ mm HG at 250° F. A tri-laminate mylar dielectric capacitor of the same total thickness has been running for sixty hours with no evidence of dielectric deterioration. ✓

E.S.
Delays
expected?
B

2. UNOBLIGABLE FY-64 SRT FUNDS: On May 28 a meeting was held between Mr. Weidner and members of RPL, FMO, P&C, and Executive Staff to discuss the FY-64 SRT funds which presumably cannot be obligated by June 30. The amounts which P&C cannot obligate are, by programs, as follows:

CMSF (LVT)	\$860,187
OSSA	\$ 75,000

All OART program authority currently at MSFC can be obligated. However, a number of high priority tasks were not received at P&C by the 15 April deadline and may not be obligated; lower priority tasks may have to be obligated in their stead. An additional \$1.5 million program authority, which is expected from OART, is understood to carry its own fifth quarter authority.

RPL and FMO will prepare a letter for your signature asking for general fifth quarter program authority. ✓

3. SRT PROGRAM STATUS: The status of the portion of the SRT program managed by RPL is, as of May 30, 1964, as follows:

	<u>ANNUAL PLAN</u>	<u>AUTHORIZED</u>	<u>PROCESSED TO FMO</u>	<u>OBLIGATED</u>	<u>CHANGES IN OBLIGATIONS SINCE 5/22/64</u>
OART	9,908,000	9,908,000	9,864,000	3,760,061	374,007
CMSF	14,163,000	14,133,000	14,115,172	1,312,609	226,168
OSSA	675,000	675,000	667,104	96,339	0
	<u>24,746,000</u>	<u>24,716,000</u>	<u>24,646,276</u>	<u>5,169,009</u>	<u>600,175</u>

✓

B 6/8

J-2 ENGINE

The reason for damage to PFRT engine 2005 has been determined to be system affect associated with initial main LOX valve opening. The initial main LOX valve opening was set at 20°. When the valve moved to full open the fuel turbopump was forced to catch up with engine system demand. The fuel turbopump stalled just after the main LOX valve moved to the full open position. All future production ground test engines will have a 16° initial main LOX valve setting. The 16° setting will increase the fuel turbopump stall margin. ✓

The J-2 program review was held at Rocketdyne this week. ✓

*fw RL10 ENGINE

The thrust level on engine #4 of S-IV-6 went up 10% above the 15K nominal shortly after S-IV ignition. This has been attributed to a closing of the thrust control valve which ran the turbine at maximum power. Possible causes are contamination of the thrust control valve or a failure of the motor bellows in this valve. Tests are in process at P&WA to determine the effects of contaminating the valve with moist helium supply. A service check procedure has been established whereby all thrust control valves in the field will be checked at a higher pressure than previously specified in the event that the S-IV-6 performance was a result of a failed bellows. This is a typical reason to continue R&D in support of our flights) ✓

*fw H-1 ENGINE

Detailed analysis of flight data from SA-6 has not revealed conclusive evidence of why the engine at position No. 8 cut-off at T+117 seconds. It has been concluded, however, that the failure occurred within the gearcase since the turbopump stopped abruptly. Turbopump bearing temperatures monitored during flight does not conclusively indicate a complete bearing seizure. Further, turbopump pressure measurements did not reveal any abnormalities. Investigation of previous data obtained during R&D testing has not revealed a failure ever occurring which exhibited bearing temperatures as low as those of this failure. Investigation will continue. The turbopumps on engines of SA-7 (the Mark III H) contain higher strength gears than those of the SA-6 Mark III turbopump. The Mark III H turbopump also has an improved lubrication system and improved bearings. ✓

F-1 ENGINE

F-1 engine #021 (the first Block II type engine) has arrived at Edwards for R&D testing. ✓

FRT candidate injector 092 was installed in engine #020 and accumulated 420 seconds of testing. No tube erosion or heating has been noted. The preliminary performance data analysis indicates Saturn V performance is within our commitments for the first three flights. ✓

The first turbopump modification kit has arrived at MSFC and F-1 engine testing should resume approximately June 19, 1964. ✓

B 6/8

7/20/68

1. S-II: This Laboratory considers the S-II LH₂ tank wall double-seal insulation concept in an advanced stage of development and also considers it available to vehicle SA-504. We are proposing this to Industrial Operations now. ✓

2. INSTRUMENT UNIT (IU): The IU model specification will be completed approximately 8-1-64. This is four weeks late due to late information submittal, but still can be incorporated into the IU prime contract. ✓

3. KIWI B4D: The reactor has been completely disassembled. One peripheral tile (pyrolytic graphite) was found to be cracked. All fuel elements were in perfect condition. The cause of the nozzle failure is not yet known, but the leaks developed in areas which had previously been repaired following nozzle pressure testing at Rocketdyne. ✓

4. H-1 ENGINE MALFUNCTION ON S-I-6: All data clearly indicates that a mechanical seizure of the turbopump rotating assembly caused the premature shutdown (117 seconds after lift-off) of engine 2007 installed in position number 8 on S-I-6. Power losses of approximately 1.5 percent occurred, beginning at 114 seconds. Unusually abrupt flow stoppage of fuel and LOX occurred coincident with thrust OK drop-out along with pump stoppage in one-tenth of the normal time. Temperature anomalies on bearings 5, 6, and 8 were inconclusive; bearings 2 and 4 were not measured. Primary suspicion centers on the "A" pinion gear, but the exact failure mode cannot be determined. The Mark III turpump flown on SA-6 has been replaced with the improved and strengthened Mark III-H on SA-7 and subsequent. ✓

5. COLDPLATES FOR SATURN IB AND V INSTRUMENT UNIT: (Reference NOTES 6-1-64 CLINE, paragraph 2.) Structural redesign of coldplates to overcome fabrication difficulties will not cause slippage in flight schedules. Redesign will increase the weight of the Environment Control System by 100 to 170 pounds. This weight can be eliminated, possibly on SA-204, when final configuration of equipment mounted on the plate is established. Twenty-nine plates of the original design, which is suitable for IU Ground Test Program, will be delivered by 6-24-64. ✓

NOTES 6/8/64 CONSTAN

B q/s

7/6/8

1... VISIT OF MANAGEMENT ADVISORY COUNCIL

Dr. Bode, Major General McCormick and Dr. Raymond, of the Management Advisory Council, Mr. Paul Cotton, Executive Assistant to the Associate Administrator, Manned Space Flight, together with key officials of the Marshall Center, visited Michoud Operations on June 4, 1964. The group received briefings on our operations here at Michoud and a tour of our facility. ✓

NOTES 6-8-64 DANNENBERG

B48

7/10/78

1. Additional Task Assignments to GE - Gen. Phillips approved conditionally 20 GE personnel for ESE fabrication mission (Task 4). ✓

2. MORL Project - Mid-term briefing at Langley and NASA Hqs on 5-26/27-64 revealed the following points of significance to MSFC:

a. A 2-year program slip from 1967/68 to 1969/70 was quite calmly announced and no one voiced the slightest concern.

b. The 15 Gemini/Cargo Resupply Flights for MORL have had their booster vehicle assignments changed to the Titan III-C. This decision was made due to a requirement for a 30-day launch rate. Currently, the Saturn IB is programmed for a 90-day sequence. The Vertical Integration Building provides the Titan III-C with a 30-day launch rate capability.

c. Dr. Yarymovych requested that the 6-16-64 MORL briefing to you be very informal and limited to a few high level people at MSFC. A formal presentation in the form of a Project Proposal is now being prepared for Dr. Seamans for mid-July. A dry run of this presentation can be made to MSFC after 7-6-64. MSF suggests this be done before Dr. Seamans presentation. This project proposal will lay out NASA's plans for space stations for the next few years.

WE MUST NOT let the MORL slide thru our fingers & go to the T_{III} → we also need to reactivate our anti-T_{III} activities

3. MSC/MSFC Small Rocket Engine Committee - Dr. Gilruth has formed a MSC Survey Committee to review the management and technical problems associated with the small rocket engines used by Gemini and Apollo. ✓

4. S-II Posigrade System - Results of the MSFC evaluation of Dr. Mueller's proposal to utilize this system in lieu of the S-IC retro and S-II ullage rockets will be presented to Dr. Mueller during his visit to MSFC on 6-11-64, after a dry run on 6-10-64. ✓

5. Repository - A meeting with Panel chairmen and others concerned with Intercenter Control Documentation was held and details were furnished by the Panels. A presentation will be made to the PRB on 6-10-64 in Houston. ✓

6. Saturn IB Payload Capacity - Informal information from MSC indicates that MSC is studying increased S/C capacity beyond the present requirements. This is apparently the result of the increased Saturn V payload capability. ✓

K.D.
we not aware that they had we planned it for Saturn IB.

B

Track 5, and K.D. Let's discuss this together.

B

NOTES 6-8-64 FORTUNE

B6/8

7/6/8

1. Gulf Coast Building Trade Council Calls Off Threatened Strike: Julious Kuczma, Executive Secretary, President's Missile Sites Labor Commission, talked to Peterman, head of local union trade council late last night. He persuaded him to defer striking until the construction committee could discuss the project stabilization agreement with Farrell against whom the strike was to be directed. Farrell has indicated that he would appear before the committee if he went to Washington. Farrell has consistently refused to hire employees through the union hiring hall and may continue to do so, this being a right to work state. Fred Tyvol, Paul Style's representative here, says we will have one to two more weeks grace. There was an erroneous impression that Tyvol was working with the union independently of the Corps of Engineers. This was not the case. ✓

2. GE Negotiations Impasse: I talked to Bill Eaton Friday afternoon and again this morning trying to convince him that our prior approval of their staffing plan was essential, under present circumstances, and to further arrange for a meeting between their salary and labor specialists and Jim Spearance, NASA Auditor. Eaton feels we are unduly restricting his capability to respond to our support and that his proposed salaries here are completely in consonance with GE salaries elsewhere. The auditor has compared them with other support contractors, such as Pan Am, RCA, TWA and states he cannot certify them as being reasonable. A memorandum has been delivered to GE stating that negotiations have been recessed until further notice for the government negotiations team plans a paper covering the above points for presentation to and discussion with MSFC management.

Henry Gorman

Please look into this and let me know what you find. Should we inform GEMveller about this, in view of Mr. Tobb's involvement in GE's role at MTF?
B

CONFIDENTIAL

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JW 4/8

NOTES 6/8/64 GEISSLER

B48

E.F.
Do
Joe de Fries
and
Taylor
also see
eye
to eye?
B

1. Apollo Logistic Support System: In the notes of 5/18/64, Dr. Koelle explained to you E. Z. Gray's Advanced Study Funds for his FY 65 budget totalling 22.1 M\$; these funds do not include FY 65 ALSS work. E. Z. Gray and Col. Evans want to exclude the ALSS in FY 65 from Advanced Studies Budget, and put the money in a new funding category called "Program Definition;" this would not yet be hardware funding, but neither is it Advanced Studies. Note: This would be in full consonance with the Air Force's three phased approach to the evolution of programs as laid down in AFSCM 375. George Mueller is in line with this and it appears that they want to request the ALSS money from Dr. Seamans as a separate line item. So far 19 M\$ are proposed by Washington for ALSS in FY 65 of which MSC gets 5.5M\$, Hqs retains 5.5 M\$ and MSFC gets 8 M\$. Joe de Fries has a good agreement with E. Z. Gray and Col. Evans on the spending of the 8 M\$. It appears rather certain now that OMSF will soon create an ALSS Directorate. Bill Taylor is the expected Director of this Office. Mr. Taylor would still be responsible to E. Z. Gray, but it has all the markings of a future program office. Col. Evans retains the Advanced Lunar Studies Directorate, but will support Bill Taylor in a dual capacity. ✓

2. S-II Lox Tank Baffle: Reference your comments on item 2, Notes 5/25/64 Geissler, Copy attached. The 3-5% damping for the S-II Lox Baffle during S-I-C burn has been a requirement for approximately 1 1/2 years. The baffle was designed based on theoretical procedures, but was not verified until recently when North American completed their slosh test program. Their evaluation of the slosh test showed the baffle to be inadequate. This inadequacy can be removed by changing the baffle orientation, and is not a major change since the same attach points can be used. ✓ The old baffle design has not been fabricated, therefore, the design change would only require minor changes to the drawing. ILO. is aware of the situation. ✓

3. Saturn IB/Centaur: The Saturn IB/Centaur Study guidelines which we gave you last week were coordinated with E. Z. Gray prior to our internal distribution. He will send us a TWX giving the guidelines official Headquarters sanction. ✓

4. SA-6 Flight Results: Reference your comment on Notes 6/1/64 Haeussermann, the attached reply, subject as above, is for your information. (A. von Braun's copy only). ✓

WHEN ENCLOSURES ARE WITHDRAWN, THE CLASSIFICATION OF THIS DOCUMENT IS DOWNGRADED TO UNCLASSIFIED.

CONFIDENTIAL

B 6/10

July 13

1. S-I-9 POST-STATIC CHECKOUT: Pressure and functional testing of the S-I-9 stage continues in the pressure cell of building 4705. Part shortages will prevent completion of these tests and alignment testing prior to releasing the stage to final electrical checkout. Completion of the tests will be worked into the schedule at a later date. ✓
2. S-IV PROGRAM: Simulated Flight Test of the S-IV-7 stage was conducted at Sacramento June 1, 1964. The evaluation was completed and 12 telemetry channels were found to be questionable. During "walk around" inspection, AF reported 45 discrepancies and DAC reported 125. The NASA/DAC stage turnover meeting was held June 4, 1964. IO personnel from KSC participated in this turnover meeting in an effort to provide closer coordination between all parties. The stage is scheduled to be shipped to KSC June 9, 1964. The S-IV-8 stage is presently undergoing post-manufacturing checkout at Santa Monica. Electrical controls and electrical subsystems tests have been accomplished. Hydraulic and instrumentation subsystems tests are underway. Shortage of stage hardware is tending to limit progress in several areas of checkout, particularly in the propulsion subsystem. Approximately 24 pressure transducers are suspected to be damaged because of impression identification method. The S-IV-9 stage is presently undergoing pre-static checkout operations at Sacramento. The hydraulic systems on engine positions 1, 2 and 4 were checked and accepted. A sequence valve failure on engine position #3 required actuator replacement. The accumulator on actuator position #5 engine apparently is "shedding" the "O" ring since the fluid will not clean up; therefore, the actuator will be replaced. ✓
3. CONTRACTOR/PLANT REPRESENTATIVE QUALITY SURVEY: DAC and DAC's Air Force Plant Representative (AFPR) will conduct their first joint quality survey at Thompson-Ramo-Wooldridge, Cleveland, Ohio, June 9-10, 1964. Thompson-Ramo-Wooldridge has a subcontract to design and manufacture the ullage engine for the S-IVB, and NPC 200-2 was included in the contract as a part of the quality requirements. Representatives from this Laboratory will monitor the survey in that this is the first joint effort of DAC and DAC AFPR. ✓
4. S-II PROCUREMENT SPECIFICATION REVIEW: In order to assure that S&ID is requiring their vendors to perform adequate qualification testing, this Laboratory has made provisions to review S-II procurement specifications. One hundred and eighteen (118) of 168 specifications submitted to date have been reviewed and detail abstracts on 55 of the specifications have been provided to the cognizant design organizations for their evaluation and use. The balance of the abstracts on the reviewed specifications are in various stages of preparation and will be provided the cognizant design organization upon completion. ✓

July 13

NOTES 6-8-64 GRUENE

B 6/10

- *fw
1. SA-7 Status: The S-I Stage arrived Sunday, June 7, at the Cape and was transported to Pad 37. It will be erected Tuesday morning. ✓
 2. IBM Computer Course: 25 of my key personnel will attend a one-week computer course at the IBM facility, Binghamton, New York. ✓
 3. Our VAB construction program is hampered by continuous labor problems with work interruptions of one to two days. ✓
 4. Accident at VAB on June 4, 1964: Five persons were injured in the VAB when some supports broke on the 3rd floor level and the men fell down two floors. Two of the men were injured seriously but not critically. ✓

B610

JW 6/8

* JW
Frank
I think this has
been arranged!

1. SA-6 CAPSULE CAMERAS: All eight motion picture capsules were recovered. All pictures were perfect, with the exception of a few missing strobe flashes in one interstage view. Films have been widely shown in Astrionics and other laboratories. They are available with taped commentary for special showings you may select. ✓

2. SA-6 MEASUREMENTS: Preliminary evaluation reveals:

- S-I and I.U., total measurements including blockhouse: 918
- Measurement failures: 6
- Measurement partial failures: 4
- Measurements off-scale at some time: 12 of which 10 were known before flight, but were inaccessible in the fins. ✓

3. DELETION OF Q-BALL ON SATURN IB/V: A tentative decision has been reached to delete the Q-ball angle-of-attack instrument from consideration as a back-up for accelerometer control on the SAT IB and V vehicles. There seems to be no strong justification for the Q-ball back-up since three other possible control methods exist. W.H.

- a. Accelerometer control with body-fixed accelerometer.
- b. Attitude only control.
- c. Utilization of velocity information derived from the platform accelerometers. (In implementation, this is similar to the "steering misalignment correction" feedback method already used on SAT.I.)

But I understand Seidler wants to keep it to collect reliable angle-of-attack data for aerodynamic and structural evaluation please clarify B

There is a high level of confidence that at least one of the above three methods will be satisfactory to control the SAT IB and V.

Sufficient information is not yet available to definitely determine whether or not the EDS and measuring requirements for the Q-ball can also be dropped. Aero-Astrodynamic Laboratory is continuing to study the matter.

4. CLOSE OUT OF HORIZON SENSOR DEVELOPMENT: (Reference your comment to Item 2 of 5/4/64 Notes, Copy Attached*) I obtained Dr. Mueller's agreement on 5/28 at KSC to bring the horizon sensor contract with Martin Baltimore to a completion (about \$200,000 FY-65 funds must be applied). ✓

5. OART'S NATIONAL ADVISORY RESEARCH COMMITTEES: I have learned from Mr. Gilchrist, OART, that Dr. Bisplinghoff gave directions to exclude all "non-Research-Centers" from membership to the National Advisory Research Committees. Only members from Ames, Langley, Flight Research, ERC, and JPL will participate. Our present members are very concerned about this situation and in agreement with Mr. Gilchrist. I would like to ask you whether you would be willing to discuss the subject with Dr. Bisplinghoff to modify his directions. Talk to him Thurs when he is here. JW

6. STATUS REPORT - 100 g VERTICAL LINEAR ACCELERATOR WITH ZERO-g TEST CAPABILITY: Construction has begun. Concrete piles of the foundation for the tie-in to bedrock have been poured. Scheduled completion of the tower, which will house the accelerator mechanism, is 1/65. Installation, alignment, and checkout of the test facility and drag compensation equipment for zero-g conditions is to be completed by 7/65. The accelerator mechanism is completely designed, documented, and ready for fabrication. Design of drag compensation equipment (linear electric motor) is in preparation. ✓

7. VISIT OF MSC'S APOLLO GUIDANCE AND CONTROL CONTRACTORS: This week I will be on TDY with Dr. Duncan, my counterpart at MSC, visiting all major companies contributing to the Apollo Spacecraft guidance and control system. ✓

* Attachments provided M-DIR and R-DIR only.

7/6/8

B d/o

NOTES 6/8/64 HEIMBURG

*fw 1. FATAL ACCIDENT:

Harry

(think we are expected to report this accident)

A fatal accident occurred on Monday, 6/1, when an employee of Wyle Laboratories died shortly after coming out of the lox storage tank at the Cold Calibration Test Stand. A thorough investigation of the accident is being conducted by a committee chaired by Mr. Wilbur Riehl of P&VE Lab, and comprised of Test Lab, Technical Services, Safety Office, and Chief Counsel representatives. You will be kept informed regarding the progress of the investigation and the committee findings. (Detailed information on the accident is attached - COPY FOR DR. VON BRAUN ONLY.)

to Washington

B

Gorman should have copy

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

New and modified parts for the engine 1002 lox pump have been received. Engine rebuild will be completed by the end of this week, 6/12. Installation of this engine in the test stand will be conducted on 6/15, and the first run is scheduled on 6/23. ✓

The 17-inch Whittaker lox pre valve far exceeded our expectations on the fast closing time and the resulting surge pressure. The valve closed in 0.575 second at a water flowrate of 22,100 gallons per minute (34,500 g.p.m. equivalent lox flowrate). This resulted in a surge of 165 p.s.i.g. total pressure. ✓

3. S-1-8:

Checkout and preparation for the duration test of this stage has been conducted. No explanation has been found for the high thrust level on six engines, recorded during the short duration test on 5/26. Rocketdyne theorizes that differences in the turbine back pressure at Neosho and MSFC might have caused this upward shift in thrust level. Measurement of turbine exhaust gauge pressure will be made during the next test. The engines will be reorificed for a thrust level of 190K. ✓

*fw The duration test of S-1-8 is scheduled for 6/11. ✓

1. IBM DATA CENTER GROUP: In line with our plans to have one support contractor per laboratory, we are presently considering having the IBM group subcontract to General Electric for any future effort on which this group may be used. This arrangement would permit us to hold General Electric responsible for the whole operation and, at the same time, retain the somewhat unique talent of this particular group of IBM people. ✓

2. CIF COMPUTER FACILITY: As you may recall an RFP was sent out for a large scale computer to be installed in the Central Instrumentation Facility Building at the Cape. Proposals were received from the following five companies:

- IBM
- GE
- Burroughs
- Univac
- CDC

The proposals have been evaluated technically by the following committee:

- Mr. Carl Prince, MSFC
- Mr. Lowell Hamilton, MSFC
- Mr. Bobby Griffin, KSC
- Mr. B. A. Corbett, KSC
- Mr. Clyde Bridewell, KSC
- Mr. Pete Minderman, KSC

with the results that General Electric and CDC are both good first choices, with Burroughs as a second choice. IBM was ruled out on the basis of delivery and Univac was ruled out on several points where they were considered unresponsive. Of course, a complete cost analysis is yet to be done. This will be done by our local Purchasing people and the Computation Laboratory. ✓

NOTES 6/8/64 JAMES

B 6/10

July 18

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SA-6: The SA-6 Post Launch Review is scheduled for June 22, 1964, 11:00 - 12:00 AM, in the Director's Conference Room, Building 4200. ✓

SA-7: S-I-7 and IU-7 arrived at KSC June 7, 1964, and the S-I Stage will be erected today. (6/8) The following IU components will be shipped separately to KSC on a schedule which is acceptable to KSC: Flight Control Computer, GSP-24, Guidance Computer, Radar Altimeter, Mini-track Transmitter, Control Acceleration Switch, Minitrack Battery Assembly, and ST-124 Platform. S-IV-7 is scheduled to be shipped to KSC via Pregnant Guppy June 9, 1964. ✓

S-IV-9: Current status shows a delay of three days for the first cryogenic calibration propellant loading test, from June 13 to June 16, 1964. The second such test earlier scheduled for June 23 is more realistically scheduled June 26. Acceptance firing is scheduled July 23, 1964. Shipment to KSC is scheduled for September 9, 1964, with time for incorporation of non-propulsive vent at SACTO. The minimum delay to incorporate S-13 painting is three days, if done at KSC. KSC prefers that the painting be done elsewhere. This problem is still under investigation. ✓

S-I STAGE DUMMY TURBINE EXHAUST FAIRINGS: AERO, P&VE, and ASTR have dropped the requirement for incorporating dummy turbine exhaust fairings on S-I-7 and subsequent. ✓

S-I-8: Preparation is continuing for the long-duration static firing of S-I-8 on June 11, 1964. ✓

MODIFICATION OF ORBIT FOR SA-9, SA-8 & SA-10: As a result of a letter from Dr. Mueller, AERO is conducting a study to determine the various orbits associated with lifetimes which would be compatible with the performance capabilities of SA-9, SA-8, and SA-10. The results of the study will be available for the micrometeoroid presentation to Dr. Mueller on June 11. ✓

S-IB TURBINE EXHAUST: It has been established that uniformity of partial aspirators for inboard and outboard engines cannot be accomplished before SA-205. It is the opinion of some that we should continue with full aspirators for outboard engines and partial aspirators on inboard engines. This will be discussed with Dr. Mrazek this week.

S-IVB: As reported last week, DAC recommended utilizing the forward LH₂ dome of the facility checkout stage for SA-201 due to a weld porosity problem. The MSFC Quality, P&VE, and S-IVB resident personnel reviewed the DAC documentation on the facility checkout vehicle and all agreed to permit DAC to exchange the domes. Welding of the former facility vehicle dome to the first flight stage was completed on June 1. Dye checks and X-ray are in progress. ✓

SATURN I/IB OBLIGATION STATUS: The Saturn IFY-64 authorization is \$179.2M; \$177.5M has been initiated and \$171.7M obligated. Based on April 30, 1964, accrued costs, it is estimated that prime contracts will be pre-financed into FY-65 by \$19.5M. The Saturn IB FY-64 authorization is \$139.9M; \$137.4M has been initiated and \$111.2M obligated. Based on April 30, 1964, accrued costs, it is estimated that prime contracts will be pre-financed into FY-65 by \$34.5M. ✓

L.S.
makes
sense
B

B 6/10

fw 6/8

1. DR. AL EGGERS DEPUTY TO DR. BISPLINGHOFF - We are very happy about Dr. Eggers new appointment as Deputy for Long Range Planning in ART. He is "our type of a man". He is a "doer" with vision and courage. I expect him to do a lot of good in our area within ART. They surely need to get organized. I suggest you give Al Eggers a call and congratulate him and tell him how delighted we are. You may also want to invite him to MSFC for a tour and discussion on our joint problems.

I HAVE prepared a letter for your signature fw

will be sent in separately, 6/9

2. SATURN IC STAGE RECOVERY - Dr. Seamans has second thoughts about a \$200,000 study with BOEING which we were planning to do this fiscal year. He originally approved it. While this is not extremely urgent, we would like to keep one recovery study alive because of (1) the constant inquiries by Congress and (2) we would like to know whether there is a better system than the classical retro-rocket/parachute system. We have sent in a reclame to Mr. Gray and hope for your support in case Dr. Seamans calls you on this subject.

I have signed that letter B

3. NUCLEAR ORBITAL FERRY - You know that Dr. Mueller has introduced the idea of a manned synchronous satellite system which can do several missions such as reconnaissance, weather observation, communications, subsystems development for planetary missions and others. We looked into the logistics supply of such a system and found that our reusable nuclear ferry vehicle could do an excellent job, much more efficient than a SATURN V can do alone. We are talking, however, a 1980 and beyond time period; anything earlier has to be done by SATURN V.

NOTES 6-8-64 KUERS

7/6/8

Manufacturing Engineering Support to MSC:

This will be covered during Mueller visit to ME on 11 June 78
Befw

a. As requested by Dr. Shea we have now one resident engineer assigned to monitor the tooling program and manufacturing activities at NAA for the Command Module program. The purpose is to prevent major crisis in manufacturing in order to assure quality performance on schedule. ✓

b. In response to a request from MSC to support an audit of Grumman's LEM manufacturing performance, Mr. P. Maurer and Mr. W. Franklin attended a review meeting at Grumman on May 11 and 12. We were able to make some recommendation for improvement of the tooling concepts. No major problem areas in manufacturing were discovered at this time. The program presently suffers--as any other program does--from delays in engineering releases and excessive numbers of engineering changes. As much as we could observe in these two days this program is characterized by austerity policies in providing facilities and equipment for manufacturing. ✓

c. In addition to the above mentioned meeting MSC had requested us to support and audit the Grumman's structural design changes to a combination of sealed rivet joints and welded joints as opposed to an all welded structure. This meeting took place on May 27 at GAEC. The MSC personnel, as well as ourselves, are seriously concerned about the sealing problems that could occur and as a result the following points were discussed: (1) Possible schedule impacts, (2) Continuous weld development as a back-up, (3) Qualification of sealants. It was evident that Grumman has little experience in sealing thin gage materials such as used on the LEM, and at this time, has not selected a sealant. MSC suggested that a meeting be held at MSC, where the sealing problems could be discussed in detail with knowledgeable people from MSFC and Saturn V major contractors. The ability of MSC's managers to interface with the contractor is, according to our observations, exceptional. Rather than giving the contractor technical directions, and relieving him of his responsibilities, they use the technique of expressing a low confidence in certain areas, thus motivating the contractor to put forth a special effort to assure his success. ✓

NOTES 6-8-64 MAUS

B/CO

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1. DATA MANAGEMENT - The MSF Ad Hoc Committee met in Huntsville June 3 and 4 to review progress on the Apollo Documentation Administrative Plan (5th draft) and the survey. The MSF Task Team Chairman appeared impressed and pleased with MSFC's plan for getting control of the documentation program, our approach to the problem, and accomplishments to date. ✓

The MSFC recommendations listed in the third report by the MSFC representatives were all adopted. ✓

The Houston Panel Review Board Meeting agenda includes an MSF progress report on the Documentation Working Group. Chris Andressen will attend. ✓

2. RESULTS OF MANPOWER MEETING BETWEEN DR. SEAMANS AND DR. MUELLER - On June 1, Dr. Mueller and Dr. Seamans resumed the manpower requirements discussion which was interrupted after the presentations by the three MSF centers. Capt. Kahao indicated there was much discussion and confusion and no final decisions. The only constructive proposal was MSF's recommendation that pressure be applied to minimize wage board personnel at all NASA centers, and that spaces vacated thereby could be used in critical areas. Primarily affected by this recommendation would be Lewis, Langley, and Marshall. ✓

3. MARSHALL ORGANIZATION - After Dr. Mueller made a final decision, the NASA Office of Administration is preparing for publication in the NASA Management Manual a new MSFC organization chart which will list the I and IB, V, and Engine Offices as Program Offices, and show the Technology Utilization Office as a part of the Management Services Office. ✓

Dr. Mueller has overruled our request for the title Program Director, and has decided that the heads of the Program Offices in the field will carry the title Program Manager. ✓

4. MANAGEMENT ADVISORY COMMITTEE - Paul Cotton reports that the Management Advisory Committee was generally pleased with their tour of the three Manned Space Flight centers. Dr. Mueller will send a letter on this subject to the three center directors some time this week. ✓

1. OBLIGATION OF FY-64 SATURN FUNDS: On June 6, representatives from Purchasing, FMO, I-RM, and this office met to determine the Saturn-program procurement actions which cannot be obligated this fiscal year. As a result of this meeting, about \$0.581M Saturn I funds, \$3.5M Saturn IB funds, and \$2.6M Saturn V funds were found to be available for return to IO for pre-financing prime contracts. ✓

2. NON-PROGRAM FOREIGN TRAVEL: The responsibility for coordinating non-program foreign travel for MSFC was officially transferred from R-RP to PAO, effective May 25. The appropriate administrative files will be divided between PAO and R-RM. We are responsible for staffing R&D Operations requests for non-program foreign travel before these are submitted to PAO for action. ✓

→ Personnel Admin. ? B

3. SINGLE SUPPORT CONTRACTOR MANAGEMENT PLANS: Last week, the RP single support contract management plan was reviewed and approved. Review of the ASTR and P&VE plans have been scheduled for this week. ✓

4. IRREGULARITIES IN ACQUISITION OF MATERIALS BY TASK ORDERS: At the request of Purchasing, an investigation was performed of suspected irregularities in the acquisition of materials by certain ME task orders. Findings confirmed that irregularities had occurred and established Contracting Officer Representative (COR) authority and procedures had not been complied with. On June 4, R-DIR authorized Purchasing to revoke the COR's appointment and to stop payment on invoices of the contractors involved. To prevent reoccurrence of this situation, an R-RM representative will assist Purchasing in setting up a training program for COR's. The program will be conducted by Purchasing. The Director of ME has been advised of these findings and has been requested to assist Purchasing and the Technical Services Office in determining and recording the accountability of the property involved. ✓

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6/10

July 8

1. Saturn V Financial Status - As of June 8, 1964:

Annual Plan Without Supplement -----	\$681.1 M
Initiations -----	678.1 M
Obligations -----	629.0 M
Balance to Initiate -----	3.0 M
Balance to Obligate -----	52.1 M

A plan is being developed for reprogramming unobligated Program Authority in order to assure complete obligation by June 30, 1964. ✓

2. S-IC Stage:

S-IC Thrust Augmentation Program - Work is progressing on the Work Statement for the S-IC thrust augmentation program. It has been determined that suitable scale models of Minuteman motors are not available; however Boeing will be able to fabricate firing models without increasing the proposed program cost. The time schedule for implementation of strap-on-solid motors has been set for S-IC-4. Allocation of wind tunnel time remains a problem. ✓

Explosive Bridge Wire (EBW) - On June 4, 1964 The Boeing Company was notified to stop all procurement action on the EBW firing units except that effort which is under subcontract. Future units will be Government furnished. The Contractor was directed to report the status of present EBW firing unit procurement, the impact of the decision to GFE and his requirements for future units. ✓

* Jw 3. S-II Stage Common Bulkhead - The manufacturing repair action on the S-II-S Common Bulkhead Forward Facing Plate to upgrade several "J" welds to Class II classification was not successful. Additional material is being added in questionable "J" weld areas; expected to be completed June 8, 1964, at which time manufacturing will resume. It was discovered that the honeycomb core on the aft facing plate is three-eighths of an inch undersize in the area of the apex. Additional core will be added in this area, and no adverse schedule impact is anticipated. Final completion date for the Common Bulkhead remains July 3, 1964. ✓

* Jw 4. S-IVB All Systems Stage - Hydrostatic Testing (proof test) has been successfully completed with the All Systems Stage. The stage has been installed in tower No. 4 for cleaning, degreasing, and testing of common bulkhead joints. ✓

* Jw 5. Instrument Unit Prime Contract - IBM's proposal for the IU Prime Contract was received June 1, 1964, on schedule. The proposal has been distributed to the cognizant labs and is being evaluated. Target date for evaluation completion is June 22, 1964. ✓

NOTES-6-8-64-SHEPHERD

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7/2 6/8

No Notes

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1. MMC PROJECT: The second in a series of regularly scheduled bi-weekly management conferences between the Project Office and Fairchild Stratos Corporation will be held on Tuesday, June 9. These meetings are for the purpose of defining the current problem areas and determining courses of action to solution. They are generally limited in attendance to senior personnel from both organizations. The first meeting, on May 26, proved highly beneficial in uncovering soft spots in the Fairchild schedule. These are now being corrected and manpower shifted to keep the program on schedule.

The detector testing program is now firmly established. Dr. Dozier, R-RP-P, will continue to monitor and direct this program for the project. Detector performance has been highly successful in all tests to date. Problems in this area now appear to be solved. ✓

2. SRT PROGRAM STATUS: The current status of the ART/SRT Program under the cognizance of this Laboratory is, as of June 5, as follows:

	<u>ANNUAL PLAN</u>	<u>AUTHORIZED</u>	<u>PROCESSED</u>		<u>CHANGE IN OBLIGATIONS SINCE 5/15/64</u>
			<u>TO FMO</u>	<u>OBLIGATED</u>	
OART	9,403,000	9,403,000	9,397,000	4,049,699	289,638
OMSF	14,163,000	14,133,000	14,131,200	1,717,234	404,625
OSSA	675,000	675,000	665,846	143,985	47,646
	<u>24,241,000</u>	<u>24,211,000</u>	<u>24,194,046</u>	<u>5,910,918</u>	<u>741,909</u> ✓

3. FY-64 OART REPROGRAMMING FOR \$1.9 MMC: A form 506 was received from OART Headquarters, June 4, reflecting the latest change in the SRT program. \$300 K was taken from the 127 program, Human Factors, to fund ten research tasks that would have been dropped from our Research program. ✓

4. CONSOLIDATION OF MSFC SUPPORTING RESEARCH PROGRAMS: RPL submitted a proposal to Hermann Weidner concerning the consolidation of the presently existing Supporting Research Programs under one Program Manager. Joint discussion of this proposal between IO and R&D is expected soon. Would you like to see this proposal, or would you prefer to wait until a decision has been reached? ✓

E.S.
Yes
B

4. PROJECT SUPER: Mr. H. P. Gierow of RPL will make a presentation at the MSFC - AF Project SUPER meeting at Wright-Patterson AFB this week. He will generally describe MSFC areas of research including the six on-going RPL Project SUPER tasks, and will suggest possible future work between the AF and MSFC in connection with these lines of activity. ✓

5. LECTURE COURSE AT AUBURN: I will teach a two-day course on advanced propulsion at Auburn this week. Dr. R. Bussard and the University asked me last fall to teach this course. ✓

June 15 1964



NOTES 6-15-64 BELEW

7/26/65
B 6/22

* FW F-1 ENGINE

Test stand 1C, the second of the three new acceptance test stands, passed final inspection on June 10, and was turned over to Rocketdyne on this date. Rocketdyne moved into the pretest building and the Support Services Building on June 10 and June 12, respectively. The third test stand, I-E, is on schedule and should be turned over to the contractor by August 1, 1964.

The turbopump modification kit for F-1 engine, F-1002, at MSFC has been installed and the engine is in preparation for testing. ✓

H-1 ENGINE

Stability and performance testing of improved H-1 injectors is progressing satisfactorily. One of these injectors (Type 5590) has been performance tested in a near production engine and exhibits specific impulse of 4 to 5 seconds higher than the current production engine specific impulse. ✓ Four injector types have exhibited favorable stability characteristics up to thrust levels of 225K. ✓

In response to a TWX from General Phillips, a 30-minute presentation on the premature cut-off of engine H-2007 on SA-6 will be available at the time of the Management Council Meeting on June 23, 1964, at Headquarters. ✓

* FW J-2 ENGINE

Rocketdyne signed the J-2 engine production contract (NAS8-5603) on June 10. The contract will be handcarried to NASA Headquarters early next week for approval. ✓

Engine 003, the S-IVB Battleship Engine, was installed on Douglas Battleship stand June 4. ✓

Two incidents occurred in the Bowl test area this week. A thrust chamber and injector was damaged beyond repair during a test on the thrust chamber test stand (VTS-1). cursory examination of the stand and engine hardware indicates the facility LOX valve unfunctional. The estimated stand down time is one week.

A 70-second run was accomplished in the horizontal altitude test stand (VTS-3A). Post-test examination revealed 18 split tubes in combustion zone of the thrust chamber and overheating from the thrust to the exit of the thrust chamber. Several splits in the divergent section of the altitude diffuser were also found. Run records indicate that a facility GN₂ purges of the LOX dome did not cut-off prior to engine stand, but continued throughout the run. Some conjecture has been raised as to whether this malfunction could cause the resultant overheating. Rocketdyne states the diffuser and the engine are usable but another firing will not be made until the cause of the malfunction has been determined and corrective action taken.

Investigation of Rocketdyne's test operations procedures and test responsibility by our office is underway. ✓

RL10 ENGINE

We understand that MSF plans to continue to fund the RL10 R&D effort for FY '65 and FY '66 based on R&D requirements for both Saturn and Centaur, but will probably justify a portion of the effort for both years on the basis of requirements external to MSF in an effort to keep funding directly attributable to the Apollo Program to a minimum. ✓

The launch of Centaur Vehicle AC-3 has been delayed until late June due to problems associated with unsuccessful attempts to jettison Centaur insulation panels. ✓

July 15

B 6/22

NOTES 6-15-64 CLINE

1. F-1 ENGINE COMBUSTION STABILITY STATUS: The last self-triggered engine instability occurred over one year ago. However, the problem is not completely solved. Requirements for dynamic stability, model specification performance, and injector-chamber compatibility have been met individually in various injectors, but not to the desired degree in one design. Although an injector meeting the requirements for Flight Rating Test has been approved, tests are being conducted to further check on dynamic stability, performance, and compatibility. Model specification performance may be exceeded beginning with the Flight Rating Test engine. ✓

2. PROPELLANT DISPERSION STUDIES: This Laboratory is participating in a study, proposed by Kennedy Space Center Safety Office, of better methods to achieve vehicle propellant dispersion. The goal of the study is to create a less hazardous condition for all personnel associated with the vehicle while the ordnance is onboard. We are also investigating use of liquid explosives as a means of rupturing the vehicle propellant containers. If the investigation proves that liquid explosives are feasible, the installation could be accomplished on the pad. ✓

F.C.

Filling of the tubes?

B

3. S-IC UMBILICALS: Due to an error in the design of the locking mechanism cam, the development test program of the S-IC aft umbilical no. 34 (LOX) prototype and the Kennedy Space Center tail service mast was discontinued until 6-19-64. The Boeing Company has been notified of the problem and will redesign the mechanism. However, to prevent further delay, this Laboratory has initiated a temporary fix so that the test can be continued 6-19-64. ✓

July 15

B 6/22

*I. SATURN I, SI & SIB STAGES QUARTERLY REVIEW

The SI and SIB Stages Quarterly Review will be held on June 24 and 25, 1964 at Michoud Operations in New Orleans. ✓

II. CONTRACTOR AND MSFC/MICHOUD PERSONNEL STRENGTH

On June 15, 1964, personnel strength of contractors and MSFC/MICHOUD Personnel located in New Orleans is as follows:

Boeing	5,972
Chrysler	3,006
Mason Rust	807
NASA	281
Rocketdyne	17
Telecomputing Services Inc.	<u>123</u>
TOTAL	10,206 ✓

Feb 6/15

B 6/22

NOTES 6-15-64 DANNENBERG

1. Panel Review Board Meeting took place in Houston, 6-10-64. The Communications and Tracking Working Group (at the Seamans level) will be abolished to eliminate duplication with panels. It was determined that the "Joint Flight Operations Meetings" (started by Mr. Williams) will be continued under Gen. Phillips and will incorporate JPL. Next meeting will be at Houston, on 6-15-64. ✓

General Phillips commended the Centers for their fine cooperation in the Documentation effort. Dr. Mueller commended our repository progress. Presentations of the Launch Operations Panel and the Crew Safety Panel were well received. ✓

Q-ball was subject of long discussion. Dr. Geissler presented examples of slow control failures requiring angle of attack information for EDS. (For example, loss of control commands prior to Q max.) L. Richards gave results of Mueller-requested quick look study (joint MSFC/MS effort) to replace Q-ball by guidance systems information. This appears possible in principle, but is complicated and has low accuracy (1 to 2 degrees not sufficient for EDS and flight evaluation). MSFC dropped requirement of angle of attack as control backup. ✓ Results on guidance study will be considered in Crew Safety Panel. Dr. Mueller concurred that Q-ball will stay on unless new evidence becomes available. ✓

2. MORL - Status/description briefing has been rescheduled to 6-25-64, at MSFC. The Director, Manned Earth Orbital Mission Studies, MSF, will make the presentation. It is not yet certain that MSC and/or Langley will participate in the briefing. ✓

3. Saturn IB/Centaur - Updated Project Development Plan based on the Voyager configuration was furnished Mr. deFries to be used as a guide in preparing a detailed project proposal. ✓

4. Saturn IB vs Titan III - R-SA is coordinating the R&D Operations effort toward preparing Saturn IB and comparative Titan III data to support you in any hearings that may come up. It is strongly urged that the AF submit "in kind" data on Titan III before MSFC releases any more Saturn data to it. ✓

Frank W.
to treat the way you said this handled?
B

NOTES 6/15/64 FORTUNE

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Jw 6/15

1. Institute of Technical Training Approved for Gulf Coast: Mississippi State Legislature approved bill to establish a technical institute somewhere in this area for training for electronics and engineering technicians for aerospace and related industries. ✓ Mississippi State University will operate the institute in conjunction with local junior colleges. ✓ Equal employment opportunity aspects were made clear early in the planning. ✓ Meeting is now scheduled for Monday afternoon, June 15, for the Governor's Educational Committee to finalize plans and initiate build-up. ✓

2. Equal Employment Opportunity: Meeting was held June 11 among representatives from MTO, General Electric Company, Boeing Company, and North American Aviation, Inc. to discuss problems being encountered in recruitment and housing for Negroes. It is felt that through informal meetings every two months, problems of mutual concern can be discussed and possibly resolved. ✓

3. Busy Week In Public Affairs: The number of visitors were 251 and we had 9 briefings and tours. Mississippi Press Association held their 98th annual meeting in Biloxi June 11 - 13 in which Mack Herring, Joel Meriwether and myself participated. Friday night, I joined an industrial group honoring Governor Johnson and key members of his legislature in Pascagoula. The Standard Oil Co. of Kentucky sponsored the event. Saturday night, I addressed a meeting of Mississippi Savings and Loan Associations in Gulf Hills, scotching rumors that tests here had been cut from 48 to 2, ?? which somehow was being circulated nearby.

4. Negotiations with GE: Negotiations with General Electric Co. for FY 65 support services are still suspended pending resolution of non-agreement on wordage of two articles and the wage and salary cost estimates. Hirsch and Auter met with Eaton and Woodside Friday and did not obtain agreement. Further efforts will be made next week to resume negotiations. ✓

NOTES 6/15/64 GEISSLER

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Jw 4/15

1. Ground Wind Oscillation Problem: Per your suggestion in recent briefing, this subject, we have had two meetings with P&VE and LOC - June 2 and June 5. Dr. Debus attended latter. A cooperative effort was established and meeting minutes will be issued by KSC. Aero-Astro will continue planning necessary wind tunnel tests; P&VE will be determining hard points on the vehicle where dampers could be attached and specify the loads that would be imposed thereby; LOC will investigate the application of external dampers. Planning will continue on the use of the facility check-out vehicle to obtain full scale data at the Cape. ✓
2. Frequency of Thunderstorms at Cape Kennedy: Re: your comment on this subject in Notes 5/18/64 Geissler, item attached: Lightning and thunderstorm frequency at the Cape were discussed with Dr. Knothe. He pointed out that Range Safety has made some concession to KSC by lowering the limit of thunderstorm activity to a radius of 5 miles before work in the preparation of the vehicle on the pad must cease. Also, KSC is installing electrical potential gradient instrumentation to monitor the gradient build-up during crucial operations. ✓ We will continue to work with KSC in system development of lightning hazard detection and warning. ✓
3. Fluid Mechanics Facility: Reclamma for our Fluid Mechanics Facility was successful. ✓ MSF submitted the facility as part of the FY-66 C of F Budget, but as an addition to our existing facilities (\$2.62 million) instead of the original separate facility (\$3.7 million). ✓ We understand there is to be a presentation and discussion with Seamans, together with you and Dr. Bisplinghoff. We still hope that reprogramming from FY-65 funds will be possible. ✓
4. Q-ball on SA-8, 9, 10: At the June 10 PRB meeting at Houston, I reported to Dr. Mueller on our studies concerning the need of the Q-ball on SA-8, 9, 10 and later S-IB, S-V. (1) We have constructed cases of failures of S-IB where a slow divergence develops which is not sensed by angular deviation or angular rate prior to structural breakup or prior to attainment of angles-of-attack dangerous for LEV. Consequently, EDS should get additional sensor inputs for manned abort by either angle-of-attack meter or accelerometer, or even better, both. We found that both body fixed accelerometers or platform mounted accelerometers can be used as EDS sensors, but require additional data from angular acceleration and certain other complications. (2) We again stressed the benefit for flight evaluation with respect to aerodynamic stability and structural loads accuracy from direct α -measurement, which is more accurate than calculation via measured acceleration. (3) We found that satisfactory attitude stabilization for S-IB and Saturn V will probably be possible using the platform mounted accelerometers; however, this will need more studies concerning bending and sloshing. But we withdrew our argument which claimed the Q-ball as required backup for body fixed accelerometer used for attitude control. Dr. Mueller decided that the Q-ball will stay on Saturn I vehicles, but we will continue to investigate the needs for EDS systems on IB and V. Dr. Mueller did not seem to consider the flight evaluation arguments as conclusive. Astronaut Borman commented in favor of angle-of-attack sensors as EDS inputs. Mr. Piland admitted that the MSC crusade against the Q-ball was motivated largely by the fact that it required the mounting on the LES tower. ✓
5. SA-9 Guidance Mode: Astrionics and Aero have agreed to use the "Iterative Guidance Mode" for SA-9. ✓
6. Saturn IB/Centaur: A general status meeting was held on June 9. No major problem areas were indicated, and it is anticipated that the rough draft of the project proposal will be ready by July 8. ✓

1. S-I-9 POST-STATIC CHECKOUT: Pressure and functional testing of the S-I-9 has been satisfactorily performed on all systems. All engine positions, except position 3, have experienced leakage in the turbine exhaust system at the following connections: (1) Engine positions 1, 2, and 4 -- Elbow to Turbine. (2) Engine positions 5, 6, and 7 -- Upper Duct to Turbine. (3) Engine position 8 -- Heat Exchanger to Lower Duct. Torquing the flange bolts to the maximum torque of 80 inch pounds, proved to be unsuccessful except for engine position 7. The remaining six leaking connections were corrected by replacing the flexitallic gaskets and applying maximum specified torque. Inspection of the defective flexitallic gaskets indicates that the plastiseal used to lubricate the gaskets may be contributing to the problem by hardening and becoming brittle subsequent to static firing. A study of this problem is underway. ✓ Several unincorporated items presently outstanding due to part shortages will be completed during vehicle clean-up. The stage is presently undergoing electrical defects rework prior to beginning final electrical checkout. ✓
2. S-IV PROGRAM: The S-IV-9 stage continues in pre-static checkout at Sacramento. There are approximately 192 missing components on this vehicle. The S-IV-8 stage continues in post manufacturing checkout at Santa Monica. Checkout is approximately 50 percent complete. ✓
3. EMERGENCY DETECTION SYSTEM (EDS) QUALITY ASSURANCE PROGRAM PLAN: The Laboratory has completed a Quality Assurance Program Plan for the Saturn IB and Saturn V EDS. The Plan was developed to clearly establish responsibilities, provide for overall systems management, and to assure that all necessary quality functions are performed to the required detail and within the schedules of the vehicle hardware. It is intended to cover Quality practices from component fabrication through complete EDS checkout prior to launch. The ARINC Reliability Analysis of the Saturn IB EDS is being reviewed by the Laboratory to determine how the automatic and manual abort parameters are combined to meet the overall reliability goal. ✓

NOTES 6-15-64 GRUENE

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*fw 1. SA-7 Status:

a. The S-I was erected as planned on June 9. The IU was mated to the spacecraft in the hangar. The S-IV was delayed one day because of bad weather at SACTO and one day because of Guppy trouble at Austin, Texas (flat tire). However, since no mods are planned at the present time in Hangar AF, the two days were made up by working through the last weekend. Erection of the S-IV will be accomplished as planned on June 19. ✓

b. The SA-7 Command Module arrived today (June 15) with only a slight delay which will not affect launch date. ✓

2. MILA:

The attached pictures show construction progress in the MILA area. (Pictures to Dr. von Braun only) ✓

Attachment
4 Pictures

7/15

B/22

NOTES 6/15/64 HAEUSSERMANN

1. GUIDANCE MODE FOR SA-8 AND SA-9: By agreement between Astrionics Laboratory and Aero-Astroynamics Laboratory, the Iterative Guidance Mode (IGM) is being investigated for application on SA-8 and SA-9. ✓ All analyses to date have shown the IGM to be completely satisfactory. ✓ Consequently, the IGM equations are presently being programed to actively guide SA-9. The flight program may not be available in time to start SA-9 guidance checkout in Quality Laboratory 6/27. ✓ In the event that the IGM programs are not ready, Quality Laboratory has agreed to proceed with the checkout, utilizing the SA-7 Polynomial Guidance Mode (PGM) program. The functional checkout of the system will be identical with either the PGM or IGM equations. ✓

W.H.
But Q-ball stays at least in Saturn I

2. DELETION OF Q-BALL ON SATURN IB/V: (Ref. your comments to Item 3 in Notes of 6/8, Copy Attached*) This item was discussed in the Panel Review Board Meeting 6/10 at MSC and agreements were reached on future plans. Dr. Geissler will provide details in his 6/15 Notes. We established that angle-of-attack information can be computed in the on-board guidance systems with a possible error of 1 to 2 degrees. ✓

3. SA-6 COMMAND GUIDANCE TEST: Supplementing preliminary results reported in Notes of 6/1 further evaluation of data indicates that all phases of the test were successful.

<u>Number of Messages</u>	<u>Transmitted From</u>	<u>Interrogation Verified</u>
270	Ascension Island	270 received ✓✓
71	Green Mountain	68 received** ✓✓

**Look angle from Green Mountain was less than 3 degrees.

More extensive testing is being considered for SA-7. ✓

Enc.
a/s

*Attachments provided M-DIR and R-DIR only.

NOTES 6/15/64 HEIMBURG

Ba/22

fw
1/5

*fw 1. S-1-8:

Test SA-21 was performed on 6/11. Mainstage duration was 139.92 seconds with inboard engine cutoff initiated by the lox low level sensor. Outboard engine cutoff came 5.69 seconds later by lox depletion on engine 4. No major hardware discrepancies were noted. Data evaluation revealed a downward performance shift in all parameters except consphere temperature on engine position 8. These shifts occurred at approximately 52 and 132 seconds. Total chamber pressure drop was approximately 40 p.s.i. No firm conclusions have been reached on this engine. Final sea level thrust is not available at this time. The gas generator of engine 8 will be checked for dirt this morning. If no dirt is found, the engine may have to be pulled. ✓

Tentative schedule for the coming week is as follows:

- a. Continue data evaluation. ✓
- b. Preparations for the special lox loading test, which is scheduled for 6/17. ✓

*fw 2. F-1 ENGINE, STTW:

Engine F-1002 will be installed in the test stand today, 6/15. The first firing is scheduled for 6/23. This will be the first run with the heat exchanger. ✓

3. MTF WORKING GROUP:

The GE proposal covering Phase II Technical Systems for MTF has been received and reviewed. During presentation to you tomorrow (Tuesday), we will discuss problem areas. ✓

July 15

B6/22

NOTES 6-15-64 HOELZER

1. FLIGHT DATA EVALUATION INFORMATION SYSTEM: A task group has been established between our Data Center personnel, the Data Reduction Branch, and Aero-Astrodynamic personnel to determine what flight evaluation data should be stored and retrievable in support of Dr. Speer's operation. This task group is expected to come up with a system which will allow storage and retrieval of significant flight data on a continuing basis for the Saturn program. ✓

Harry G.
Again, please
look into
this B

2. RECRUITMENT PROBLEM: (Reference NOTES 3-23-64, attached). Personnel Office has contacted Headquarters several times about this recruitment problem but has been unable to obtain a written waiver and it appears that we will be unable to obtain this waiver. We still consider this to be a serious problem and wonder if some additional action is possible through your office.

3. CONTINUATION OF DATA CENTER STUDY: We are moving a portion of the Data Center study group to I. O. to begin a study of data processing and management problems in the Saturn V Project Office. This is in conjunction with Mr. Joe Reed's office and Saturn V personnel. The MSFC reorganization last fall necessitated a re-survey of the Saturn Project area due to the rapid expansion in Industrial Operations' side of MSFC. ✓

4. OFFICIAL VISITOR FROM HILL AIR FORCE BASE, OGDEN, UTAH: The Computation Laboratory was visited last week by Mr. Robert Stirland representing General Coupland of Hill Air Force Base. This visit was part of an information exchange agreement reached by Mr. Webb and General Coupland when Mr. Webb visited Hill Air Force Base a few months ago. Mr. Stirland also visited the Managerial Data Center and gathered information about MSFC's approach to computer processing and presentation of management information. His tour also involves a visit to the Cape, Slidell, and Houston. Following his visit with us last year a surplus B-47 Simulator was obtained by our Simulation Branch from Hill Air Force Base and we are now in the process of obtaining other valuable electronic equipment for use in our Simulation Branch. You will probably receive a courtesy letter from General Coupland after Mr. Stirland's tour is completed. ✓

James

SECURITY

NAME OF AGENCY NASA MARSHALL	PRECEDENCE
	ACTION: PRIORITY
ACCOUNTING CLASSIFICATION	INFO:
	TYPE OF MESSAGE <input checked="" type="checkbox"/> SINGLE <input type="checkbox"/> BOOK <input type="checkbox"/> MULTI-ADDRESS
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CLASSIFICATION	UNCLASSIFIED
STANDARD FORM 14 REV. MARCH 15, 1957 GSA REGULATION 2-IX-203.04 14-303	
TELEGRAPHIC MESSAGE	
OFFICIAL BUSINESS U. S. GOVERNMENT	

MESSAGE TO BE TRANSMITTED (Use double spacing and all capital letters)

THIS COL. FOR AGENCY USE

TO: DR. JOSEPH F. SHEA, MANAGER, APOLLO SPACECRAFT PROGRAM OFFICE,
NASA, MANNED SPACECRAFT CENTER, HOUSTON, TEXAS

INFO: GEN. S. C. PHILLIPS, DEPUTY DIRECTOR, APOLLO PROGRAM,
WASHINGTON, D.C., CODE MA

SUBJ: JETTISONING OF THE SPACECRAFT ESCAPE TOWER FOR BOILERPLATE TO
BE FLOWN ON SATURN LAUNCH VEHICLES SA-8, SA-9, SA-10.

REF: PT5-64 DATED JUNE 10, 1964, SIGNED BY DR. SHEA

UNCLASSIFIED MESSAGE. IN REPLY REFER TO I-I/IB-DIR/REINARTZ
BEGINNING OF TEXT.

MSFC AGREES WITH THE WORK STOPPAGE ON THE MISSION SEQUENCER FOR
BP 16 AND 26. MSFC IS IN THE PROCESS OF PREPARING AN ELECTRICAL
SCHEMATIC THAT WILL SUBSTITUTE RELAYS FOR THE MISSION SEQUENCER AND
ELIMINATE THE NEED FOR THE SEQUENCER CHECKOUT CABLE IN THE SERVICE
MODULE UMBILICAL AND THE MSC/NAA GSE PANELS ASSOCIATED WITH THE
CHECKOUT OF THE LES SEQUENCER SYSTEM. MSFC DESIGN WILL PERMIT
CHECKOUT THROUGH THE I.U. WITH ONLY MINOR CHANGES TO PRESENT MSFC
VEHICLE AND GSE DESIGN.

HOWEVER, MSFC DOES NOT WISH TO ASSUME OVERALL RESPONSIBILITY
FOR THE MSC/NAA FURNISHED HARDWARE FOR THESE FLIGHTS. SINCE USE OF
I.U. BATTERIES FOR LES JETTISONING POWER WOULD INTRODUCE TRANSIENTS

Mail & Records

E-DIR
Mr. Rees

R-DIR
Mr. Weidner

I-DIR
Mr. Young
Dr. Mrazek

R-P&VE-DIR
Mr. Cline

R-ASTR-E
Mr. Fichtner
Mr. Smith

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PAGE NO.	NO. OF PAGES
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NAME AND TITLE OF ORIGINATOR (Type) <i>Stanley R. Reinartz</i> Stanley R. Reinartz Dep Dir, Saturn I/EE Project, I-I/IB-DIR	ORIGINATOR'S TEL. NO. 876-2148
--	-----------------------------------

DATE AND TIME PREPARED 11:30 a.m. 6/15/64
SECURITY CLASSIFICATION

I certify that this message is official business, is not personal, and is in the interest of the Government.

(Signature)

UNCLASSIFIED

NAME OF AGENCY NASA MARSHALL	PRECEDENCE	SECURITY CLASSIFICATION UNCLASSIFIED
	ACTION: PRIORITY	
ACCOUNTING CLASSIFICATION	INFO.:	STANDARD FORM 14 REV. MARCH 15, 1957 GSA REGULATION 2-IX-203.04 14-303
	TYPE OF MESSAGE	
THIS BLOCK FOR USE OF COMMUNICATIONS UNIT	<input checked="" type="checkbox"/> SINGLE	<input type="checkbox"/> BOOK
	<input type="checkbox"/> MULTI-ADDRESS	
		TELEGRAPHIC MESSAGE
		OFFICIAL BUSINESS U. S. GOVERNMENT

MESSAGE TO BE TRANSMITTED (Use double spacing and all capital letters)

THIS COL. FOR AGENCY USE

INTO THE VEHICLE SYSTEM AT A CRITICAL TIME, MSFC REQUIRES USE OF THE PRESENT PYRO BATTERIES IN THE COMMAND MODULE AND A RELAY LOGIC SYSTEM.

MSFC REQUESTS THAT THE NECESSARY MODIFICATIONS AND INCORPORATION OF THIS SIMPLIFIED, ONE TASK, SYSTEM INTO THE CM/LES BE PERFORMED BY NAA AT DOWNEY OR KSC. MSFC IS READY TO FURNISH THE ELECTRICAL SCHEMATIC AND THE NECESSARY RELAYS AND KSC HAS INDICATED THEIR WILLINGNESS TO ASSIST IN MODIFICATIONS AT THE CAPE IF NECESSARY.

REQUEST YOUR AGREEMENT TO THIS PLAN PRIOR TO THE PROGRAM MANAGEMENT REVIEW MEETING ON JUNE 23, 1964.

A SECOND TWX WILL FOLLOW CONCERNING MSFC'S URGENT REQUIREMENTS FOR A SUITABLE AND ON SCHEDULE BOILERPLATE SPACECRAFT FOR SA-10.

~~END OF TEXT. SIGNED STANLEY R. REINARTZ~~

INFO COPIES OF THIS TWX WERE SENT TO J. C. MOSER, MSC FLA. OPNS; DR. GRUENE, DIR, LAUNCH VEHICLE OPERATIONS; KSC; E. R. MATTHEWS/K-PA, CHIEF, SATURN I PROJECT OFFICE, KSC. END OF TEXT. SIGNED STANLEY R. REINARTZ.

DO NOT TYPE MESSAGE BEYOND THIS LINE

PAGE NO. 2	NO. OF PAGES 2
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NAME AND TITLE OF ORIGINATOR (Type) <i>Stanley R. Reinartz</i> Stanley R. Reinartz Dep Dir, Saturn I/IB Project, I-I/IB-DIR	ORIGINATOR'S TEL. NO. 876-2148
I certify that this message is official business, is not personal, and is in the interest of the Government.	
<i>Stanley R. Reinartz</i> STANLEY R. REINARTZ (Signature)	

DATE AND TIME PREPARED 11:30 a.m. 6/15/64
SECURITY CLASSIFICATION UNCLASSIFIED

twc
15

B 6/22

NOTES 6-15-64 Koelle

HHK
Yes, let's
arrange
that
B

1. LONG RANGE PLANNING EXERCISE: We have now drafted 10 alternative program plans within the Headquarters guidelines for detailed analysis. These plans are displayed on large data sheets in our conference room, no. 815. If you (or anyone else reading these NOTES) have an hour to visit us, we will be glad to explain where we are and what we plan to do in the next 6 weeks. ✓

↑ together
2 hrs?

HHK
Let's
discuss
this again
together
with
Frank
Williams
B

2. SATURN IB VERSUS TITAN III: While I am doing my share to protect and increase the market of the SATURN IB, I am somewhat concerned that we might select a poor strategy in our fight with the AF. I do believe that there is no chance to cancel the SATURN IB during the length of its APOLLO orbital test program, so the question is one of competition with TITAN III for some missions in the 1969 period and beyond. ✓ I think the best strategy is to show SATURN IB in its best light, and not to degrade or attack the TITAN III. If the TITAN III should get cancelled, this also might have undesirable consequences for NASA and MSFC. We all know that the AF has to have a visible share of the national space program, because of the great public and congressional pressures prevailing at the present. If the TITAN III gets cancelled, this would greatly improve their chances of getting the next launch vehicle assigned in the national booster program, which comes up for development. In my judgment, this will be the "Reusable Orbital Transport." As long as the TITAN III is with the AF, NASA has an even chance to get this project for systems development. Whoever will be in charge of the "Reusable Orbital Transport" will control the national space activities from 1975 on. I would prefer to see NASA in this role and it seems to me, therefore, that the TITAN III should be kept alive for whatever military missions are coming along. [We should concentrate on securing all of the NASA missions for SATURN IB. ✓

3. NUCLEAR PULSE: It appears that the conservatives have won out over the liberals this year on this subject. On June 11 Dr. Dryden answered Lt. Gen. Ferguson's letter to the effect that the NASA budget of FY 1964 and 1965 does not leave room for NASA participation in research activities for this project. (Editorial comment: This was not requested!) Dr. Dryden concedes, however, that "the concept offers a theoretical base for substantial increases in efficiency of boosters in deep space operations." He continues "NASA would be glad to coordinate its efforts in this area with the AF effort if they are planning to continue their work." I think I am at the end of the rope, but would suggest that you make an effort to discuss this subject, if you have an opportunity, with Mr. Webb, Dr. Dryden, Dr. Seamans and Dr. Bisplinghoff. I think we should continue to fight for the opportunity to conduct contracted systems and applications studies in this area, in order to be able to assess the potential of the nuclear pulse propulsion system. ✓

7/6/15

NOTES 6-15-64 KUERS

B 6/22

* 7w

1. Saturn V, S-IC Stage Progress and Problems:

a. Lox Container for -T: The final horizontal close-out weld has been successfully completed. Next operations, prior to hydrostatic testing, are installation of last ring baffle and helium manifolds. ✓

b. Fuel Container for -T: It was determined that the weld cracks in the fuel outlet elbows must be repaired before hydrostatic testing. It is a proven principle of ME Laboratory, that the manufacturer of components shall make and be responsible for repairs on his hardware. If his hardware cannot be shipped back, he has to send a repair crew consisting of the pertinent professional skills. Presently, Boeing has a crew here consisting of a supervisory engineer, welding engineers, welders, design and quality engineers, and X-ray technicians working around the clock and over the weekends. The support in equipment, materials, and handling crew is provided by MSFC Laboratories. ✓

c. Thrust Structure for -T: This continues to be the pacing item. Shortage of components and effect of design changes on manufacturing are the major problems. This will be discussed tomorrow (6/16) in a meeting called by IO, Mr. Young, where Boeing will present the total picture of impact on program schedules. ✓

d. Fuel Container for -S: The weld repairs by the Boeing crew is underway and will be completed shortly. Because of the fuel elbow problems on the lower bulkhead we started the welding of the upper dome first. On the weld of Y-ring to dome we employed for the first time the high speed welding technique in order to avoid porosity and hand repairs. Welding speed was 25 inches per minute versus 5 inches per minute as previously used. The quality of the weld has not been evaluated yet. ✓

2. Personnel: Mr. Milton Steen, former Development Manufacturing Manager of Lockheed for the RIFT Program, has joined ME Laboratory as a civil service employee. He will work on my staff as a project engineer for the S-IC Program. ✓

7w 6/15

B 6/22

NOTES 6-15-64 MAUS

H.M.
I'd like
to see
them B

1. PROGRAM OBLIGATION PLAN (POP 64-3) - The POP guidelines requesting FY65 obligation plan and FY66 final budget submission were received today. Included in the package are guidelines for approved projects, program additions, and C of F. Guidelines for other Program Offices and for Administrative Operations are not yet available. ✓

<u>Program Additions include:</u>	<u>Principal Elements Assigned to MSFC</u>
ALSS First Flight 509	→ Payload Development, ✓ 14 Launch Vehicles (6 presently programmed plus 8 new)
Apollo - X First Flight 208 time frame	→ 5 Launch Vehicles (in addition to present program)
Saturn IB/Centaur First Flight 206	→ Centaur Adaptation Launch Vehicles (We will plan and price the development plus recurring costs for one mission.)

URGENT

H.M.
Let's
discuss this
B

The above assignments are for development of cost and schedule estimates and "do not represent assignment of project management responsibility for development or operation."

MSFC and MSC are requested to make proposals for a Lunar Simulation Facility and a Terrestrial Proving Ground as part of the ALSS Program.

Complete program estimates will be developed for the ALSS and Apollo X, however, in the case of IB/Centaur, no payload assignment has been made. It is planned that mission assignments will be developed during the Saturn IB - Titan III studies. ✓

The approved program and C of F submission is due August 1. Program Addition data is due July 10. Final MSF review of the Program Additions will be made in the July Management Council Meeting. ✓

700
165

B 6/22

NOTES 6-15-64 McCartney

1. PHYSICAL SPACE REQUIREMENTS: A study has been completed to determine laboratory physical space requirements projected through July 1965. The space requirements included those to be provided at the Center, leased at the Huntsville Industrial Center, and those which should be provided by the support contractor. It is likely that additional contractor-furnished trailers will be needed at the Center during the phase-over period to single support contractors. ✓

2. REQUESTS FOR PERSONNEL ACTIONS: A directive will be issued by R-DIR allowing a limited submission of Requests for Personnel Actions (Promotions) from R&D Operations' Laboratories and Offices. A similar directive will be published by Industrial Operations for their organization. Promotion actions in MSFC will be limited to 40 per month; however, GS-5 through GS-11 engineer promotions will not be included in this figure. Quotas, as such, will not be assigned to laboratories and offices. Promotion requests will be controlled by R-DIR and I-DIR. ✓

NOTES 6/15/64 RUDOLPH

B 6/22

July 15

1. Boeing Mission Support - Action is underway to extend the Boeing effort for Saturn V Systems Engineering, currently being procured under the S-IC contract, for a period of 60 days (June 30 to August 31, 1964). This action is being taken pending NASA approval of the proposed task assignments with Boeing for Saturn V Launch Vehicle Systems Engineering and Systems Integration effort. This subject was discussed in a meeting between Dr. Seamans and Mr. Webb on Friday, June 12, 1964, however no decision was rendered. At the request of Mr. Webb, additional data was generated over the weekend (June 13 and 14, 1964). Indications are that a decision can be expected soon.

(Was o.k.'d by Seamans & Webb B)

2. Saturn V Optimum Launch Sequence - Negotiations have been completed with the Boeing Company on a scope of work to perform an analysis to establish the optimum launch sequence of the SATURN V System for the Lunar Orbital Rendezvous Mission. This work is presently being done by Boeing under a Technical Assistance Order. ✓

3. S-IC Stage Thrust Structures Assembly - A firm cost proposal was received from the Boeing Company on the structural assembly of Thrust Structures for S-IC-S, -1, -2. ME Laboratory is currently evaluating this proposal with the negotiation scheduled for late next week. The Boeing proposal of \$5 Million is considered much too high for this effort. ✓

4. Display System - Authorization for Boeing procurement of the Raytheon Cathode Ray Tube display system has been extended to include two additional sets. Procurement authorization includes systems for the following Test and Checkout stations:

- 1 each, Quality & Reliability Assurance Laboratory
- 1 each, Test Laboratory
- 2 each, Michoud
- 1 each, Mississippi Test Facility ✓

5. Onboard Tracking Instrumentation Requirements - The report, "Onboard Tracking Instrumentation Requirements for Saturn IB and Saturn V Launch Vehicles," requested by Dr. Mueller was forwarded to NASA Headquarters on June 8, 1964. ✓

6. Instrument Unit Stage Contractor - Two proposals have been received from IBM in response to RFQ's asking IBM to expand their capabilities to assume acceptance testing, product evaluation and procurement responsibility preparatory to assuming the role of stage contractor on August 5, 1964. These proposals will be evaluated and negotiated prior to June 30, 1964. ✓

7/5/15

B 6/22

NOTES-6-15-64-SHEPHERD

Office of Construction: Col. J. V. Sollohub, Bob Long's replacement in the Office of Construction, NASA Headquarters, visited Huntsville, MTF and Michoud on June 8, 10 and 11. His most important observation was "the Office of Construction could cease to exist for a year and no one would notice it". Such candor was refreshing.

||

S-II: The GAO Auditors are back at Downey looking further into the Seal Beach construction program. This makes the third or fourth visit to the site. An unfavorable report should be expected covering the beginning of the program when S&ID was practically free wheeling. ✓

||

7/15

B6/22

NOTES 6-15-64 Stuhlinger

*fw 1. MMC PROJECT: Transfer of the MMC Project to IO will become effective June 15, 1964. Agreement regarding the transfer of persons and responsibilities are presently being worked out between IO and R&DO. ✓

Dr. Mueller and Dr. Bisplinghoff have reached a general understanding on the relationship between their offices with respect to operation of the MMC Project subsequent to the transfer. In general, Dr. Mueller expects to maintain a single point of direction in Gen. Phillips' office. Technical monitorship of the project will continue with Dr. Bisplinghoff, but will be channeled through OMSF to assure compatibility of all requirements. The exact staff operation will be worked out between the two Administrators this week. ✓

2. MMC ORBIT: A letter to Headquarters is being prepared concerning the change in the MMC orbit requested by Dr. Mueller and Dr. Bisplinghoff. Informal discussions with them resulted in these conclusions:

- a. A somewhat lower orbit is desired.
- b. The orbit should be determined on the basis of major parameters - radiation, lifetime, and meteoroid counting rate.
- c. Dr. Mueller would like a briefing, in the not too distant future, on the technical aspects of the program. This will be arranged to his convenience for about mid July. ✓

3. SRT PROGRAM STATUS: The current status of the ART/SRT Program under the cognizance of this Laboratory is, as of June 12, as follows:

	<u>ANNUAL PLAN</u>	<u>AUTHORIZED</u>	<u>PROCESSED TO FMO</u>	<u>OBLIGATED</u>	<u>CHANGE IN OBLIGATIONS SINCE 6/ 5/64</u>
OART	10,515,000	10,515,000	9,456,039	4,377,656	327,957
OMSF	14,133,000	14,133,000	14,089,472	2,066,005	348,771
OSSA	675,000	675,000	663,141	145,912	1,927
	<u>25,323,000</u>	<u>25,323,000</u>	<u>24,208,652</u>	<u>6,589,573</u>	<u>678,655</u> ✓

4. FY-64 AND FY-65 FUEL CELL CONTRACT: Program authority for \$1M has been granted with a NASA Form 506 for the Allis Chalmers Fuel Cell Contract. This additional authority will make a total commitment of \$1.250M for FY-64, and Headquarters has promised \$1.5M to be expended in FY-65 for the Fuel Cell Contract. ✓

5. PROJECT POODLE: Several weeks ago, Dr. R. Bussard, STI, gave a presentation at MSFC on a propulsion system which utilizes an isotope (Polonium) to heat H₂ as propellant (I_{sp}=700 to 800 sec.). In the meantime, P&VE (Will Jordan) and RPL have looked further into this project, particularly into possibilities of using Poodle in combination with Saturn stages. It is our conclusion that this project is so promising that a presentation by Dr. Bussard to you and other members of MSFC would be warranted. Would you like to have such a presentation?

E.S. Yes, please lay on through Bonnie B

June 22 1964



File
Notes 6/22/64
File
575

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO Mr. F. Williams, DIR

DATE July 21, 1964

FROM Director, Research Projects Laboratory
R-RP-DIR

SUBJECT Design Criteria Handbook

In the *cy attached* NOTES of 6-22-64 (Geissler), Dr. von Braun requested information in connection with Dr. Geissler's Design Criteria Handbook Study. My reply to Dr. Geissler is attached for your information. Dr. von Braun read my Memo last week on the plane to California.

Ernst.

Ernst Stuhlinger

1 Enc:
a/s



1. Stability, Guidance, and Control Sub-committee of the NASA Design Criteria Steering Committee: Reference Item 3, Notes 2/17/64 Geissler, copy attached. The status of the Design Criteria Handbooks that were to result from this effort, is uncertain at this time. The total cost of this project was estimated at \$750,000. Mr. Rhode, Space Vehicle Division, Headquarters, gave us \$325,000 of FY-64 OART funds (\$65,000 for each of five tasks) and stated he would fund the remaining \$425,000 with FY-65 funds. Research Projects Laboratory authorized us only \$130,000 of the appropriated \$325,000. Dr. Bisplinghoff has written a letter of complaint to Marshall because the funds appropriated for Design Criteria have been spent on other projects. We intend to hold all five design criteria proposals until the previous situation is clarified. At the present time, Dr. Stuhlinger and Dr. Bisplinghoff are attempting to settle the FY-65 funding problem.

RPL
That's going on here?
B

2. Apollo Logistic Support System: Reference your comments on Item 1, notes 6/8/64 Geissler, copy attached. Joe de Fries has worked with Bill Taylor for a long time, and they, too, see eye to eye. Their working relationship is excellent. ✓

3. Orbit Parameters for Meteoroid Satellites: Upon request by Dr. Mueller, new orbit parameters for SA-9, SA-8, and SA-10 have been investigated with regard to their lifetimes. By compromising the confidence levels of both vehicle performance and orbital lifetime, it is possible to lower the apogee to altitudes below 600 to 700 km (the radiation limit quoted by Bisplinghoff). Our recommended solution has an apogee of 620 km, perigee of 515 km, nominal life of 800 days, a 94% confidence of achieving one-year life, and a performance capability corresponding to a 1.6σ level. A 2σ vehicle performance deviation would still yield a nominal life of 430 days. ✓

Sounds good to me
B

4. Joint Operations Meeting: Gen. Phillips chaired the 2nd Joint Operations Meeting on June 15 in Houston. Important results for MSFC: (1) Gen. Phillips will call special meeting on July 8 to solve the problem of S-IVB/IU post separation tracking (inputs required from Flight Mechanics and Instrumentation and Communication Panels); (2) There seems to be some question now on funding our famous Bermuda C-band Radar. OTDA is to report to Gen. Phillips immediately; (3) An Ad-hoc group with two MSFC members was established to investigate Saturn-Apollo instrumentation requirements documentation; (4) Mission rules (go/no-go conditions) for all future Saturn flights will be coordinated by KSC. SA-7 mission rules are due within 2 weeks. MSFC contact is Mr. Cooper, I-I/IB; (5) KSC was requested to show launch director organization for Apollo launches (Saturn IB/V); (6) Chris Kraft (MSC) made a strong pitch against the allegedly too large number of unmanned Saturn IB and Saturn V flights; (7) Gen. Phillips requested MSFC to develop a position with regard to closing the EDS loop on SA-202 (will be discussed in Management Council Meeting). ✓

O. Lane
fyi
B

→ E.F.
I talked to Chris. All he is against is unmanned flights (the complete life support equipment in space craft (the "iron men" or monkeys))
B

Memorandum

TO Dr. Ernst Geissler, R-AERO-DIR DATE July 15, 1964

FROM Director, Research Projects Laboratory
R-RP-DIR

SUBJECT Design Criteria Handbook Task

1. In your NOTES to Dr. von Braun, dated 6-22-64, you mentioned that funding of the Design Criteria Handbook task is uncertain at this time. I received a copy of your NOTES on July 10 after my return from TDY, and I would like to reply to you by describing as briefly as possible the development of this task, and its present status within our research program.

2. Discussions and exchange of letters between Aero-Astro and Mr. Rhode, Assistant Director, Space Vehicle Systems, OART, concerning your contributions to a NASA Design Criteria Handbook started as early as December 1963 (your letter to Rhode, dated December 6, 1963; Rhode's letter to Dr. von Braun, dated January 8, 1964 and Rhode's letter to you, dated January 8, 1964). We at RPL, as Research Program Managers, were not made aware of this beginning research task until several weeks later when Aero-Astro forwarded to RPL four tasks to be included in our 1964 Research Program. I reviewed these tasks, and my first feeling was that these tasks, being primarily a compilation of data, would not very well fit into a research program, and should rather be funded out of Saturn funds.

3. About January 16, Mr. Kinser (RPL) went to Washington and discussed these tasks with Mr. Rhode and Mr. Underwood. Mr. Kinser was informed that OART would like to have Aero-Astro do this work, and that the project would be funded out of OART research funds as soon as I had signed Forms 1044 for the tasks.

4. On January 30, RPL forwarded to Mr. Rhode the four tasks written up by Aero, plus a fifth task, "Material Properties Handbook", which is also a part of the overall Design Criteria Handbooks, but is being prepared by P&VE. I signed all five tasks.

Enc 1

July 15, 1964

5. On February 11, 1964, I received a letter from Mr. Rhode stating that he had reviewed the five task descriptions and had taken steps to increase our program authority to provide the funds.

6. On March 4, 1964, RPL received from OART a NASA White Form 506, which gave us program authority to fund these five tasks, totaling \$400,000., of which \$325,000. was designated for the work to be done by Aero-Astro.

7. At that time, the MMC Project developed a requirement for additional funding of \$1.9 million within FY 64. Dr. von Braun received a letter from Dr. Bisplinghoff, dated April 16, 1964, in which the statement was made that MSFC will have to reduce the OART Research Program at MSFC by \$1.9 million to cover the additional requirement of the MMC Project.

8. My associates and I made a very strong effort to obtain the required funding for the MMC Project from sources other than the SRT Program. I made several trips to Washington in this connection, but I was not successful in finding another source at OART or OMSF for the required MMC funding. As you may recall, this effort of finding OMSF support for the MMC Project finally led to the transfer of the MMC Project from RPL to IO. However, the decision by OART that the \$1.9 million had to be taken from the OART Supporting Research Program at Marshall was not changed.

9. After several meetings with members of the Executive Staff, P&C, FMO, Mr. Gorman, Mr. Newby, Mr. Weidner, and others, we finally submitted to OART a plan according to which we would reduce the OART-SRT Program by \$1.9 million. The letter of transmittal was signed by Dr. von Braun on May 8, 1964.

10. It is needless to say, of course, that in all Laboratories each task proposer who was hit by this required reduction was extremely unhappy to lose support of his task. Also, you may understand that it was an extremely unpleasant task for my associates and me to execute this reduction. The foremost consideration which guided us in this reduction was a list given to us by P&C at that time which contained those tasks that P&C was not able to obligate before the deadline of June 30, and which therefore had to be transferred to the FY 65 program anyway. It was not known at that time that we would be able to obtain fifth quarter funding authority for FY 64 tasks.

July 15, 1964

11. On June 1, Dr. Bisplinghoff wrote a letter to Dr. von Braun concerning our plan to reduce our program by \$1.9 million, and he pointed out that he was unhappy to see only one of the Design Criteria Handbook tasks left in the 64 program after the \$1.9 million cut. He also stated that we should re-examine our FY 65 program and be sure that the remaining Design Criteria Handbook tasks will be included in our FY 65 program.

12. It should be noted that instead of the original four tasks from Aero-Astro, we actually received five procurement requests from you to be included in the program.

13. On June 10, Mr. Kinser and Mr. Cannon (RPL) discussed with Mr. Baker and Mr. Bean (Aero-Astro) the Design Criteria Program that Aero-Astro wished to pursue. At that time, we learned from Mr. Baker that the total program would cost at least \$750,000.

14. On June 16, I wrote a letter to Dr. Bisplinghoff, stating that we had managed to fund two tasks, totaling \$130,000. out of FY 64 funds, and that we would reorient our FY 65 program to include the other three procurement requests, totaling \$195,000. I also stated that Aero needed an additional \$425,000. to complete the program and that I felt that this amount should be authorized to us above our present FY 65 funding guidelines. If this were not possible, this additional amount should be included in the FY 66 program.

We tried on June 16 to show this letter to you for concurrence. In your absence, we read the letter to Mr. Bean, Aero-Astro, who concurred in the letter as written. Mr. Bean stated that he could speak for you in this matter. He also stated that you and Mr. Baker had discussed this situation after the June 10 meeting, and that my letter to OART was in accordance with your desires.

15. Subsequent to this letter, MSFC received fifth quarter authority from Headquarters, and also the authority to reprogram up to 10% between sub-programs within one program. This allowed us to fund another one of your Design Criteria Handbook tasks with FY 64 money.

16. On July 1, Mr. Kinser wrote a letter to FMO requesting that FY 65 program authority be put on the remaining two procurement requests. This will now be accomplished as soon as the Work Order System for FY 65 has been agreed upon.

July 15, 1964

17. On July 10, Mr. Kinser tried unsuccessfully to call Mr. Underwood at OART. On July 13, Mr. Kinser talked with Mr. Underwood and was informed that MSFC would receive \$419,000. for Environmental Design Criteria within the FY 65 program. Out of this amount, \$100,000. will go to Bill Vaughn for one of his studies; the remaining \$319,000. will be used for the Design Criteria Handbook tasks. Also, Mr. Underwood stated that he will write a letter to Marshall, outlining what CART would like to see accomplished by MSFC in the Space Vehicle Design Criteria Sub-Program. This letter has not yet arrived.

18. At the present time, we have the following situation:

FY 1964	\$195,000.
FY 1965	130,000. (old guidelines)
FY 1965 (addition)	189,000. (new guidelines)
FY 1966	<u>236,000.</u>
Total	\$750,000.

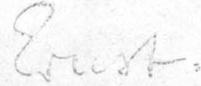
19. Throughout the development of this project, RPL has been in frequent and close contact with the Research Program Coordinator at Aero-Astro, Mr. Murphree. We requested Mr. Murphree to update the writeups for the procurement requests in such a way that they reflect this funding schedule, and at the same time agree with Aero-Astro work plans for the entire project. I would like to repeat this request to you. On July 14, Mr. Underwood called us again and asked for the up-dated task forms. Submission of these forms by you to RPL, and further to OART, is necessary before final authorization to obligate funds for the first three tasks will be obtained from OART.

20. You probably agree that the history of these tasks is a complicated one; however, we hope that you also agree that RPL spent a great effort to implement these tasks, and to obtain funding for them as expeditiously as possible under the complex circumstances. Also, I would like to note that these are only five out of a total of about 500 research program tasks which RPL has to handle during each Fiscal Year. The history of many of these tasks is no less involved than the history of your tasks.

SUBJECT: Design Criteria Handbook Task

July 15, 1964

21. I have tried to keep this reply as brief as possible. If you wish to have more detailed information, we will be glad to furnish it.



Ernst Stuhlinger

OFFICE OF DIRECTOR - MSFC

CODE	NAME	INIT.	<input type="checkbox"/> ACTION	<input checked="" type="checkbox"/> INFORMATION
DIR	Dr. von Braun			
	SHOW DIRECT			
	Boys			

REMARKS

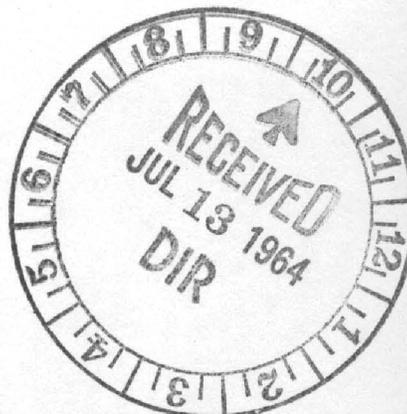
Reference: Captain Fortune's Notes of 6/22/64 and your comment directed to Mr. Gorman

I am attaching a memorandum from Mr. Styles which explains the situation.

He also clarifies the meaning of the initials PSA (Project Stabilization Agreement).

2 Enc:

1. Cy of Notes, Fortune, 6/22/64
2. Memo from Mr. Styles, 7/10/64



CODE	NAME	DATE
DEP-A	D. H. Newby	July 13, 1964

7/6/22

B6/30

NOTES 6/22/64 FORTUNE

1. Urban League Visitors: Friday, J. Harvey Kerns, Executive Director, and his assistant Mr. Barney, Urban League of Greater New Orleans, visited GE/MTSO and MTO. They briefed us on their function, capabilities, National Skills Bank and how they might help us locate qualified Negro applicants in the Greater New Orleans area. There is no urban league branch in Mississippi, nor are they particularly optimistic about creating one. They have been able to effect good relationships with the industries around New Orleans and I understand George Constan has spoken to one of their groups. One unexpected observation developed; that is, the State of Louisiana does not accept Manpower Development Training Act programs because of integration considerations that Mississippi has.

BF
Impact?
B

2. All Appears Quiet on Labor Front: Fred Tyvoll, our MSFC Labor Relations expert, does not think the unions will strike against the Farrell Construction Company soon. We would let them picket only that company, and it being non-union would not be effective. Picketing against other contractors, being secondary boycott, is forbidden by law. Farrell has not met with the President's Missile Sites Labor Committee, but if he did would probably insist on maintaining an open shop, which is his legal right. I was surprised to learn that only one of our prime contractors, Morrison-Knudsen, is signatory to the Project Stabilization Agreement. All the construction contracts, of course, have a PSA wage and fringe benefits incorporated in them.

Meaning? *

Hasty?
I am surprised to hear that for. I thought Paul Styles had all contractors sign (as specifically refuse to do so).
B

3. Logtown School Requests to Stay Open Until June 1965: The Hancock County Board of Education requested approval to utilize the Logtown school for another year since they had been unable to find another location. A bond issue to provide funds for three schools, one of which would replace Logtown, failed to carry by a few votes. Acquisition by the Corps of the Logtown property has not been completed due to disagreement of reimbursement. After talking to Heimburg, Tessmann and Shepherd, I agreed to let them use the school until they could complete another facility, but in no event longer than June 1965. I cautioned them of the heavier traffic they would experience this year.

4. GE Contract Negotiations: Support negotiations remain at stand-still pending acceptance by GE of MSFC position on approval of staffing. Eaton has requested meeting with Gorman on Wednesday, which we will defer until Thursday so that Hirsch can attend. Phase II proposal discussed with GE on June 19, with further clarification meetings scheduled this week.

Enc 1

Memorandum

B812

TO Mr. Newby
DEP-A

FROM Chief, Labor Relations, LR

SUBJECT Comments on Weekly Notes

DATE July 10, 1964

1. To understand the status of the Project Stabilization Agreement (PSA) at Mississippi Test Operations, it is necessary to differentiate between the general terms of the PSA and the money provisions or Table of Employee Compensation.

2. The Project Stabilization Agreement was negotiated by labor and several local contractor associations. The agreement constitutes a sort of super collective bargaining contract which applies to all construction work at MTO. It was signed by the international offices of all unions whose members were expected to work there.

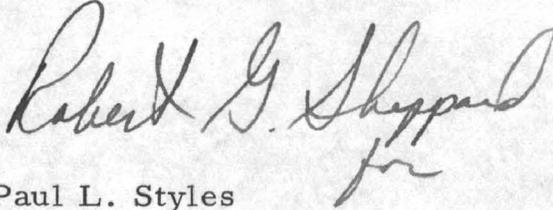
3. It was not possible at the time of negotiation to obtain the individual signatures of the contractors now operating on the site because their contracts had not then been awarded. However, since the agreement was negotiated and signed by contractor associations such as the Associated General Contractors, National Electrical Contractors Association, etc., the contractor members of these associations are automatically covered by the PSA. Moreover, there is considerable precedent to support the government's position that any contractor who is signatory to a collective bargaining agreement anywhere in the country, either individually or as an association member, is similarly bound. As a matter of information, there is being organized at present a new construction contractor's association at MTO. We believe the association will become signatory to the PSA, thereby expressly binding all its members.



Enc 2

SUBJECT: Comments on Weekly Notes

4. The Table of Employee Compensation is that portion of the PSA which is enforceable by the government contracting agency. It deals with wages, overtime, holidays, fringe benefits, etc., and is made a part of all construction contracts for work at MTO. All contractors are, therefore, required to pay the wages and fringes contained therein. It should be noted that provisions of the PSA such as the hiring and grievance procedures are not enforceable by the contracting agency and, therefore, cannot be included in government contracts.



Robert G. Sheppard
for

Paul L. Styles

H-1 ENGINE

During the last static test of SA-8, Engine S/N 2029 at Position #8, exhibited two sharp downward shifts in performance. Investigation to date has not revealed the cause of this condition. Therefore, the engine is being replaced with a spare engine and investigation will continue by refiring engine 2029 at the Test Laboratory.

The first R&D rerouted inboard engine turbine exhaust system will begin engine test the week of June 19-25, 1964. This represents a slight advance in schedule. ✓

J-2 ENGINE

*fw Testing was conducted this week to evaluate the engine start sequence with the thrust chamber pre-chilled to -150°F . This temperature is the nominal pre-chilled temperature required for the thrust chamber to prevent excessive "gassing" of the liquid hydrogen, thereby improving the fuel pump stall margin. Nine tests showed improvement in fuel pump stall margin. ✓

Engine 2006 was accepted by MSFC June 13, 1964. This engine will be sent to S&ID for the S-II stage Battleship program. ✓

The J-2 production contract (NAS8-5603) is at NASA Headquarters for approval. ✓

RL10 ENGINE

Specific impulse of 444 seconds was obtained on an engine modified with a carbon throat to simulate the 57:1 expansion ratio "reduced throat" engine. Additional testing is planned at a chamber pressure of 400 psia without the carbon plug to gain control experience. ✓

At the present time preliminary results from analog simulation studies and engine testing indicate that the most likely cause of the thrust control malfunction on S-IV-6 was the partial blockage of the thrust control body pressure vent line. Investigations are continuing and other failure modes are being studied. ✓

F-1 ENGINE

*fw Repair, modification, and calibration of the injector/thrust chamber test stand 2A was completed June 16, 1964, and testing is to be resumed on June 19, after three weeks downtime. ✓

Modification of the flame deflector on test stand 1A was completed June 15, four days ahead of schedule, and engine #012-1 is being installed. This is the first engine to be equipped with the new rigid high pressure lines. ✓

Engine #020, with injector 092, is still meeting performance requirements for vehicles 501-503. ✓

The basic construction of the last of the three new engine test stands (1E) is complete and the environmental simulation chamber is being added prior to activation. ✓

Engine #021 (the first production type engine) has been installed in the new test stand 1D. Approximately two weeks of stand checkout time will be required before static testing can begin. ✓

Two 6/22

NOTES 6-29-64 CLINE

B 6/30

Negative Report

NOTES 6/22/64 CONSTAN

fw
6/22

B
6/30

*fw I. SATURN I, SI & SIB STAGES QUARTERLY REVIEW

The SI and SIB Stages Quarterly Review will be held on June 24 and 25, 1964 at Michoud Operations in New Orleans.

7/6/64

B 6/50

NOTES 6-22-64 DANNENBERG

1. Manned Lunar Exploration Symposium in Houston - Several MSFC representatives attended the Symposium 6-15/17-64, the purpose of which was to give individuals throughout the country an opportunity to suggest lunar experiments for the astronauts. The following groups were organized: (a) Geology, (b) Mineralogy and Petrography, (c) Geochemistry, (d) Seismology, (e) Heat Measurements, (f) Gravity Measurements, (g) Magnetic Measurements, (h) Atmospheric Measurements, (i) Biological Aspects. These groups are composed of the leading authorities from universities, industry, and NASA. They will recommend to NASA Headquarters and MSC the experiments to be accomplished by the astronauts on the lunar surface. ✓

2. Apollo Boilerplate for SA-10 - MSC has difficulties refurbishing and modifying BP-9 which was used earlier for dynamic tests. We are initiating action to insure Apollo boilerplate availability for SA-10. ✓

3. GSE Prime Contractor - R&D has recommended that GE be selected as the prime contractor for both electrical and mechanical GSE. ✓

4. Advanced Flight Mission Planning of MSC. Mr. Stoney, MSC, Director of the Advanced Technology Division under Faget, gave an informal presentation to a small MSFC group (Goerner, Koelle, DeFries, Williams, Ise, Vreuls, Kuettner) on MSC's ideas for possible advanced missions on available Saturn Launch vehicles. A more systematic exploration at MSFC of mission possibilities for the immediate future following, say, 207 and the possible need for a joint MSC/MSFC discussion group became apparent. ✓ Will keep you posted on proposals along these lines. ✓

K.D.
I'm all
for this
approach
B

5. MORL Presentation - Dr. Yarymovych and Mr. Raffensperger (from Gray's Headquarters group), Mr. Gardner, Langley, and Mr. Stoney, MSC, will attend MORL presentation to you on June 25. Mr. Gray plans to discuss agenda with you in Washington. ✓

7/6/62

B6/30

NOTES 6/22/64 FORTUNE

1. Urban League Visitors: Friday, J. Harvey Kerns, Executive Director, and his assistant Mr. Barney, Urban League of Greater New Orleans, visited GE/MTSO and MTO. They briefed us on their function, capabilities, National Skills Bank and how they might help us locate qualified Negro applicants in the Greater New Orleans area. ✓ There is no urban league branch in Mississippi, nor are they particularly optimistic about creating one. They have been able to effect good relationships with the industries around New Orleans and I understand George Constan has spoken to one of their groups. One unexpected observation developed; that is, the State of Louisiana does not accept Manpower Development Training Act programs because of integration considerations that Mississippi has.

BF
Impact?
B

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Meaning? #

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B

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B4/30

7/1/64

1. Stability, Guidance, and Control Sub-committee of the NASA Design Criteria Steering Committee: Reference Item 3, Notes 2/17/64 Geissler, copy attached. The status of the Design Criteria Handbooks that were to result from this effort, is uncertain at this time. The total cost of this project was estimated at \$750,000. Mr. Rhode, Space Vehicle Division, Headquarters, gave us \$325,000 of FY-64 OART funds (\$65,000 for each of five tasks) and stated he would fund the remaining \$425,000 with FY-65 funds. Research Projects Laboratory authorized us only \$130,000 of the appropriated \$325,000. Dr. Bisplinghoff has written a letter of complaint to Marshall because the funds appropriated for Design Criteria have been spent on other projects. We intend to hold all five design criteria proposals until the previous situation is clarified. At the present time, Dr. Stuhlinger and Dr. Bisplinghoff are attempting to settle the FY-65 funding problem.

RPL
 That's going on here?
 B

2. Apollo Logistic Support System: Reference your comments on Item 1, notes 6/8/64 Geissler, copy attached. Joe de Fries has worked with Bill Taylor for a long time, and they, too, see eye to eye. Their working relationship is excellent. ✓

3. Orbit Parameters for Meteoroid Satellites: Upon request by Dr. Mueller, new orbit parameters for SA-9, SA-8, and SA-10 have been investigated with regard to their lifetimes. By compromising the confidence levels of both vehicle performance and orbital lifetime, it is possible to lower the apogee to altitudes below 600 to 700 km (the radiation limit quoted by Bisplinghoff). Our recommended solution has an apogee of 620 km, perigee of 515 km, nominal life of 800 days, a 94% confidence of achieving one-year life, and a performance capability corresponding to a 1.6σ level. A 2σ vehicle performance deviation would still yield a nominal life of 430 days. ✓

Sounds good to me
 B

4. Joint Operations Meeting: Gen. Phillips chaired the 2nd Joint Operations Meeting on June 15 in Houston. Important results for MSFC: (1) Gen. Phillips will call special meeting on July 8 to solve the problem of S-IVB/IU post separation tracking (inputs required from Flight Mechanics and Instrumentation and Communication Panels); (2) There seems to be some question now on funding our famous Bermuda C-band Radar. OTDA is to report to Gen. Phillips immediately; (3) An Ad-hoc group with two MSFC members was established to investigate Saturn-Apollo instrumentation requirements documentation; (4) Mission rules (go/no-go conditions) for all future Saturn flights will be coordinated by KSC. SA-7 mission rules are due within 2 weeks. MSFC contact is Mr. Cooper, I-I/IB; (5) KSC was requested to show launch director organization for Apollo launches (Saturn IB/V); (6) Chris Kraft (MSC) made a strong pitch against the allegedly too large number of unmanned Saturn IB and Saturn V flights; (7) Gen. Phillips requested MSFC to develop a position with regard to closing the EDS loop on SA-202 (will be discussed in Management Council Meeting). ✓

O. Lane
 FYI
 B

→ E.F.
 I talked to Chris. All he is against is unmanned flights & the complete life support equipment in space craft (the iron men at work) B

B 6/30

fw 6/22

1. S-I-9 POST-STATIC CHECKOUT: The S-I-9 stage was moved to Station E, building 4708 for final electrical checkout June 16, 1964. Electrical hook-up has been completed and power distribution tests are underway. ✓
 2. S-IU-9 INSTRUMENT UNIT CHECKOUT: The S-IU-9 Instrument Unit is located in building 4708 undergoing preparation for Megger and Electrical Continuity checks. ✓
 3. S-IV PROGRAM: Pre-static checkout of the S-IV-9 stage is continuing at DAC, Sacramento. Hydraulic systems remain a problem source with two actuators replaced on this stage during pre-static testing. The S-IV-8 stage continues in post-manufacturing checkout at Santa Monica. During hydraulic and propulsion tests, 16 leaks were discovered; these are being corrected as the trouble is isolated and parts are available. Pressure transducers damaged by impression markings continue as a problem. Thirteen (13) (10 at SACTO and 3 at Santa Monica) of 29 transducers removed from the stages for checking have been found defective. Approximately 30 more are to be removed for lab checks. ✓
 4. S-II PROGRAM: The problem of NAA/S&ID using substitute parts for electro/mechanical mock-up of the S-II stage has been relieved at least temporarily. A recent investigation of the problem by personnel of this Laboratory and Astrionics Laboratory resulted in agreement that Astrionics would place a man on 90 days TDY to Los Angeles to review the substitute parts approval request and determine if the parts are suitable for use. ✓
- *75. QUALITY ASSURANCE PROVISIONS FOR GOVERNMENT AGENCIES: Dr. Seamans has approved NPC 200-1A, subject as above, and distribution is to be made by the end of this month. This document expands and clarifies provisions of NPC 200-1 with which implementation problems had been experienced. NASA Headquarters will make distribution to DOD Agencies through district or major plant level. The DOD letter to Departments of the Army, Navy, and Air Force concerning utilization of NPC 200-1A has not yet been issued; however, it is anticipated that this will be issued by the time NPC 200-1A distribution is made. ✓
- 

706/22

NOTES 6-22-64 GRUENE

B 6/30

SA-7 is on schedule; no difficulties at present.

B 4/30

7/6/64

1. SA-7 GUIDANCE AND CONTROL SYSTEM SIMULATION: Simulation and hardware checkout has been completed with the originally released control gains and networks. The hardware in this simulation included flight type ASC-15, GSP-24, control rate gyro, control accelerometer, ST-124 (on three axis table), flight control computer and control signal processors, and hydraulic-valve actuator system. Second stage guided flights, which considered single perturbations excluding engine out, resulted in injection angle error within 0.1°. No problem exists in the area of guidance-control interaction areas related to the stability and noise problems. All tests compare favorably with design studies, indicating adequate stability and response characteristics. A small part of the control test must be repeated to verify the control computer change which was initiated after SA-6 to provide for actuator hard-over capability after 110 seconds. ✓

2. SATURN IB/V IU MOCKUP: Mockup which was begun during 10/63 is now approximately 50% complete and has been used to some advantage by design personnel. Delay is principally the result of design changes and low priority. A recent agreement among ASTR, P&VE, and ME is expected to expedite the project. Presently, the predicted date for completion is 8/1/64. The mockup is regarded by Astrionics Laboratory design personnel as essential for achieving optimum cable routing design. ✓

3. FUEL CELL: We were informed 6/15 that the 1.0M OART fuel cell funds had been transferred to MSFC. The procurement plan calls for a 2.5M effort and it was agreed by all groups involved (MSFC and Headquarters) that the work scope will be incrementally funded, 1.0M from FY-64 and the remainder from FY-65. We released the procurement request on 6/11. Correspondence received from OMSF and OART personnel has repeatedly stressed the urgency of this program. ✓

4. MSFC AUTOMATION PLAN, FIRST REVISION: The Saturn MSFC Automation Plan Revision 1 dated 6/1/64 is complete and is now being distributed. ✓

5. CONTRACTOR STATUS - SATURN I/IB BREADBOARD AND SATURN I ESE: The Saturn I and Saturn IB Breadboard operations have been turned over to Chrysler under the recently approved mission contract. Final approval of the Saturn I ESE design mission contract with Chrysler is expected this week. Following approval, a week or two will be required to move the in-house people (approximately 30 covered by this contract) into Chrysler facilities. ✓

W.H.
Request a
briefing on
detailed
procurement
plan set
up with
Allis Chalmers
B

Frank G.
Request copy
B

I have called Dr. H's office. They will send over a copy.

JF 7/8

1006/22

B 4/20

NOTES-6/22/64 HEIMBURG

*fw 1. F-1 ENGINE (STATIC TEST TOWER WEST): Engine F-1002 will be fired for the first time at Test Laboratory, Tuesday, 6/23. The run will be for a total time of 10 seconds to determine the engine performance utilizing a new lox impeller and Rocketdyne-recommended orifices. The turbopump will be redlined at 5,800 r.p.m. with this impeller. ✓

2. S-1-8: Evaluation of data from test SA-21 showed that all engines performed within specified thrust levels except engine H-2017 at position 6. This engine did not respond properly to reorificing and is being investigated.

A special lox loading test was performed on 6/17. The objective of this test was to investigate problems encountered when loading lox to an ullage of 2.2%. A considerable amount of special measurements were required, and the data recorded indicate that overflow in the gox riser line occurs during helium bubbling. Bubbling with the vents closed might eliminate this problem, but the effectivity of the bubbling is impaired. P&VE is considering another propellant loading test. ✓

Engine H-2029, which experienced a performance shift downwards during test SA-21, was removed from position 8 and will be hot-fired at the Power Plant Test Stand, 6/24, before disassembling for inspection. Spare engine H-2031 was shipped from Michoud as replacement. It was hot-fired at the Power Plant Test Stand with satisfactory results on 6/18, and installed in S-1-8. ✓

Tentative schedule calls for shipping the stage on 6/26/64. ✓

3. MTF WORKING GROUP: A Corps of Engineers (C of E) sponsored conference on Propellant Loading Systems (PLS) with nationwide C of E participation was held at MSFC, Test Laboratory on 6/16 and 6/17. The conference provided participants with requirements for cryogenic systems, problems encountered by NASA on past construction projects, and discussions of how the C of E could improve their construction performance. ✓

Preliminary plans for the Interstate 10 Bridge over East Pearl River have been received from the Bureau of Public Roads. The design is proceeding on the basis of a high-level bridge (73-foot vertical clearance). General Accounting Office has advocated a low-level (hence less costly) bridge which would be opened for river traffic. This is a topic for decision between Bureau of Public Roads and General Accounting Office. ✓

Additional funds in the amount of \$2,685,000.00, which are required to complete the Land Acquisition Program at MTF, were received from NASA Headquarters on 6/3, and furnished to the U.S. Army Engineer District, Mobile, on 6/8. The total funds received for this project amounts to \$19,485,000.00. ✓

NOTES 6-22-64 HOELZER

B 4/20

✓
100

H.H.
Request a
1/2 hr briefing
on Data
Center
layout and
programs
B

1. INCREMENT OF DATA CENTER EQUIPMENT: The Projects and Industry Applications Division began installing another increment of the MSFC Data Center equipment this past week. The equipment is a small scale IBM 7740 computer which will allow receipt of simultaneous inquiries, storing and forwarding messages to the 1410 computer and the mass storage disc files. It is planned that this small computer will be used on an interim basis until our total MSFC switching needs and equipment are completely worked out. It represents another increment of equipment which will allow on-line type inquiries to the Data Center as portions of it become operational in September. ✓

2. PARTICIPATION IN PUBLIC ADMINISTRATION GRADUATE TRAINING PROGRAM: The Projects and Industry Applications Division is participating in the Southern Regional Training Program in Public Administration, sponsored by the Universities of Alabama, Tennessee, and Kentucky. A graduate student intern in the program will receive three months of on-the-job training in public administration and computer applications with Computation Laboratory. MSFC has participated in this program in past years but this is the first graduate intern assigned to the Computation Laboratory. ✓

3. LEASE VERSUS PURCHASE: By the end of FY-65 we plan to have updated and purchased all of our small and medium scale computers. In some cases we would actually buy a replacement machine. On our large scale computers we also plan to buy replacements for our commercial type computers, both here and at Slidell. We plan to continue leasing the large scale scientific systems through FY-65, but will ask that money be reserved for purchase of the second generation scientific computers in FY-66. Our actual dollar figures are not quite firm enough to give you yet, but certainly should be high enough to satisfy NASA Headquarters and anyone else concerned with Government purchase of computers. We think we can live with this plan if we are permitted to implement it as we desire. ✓

Jw
6/22

B6/30

NOTES 6/22/64 JAMES

*fw

SA-7: S-IV-7 - Was erected and bolted to the S-I Stage on June 19, 1964, and no problems encountered. Decision was made (at Management Council Dry Run) on June 17 not to incorporate the non-propulsive vent in S-IV-7 but to incorporate in S-IV-9. A meeting is being set up this week to review adequacy of DAC design for S-IV-9. ✓

IU-7 - Batteries scheduled for IU-7 will be replaced with batteries of greater capacity to increase the telemetry period after liftoff. This was requested by Dr. Speer to assure data for at least one full orbit. ✓

*fw

S-I-8 ENGINE REPLACEMENT: Analysis of data from the long duration firing revealed a performance drop in inboard engine position 8. A chamber pressure drop of 40 psi resulting in a loss of 10K engine thrust was encountered. The engine was removed on June 18; it will be disassembled and the turbopump and thrust chamber will be checked for discrepancies. After checking, the engine will be sent back to Neosho for hot firing. A spare engine has arrived from Michoud, been hot fired, and will be installed on the booster June 22. No schedule delay anticipated. ✓

STB

S-IVB TURBINE EXHAUST: Reference my 6/8/64 notes. The subject has been discussed with Dr. Mrazek and it has become apparent that a single engine cannot serve as both an inboard and outboard spare without weight and cost penalties. He agrees that we should go with the partial aspirators on the inboard engines and full aspirators on the outboard engines. This office and Engine Office will publish a memorandum to this effect. ✓

S-IVB BATTLESHIP: The battleship buildup schedule is now considered approximately one week behind the schedule of engine ignition on August 19. It is the opinion of DAC Sacramento Management that the one week can be recovered and that the engine ignition date will be met. ✓

S-IVB/IB STAGE AND GSE PROCUREMENT: The contract supplements providing interim coverage for the eight S-IVB/IB flight stages and one additional set of automated checkout equipment have been approved by NASA Headquarters. These supplements will allow highly critical effort to proceed until the complete packages are negotiated and approved. ✓

SATURN IB CONTROL WEIGHTS: Saturn IB Control Weights were forwarded to NASA Headquarters on June 17. These control weights reflect 1000 lb. and 500 lb. smaller payload for SA-202 and SA-203, respectively, than the requirement of the Flight Mission Assignments Document. ✓ NASA Headquarters, by letter dated June 13, has requested that we establish control weights based on a payload 2000 lbs. higher for no later than SA-206 and preferably by SA-204. Our answer stated that this might be feasible by SA-205 but that we had not performed any detailed study and control weights had not been established on this higher payload figure. This item to be further discussed at the June 23 Management Council meeting by Dr. Mrazek. ✓

SATURN IB PERFORMANCE STATUS: The June Saturn IB performance report reflects a sharp increase in payload capability. This increase varies between 730 lbs. on SA-205 to 1410 lbs. on SA-202 over last month. This increase is primarily attributable to increasing the J-2 thrust to 207K and a slight increase in the H-1 Isp (from 258.8 to 259.4). The S-IVB stage dry weight decreased for the first time (-51 lbs.). ✓

7/29/64

B480

NOTES 6-22-64 Koelle

1. VENUS/MARS FLYBY STUDY: An in-house study on manned planetary flyby missions was started in November 1963. The main technical effort of Phase I is about completed. Final write-up remains to be done. The total effort spent so far is approximately 4,000 man-hours, of which the bulk (2,200 hours) was used by R-P&VE-A.

Request briefing whenever available

HHK
That's the way we get action approved!
B

A spacecraft has been designed which can do both the Mars and the Venus mission, being slightly overdesigned for the Venus case. But this commonality promises economic and reliability benefits. Basic to the design is maximum usage of APOLLO hardware - we have a crew of three, and the APOLLO command module, as is, for Earth return entry, the APOLLO service module (only propellant loading changed) to brake the command module from arrival speed to parabolic speed; the LEM lander propulsion system for midcourse corrections. New in the spacecraft is the living cabin for the long mission duration, storm cellar, life support system (essentially open loop, except for water) and internal power generation (several isotope/thermoelectric generators).

Has about exploratory gear for use (data gathering) during the short fly-by period?

The APOLLO module and most of the experiments are packaged within a hangar in order to avoid degradation by the space environment, e.g., outgassing to the vacuum; micrometeoroid damage.

HHK
Since empty SII can be carried into orbit with one slightly degraded Sat V launch how many launches do these profiles require - considering how orbital ops. factor?
B

This realistic treatment has lead to a quite heavy spacecraft system:

	Venus (1 year)	Mars (2 years)
Spacecraft	165,000 lb	200,000 lb
S-II stage	110,000	110,000
Propellants for injection	460,000	700,000
Orbital launch weight	735,000 lb	1,010,000 lb

Several improvements are possible, and their effects are under investigation. At present, it appears as if these flyby missions are attractive; can be performed by SATURN V, for some orbital operations, and an extension of APOLLO/space station hardware.

2. ADVANCED SYSTEM STUDIES FY 1965 AND BEYOND: OUR most recent estimates for desirable advanced systems studies are as follows (figure in () gives the number of studies):

	\$ 10 ⁶	FY 1965	FY 1966	FY 1967
Earth Orbital Systems	(3) 0.6	(5) 0.9	(7) 1.5	
Lunar Systems	(11) 2.1	(20) 3.9	(18) 4.8	
Planetary Systems	(7) 1.5	(12) 2.2	(12) 2.8	
Launch Vehicles	(11) 7.3	(14) 7.5	(14) 7.1	
Total	(32) 11.5	(51) 14.5	(51) 16.2	

This is probably more than we will get. We are presently at 10 million dollars a year and expect to stay at about that level, new starts not included.

But we also expect 8.0 M for ALSS Program Definition in FY 65!
B

B 6/30

7/6/64

1. Saturn V, S-IC Stage:

a. The high speed weld for the Y-ring to dome joint for -S was not successful. The X-ray inspection revealed again excessive porosity. A very important parameter for achievement of high weld efficiency is the energy input per linear inch of the weld per inch of gage thickness. If this specific energy input is too high the result is a weak heat affected zone adjacent to the weld. Because of this fact we have to weld thinner gages with higher speed. This particular Y-ring weld for the upper fuel bulkhead is the most difficult one because it is the thinnest horizontal weld we have to accomplish without use of back-up bars. The thicker welds do not present basic problems any more and have almost become routine operations.

b. The Thrust Structure for -T has been removed from the structural assembly fixture. This fixture is being dismantled for shipment to Michoud since we will discontinue to assemble these structures here. The Thrust Structure for -T is not yet complete, approximately 18,000 to 20,000 manhours of work remains to be accomplished. However, shortage of components does not allow a speed-up of this assembly. Almost every missing component presents a problem in design, (changes), qualification testing, tooling and fabrication, procurement of lead time material, etc. The outboard Lox PV compensators from Arrowhead, for example, (MSFC procurement) are delayed because the upper gimbal yoke broke under proof load; new stronger yokes could not be obtained in time because the sub-contractor for these parts, Cleveland Pneumatic, went on strike.

c. Total number of EO's for the S-IC stage has increased since April 6 from 11,186 to 18,819. This is an average of 138 EO's per work day.

W.K.
Stoner told me that in many instances we just ordered these parts over the side of this story?

* fu

2. Aluminum Welding Symposium: On July 7, 8, and 9 we will conduct a "Aluminum Welding Symposium" here at MSFC. Industry and technical institutes have shown great interest in this meeting. A great number of papers have been submitted for presentation. Approximately 50 companies will participate. Purpose of this symposium is exchange of knowledge and experience in the rapidly changing field of technology.

3. Meeting at Aerojet General on Manufacture of M-1 Engine: At the request of Mr. Gomersall of Lewis Research Center and Mr. J. W. Thomas, Jr. of MSFC/IO a meeting was arranged at Aerojet in Sacramento on June 11 and 12 to discuss various aspects of manufacturing, such as Elox machining of injector plates vs. welded construction, brazing techniques of combustion chambers, electron beam welding application, fabrication problems on LH₂ toroidal manifolds, etc. Our people were able to furnish valuable consultation. We will also provide some non-proprietary information from other engine manufactures next week. Another meeting will be held soon in which it will be determined whether an ME Laboratory engineer in residence at Sacramento for support of the Lewis Resident Program Manager would be desirable.

W.K.
Does Lewis ask for him, or do we volunteer him without being asked?

(I'd like to know details before you commit MSFC to two engineers in residence!)

NOTES 6-22-64 MAUS

3/6/30 ✓ 7/2/20

1. PROGRAM OBLIGATION PLAN (POP) 64-3 - An internal call has been made to gather data for POP 64-3 in the Program Additions area. For this submission which is due in MSF on July 10, 1964, program coordinators were designated by Mr. Young and Mr. Weidner as follows:

- | | |
|-------------------------------|----------------------------|
| a. ALSS | K. K. Dannenberg |
| (1) Payloads | P. J. deFries |
| (2) Vehicles | Art Rudolph |
| b. Apollo X | Lee James |
| c. Saturn IB/Centaur Vehicles | P. J. deFries
Lee James |

We will continue the overall integration of this effort. ✓

2. MSF APOLLO FLIGHT MISSION ASSIGNMENT DOCUMENT - This document was released within MSFC by your directive of April 16, 1964, for implementation and for an analysis that would culminate in an MSFC proposal to MSF. This proposal is to include needed changes and additional mission definitions.

H.M.
Suggest
you and I
discuss
this a bit
B

The recent and pending actions and decisions concerning Saturn IB and V payload capability requirements will probably require a major revision of the mission assignments directive. Therefore, we have temporarily postponed the current analysis effort and the July 14 review with you on this subject. If the new payload weights do not drastically effect current mission assignments, we will later continue this effort as planned. If the new Spacecraft weights cause drastic changes in mission assignments, we will get together with MSF to implement a series of reviews and joint MSF/Center meetings similar to those we went through in formulating the original directive. These actions have been coordinated with Dr. Kuettner and Dr. Mrazek. We will keep you advised of the actions and dates as the plans evolve. ✓

3. CONFIGURATION MANAGEMENT TASK TEAM - This office has worked out an agreement with Dr. Mrazek and Dr. Hueter that we will place two people (Mr. Landau and Mr. Crouch) on Dr. Mrazek's team. This will facilitate making the organization changes and insure compatibility with Data Management and other management systems. ✓

4. SATURN IB - TITAN III COMPARISON STUDY - MSFC preparations for the Senate and House Committee hearings are underway. We met with Bob Freitag, Thursday, June 18, and will meet again with him Friday, June 26, tentatively. R&DO and IO are being involved for support in the total effort, which will probably continue for the next several months. We are working toward a schedule of July 6 - 7 for the Senate Committee hearing, and July 20 for the House Committee hearing. ✓

1. FY-66 CofF PROGRAM: The Facilities & Design Office has requested final FY-66 project writeups by July 20. An MSF representative plans to visit Marshall at the end of June to discuss these writeups with the Facilities & Design Office and R&D Operations. ✓
2. METEOROID PROJECT TRANSFER: The Meteoroid Project is being transferred to Industrial Operations with five contractor people and fifteen civil service personnel. The latter are to be returned to R&D Operations at the conclusion of the project. ✓
3. FY-64 BUDGET: The FY-64 Saturn and Non-Saturn Programs are fully initiated. As of June 19, R&D Operations' obligation status was: (dollars in thousands)

	<u>Initiations</u>	<u>Obligations</u>	<u>Unobligated Bal</u>
Saturn I	39,212	35,217	3,995
Saturn IB	42,874	30,108	12,766
Saturn V	165,017	130,286	34,731
TOTAL	247,103	195,611	51,492* ✓

*All planned for obligation by June 30. In addition, about \$7,000 is unobligated in the program for use as obligational adjustments or, if not required, will be returned for obligation in Industrial Operations' prime contracts by June 30. ✓

As of June 19, the FY-64 Non-Saturn Program status was:

	<u>Initiations</u>	<u>Obligations</u>	<u>Unobligated Bal</u>
SRT	36,778	12,143	24,635
Adv. Studies	9,260	1,697	7,563
Adv. Vehicles	6,645	5,765	880
Meteoroid			
Experiment	9,900	9,003	897
TOTAL	62,583	28,608	33,975*

*This includes \$6,292 planned for obligation in 1st quarter FY-65

4. SINGLE SUPPORT CONTRACTOR MANAGEMENT PLAN:

Meetings were held recently with P&VE and Astrionics to review their Single Support Contractor Management Plans. P&VE is incorporating a few changes for their final writeup. Astrionics has a little more work to do. It was agreed that Chrysler-furnished engineering support in the instrumentation area would continue at the current level until January 1965, followed by a rapid phaseout. ✓

5. PERSONNEL ACTIONS (PROMOTIONS):

On June 18, R-DIR issued a directive allowing a limited submission of requests for Personnel Actions (promotions) from R&D Operations elements. The directive establishes a procedure for assuring that laboratory management and R-DIR agree on a proposed action before submittal to Personnel Office. This should reduce work per action and the backlog in the Personnel Office. ✓

B 6/30

Jul 6/22

Sully
Notes
Request
a short
briefing
on
design
details
B
to
MSFC
Crew
NOTES

1. Boeing Mission Support - Approval was granted June 16, 1964, by Dr. Seamans, to the MSFC request of March 23, 1964, to contract with Boeing Company for certain Saturn V Launch Vehicle Systems Engineering and Systems Integration tasks.
2. S-IC Stage Separation - A study work statement is being prepared to investigate the GOX expulsion method of S-IC stage separation. This alternate staging method will use the residual pressure in the LOX tank to effect stage separation at S-IC burnout. Implementation of such a system is expected to increase the SATURN V payload capability by approximately 470 lbs. !!
3. S-II Stage Design Changes - NAA/S&ID is being requested to incorporate the MSFC "double seal" insulation configuration for the LH₂ tank wall on vehicle S-II-4 and subsequents. Authorization is being given for the reduction in LH₂ tank pressure from 39 psi to 36 psi. The LOX tank pressure will remain at 42 psi. ✓
4. S-IVB Stage GSE - A significant milestone in the evaluation and checkout of the prototype S-IVB automatic test equipment was reached on June 6, 1964 with the successful completion of a series of system self tests. These tests, performed under computer control, provided a complete test of the analog portion of the GSE/Vehicle interface in individually exercising and testing some 480 command and self-check relays in the signal distribution unit. These tests also provided the first fully integrated exercise of the digital test equipment including the test operator's station-computer interface unit - stimuli conditioner and response signal conditioner - all of which functioned without malfunction. ✓
5. Instrument Unit - IBM has refused to sign the definitive contract as negotiated for prototype guidance computers and data adapters (NAS8-11561) unless language is added essentially recognizing the fact that, pending agreement with NASA Headquarters, IBM's Home Guarantee Policy is an allowable item of cost. This would constitute a waiver to the NASA Procurement Regulation, which specifically prohibits losses on the sale of homes, premature cancellation of leases, etc., as items of allowable cost. The question was referred to Headquarters for resolution, along with a request to extend the definitization date for prototype hardware from June 15 to June 30 and for flight hardware from June 30 to July 31. ✓ Pending this authorization, no additional funds may be put into the letter contracts. ✓
6. Saturn V GSE Status - Our Saturn V presentation at the July 1964, Management Council Meeting will include a total GSE status, with particular emphasis upon the Breadboard Operation. ✓ My Vehicle GSE Office (Gene Smith) will work very closely with R&DO and KSC to ^{assume} a coordinated and comprehensive status presentation. ✓

NOTES-6-22-64-SHEPHERD

B 6/30

July 1964

Colonel Marshall's Visit: Col. Bob Marshall, new Mobile District Engineer, (effective July) visited Huntsville June 18 and 19. The purpose of Col. Marshall's visit was to be orientated in the mission and capabilities of the various laboratories. It is believed that he will do a better job for us as District Engineer if he understands our overall mission. ✓

Area Engineer, Mississippi Test Facility (MTF): As you know Col. Antonelli died of a heart attack prior to assuming his duties as Area Engineer, MTF. The Corps has selected a replacement, Lt. Col. Roy Beatty, presently Deputy District Engineer, Honolulu District. He is scheduled to report to MTF around August 1. I have not been able to determine what he did to merit transfer from Honolulu to MTF. *Merit's the word?*

Dr. Mueller tour of MTF: Dr. Mueller has not, to our knowledge, visited MTF. A tour by Dr. Mueller should prove beneficial to both Dr. Mueller and Marshall. If possible this visit should be arranged to take place some-times this summer. *↑ SHEP - I will work it into one of Muellers monthly meetings to MSFC. You & Bill F. pick a good time.*

Test Stand Activation: During the next 5 months a number of test stands will be activated. The following table briefly highlights these activities:

*Frank
To take
to be
present.
Please
Coordinate
is timing
own
schedule
(Bonnie)
B*

<u>Program</u>	<u>Location</u>	<u>Test</u>	<u>Date</u>
S-IVB	Sacramento - Beta I	Battleship	Mid Aug. 64 ✓
S-II	Santa Susana	Battleship	November 64 ✓
F-I	Edwards Air Force Base ID	Engine acceptance	Mid July 64 ✓
F-I	Huntsville	System Integration	Sept/Oct 64 ✓

Claims by Construction Contractor at MTF: As you are aware, considerable difficulties has been encountered in the excavation and foundation work for both the S-II and S-IC test stands at Mississippi. The original construction contract called for completion of the two efforts within 241 days at a price of \$1.7M. The Mobile District Engineer is asking us to concur in his recognition of the contractor's claims for approximately \$1.5M with an extension of time of 114 days. The basic cause for these over-runs is primarily insufficient subsurface information and secondarily to the weather. The contractor submitted his original bid based on the subsurface information supplied by the Corps of Engineers. After excavation and pile drivings were underway, subsurface conditions were encountered that were different than those anticipated when the contractor submitted his bid. Col. Marshall is of the opinion that the Corps of Engineers has been remiss in not making sub-surface adequate investigations in both military and civil construction for the past several years. He expects this condition to change as a result of difficulties encountered in the civil works program, as well as, problems such as the one at MTF. It is important to note that the foundations of both test stands are technically sound.

HAS THE OVER-RUN BEEN SPENT AT THE WORK ACCOMPLISHED?

Yes B

fw

July 6/64

RUSH

NOTES 6-22-64 Stuhlinger

B430

Eberhard
Frank is right.
Please familiarize yourself with this plan and (if worthwhile) defend it in next MSF Experiment Board Meeting.
E.S.
A.Y.I.
B

1. MMC PROJECT: As of June 15 the MMC Project, with a total of 14 RPL persons, has been transferred to the Saturn I/IB Directorate in IO.

2. THERMAL EXPERIMENT FOR SA-10: Mr. De France (Director of Ames) has given approval to his people to spend time and money for the preparation of a thermal experiment to be flown on SA-10. They intend to let a contract with Ball Brothers for the electronics package. The sensors will be made by Ames personnel. Dr. Johnson will schedule the experiment for SA-10, and prepare a letter to De France for your signature.

THIS SHOULD BE TAKEN TO THE MSF Exp. Board FOR Approval
fw

3. SCIENTIFIC APOLLO EXPERIMENT: Several members of RPL (Heller, Mechtly, Downey) attended a symposium on scientific experiments for Apollo at MSC June 15-17. The involvement of RPL in these scientific experiments, and also in experiments for ALSS and LESA, will be made the subject of a separate memo to you in the near future.

4. SATURN IB PAYLOAD STUDIES: RPL (Dr. Mechtly) is presently engaged in an effort to collect and review proposals for scientific and technological experiments for Saturn IB payloads. In this connection, Messrs. Shallon, Sandler, and Olson from Hughes Aircraft visited RPL and reviewed the status of Surveyor. Shallon, Surveyor Chief Scientist, feels that three Surveyors can be flown on IB/Centaur with minor modifications. Mechtly keeps close contact with de Fries in connection with this proposal. We will be ready with a first presentation on the results of our SIB payload study effort in the near future.

E.S.
But OSS seems to be very cool to this scheme. At least Conright said so B

5. LUNAR RADIATION SHIELDING CALCULATIONS: Mr. M. O. Burrell of the Nuclear and Plasma Physics Branch recently completed a study of the proton dose to be expected within various lunar surface cabin configurations due to solar flare protons. The calculations are summarized in an internal note (R-RP-INN-64-16) and were based on the most recently accepted solar flare model. This model is less severe than previous models and the shielding problem is correspondingly less serious.

E.S.
Would like to see it B

6. SRT PROGRAM STATUS: The status of the ART/SRT Program under the cognizance of this Laboratory is, as of June 19, as follows:

	<u>ANNUAL PLAN</u>	<u>AUTHORIZED</u>	<u>PROCESSED TO FMO</u>	<u>OBLIGATED</u>	<u>CHANGE IN OBLIGATIONS SINCE 6/12/64</u>
OART	10,515,000	10,515,000	10,401,177	5,173,642	795,986
OMSF	14,133,000	14,133,000	14,087,915	3,091,239	1,025,234
OSSA	675,000	675,000	663,163	147,199	1,287
	<u>25,323,000</u>	<u>25,323,000</u>	<u>25,152,255</u>	<u>8,412,080</u>	<u>1,822,507</u>

7. ELECTRIC PROPULSION: A contract has been signed with G.E. Missile and Space Division (Valley Forge) for a "Study of Electrically Propelled Cargo Vehicle for Sustained Lunar Supply Operations." It was funded by OART (Office of Nuclear Systems, Mr. Finger). This contract is the first result of our efforts to initiate several studies on the application of electric propulsion.

DAM

x

DIR

Dr. von Braun

Reference: Captain Fortune's Notes of 6/22/64
and your comment directed to
Mr. Gorman

I am attaching a memorandum from Mr.
Styles which explains the situation.

He also clarifies the meaning of the
initials PSA (Project Stabilization Agreement).

DEP-A

D. H. Newby

July 13, 1964

Mr. Newby
DEP-A

July 10, 1964

Chief, Labor Relations, LR

Comments on Weekly Notes

1. To understand the status of the Project Stabilization Agreement (PSA) at Mississippi Test Operations, it is necessary to differentiate between the general terms of the PSA and the money provisions or Table of Employee Compensation.

2. The Project Stabilization Agreement was negotiated by labor and several local contractor associations. The agreement constitutes a sort of super collective bargaining contract which applies to all construction work at MTO. It was signed by the international offices of all unions whose members were expected to work there.

3. It was not possible at the time of negotiation to obtain the individual signatures of the contractors now operating on the site because their contracts had not then been awarded. However, since the agreement was negotiated and signed by contractor associations such as the Associated General Contractors, National Electrical Contractors Association, etc., the contractor members of these associations are automatically covered by the PSA. Moreover, there is considerable precedent to support the government's position that any contractor who is signatory to a collective bargaining agreement anywhere in the country, either individually or as an association member, is similarly bound. As a matter of information, there is being organized at present a new construction contractor's association at MTO. We believe the association will become signatory to the PSA, thereby expressly binding all its members.

SUBJECT: Comments on Weekly Notes

4. The Table of Employee Compensation is that portion of the PSA which is enforceable by the government contracting agency. It deals with wages, overtime, holidays, fringe benefits, etc., and is made a part of all construction contracts for work at MTO. All contractors are, therefore, required to pay the wages and fringes contained therein. It should be noted that provisions of the PSA such as the hiring and grievance procedures are not enforceable by the contracting agency and, therefore, cannot be included in government contracts.

Paul L. Styles

June 29, 1969

Mr Gore mans Copy



B 7/3

6/29

J-2 ENGINE

Testing continued on the evaluation of engine start with the thrust chamber pre-chilled to -150°F. Some difficulty has been experienced in chilling the chamber to -150°F, but once the low chill temperature has been reached, engine starts have been successful. ✓

A meeting was held at MSFC on June 23-24, with DAC, S&ID, Rocketdyne, and MSFC to discuss interface problems. ✓

The J-2 engine production contract (NAS8-5603) has been approved by NASA Headquarters and returned to MSFC. ✓

H-1 ENGINE

*fw Engine H-2017 was removed from the S-I-B booster at MSFC because of a performance problem. The engine performed at 200K during the first firing of the booster and the engine was subsequently reorificed to obtain the desired 188K thrust level. However, during the second booster firing the engine did not respond to the reorificing and again performed at a high thrust level (196K). Therefore, engine H-2017 was replaced on the S-I-B booster by engine H-2032. Engine H-2017 will be used to investigate this specific problem area. ✓

During the pressure checkout of vehicle SA-7, a leak was discovered on engine H-2011. This leak was traced to a crack in the inlet section of the LOX dome. The engine is being removed and will be replaced by engine H-2019 this week. Engine H-2011 will be returned to MSFC for LOX dome material analysis. ✓

*fw F-1 ENGINE

Engine #018 with increased thrust chamber coolant flow (20% fuel by-pass) sustained damage during a non-damped bomb induced instability and has been removed from the stand for repair of the chamber, replacement of the damaged injector, and inspection of the turbopump primary LOX seal. ✓

LB.
How much by-pass is normal on F-1?
B

Test with engine #012-1 was terminated by a high LOX pump discharge pressure indication. It appears that the LOX pump performance has been substantially improved with the installation of a underfiled LOX impeller. ✓

Wednesday, June 24, 1964, a facility LOX leak on test stand CTL-3 of Santa Susanna caused an explosion which damaged an F-1 heat exchanger. The explosion occurred 5 seconds after a 30 seconds test was satisfactorily terminated on this heat exchanger. Damage to both the heat exchanger test cell and the adjoining F-1 gas generator test cell was reported to be heavy. The full extent of the damage and the impact on the program is being assessed. ✓

RL10 ENGINE

As part of the injector improvement program, a modified injector ("swirlers" in all LOX spuds, positioned close to the exit of the spud) exhibited a specific impulse of 442 seconds in 300 seconds of firing in a RL10A-3-1 configuration engine. The thrust chamber was disclosed due to extreme heat flux.

↑
Measuring?
B

July 6/29

B 7/2

NOTES 6-29-64 CLINE

1. Propellant Dispersion Studies: (Answer to Dr. von Braun's question on 6-15-64 Notes). This Laboratory initiated a contract with Picatinny Arsenal to study the application of liquid explosives (Aerex) for the propellant dispersion system. The purpose of the study is to develop a fill and drain system, heating system, and V-shaped tubes. The proposed operation for the utilization of liquid explosives is the following: The propellant dispersion system will be installed prior to assembly of the vehicle on each stage. A flat conductor resistant system will provide necessary heat to keep Aerex from freezing and allow drainage if necessary. The liquid explosives will be filled into the tubings using a pump or pressure system.

Maxe Kambert

???
B

2. S-II Umbilicals: In a visit to NAA, S&ISD, June 17, 1964, it was found that the contractor was not proceeding in their design of the ball and cone GH₂ vent coupling as directed by the MSFC contracting officer and concurred to in writing by the contractor. This will delay NAA, MSFC, and KSC qualification programs and the firing schedule. The contracting officer was informed of the situation and has transmitted a TWX to NAA for official reply.

3. Two Engines Replaced on S-I-8: Because of a double downward shift in performance, engine H-2029 (position 8) was replaced by spare engine H-2031. Engine H-2017 (position 6) was reorificed after the first static test but did not respond properly and is being replaced with engine H-2032. The engines removed will be tested to evaluate the discrepancies.

4. Redesigned Shaft Bearing Malfunctions on H-1 (200K) Main LOX Valve: Interference between the shaft bearing and the shaft (reported on May 21st) also occurred with the redesigned bearing. An investigation is being conducted.

F.C.

F-1 3?

B

5. FRT Injector Fails Bomb Test: Engine 018 with injector type 092 (S/NO56) was bomb tested and was terminated by RCC. The thrust chamber tubes and injector were damaged by 300 milli-seconds of rough combustion. Leakage past the LOX pump primary seal was discovered after the test. The thrust chamber will be repaired, the LOX primary seal will be replaced, and the injector will be replaced with S/NO84 which has a different outer ring mixture ratio (2.2 compared to 2.8 for S/NO56). This injector has consistently damped within 10 milli-seconds after bomb detonation on stand 2A. Injector S/NO56 will be repaired and retested.

6. LOX Leak Causes Explosion at CTL #3 (Santa Susana): Both positions were destroyed, eliminating all testing for the F-1 gas generator and heat exchanger at Santa Susana. The possibility of converting BRAVO for these tests is being investigated. CTL#3 will be out of service for one to three months.

F.C.
We had some problems with the 2 Co-line and
raked them over the coals. Hope
it'll help. B

Jul 6/29

NOTES 6/29/64 CONSTAN

3.7/3

*fw

1. S-IC

The Fiscal Year 1964 Fourth Quarter Boeing Quarterly Review is scheduled to be held at Michoud Operations on July 23-24, 1964. This review will be held in The Boeing Company's new Program Information Center room. The Program Management portion will be held on July 23, with the technical portion being held on July 24, 1964. ✓

2. S-IB-I

Six engines have been received for vehicle S-IB-1 (four inboard and two outboard). Receiving Inspection has been completed on two of the inboard engines. ✓

3. S-I-10

*fw

Performance testing of S-I-10 is continuing. Testing during the past week was mainly restricted to Instrumentation Compatibility. The tests have been run and evaluation of the telemetry records is in progress. Overall testing is approximately 85 percent complete. Estimated date of completion of pre-static testing of S-I-10 is July 6. ✓

7/29

B 7/3

NOTES 6-29-64 DANNENBERG

1. LES Tower Jettison, SA-8, 9, & 10 - The recent agreement between Dr. Rees & Dr. Shea for MSC/NAA to supply the same system on SA-7 & 9 as was flown on SA-6 and for MSFC to assume the responsibility of tower jettisoning on SA-8 & 10 (with NAA delivering the batteries for the power supply) was discussed in a meeting on 6-24-64. It was decided that MSFC should also assume the responsibility for tower jettisoning on SA-9 in addition to SA-8 & 10. ✓

K.D.
Please send me a hand sketch to illustrate the problem
B

2. LEM Adapter Panel Deployment - The 6-25-64 Instrument & Communication Panel Meeting at MSFC discussed the problem of the LEM adapter panels in the deployed position interfering with the S-IVB/IU antennas. The present design calls for the panels to rotate on hinges in 4 segments towards the IU and stop flush with the lower portion of the adapter, attached to the IU. This will completely cover the IU antennas preventing telemetry and command to and from the IU. The four Panels involved (Mechanical, Flight Operations, Flight Mechanics, and Instrumentation Panel) will work out a common solution. ✓

3. MORL Project - The status/description briefing scheduled for 6-25-64 was called off at Headquarters request. Rescheduling is planned for late July. Langley Research Center Task team led by Mr. Edwards and Mr. Bonnet, DAC, visited MSFC for data on Saturn IB as a logistics resupply system for MORL. ✓

Frank W
You wanted in?
B

4. Saturn IB, Titan III-C Comparison - Preliminary performance data, growth capability, reliability, and market assessment information was provided to Mr. Evans. This data will be updated prior to the Senate Committee meeting hearing on 7-7-64. ✓

5. GE Contract -
ESE Design Mission - The GE proposal is still being reviewed. Delay has been incurred by the necessity to review the cost proposal concurrent with the technical proposal. Anticipated date for completion of the review is 6-29-64. ✓

ESE Fabrication Mission - A meeting was held on 6-23-64 with R&D Operations and IO representatives to resolve questions on the Fabrication Mission scope of work. All questions were resolved satisfactorily and revisions are being made by R-ASTR. The Procurement Request is scheduled to be forwarded on 6-29-64. ✓

Annual Work Statement for GE - The RFQ has been received by GE. GE indicates the proposal will be submitted to Purchasing Office by 6-29-64. ✓

700
6/29

B-7/3

NOTES 6-29-64 FORTUNE

1. FHA Requiring NASA Certification for MTO - Michoud Employee Mortgages: Washington decision has reached us that Section 809 certificates will be required for FHA financing of Louisiana - Mississippi homes for NASA, Stage and Support Contractor personnel. ✓ Marion Kent and Paul Perry are coming down to explain MSFC part in program and help us get started. ✓

2. GE Being Sued by Corps of Engineers' Food Vendor: O'Bannon has filed suit in Mississippi Courts against GE, asking \$78,000 for loss of business under their alleged exclusive contract for feeding MTF personnel. Since the GE contract discussions preceded theirs; they do not have an exclusive agreement; and GE has letters from the Area Engineer and several construction firms requesting service because O'Bannon was providing poor or no food service; we see no reason to intervene, unless GE asks for our help. ✓

3. GE Support Negotiations to Resume: Meetings held last Thursday and Friday resulted in acceptance by GE/MTSO of MSFC requirement for prior approval of staffing plans. ✓ FY-65 negotiations will resume today to complete the establishment of total cost base and fee. FY-64 contract will be extended a maximum of one month to cover services during July until new contract is obtained. ✓

July 6/24

B-7/3

NOTES 6/29/64 GEISSLER

1. Saturn IB/Centaur: OSS and OMSF Task Force met June 16 in Washington. Attendees: Vincent Johnson (Morrison's successor); Carl Wentworth, Lewis; Les Fero, OMSF, Chairman; and Joe de Fries, MSFC. MSFC guidelines for the 260" study we published June 1 were reviewed. The 13 points of the guidelines were agreed to by attendees. We obtained constructive comments. Mr. Johnson said that anything under 240" is marginal for Voyager Spacecraft. (Specific comments to each of 13 points are available if you desire them). Further items of interest on the IB/Centaur case: GE's study for JPL of use of Titan III for Voyager to be done by end of July. GE will conclude that it is impractical to carry lander with orbiter spacecraft due to performance limitations. GE will recommend an orbiter spacecraft and a separate independent lander spacecraft of 134" diameter for Titan III. Obviously, two independent spacecrafts will cost more than single bus with instrumentation for orbital measurements and attached lander. LRC is conducting in-house study on Titan III potential for heavy surveyor. Results available after August. Per task force request, we sent IB/Centaur performance to OSS. Mr. Johnson will make analysis of available launch windows for Mariner and Voyager class payloads. Our investigation shows these launch windows to be considerably wider than anything talked about in the past because of high payload capability.

↓
 E.F.
 Yes, I'm greatly interested
 B

Sounds a lot
 better!
 B

B-7/3

Jul 6/12

1. MICROMETEOROID PROJECT: During my visit to Hagerstown and Bladensburg on June 16 and 17, I was very much impressed with the team operation of the MSFC personnel (R-RP and R-QUAL) and I plead that no change be made in that operation following the transfer of the project to the I/IB Project Office. Some additional support in the areas of monitoring of qualification tests and checkout in the around-the-clock operation is necessary, which this Laboratory will provide on a TDY basis as needed. Despite the small amount of guidance Fairchild has received from MSFC in the reliability area (the cause of this can be explained historically) the Company has a meaningful program going for which credit is due to the Director of Product Assurance, Mr. Lichter. ✓

See James
AV
B

2. ZERO DEFECTS SEMINAR: It was most gratifying to see in this seminar (which was very well conducted by the Missile Command on June 23, 1964) that seeds planted by members of your organization have developed into very efficient programs. It was shown in the seminar that when the job is done right the first time, rework, repair, and scrap are eliminated, and good end results are accomplished with less costs. ✓ Therefore, efforts in support of quality tend to reduce the overall costs rather than to increase them. ✓ The speakers for the Government emphasized that the contractor carries the responsibility for the conduct of such a program, that it is part of his obligation for furnishing products of high quality, and that the contractor is not entitled to additional reimbursement. I envy the momentum the Zero Defect Program has in the Missile Command when I compare this with the Manned Flight Awareness Program which this Center tries to introduce and which, from the standpoint of motivation, can fall back on much more enthrusing basic information than the Zero Defect Program. I suggest to put more manpower on the Manned Flight Awareness Program: (a) to get it going, and (b) to sustain it thereafter.

D.F.
I am
with you.
Please
see me
in a
package

3. VIP PROGRAM: The VIP Program (Value in Performance through Very Important People) is the DAC version of the Zero Defect Program and is in operation. DAC has a steering committee composed of key personnel of several organizational segments including Quality Control, Reliability, and Public Affairs and five (5) people full time on the job to keep the program going. Is it effective? ✓

(first
alone w/
Widlar or
McCull)

4. DAC VENDOR SURVEY: After the Zero Defect Seminar, I had a discussion with Mr. Clawson (recently appointed corporate vice-president for Reliability and Quality Assurance), Mr. Buchele, Director of Quality Control, and Mr. Truhan, Director of Flight Readiness, (whom I like to give credit for having fathered several significant improvements in the operations at DAC during the past year) concerning a visit to DAC vendors patterned after the visit to Boeing vendors during the month of May. The proposal was very well received, and Mr. Buchele will start to organize such a tour which is tentatively scheduled for the week of July 20. ✓

NOTES 6-29-64 GRUENE

B 7/3

SA-7 Status:

During the combustion chamber pressure test it was discovered that Engine No. 6 had a crack in the lox dome. IO and P&VE were immediately informed and arrangements were made to ship a spare engine to PAFB over the weekend. The spare engine arrived Sunday Noon and has been modified to the SA-7 configuration. It will be installed in the vehicle today. ✓

July 6/29

NOTES 6/29/64 HAEUSSERMANN

1. STATUS OF IBM CONTRACTS FOR SATURN V COMPUTERS AND DATA ADAPTERS:
Negotiations of the definitive contract for Saturn V Computers and Data Adapters were completed in May. The contract will be of the CPIF (cost-plus-incentive fee) type and should be definitized in June.

IBM Proposed Cost + Target Fee	\$33,266,000
Negotiated Cost + Target Fee	<u>30,987,750</u>
Difference	2,278,250

Copies of the final contract were presented to IBM for signature early in June. IBM declined to sign, claiming the following reasons:

S.H.
Please elaborate
in next
NOTES
B

a. A complete misunderstanding by IBM's negotiators of the final contract incentive structure.

b. The inclusion of NASA procurement regulation No. 15 precluded reimbursement by the government for those losses incurred under IBM's "Home Guarantee" plan as a result of transfers of IBM personnel.

WH
That might
be tough
to get out
of HQ!
B

The contractor agreed to sign the contract at such time as the above two issues were resolved to IBM's satisfaction. When such resolution was refused by NASA-MSFC, IBM agreed to waive changes in the incentive structure if MSFC would agree to incorporate, as a contract item, any agreement the contractor was able to reach with NASA Headquarters concerning incorporation of a "Home Guarantee" clause. The Contracting Officer agreed to the foregoing and the contract was sent to NASA Headquarters for resolution of the issue.

As of the present, no resolution has been achieved at NASA Headquarters and the contract remains unsigned. However, we have been advised that the Basic Letter Contract has been extended to 7/15/64 and the computer and data adapter contracts to 8/30/64. ✓

July 6/29

*fw

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

Three calibration firings were performed on engine F-1002 this past week. The engine was reorificed between each test. The first test, TWF-020, had a duration of 0.75 second, and was cut off when the pump outlets exceeded the redline values. Test TWF-021 had a duration of 0.96 second, and was cut off by thrust OK pressure switch for low chamber pressure. Test TWF-022 had a duration of 11.24 seconds. It appears that this was an erroneous thrust OK switch cutoff and further investigation will continue. One test is planned this week, 6/30/64. ✓

*fw

2. S-1-8:

Engine position 8 (H-2029) was removed from stage S-1-8 due to downward performance shifts during test SA-21. The turbine from this engine was disassembled at the engine shop, revealing the following discrepancies: The screws that hold the I-B turbine seal (located in the first stage cavity) were missing. The I-B turbine seal was broken in four places. The blades on the first stage turbine were worn and defaced. Refiring of this engine most likely would have resulted in destruction of the turbine.

Subsequent to this finding, the turbine from test engine (H-5011) was removed and inspected. The four screws that hold the I-B turbine seal were found to be loose.

An engine change had been authorized to correct this deficiency, which was noted at Rocketdyne. However, 59 engines are in the field which were not included in this change and can potentially have this same problem. We consider this failure to be critical, and recommend that all S-1-7, -8, -9, and -1) turbines be corrected prior to the next firing of any of these stages. ✓

Lee Loucks
Billy
Alvarez
Stat do
for
recommend.
B

Engine position 6 (H-2017) was removed from stage S-1-8 on 6/22 to determine why this engine failed to respond properly to reorificing. This engine will be replaced with a spare which has been fired on the Power Plant Test Stand at MSFC. ✓

Stage S-1-8 was removed from the test stand on 6/23, ^{on it from days} and was shipped on 6/24. ✓

706/29

B-13

NOTES 6-29-64 HOELZER

MANUAL BOOSTER CONTROL SIMULATION: The Simulation Branch in cooperation with Astrionics Laboratory has begun operation of a system which simulates instrument controlled, piloted, booster flight. After correlating with base line data from a previous study at Ames, this system will be used to study malfunctions and abort situations. ✓

July 6/69

B-7/3

NOTES 6/29/64 JAMES

NASA HEADQUARTERS: General Phillips called me several times last Thursday and Friday. He had two main subjects: one is his concern over the micrometeorite project and the other was a 2 July briefing he wants me to give to Webb concerning results of firings and what we do about malfunctions. On the micrometeorite, Dr. Rees, Dr. Johnson, and myself are going to G. T. Schjeldahl, Northfield, Minn., to look into the detector panels. Also, at Phillips' request, we will try to set up some way of surveying the project more often than normal for the next few months.

CCSD QUARTERLY REVIEW: We had a good quarterly review of the S-I/IB at Michoud 25 June. The two main problem areas were the large backlog of unnegotiated changes and the fact that the Chrysler Corporation effort at KSC still does not have proper contract coverage. At the meeting we took steps to properly resolve the first problem. I doubt if a real satisfactory answer to the KSC problem can be obtained prior to the resolution of the MSFC/KSC organizational discussions now going on.

*fw
S-I-8: The booster is enroute to Michoud via the barge Promise. The barge left Huntsville at 5:00 PM, 24 June. The estimated time of arrival at Michoud is 29 June.

LoeJames
What do they mean with cryogenic calibration?
Is this what we call cold flow testing?
B

S-IV-9: The fuel cryogenic calibration was successfully performed on 25 June. This was the second attempt. The first test was aborted when the GH-2 detector indicated GH-2 in excess of 4% present in the environmental bag. An additional LOX cryogenic calibration was successfully performed 26 June. After this test, no further cryogenic calibration will be accomplished in order to prepare for the static firing which is scheduled for 23 July.

S-IVB MONTHLY PROGRAM REVIEW: The meeting was held at DAC on 15 June. The principal topic of discussion was the potential problem of the start and restart sequence of the J-2 engine. DAC will prepare and furnish recommended alternate design approaches, including schedule and cost impact for MSFC consideration. The backup solutions would be implemented if early battleship testing indicates serious problems.

S-IVB BATTLESHIP: DAC is still approximately one week behind in meeting scheduled engine ignition on 19 August but DAC says the week can be recovered.

SATURN I/IB PROGRAM STATUS: As of 26 June there remained an unobligated balance of \$5.5M on Saturn I and \$10.4M on Saturn IB. FMO and Contracts worked last weekend to record obligations. A meeting is scheduled today to identify those actions which will not be obligated by 30 June. Those actions will be withdrawn and the funds will be utilized to prefinance our major contracts. Using this approach, we plan to obligate 100% of our program.

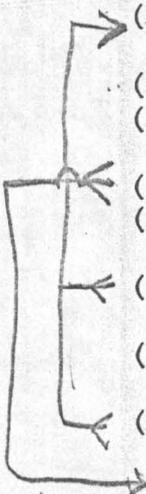
July 29

B 7/3

NOTES 6-29-64 Koelle

1. WEIGHTED OBJECTIVES OF THE NATIONAL SPACE PROGRAM: We conducted an "opinion poll" among 60 MSFC key personnel (Laboratory Directors, Deputies and Division Chief level) on the relative importance of individual objectives of the national space program. This resulted in the following "weighted objective list," which we intend to use to determine the "relative worth" of individual project combinations within the present long range planning exercise:

<u>Ranking:</u>	<u>Objective:</u>	<u>Weight (Percent):</u>
(1)	Achieve and preserve U. S. leadership.	8.2
(2)	Utilization of space knowledge and technologies for the benefit of mankind.	8.0
(3)	Gain of knowledge about the nature of the universe and life itself.	6.1
(4)	Develop an industrial base which can quickly respond to security needs in space.	6.1
(5)	Incentive for improved education.	5.9
(6)	Promote international cooperation.	5.8
(7)	Stimulate the nation as a whole.	5.7
(8)	Stimulate economy (investments and employment)	5.6
(9)	Demonstrate space systems applicable to the security needs of the U. S.	5.6
(10)	Increased knowledge about terrestrial and space environment.	5.2
(11)	Strengthen educational facilities.	5.2
(12)	Improve industrial base continuity, including management practices to develop very complex technical systems.	4.85
(13)	Development of manned space transportation systems as a new dimension to terrestrial transportation systems.	4.85
(14)	Improve government capability to handle complex problems.	4.3
(15)	Provide quick inspection capability to police arms control agreements.	4.0
(16)	Exploit extraterrestrial resources.	3.9
(17)	Improve U. S. competitive position in foreign trade by use of new techniques and procedures.	3.2
(18)	Aeronautical transportation systems will be improved as a fallout of space technology.	2.7
(19)	Development of efficient unmanned space vehicles for scientific research.	2.5
(20)	Space transportation systems will also permit rapid global transportation.	2.3



Do you think that this is a reasonable basis for some initial comparisons of project mixes?

HHK

My personal opinion jibes pretty closely with this poll, except for the relative ranking indicated by the arrows, which indicate my preference B 7/3

July
129

B-7/3

NOTES 6-29-64 KUERS

S-II Common Bulkhead:

a. Encouraging progress has been made by S&ID with their prime method of assembling the upper dome. Ad Hoc Manufacturing Review Meetings on June 23 and 24 at Seal Beach resulted in a decision to put off actions leading to MSFC's direction for S&ID to switch to the "back-up" strip seal. ✓

b. S&ID's concept of a common bulkhead is more ambitious in the optimum use of structural materials than Douglas' S-IV and S-IVB. Reducing the concept to practice required learning in tooling, processes, and fabrication beyond that developed by Douglas to date. A typical example is in obtaining the dimensions for machining the core to insure proper bonding. Measurements of the S-II forward facing sheet, because of the instability of the thin cross section, must be made with a vacuum bell holding the outer surface to the proper configuration. These measurements are then reduced by a computer, which furnishes the information for machining the honeycomb core. The whole process is basically a mechanized fitting method replacing the DAC hand fitting by accurate measurements and machining. ✓

c. S&ID is presently machining the core to the contoured measurements obtained from the inner surface of the upper facing sheet. First check fit will occur next week, to be followed by a final machining operation. The bonding of the upper face to the lower sub-assembly could then take place during second week of July.

d. S&ID's success in overcoming areas of development demonstrates the validity of the powerful force in the use of beneficial consultation as a stimulus--Douglas, Lockheed, Grumman, NAA, Los Angeles Division, and MSFC provided specialists to participate in reviews to enable S&ID's responsible personnel to make decisions with a minimum of back-tracking. Even with the alternate method carried along as a parallel approach up to the point of actual final assembly, with the same urgency as S&ID's prime method, the collective efforts were directed unrelentingly to supporting this prime method. ✓

e. The back-up method, admittedly a compromise because of weight penalties, was valuable in that it insured the program performance, but more importantly, it provided a compelling challenge to S&ID to validate their concept. ✓

1. SATURN IB/TITAN IIIC COMPARISON - On June 25 and 26 representatives from headquarters (Messrs. Rafel, Rosenberg, and Diamond from Dr. Mueller's office) visited Marshall relative to this subject. Representatives from Dr. Seamans' staff (Messrs. Malaga, Barber, and Campbell) were accompanied by four consultant contractors. Mr. Malaga and the contractors advocate the installation of an extremely detailed system for securing costs and costs estimates. Their goal is to use this system or a reduced version of this system in preparing information for the activities in launch vehicle evaluation by the Aeronautics and Astronautics Coordinating Board and in response to the President's letter for long range plan. The position taken by Marshall's representatives was: (1) We have a deadline of July 1 to furnish information to Dr. Mueller for use by Dr. Seamans in the Senate hearings of July 6 and 7. It would be impossible to incorporate this system without jeopardizing that deadline. (2) There are meetings planned between NASA and the Air Force in the immediate future which have as their goal the establishment of common ground rules for the comparison of Saturn IB and Titan IIIC. The best approach would be to determine the common ground rules prior to attempting to install a system such as that proposed, since these common ground rules might require scrapping of effort to date and starting over under the new ground rules. (3) If it is possible, Marshall will make an attempt to apply a limited version of the system proposed.

Messrs. Swearingen and Bethay will attend, as observers, the meeting between NASA (Mr. Malaga) and the Air Force on the development of common ground rules for Saturn IB/Titan IIIC Comparison in Washington on June 29, 1964.

2. MANPOWER PLANNING - Fifty-four temporary employees were released Friday by the Personnel Office, and eighteen additional temporary employees are to be released today and tomorrow, in order to get within our year-end personnel ceiling of 7,658. The 7,658 includes 27 new temporary spaces which headquarters allotted to MSFC last week to offset year-end vacancies at other NASA centers.
3. PRESIDENT'S SURVEY OF REPORTS - MSFC's submission for part II of the President's Survey of Reports was sent to headquarters last week. This was an inventory/listing of 891 reports, with preliminary recommendation for 32 reports to be eliminated, 121 to be simplified, and 738 to be continued. The analysis effort will be continued concurrent with the Apollo Documentation Survey. Final report will probably be due in headquarters in September and will contain recommendations for many more reports to be eliminated.

7/6/29

1. FY-66 CofF PROGRAM: On June 29 and 30, conferences will be held with the laboratories and the Facilities & Design Office to coordinate preparation of the final CofF project submittals for the eight R&D Operations projects. These are as follows:

P&VE	Additions to Materials Lab - Non-Destructive Testing Lab
RP	Space Vehicle Research Lab
AERO	Special Fluid Mechanics Lab
TEST	LOX Storage, F-1 Stand - Extension, High-Pressure Gas Systems - Test Engineering Building Extension
R&D Operations	Engineering and Laboratory Building

Final project writeups will be provided the Facilities & Design Office by July 20. ✓

2. FY-65 ENGINEERING SUPPORT SERVICES: On June 23, a meeting was held with Industrial Operations and Financial Management Office to discuss the funding of the FY-65 Engineering Services Contracts. Current support contracts will be extended for an appropriate phase-over period with the single support contractors. The Financial Management Office is furnishing information from which we may refine the FY-65 engineering support funding requirements. ✓

3. USE OF GE PHOENIX PERSONNEL: A meeting was held with Computation Laboratory and the Legal Office to determine whether GE Phoenix personnel can be used to survey other contractors' data processing equipment. It was decided that GE personnel could assist in determining the availability and capability of equipment for MSFC. Other types of services by GE Phoenix, involving MSFC contractors, would require special arrangements. ✓

4. CONTRACTOR MANPOWER AUDIT: Plans are being completed for the contractor manpower audit to be conducted within R&D Operations. The audit is to begin immediately and to be completed in July. The purpose of the audit is to verify, in detail, the present overall laboratory contractor levels authorized as a result of our initial personnel survey. ✓

5. FY-65 BUDGET EXECUTION: The FY-65 budget execution effort is underway. Some Short Form Procurement Plans for actions in excess of \$100,000 have already been processed to Financial Management Office. A log of those actions is being maintained in this office. The log will also include the matching purchase requests which implement those Short Form Procurement Plans approved by appropriate Marshall management. ✓

twg/ea

B 7/2

1. Saturn V Payload Commitment - A Saturn V Policy Directive stating the increased payload commitment and ground rules to be followed in the attainment of the new commitment has been issued. ✓

2. Boeing Mission Support - Scope of work for Saturn V System Engineering and System Integration tasks with the Boeing Company was released to the Contracting Office on June 25, 1964. The scope of work will be the basis for requesting a proposal from the Boeing Company.

AR I'd like to see it B

3. S-IC Stage:

Quarterly Review - The S-IC Quarterly Technical Progress and Program Review is scheduled for July 23 and 24, 1964 at Michoud. ✓

Thrust Structure Assembly - Negotiation on transfer of thrust structure assembly for S-IC-S, 1 and 2 to Boeing has been completed. The Contractor was given authorization to proceed on June 17, 1964. ✓

4. S-IVB Stage - A meeting was held at DAC on June 15, 1964, with Mr. R. Young, Mr. R. Godfrey, and DAC Program Management personnel in attendance. The principal topic of discussion was the potential problem of the start and restart sequence of the J-2 engine. DAC will prepare and furnish recommended alternate design approaches including schedule and cost impact for MSFC consideration. The backup solutions would be implemented if early Battleship testing indicates serious problems. ✓

5. Instrument Unit - Reference Notes 6/22/64 Rudolph, Item 5 (copy attached). Confirmation, by telephone, has been received from NASA Headquarters extending the letter contract for prototype guidance computer-data adapters to July 15, 1964, and the flight hardware portion to August 15, 1964. ✓ Headquarters has indicated that they are taking exception to the proposed waiver to the Procurement Regulation concerning contractor relocation cost. They are planning to discuss this matter with IBM this week. This issue will be a major problem on all IBM contracts if Headquarters does not take a firm stand. ✓

NOTES-6-29-64-SHEPHERD

B 7/3

July 6/29

EAFB F-I Engine Test Stand: The first test firing on the new test stand was conducted June 26, 1964, utilizing the first Block II engine (#21). It was scheduled for a ten second duration firing to checkout the facility. Automatic cutoff occurred at essentially zero time although a hypergolic flash was observed. Automatic cutoff occurred due to a seal leak in the engine LOX pump. To that point, the facility had functioned satisfactorily. It is anticipated that the engine can be removed and reinstalled to permit the test to resume this week. This first test firing occurred 27 months after first excavation started and 30 months after design start. We have accepted another test stand at EAFB, test stand IC on June 10, 1964. Rocketdyne is working three eight-hour shifts for early activation of this stand. ✓

S-IVB Sacramento Facility: The FY-65 CofF Budget contains \$10M for the third test stand at the Beta Complex at Sacto. After a review of the schedules and operating procedures, it was concluded that a vertical checkout facility would be as useful to the program as a third test stand. This position was adopted late last winter. The checkout facility is under design contract from the Sacramento District Engineers to the Bechtel Corporation. The facility will be located on Douglas land in their administrative area rather than in the Beta Complex itself. This location was agreed to as the most economical from construction and operation standpoint. The initial agreements with Douglas are somewhat different than from Beta Complex, i. e. the Government has no option to buy the land; instead, we have an option to abandon-in-place or remove the facility. The Government pays no cost for use of the land so long as Douglas is operating the facility. We will have an option to lease the land for use by other contractors. This position has been agreed to by Brackett in NASA Hdqs. The cost of the checkout facility is estimated to be approximately \$4.5M or \$5.5M less than a third test stand. The first activity to be performed in the new facility would be the weight and center of gravity determination for the S-IVB-201 approximately July 10, 1965. First stage scheduled for complete checkout in the new facility is the S-IVB-202 beginning Sept. 7, 1965. ✓

✓ B 7/13
July 6/19

1. MMC PROJECT - RPL is directing considerable effort toward a program of reducing, correlating, analyzing and evaluating meteoroid data expected from MMC satellites SA-9, SA-8, and SA-10. Part of this work will be done under contract with Fairchild. We expect to have a well integrated plan early in fall. ✓
2. MSFC-UNIVERSITY RELATIONSHIPS - Dr. Shelton and I will participate in a presentation to Mr. Webb on NASA-University relations on July 8 and 9. I will give a 20-minute talk on MSFC relations with universities. Would you like to see a copy of my presentation? → Yes ✓
3. LASER SATELLITE (SAT IB) - Mr. Roland Chase, OART, invited MSFC to participate in the planning for a SAT IB-carried Laser Satellite. Experiments will include tracking, guidance, control, and communication experiments between satellites, and between satellite and earth. MSFC has been asked to develop and write a PDP for such a project. At present, Astrionics is negotiating a contract with Perkin-Elmer for preliminary studies of Saturn I Laser experiments. RPL will discuss possible participation of MSFC in a Laser satellite project with Astrionics, Aero, and R&DO management, and will present the results of these discussions to you at your convenience with the request of establishing a MSFC position in response to OART's invitation. Any time! ✓
4. SCIENTIFIC MISSION STUDY FOR ALSS - Upon request from E. Z. Grey's Directorate, RPL participated in the evaluation of industry proposals for a scientific mission support study for the ALSS. In particular, RPL was requested by OMSF to formulate a work statement for an "Emplaced Lunar Scientific Station for the ALSS." Would you like to see this work statement? Yes please ✓
5. EXPERIMENTS ON MSFC-LAUNCHED VEHICLES - Members of R&DO management, Laboratories, and RPL held several discussions on the possible organization of MSFC's effort in flying technological and scientific experiments on Saturn-type vehicles. We expect to have a firm proposal within a few weeks. ✓
6. CONSOLIDATION OF MSFC RESEARCH PROGRAMS - Our effort to develop plans for a consolidation of MSFC research programs, and for the documentation and presentation of visible results of these research programs, has progressed further. As soon as these plans have been accepted by R&D management, we would like to discuss them with you, possibly in a Board Meeting. Request a briefing on outcome prior to Board Meeting ✓
7. SRT PROGRAM STATUS - The current status of the ART/SRT Program under the cognizance of this Laboratory is as follows (as of June 25):

	<u>ANNUAL PLAN</u>	<u>AUTHORIZED</u>	<u>PROCESSED TO FMO</u>	<u>OBLIGATED</u>	<u>CHANGE IN OBLIGATIONS SINCE 6/19/64</u>
OART	10,515,000	10,515,000	10,395,144	5,592,890	419,248
MSF	14,133,000	14,133,000	14,051,050	3,856,959	765,720
OSSA	675,000	675,000	663,149	180,972	33,773
TOTAL	25,323,000	25,323,000	25,109,343	9,630,821	1,218,741 ✓

8. SRT SUBMISSIONS TO HEADQUARTERS - To our great relief and appreciation, OMSF (E.Z. Grey) permitted us this year to submit our SRT Program tasks in larger groups. ✓ In fact, we submitted only 20 groups, covering 161 tasks. ✓ We had hoped that OART would follow this example of increased efficiency. Unfortunately, OART decided that all programs must be submitted in task detail. With about 500 individual tasks in our consolidated program, each of which must be established, written, explained, negotiated, and frequently even reprogrammed several times, we face a horrendous manpower problem. I will try to work out a suggestion on how to cope with it.
9. LUNAR ECLIPSE - Members of RPL tried to make lunar temperature measurements with their IR-radiometer at the RCAA Observatory during the eclipse on June 24. Unfortunately, the sky was too cloudy for any measurement. ✓

ES
let's discuss a letter to Bis - plinghoff