

FEBRUARY 5, 1962

*Note question about
Dobsony & WOO
answered 2-15-62*

NOTES 2/5/62
WITH COMMENTS

Mr. Gorman's Copy

B-5

MICHOUD PLANT TRANSFER

The letter containing the recommendation that the Michoud facility be transferred to NASA without reimbursement is on the desk of the BOB Director for signature. After signature a maximum of one week will be required for the formal transfer to NASA by GSA.

RENOVATION AT MICHOUD

* Reference NOTES 1/29/62

Office Building: Work stopped for over four weeks pending authorization by P&C to approve work orders and pending Headquarters approval of additional C of F monies (\$460,000). A check with NASA Headquarters on February 2, 1962 regarding the availability of the \$460,000 of C of F funds to continue the renovation of the Administrative and Engineering buildings indicates that all that remains to be accomplished is the BOB transfer of appropriations. This should be accomplished within a day or two.

Engineering Building: Roofing approximately 85% completed.

Manufacturing Building: Plumbing approximately 80% completed. Exterior painting approximately 60% complete.

Boiler Plant: Checkout and repair of equipment about 90% completed. All boilers have been acid cleaned. Replacement tubes may be needed on one boiler.

GENERAL:

Negotiations between M-P&C and Boeing for Saturn Stage C-5 effort through July 31, 1962 progressed satisfactorily and as of February 4, 1962 Boeing's cost estimate of \$9.2 million is within the "ball park". It is anticipated that negotiations will be complete by February 6, 1962.

Chrysler indicated that further detailed layout of the production area and that the space allocated to them was too small. Review of the layout by MSFC personnel showed a number of departures from what we understand to be the basic Chrysler assignment, as follows:

- a. Fabrication of nearly all items in Michoud instead of using MSFC developed vendors and sources.
- b. Extensive R&D activities as evidenced by layout of specialized laboratories (such as spectrographic lab.) and environmental test facilities.

A policy guide letter to Chrysler covering the above areas, and the area of joint usage facilities (e.g. standards and calibration laboratory, X-ray facilities, etc.) is needed and is being worked on.

A shortage of C of F funds in FY62 is going to jeopardize the S-1 and S-1-C production schedule. FY63 funds are needed in FY62 to overcome the construction lead time. The total funding required is unchanged.

Bob Lindstrom / Dr. Lange

Let's stop this nonsense. No wonder that we're short of funds!! Please let me know what corrective action has been taken. RUSH.

(See also Knerr's Notes of 2-5-62)

Cy of 2/5/62
NOTES: Constan
furnished by Bob Lindstrom
Dr. Lange / JLF 2/8/62

B-5

NOTES 2-5-62 DEBUS

No NOTES received by 12:00 Noon.

Be-5

1. GROUND WIND CRITERIA FOR C-5 LAUNCH: Previously the 95% probability ground wind criteria has been used for lift-off studies for the Saturn vehicles and the 99.9% probability ground wind has been employed for the free standing vehicle. Due to the necessity of accommodating small launch windows (20 - 30 min) for orbital operations, it is desirable that the ground wind criteria for lift-off studies be increased to 99% probability in agreement with the present C-5 in-flight wind probability level criteria. The reference period for these probability levels is based on the so-called worst wind month.

This philosophy will provide us with maximum operational capability consistent with the present knowledge of the detailed wind statistics of the Cape Canaveral area. ✓

2. COMMENT CONCERNING ITEM SA-5 PAYLOAD GEOMETRY: Since the summary of this item in weekly notes 1-22-62, the following additional events took place: a. Visit at Ames and Lockheed, which confirmed our concern about the shroudless version (see Additional Notes); b. A visit of Dr. Kuettner to MSC at Langley and a joint phone talk between Faget, Piland, Kuettner, Geissler in which MSC agreed finally to the dual approach for SA-5, i.e. to have an option for payload without or with partial shroud. It was agreed that the planned wind tunnel program in this area would be taken up in a joint meeting between the two agencies. Not settled was the question, who will pay for design and manufacturing of the shroud. It may be advisable to obtain a decision on this at Space Council Meeting. ✓

3. ITEM 4B ON SPACE COUNCIL AGENDA CONCERNING APOLLO WIND TUNNEL TESTING: A teletype (MSC 02 011520Z Feb 62) was received from MSC in which they propose to coordinate a joint general Apollo wind tunnel program in the forthcoming meeting mentioned under item 2. It is my opinion that in addition to technical coordination a firm decision should be obtained that MSFC will be in control for that part of the program where the overall configuration is involved. Again a principal decision of this type from Mr. Holmes may be useful, although Dr. Kuettner feels we ought to make an issue of this only after finding out how far they are going to meet us.

4. C-5 FIN REQUIREMENTS: C-5 fin requirements can be substantially reduced below the previously established value of 500 ft² per plane due to the cancellation of the derated version (C-3). With elimination of this configuration probably less than one-half of this will be sufficient. Final requirements will soon be available. ✓

1. Mr. Hjernevik, from Manned Space Flight Center, visited on Thursday to discuss our relations in the Downey Plant of North American. We are both objecting to the Headquarters' proposal to have WOO represent us to the contractor. There is a meeting on Monday, February 5, 1962, with Mr. Siepert in Headquarters to discuss this problem further. ✓
2. Mr. Jerome S. Adlerman, Chief Counsel for the Permanent Senate Committee on Investigation (McCellan Committee) will be here on Wednesday and Thursday this week. The prime purpose of his visit is in connection with AOMC procurement activities. We think the purpose in visiting us is to meet with you and see our activities. (Not to investigate us.) ✓

J → Last time I talked to A. he was quite curious about our union troubles at the Cape. Suggest Paul S. be ready, in case.

Harry J.

Do you think Siepert's solution, — as presented to us during the 6 Feb meeting in Washington — is acceptable? B

B-25

NOTES 2-5-62 GRAU

1. SA-2 POST STATIC CHECKOUT: The checkout of vehicle SA-2 is continuing approximately on schedule. The Simulated Flight Test is scheduled for February 3, 1962. Considerable rework of mechanical systems was required following pressure and functional testing. The major problem was contamination of the Propellant Utilization and SLOSH Measurement System which required removal of the complete system for re-cleaning. A filter change was recommended and accepted. The Kidde filter (sintered bronze) was replaced by Microporous filter (wire mesh) after qualification tests were made by this Division. The same filter change was also made in the Air Bearing Air Supply System. The Kidde filter continually passed or shedded large quantities of metallic particles in the 20 to 40 micron range. In tests to date no metallic particles in this range have been found with the microporous filter. ✓

2. MSFC SOLDERING SCHOOL: The MSFC Soldering School located at El Segundo, California, was offered to NASA Headquarters as a NASA-wide school. The Office of Reliability and Quality Assurance is investigating possibilities how to do this and an answer is expected during the month of February. This would relieve this Division of the extensive administrative burden connected with operating and maintaining the school. The specifications and procedures involved will be coordinated with the other NASA Centers to make them also NASA-wide. This Division would still give technical and training assistance and maintain close contact with the instructors. ✓

3. LEWIS RESEARCH CENTER: The newly appointed head and members of the staff of the Lewis Research Center Reliability and Quality Assurance Staff Office visited this Division and the Reliability Office for orientation, consultation, and guidance. The input of this Division was very well received, since Lewis Research Center does not have the experience with flight hardware and contractors in the field. Additional visits will be planned. ✓

1. SA-1 SLOSHING: Representatives of Astrionics and Aeroballistics held a meeting to resolve the slush instability of SA-1, and discussed the problems associated with control computer modifications for SA-2. After reviewing the modifications versus reliability and over-all improvement of flight performance, it was agreed to recommend that no changes (related to slushing) be made in control computers for SA-1. ✓
2. AUTOMATION BREADBOARD FACILITIES: Use of an available (presently in storage) Butler Building looks to be the most economical approach for the temporary housing of this facility. It is desired to have this facility ready for occupancy sometime in 6-62. Final decision to be made at Facilities Board meeting 2-6-62. ✓
3. C-5 CONTROL SYSTEM: Agreements were reached with SSO about the details of operation with the stage contractors for development of the C-5 control system. Stage contractors will be working with M-ASTR-Navigation Branch to assure over-all vehicle systems considerations. ✓
4. RIFT ACTUATOR DEVELOPMENT: Recommendation of transferring RIFT actuator development from engine contractor to stage contractor has been given to H. Finger. Followup discussions are expected this week. ✓
5. JERKMETERS FOR USE IN THE GUIDANCE SYSTEM: Early exploratory investigations are being made to determine if jerkmeters measuring the first derivative of F could replace accelerometers which provide signals for engine-out. ✓
M
6. AIR CONSUMPTION FOR THE SATURN AB-5 STABILIZATION GYRO: Tests completed this week established the air consumption for the Saturn AB-5 stabilization gyro as 7000 scc/min at 15 psi. This is a very significant reduction from the previously established 23000 scc/min for the same pressure. ✓
7. AIR BEARING TURNTABLE: Dunn Engineering delivered a precision turntable under contract NAS8-3077. This air bearing turntable will be used for high accuracy system tests on both Saturn and Centaur stabilized platforms. It will also provide the capability for extended accuracy drift calibrations over simulated orbital and storage periods. The table uses internally generated frequencies (crystal controlled) for rate programming. Rates and table position readouts are digitally presented to 3.6 arc seconds. ✓
8. PRINTED CABLES: A program is being initiated by Astrionics Division to qualify printed cables and connectors by a series of environmental tests. In addition, a study will be made to determine the development effort required for additional plug and cable sizes. The earliest large scale application will be the instrument package for C-5. ✓

1. STATIC FIRING, SA-T:

SA-T firing is planned for Tuesday, 2-6-62. Major objective is to vent through LOX tank 7-inch valve to determine influence on LOX emptying characteristics under this condition. 7-inch vent valve almost opened during SA-1 flight. ✓

2. TESTS OF S-IV CHILLDOWN GASIFICATION:

A cold flow model of the RL-10A1 P&W engine has been installed in the large vacuum drying chamber at Test Section "B". Tests to determine effectiveness of evaporation of the S-IV chilldown liquid or solid oxygen by GN₂ injection at simulated altitude should begin within a week. Initially LN₂ will be used to simulate LOX. Full-scale components will be used.

3. FACILITIES:

a. The design for modification of the West Side of the Static Test Tower is on schedule. Delay in securing final approval on allocation of construction funds has slipped the estimated completion date of "brick and mortar" from September to November 1962. ✓

b. The planning for the West Area is on schedule, with a construction completion date of June 1963 now estimated, provided additional construction funds are received by 3-1-62. The Control Center is under construction. ✓

c. Advance planning funds for the new Dynamic Test Stand have been requested from Washington by OTS. ✓

d. The addition to the Engineering Building is under construction. ✓

4. EAFB F-1 TEST STAND DAMAGE:

The deflector of the F-1 Test Stand 1-A at EAFB was extensively damaged on 1-29-62 during a 95-second duration, 1.5-million-pound-thrust run. The deflector, located 150' below the engine nozzle exit, has a water flowrate of 140,000 g.p.m., compared to our 44,000 g.p.m. flow. Repair time for improvised solution was estimated by Rocketdyne as 3 weeks. Permanent solution which must be made will take considerably longer. Mr. W. Marsalis, who played a big part in our deflector design, is presently at Rocketdyne to explain our deflector design criteria. ✓

5. TRANSPORTATION OF SA-2:

Preparations are being made for the barge "PROMISE" to depart Wheeler Dam, 4 p.m., 2-17-62, with SA-2 ~~containing~~.

K.H.
Please elaborate in next notes. Don't understand the problem B

NOTES 2-5-62 HOELZER

NAA,
✓ Douglas
ac

1. COMPUTER SYSTEM FOR COMPILING STATUS OF CONTRACTOR FUNDS:

Mr. Gorman requested Computation Division to develop and implement a machine system for compiling status of contractor funds on an MSFC basis. It is planned to enlarge the existing IBM contract on Quality Assurance Division to furnish additional trained systems personnel to develop this reporting system. The target deadline for implementation is July 1, 1962. ✓

*It would be preferable to use civil service personnel
9/2/62*

2. FLIGHT SIMULATION FACILITY: The joint Astrionics-Computation flight simulation facility is proceeding on the following schedule - design started January 22nd and is to be completed by March 1st; opening of bids by March 26; construction to start April 2nd, with scheduled completion by August 1st. ✓

3. COMPUTER REQUIREMENTS AT MICHLOUD OPERATIONS: Computation Division is studying future requirements for computer services for the Michoud operations. Continuous liaison is being maintained with Mr. Constan's staff on this matter. ✓

4. INSTALLATION OF GE 225 COMPUTER: The GE 225 computer for the P&VE Division structural testing has been installed and is now being checked out. Program check will begin sometime this week. ✓

B-5

1. CENTAUR:

a. F-1 Status: The launch date for Centaur F-1 continues to slip. The latest delay (estimated 5 days) is the result of problems in the Centaur programmer and electrical wiring. During trouble shooting to determine the cause of programmer difficulties, there was found a substantial amount of mashed, skinned and uninsulated wires. It now appears that the entire Centaur auto-pilot wiring will be replaced. This will require additional continuity and calibration tests, after which it will be necessary to repeat programmer and control tests run some week ago. Apparently the Atlas programmer, which has recently been the trouble spot, is now functioning properly. ✓

b. Surveyor Bus: On Feb 3, JPL gave a presentation at MSFC on a stripped down Surveyor bus as a single burn, third stage, for Centaur. The Surveyor propulsion system consists of a solid propellant motor (485# propellant Isp 294) and a bi-propellant vernier (Isp 318). The guidance system is a sensor type similar to that used by the Ranger spacecraft, with the exception that the Surveyor system senses the sun and Canopus instead of the sun and earth. The Advent Agency has had STL make a brief tentative evaluation of guidance system accuracies in which it was determined that the accuracies provided by the Surveyor guidance system exceed Advent requirements. The maximum total vehicle length (Atlas/Centaur/Surveyor Bus/Advent with shroud), when utilizing the Surveyor bus, would be 130 feet. We are giving an assignment to GD/A to study all the various parameters of this configuration. The use of the Surveyor Bus or another single burn third stage would eliminate many of our Centaur problems, i.e., long coast periods, three burns, etc.

c. Recommended Centaur Configuration: On the basis of investigations made to date to determine a Centaur configuration which will, with maximum reliability, satisfy the minimum requirements of Advent, Mariner and Surveyor in 1964, it will be recommended to NASA Headquarters on Feb 8 that we introduce a Centaur stage with Beta steel separated tanks, this configuration to be used with two Centaur burns for all NASA missions (Mariner-Surveyor). For Advent missions, this configuration will be used with a single burn, third stage. This third stage could be a Surveyor bus if the GD/A studies indicate that its use is feasible, or some other third stage configuration.

2. AGENA:

a. Agena Presentation: A rather comprehensive presentation on the entire Agena program is to be given to MSFC Development Board on Feb 16. This presentation will cover program status and will describe the current Agena-B vehicle and the planned Agena-D configuration.

b. GE Guidance: General Electric is now conducting extensive tests to reconstruct the conditions which caused the failure of the GE guidance in the RA-3 flight. A presentation of their findings is to be given to Air Force and MSFC personnel on Feb 6.

c. Atlas Failures: I have written a letter to Maj Albert voicing my concern over the numerous difficulties that we have experienced with the Atlas boosters delivered for both the Agena and Centaur flights. I have requested that the Air Force present to Marshall what corrective actions they plan. A list of the Atlas discrepancies which occurred during the first three Ranger launches is attached. ✓

H. H.

Please fill me in on
more details & keep me posted.
B-5

B
C-5

H.H.K.

1. NOVA PROGRAM

Let's have a 1/2 hr chat about this with Frank.

F. L. Williams spent two days in Washington (Monday and Tuesday of last week, January 30th and 31st) talking with Mr. Canright, Mr. Rosen, and Mr. Norm Rafel about future activities in the area of NOVA. The Headquarters people are in general agreement with the plan as proposed by Marshall; however, they would like to get a hardware contractor on board 4 to 8 months earlier than indicated in the MSFC plan. Several possibilities were discussed such as performing the study program as outlined in the MSFC proposal and telescoping the hardware RFQ, evaluation, etc. into the concluding time period of the study program. A second possibility would be having a shorter study program, approximately 4 months. The first of the above possibilities seems to be more attractive at this time. Future Activities: Mr. Rafel will prepare a plan which will be submitted to Rosen, Holmes and higher authorities as to what action will be taken on the NOVA plan. This plan will be coordinated with MSFC and mutually agreed upon prior to submission.

Frank
I had a long discussion with Rosen & we

It is anticipated (a guess by Frank Williams) that it will be approximately one month before the NOVA money is released to MSFC for action. As far as MSFC is concerned we can advantageously utilize this time in preparing ourselves for the NOVA study activities.

see pretty much eye to eye on how to proceed, B

Copy of these NOTES furnished Mr. Maass per Dr. von Braun's request. JJ 2/9/62

Suggest Maass join us, too.

B2-5

NOTES 2-5-62 KUERS

1. C-1 Budget: Supplemental funding in the amount of 1.974 million has been requested from M-SAT for the remainder of FY-62. This requirement is due primarily to continuing major design changes as well as the addition of components not previously budgeted. No contingency fund was provided in this request, therefore additional changes will require further funding.

2. C-5 Budget: A revised FY-62 budget has been submitted to M-SAT. New items included in the submission were (a) SI-C Mock-Up and (b) Precision Fusion Welding Equipment and Controls. The revised budget totals \$7.410 million as compared to the original submission of \$6.530 million, an increase of only 13%. ✓

3. SA-5: In order to avoid further delays in fabrication of tooling for the SA-5 Tail Section, a full time representative from this Division has been assigned to the Republic Aviation Corporation Plant to resolve technical problems arising under this contract. The Republic contract for components and tooling, FY-62, totals \$3.5 million. Republic was selected for the manufacture of the Tail Components because they had in operation not only one of the largest groups of numerical control machines in this country, but also had the necessary forging facilities available as well. ✓

*Copy of these NOTES
furnished Dr. Long/B. Lindstrom
by Dr. von Braun's request.
replied to Mr. Constant.
JG 2/10/62*

C-1 Project: The first meeting of the 3-stage C-1 Steering Group met 2-2-62. Representatives of OSS, NASA, JPL, and MSFC were present.

We are establishing with M-MICH, MSFC groups to evaluate the Chrysler program plans now being developed under the present contract. Mr. B. Meldrum of Chrysler will visit on 2-9-62 to discuss this planning.

We are establishing with M-MICH the outline for the statement of work to have by 2-9-62, and will then go to the divisions for inputs thereafter.

In our communication with Chrysler, we are tackling the vehicle documentation problem first. Hope to achieve a central documentation flow from M-P&VE to M-MICH.

We gave Mr. deFries a proposed S-I/S-IVB orbital operations test program.

Problem areas: a. SA-5 schedule, particularly the M-P&VE request for a measuring program change.

b. Money shortage: 2.0, M-ME; 2.0, DAC; 2.0 to 4.0, M-MICH facilities - trying to solve these with M-ASTR and others.

Our action on the SA-5 S-I PERT network is proceeding well and we will hit our 3-1-62 deadline. ✓

C-5 Project: An approval of 3rd quarter C-5 funds was received by TWX 1-31-62.

An analysis was started on a C-5/NOVA common hardware mutual assistance exercise to determine if both programs can profit through some concentrated component development plan. *Rosen is solidly in agreement with me on this! B*

Negotiations with Boeing have proceeded throughout the week and ~~xxxxxxx~~ the preliminary contract negotiations were concluded 2-3-62. Target date is 2-6/7-62 for submittal of preliminary contract to NASA Headquarters. ✓

M-QUAL has initiated a request to solicit inspection service proposals from the Army, Navy, and AF for the S-II. SSO is presently advising the solicitation be held up pending a better understanding of several influence factors on the S-II facilities planning. ✓

Plan I, as discussed with Mr. Parker and you on 1-30-62 was changed to show acceptance test stands at MTF. This change was made with concurrence of NAA and SSO 1-31-62. Only major difference between Plan I and Plan 2 is location of final assembly site. ✓

The contract plan for S-IVB, requesting the preliminary proposal from DAC on 3-31-62 was sent to WOO. ✓

Preliminary program planning information was obtained from DAC on S-IVB vehicle for use in rendezvous tests utilizing S-I boosters. ✓

Stage Transporter: SSO and LOD started investigation to save engineering efforts by exercising a more centralized control of transporter design, to minimize the total number of transporters and to facilitate their maintenance. The subject will be discussed with the stage contractors in early March 62. ✓

See my memo on Chrysler's Notes 2-5-62

B
2-5
See my remarks on
Koelle's Notes 2-5-62

1. NOVA PROGRAM STATUS: Mr. Rosen's Office basically accepted the MSFC development plan and no formal headquarters presentation is required. This plan was developed specifically to obtain the release of the FY-62 NOVA money and this release is anticipated in approximately 30 days.

Consistent with your combined C-5/NOVA comment on last weeks notes (reference attachment) a discussion between Dr. Lange and a subsequent preliminary meeting between Saturn Systems Office, Future Projects Office and the Lunar Program Planning Office has indicated possible ways of combining the funding for the two programs to the benefit of both. A written proposal will be developed jointly.

2. ORBITAL OPERATIONS: The orbital operations discussion with Dr. Shea is now scheduled for February 13, 14, and 15, 1962. Dr. Shea wants to limit the discussion to earth orbital rendezvous considerations except where lunar orbital rendezvous problem areas can be identified as directly related to earth orbital rendezvous problems. The Orbital Operations Committee jointly with the S-IVB Working Group and the Agena Office are preparing the proposed Gemini-Saturn C-1 rendezvous program for this meeting. ✓

3. MASTER PLANNING ACTIVITIES: The Master Planning Activities have been expanded as follows:

a. Master Planning charts on C-1, C-5 and NOVA have been advanced integrating engines and facilities with stages and projects. This package has been coordinated with Saturn Systems Office, Engine Management Office, and Future Projects Office. ✓

b. Master Agena (Atlas and Thor) and Centaur schedules and assumption charts have been prepared. ✓

c. Some initial work has been done on request of Mr. Rees and Mr. Gorman in planning the establishment of a Central Planning Office to be presented for your comments in the near future. ✓

Attachment:

Notes 1-29-62, Maus

MSFC is in basic agreement with our proposal re Saturn guidance in the Agenas!



Be-5

1. METEORIODS: Advanced Flight Systems Branch convened inter-divisional discussions to assess available knowledge of meteoroid hazards on specific MSFC launch vehicle and orbital operations commitments for MLL program. ✓
2. SA-1: M-F6VE-S has completed an investigation of lower shroud movement and wrinkling of the lower panel as experienced on SA-1 flight and determined no detrimental effects resulted to the structure. This is also applicable to SA-2 and SA-3. ✓
3. CENTAUR: A structural analysis was made of two CENTAUR-BETA configurations (all steel and steel-titanium) and a CENTAUR Midget DIANA-A configuration. Increases in structural skin thicknesses are necessary in the ATLAS structure, CENTAUR stage and adapter structure due to considerably higher loads compared to CENTAUR-ALPHA. Structural weight increase could be minimized by increasing propellant tank pressures by 1 to 7 psi. (This study was based on limited background information and therefore will be subject to changes. No alpha-loop control was assumed in the loads analysis.) ✓
4. TITAN III: A trip report was issued (1-29-62) describing a review of the AMR Safety Office's position on siting of the Titan III. On the basis of the data available, it appears that toxicity consideration will be the determining factor rather than blast hazard. An extensive experimental and analytical program would be required to support a position contrary to the one taken by Range Safety. If one is not prepared to accept some launch restrictions, an accelerated program to extend current findings should be initiated. ?
5. SA-5: Convair has expressed an interest in mounting one of the movie camera capsule prototypes on an early ATLAS missile flight. This would provide MSFC with valuable flight experience before installation on the SA-5 vehicle. ✓
6. ENGINE PROJECTS:
 - H-1 Engine: The 1.5 million dollars required for SATURN C-1 operational vehicle engines in FY-62 still have not been received by MSFC.
 - F-1 Engine: The F-1 engine (Engins #5) was successfully run at the full rated thrust level for 96 seconds at which time cutoff occurred due to a loss of pressure in a facility tank. It is believed that had this facility malfunction not occurred, a full-thrust full-duration run would have been achieved (deflector destroyed). re-ated?
 - J-2 Engine: The first test engine assembly has been completed and the engine transported to Santa Susana for installation on VTB-3B. Systems checks have been started in preparation for the first engine tests. Testing during the period 2-1/10-62, will be limited to injectors and the first engine firing attempt, due to the current LH₂ shortage caused by the AF Plant #74 breakdown.
 - M-1 Engine: 17 million dollars have been received for initial funding of this program.

The Advanced Flight Systems Branch and Advanced Propulsion Section, of Propulsion and Mechanics Branch, are working on the initial definition of major engine parameters. ✓

No NOTES received by 12:00 Noon.

Arthur:

Items of interest to OB/Ree/Gorman

1. How are you coming along with the staffing of your office
2. Latest info on forthcoming Shea meeting.
3. Latest thinking on operation and mission of Shea's office in Washington & in Huntsville.

JRM 2-5

NOTES 2-5-62 SMITH

No NOTES received by 12:00 Noon.

B₂-5

1. SUPPORTING RESEARCH PROGRAM: We considered our visit with Mr. Dixon and his group from OART to be very beneficial and encouraging. Although the procedures suggested by OART for the implementation of OART sponsored research tasks will undoubtedly require some modifications, we feel that we can adjust to the new system in a joint effort. We believe that the mechanics of the OART system are perhaps as reasonable and workable as any other system that could be devised considering the very complex structure and mission of the new Headquarters organization. The visitors from OART seemed to be genuinely interested in making use of some of the MSFC talents in the research area. I am sorry that your illness prevented you from meeting with us. ✓
2. RADIATION STUDIES: Members of RPD met with Mr. Pearson and Mr. Charak of OART, Dr. Connor and Mr. Johnson of OMSF, and Dr. Duberg of Langley Research Center to discuss radiation problems. All parties were sympathetic, genteel, and constructive, but no clear definitions were reached. Mr. Dixon, Mr. Ames, and Mr. Jack Young discussed the present situation of our radiation shielding work with Dr. Shelton, Mr. Keller, and me on February 1. Mr. Dixon and Mr. Ames apparently intend to make a test case of the ORNL proceedings between MSC and MSFC. ✓
3. ORBITAL OPERATIONS RESEARCH: I wrote a three-page letter to Dr. J. Shea, explaining again our thoughts about an orbital operations research program, and repeating our request for funding. Mr. T Dixon was given a copy of this letter upon his request. ✓
4. PROJECT HIGH WATER: A check with Mr. Nowak indicates that modifications to the S-IV and S-V stages to permit water release are underway and on schedule. No delay from this source of the SA-2 shipping date is anticipated. ✓
5. ELECTRIC PROPULSION: Thirty-two electric propulsion contracts have now been transferred to the Lewis Research Center. Some 10 or 12 other contracts will be transferred to LeRC in the next three or four weeks, as soon as certain contractual negotiations and contract modifications have been completed by M-P&C. ✓

FEBRUARY 12, 1962.

B
2-12-62

1. BOEING CONTRACT - It is expected that the Boeing contract will be completed either today or early tomorrow. The questions brought up in our Friday meeting have been resolved satisfactory to us. ✓

2. CONSTRUCTION PROGRAM - General Lampert, Corps of Engineers, Washington, D. C., will visit Marshall on Friday, February 16, for the purpose of discussing the construction program with Mr. Newby. ✓

3. WEST COAST ACTIVITIES - Mr. Gorman has been away for the past week, visiting facilities on the West Coast, to look into the problem of organization of our West Coast activities; particularly in the procurement area. He will return Tuesday night. ✓

B2/12

MICHOUD PLANT TRANSFER

The BOB Director recommended on 2/8/62 that the Michoud facility be transferred to NASA without reimbursement. GSA is now preparing papers necessary for formal transfer. This should be completed by 2/23/62. ✓

RENOVATION AT MICHOUD

General: NASA has transferred \$460,000 from R&D to C of F for the completion of the renovation of the office and engineering buildings at Michoud. ✓

Office Building: Work resumed in west end of building. Painting is 85% complete and floor tile is 75% complete. ✓

Engineering Building: Roofing complete. Additional work order will be issued to the contractor this week for the completion of the renovation. ✓

Manufacturing Building: Checking of 16 fan houses almost completed; exterior painting 70% complete and plumbing 90% completed. ✓

CHRYSLER SUPPLY CONTRACT

To expedite procurement of industrial facilities for the S-1 stage contractor, a modification of Contract NAS8-2576 is being negotiated with Chrysler in the amount of \$930,000. This modification is being incrementally funded at \$515,000. ✓

CHRYSLER LAYOUT AT MICHOUD

*Reference notes 2/5/62

Meetings are scheduled to begin today between MSFC & Chrysler to evaluate Chrysler's production layout. Preliminary meetings between interested MSFC elements have been completed and a unified position for MSFC has been established. ✓

FACILITIES REVIEW FOR MICHOUD

A complete facilities review is scheduled for 9:00 AM 2/13/62 in Director's Conference Room. ✓

CORROSION STUDY

D. Lucas is conducting a study of the corrosion effects at the Michoud facility. ✓

LEEVE STUDY

Studies are being completed by the Levee Board, New Orleans and the U. S. Army Corps of Engineers. When these studies are completed and evaluated it will be determined what action, if any, will be required to reduce the possibilities of flooding. ✓

3/2/12

NOTES 2-12-62 DEBUS

1. Organization: Since our meeting in Washington on the LOD organization, I have had many discussions with Siepert. Friday and Saturday, Carulli (Siefert's man) was here and we discussed many details. . . Also, Holmes called and said that he, Siepert and Young would be at the Cape this coming Wednesday (14th) for further discussions. I will not compromise our mutual position agreement without prior concurrence from you. . . Will keep you informed, and if you hear of anything new, please let me know. ✓

2. Titan III Siting Impasse: I presented to Seamans the factors which lead to the impasse on siting Titan III north of Complex 37. ✓

3. Land Acquisition: Progress good. Some criticism in press as to prices offered, but this is considered normal. ✓

4. Complex 37: Primary structural steel for umbilical tower all in place. Facility is on schedule to date. ✓

5. Little Joe II: Use of old Complex 56 is planned for launching Little Joe II boosters in support of Apollo project. ✓

6. Centaur: During the course of Centaur checkout this past week, it was disclosed that considerable harness wiring is not flight worthy. An overall inspection and replacement of wiring harness is in process. The schedule is being revised to reflect an overall slippage of one month from the present official launch date.

7. Lox Cleaning Facility: The new land acquisition program requires that we take over a building of the "Electro-Mechanical Company" (a lox cleaning company.) Accordingly, we plan to use it. Consequently, we will not install our planned facility in the assembly building. PAA will operate, we will operate the analytical lab portion. ✓

8. Printing Plant: LOD has now been authorized to operate a "Field Printing Plant" (Plant Number 20783) of the government. ✓

9. Labor: (a) As of February 6, 1962, the Air Force no longer pays \$5.00 subsistence per day to the IBEW members. The electricians say they will not work without it. This may affect Mercury where electricians act as "back up" before launch. Paul Styles is aware of problem and trying to work out something with Washington. (b) The Air Force is about to disallow the field rate pay of some 2500 IAM union people. They have voted to strike to keep pay. ✓

Copy of Centaur items furnished Mr. Huetter 2/12/62 JH

Hans Huetter

me about ready whole damn

To suggest to blow up the project. How long is this kind of thing to continue ??

B 2-12

B
2-12-62

1. BOEING CONTRACT - It is expected that the Boeing contract will be completed either today or early tomorrow. The questions brought up in our Friday meeting have been resolved satisfactory to us. ✓

2. CONSTRUCTION PROGRAM - General Lampert, Corps of Engineers, Washington, D. C., will visit Marshall on Friday, February 16, for the purpose of discussing the construction program with Mr. Newby. ✓

3. WEST COAST ACTIVITIES - Mr. Gorman has been away for the past week, visiting facilities on the West Coast, to look into the problem of organization of our West Coast activities; particularly in the procurement area. He will return Tuesday night. ✓

1. BASE HEATING PROGRAM STATUS: The S-IV six engine base heating program at Cornell is approximately 75% complete. ✓

A contract has been let with Cornell Aeronautical Laboratories for an S-11 Base Heating Program. Model design has begun. Tests are expected to begin in April, 1962. ✓

2. SATURN OPERATIONAL FLIGHT CONTROL: Mr. Richard A. Schmidt from Milton Rosen's office, NASA Hdq. was briefed by Dr. Speer on February 2, 1962, about the Saturn Operational Flight Control study. Although Schmidt personally appeared to believe in the great potential value of the study, he reported considerable opposition to our ideas by Mr. Rosen, primarily based on MSC input. The study itself is still in its initial phase with frequent meetings between RCA and AMR/MSFC representatives. ✓

3. COMPARISON OF OPERATIONAL MODES: A quick analysis of the relative performance of 3 modes to reach the moon with the C-5 vehicle was made. The same ground rules and weight estimates were applied in each case. The chances of success, from a performance point of view, appear very close and probably within the accuracy of the basic assumptions. With these restrictions it can be said, however, that the tanker mode ranks first, the connection mode second, with the lunar orbit operation mode being very marginal. An additional factor to be considered is the growth potential which is most obviously in the tanker mode. ✓

4. ATLAS-CENTAUR ANGLE-OF-ATTACK TRANSDUCERS: M-AERO initiated a program to conduct limited bench and wind tunnel tests of the Atlas-Centaur angle-of-attack transducers. Due to the several discrepancies observed during this program, it was recommended that the two flight instruments at AMR be shipped to MSFC for bench testing before release for flight. One of these instruments was rejected and one was accepted for flight, after certain modifications. These modifications will somewhat alleviate the excessive bearing loads and will reduce zero misalignment caused by improper balance. It is concluded that the specifications for these transducers are insufficient to insure a satisfactory operating transducer. An examination of the specifications revealed that specifications for mass balances, damping and friction are not included. A report of these findings has been forwarded to the Light and Medium Vehicle Office. ✓

1. NASA QUALITY PUBLICATIONS NPC 200-1. 2. 3: The coordination of the mentioned publications which deal with quality assurance provisions for inspection agencies, for space systems contractors, and for suppliers was successfully finished on February 6, 1962, by the Office of Reliability and Quality Assurance assisted by this Division. The group of consultants has mentioned in their final report that "the documents are fundamentally sound both administratively and technically". Comments of the group were favorably considered and were incorporated into the final version of the documents which will be available for NASA-wide use within the next two weeks. Particularly important is that top representatives of the Service Agencies (Army, Navy, Air Force) have also reviewed the documents, have made valuable comments which were incorporated into the final version. The Service Agencies have expressed in writing to NASA Headquarters that they consider the document "Quality Assurance Provisions for Inspection Agencies" (NPC 200-1) as the foundation for their future work with and for NASA, and they have offered full cooperation. ✓
2. MSFC SCHOOL FOR RELIABLE ELECTRICAL CONNECTIONS: In a meeting with Dr. Gephart, Mr. Mulholland, and myself participating, it was agreed that the MSFC School of Reliable Electrical Connections located at El Segundo, California, will be made NASA-wide and operated by WOO beginning at a date to be agreed upon as soon as funding, staffing, and housing details have been worked out between WOO and NASA Headquarters. Technical and training assistance and maintaining contact with the instructors will be the responsibility of this Division. This Division will start immediately with the coordination of the specifications and procedures involved with JPL. The results of this coordination will be used by the Office of Reliability and Quality Assurance for coordination with the other NASA Centers. ✓
3. QUALITY ASSURANCE FIELD REPRESENTATIVES: The benefits derived from the two field representatives of this Division in the Los Angeles area (located at WOO) make it advisable to locate representatives in other areas with heavy contract densities. The New York area is under active consideration at this time in order to save manpower and funds for TDY. The Procurement Office in NASA Headquarters recommended the Air Procurement Districts in New York or Newark as proper locations in absence of a suitable NASA organization and is investigating the possibilities in both places. ✓
4. STAFF ASSIGNMENTS, M-SAT: The letter with the above subject dated January 25, 1962, indicates in Par 1.b. a major change in the mission assignments to the Saturn Systems Office, to the Reliability Office, and the Quality Assurance Division. I have no reason to believe that this is intended by you. Therefore, the letter should be rescinded. I agree that the Saturn Systems Office needs a staff member for Reliability and Quality Assurance coordination within the Saturn Systems Office and for maintaining close relationship to the Office of Reliability and to the Quality Assurance Division. Thermofax of the referenced letter is attached. ACTION REQUIRED.
5. SA-2: SA-2 was moved to the Manufacturing Engineering Division 9:00 a.m. on February 10, 1962, for shipping preparation. ✓

cy staff
assign
Dr. Lange
2/3

Dr. Lange

see enclosure (next page)

B

Memorandum

DATE January 23, 1962

TO Distribution

FROM M-SAT

SUBJECT Staff Assignment, M-SAT

1. Dr. Benjamin Shratter, Technical Staff Assistant to the Director, SATURN Systems Office, is assigned the following duties and responsibilities:

a. To analyze, define and recommend means of improving the effectiveness of the SATURN Systems Working Group concepts within the management of the C-5 Vehicle System.

b. To plan, organize, establish and coordinate policies and programs for the SATURN Systems Office in the area of Reliability and Quality Assurance.

2. Your assistance and cooperation in aiding Dr. Shratter to carry out these assignments are requested.

Oswald H. Lange
Oswald H. Lange

Director, SATURN Systems Office

Distribution:

M-DIR

M-DEP-R&D

M-DEP-ADM

All Divisions & Offices

→ Dr. Lange

This should have been discussed and coordinated w/ Mr. Gray prior to issuance of this letter. Then his understandable complaint (see 2-12-62 Notes, Gray) could have been avoided. Please straighten things out with him and inform me about outcome.

1. VISIT TO ENVIRONMENTAL TEST FACILITIES: Personnel of the Gyro Branch recently visited Holloman Air Force Base for inspection of the supersonic track facilities in anticipation of a sled test program for the ST-124. Gengelbach of HAFB visited us this week to participate in preliminary planning of the program which is being considered for late fall. Acceleration up to 10 g's for periods of 5 seconds can be achieved on propelled portion of run with higher g levels attainable with use of water brake. A stop was made in Dallas to acquire more information on the Space Environmental Simulator being put into operation by Ling-Tempco-Vought. ✓
2. ADDITIONAL MEASUREMENTS FOR SA-5 (S-1): Details have been completed to add 57 new measurements requested by M-P&VE (control action 223). ✓
3. ADDITIONAL UDOP TRANSPONDER FOR SA-6 AND SUB: An offset UDOP transponder will be installed on SA-6 and subsequent vehicles. M-LOD will modify the present UDOP ground equipment for this system. This will result in improved range accuracy of 45 meters (60 meters now to 15 meters for new system). The new system will operate on 890 and 960 MC. ✓
4. VEHICLE INSTRUMENTATION WORKING GROUP MEETING: Meeting was held 1-31 and 2-1 at DAC, Santa Monica, California and splinter working group meeting with NAA-S&ID at Downey, California on 2-2. MSFC working group members toured DAC's Sacramento facilities on 1-30. ✓
5. SCHEDULE FOR FLIGHT SIMULATION FACILITY: Design started on building alterations 1-22 and is to be completed on 3-1. Start of construction is expected 4-2 with 8-1 being the target completion date. ✓
6. RATE GYROS FOR SA-5: A redesign of the rate gyros will be made so that they can be flown as passengers in the SA-5 tail section. Active use in the control loop would only be considered as a last resort. ✓

B2P

1. STATIC TEST SAT-23, VEHICLE SA-T3:

On 2-6-62 at 4:40 p.m. CST, a 45.66 second static test was performed with vehicle SA-T3. The main test objective was to investigate the effects on the LOX system when the 7-inch vent valve and LOX relief valve No. 1 open during mainstage. Cutoff was initiated by the LOX tank pressure observer after the test objective was achieved. The outboard engines were cut off 100 milliseconds after the inboard engines. ✓

2. NIKE-ZEUS TEST PROGRAM:

Tests are being conducted on the fins and various surface configurations of the NIKE-ZEUS Missile in the 164 in² High Temperature Burner Test Facility at the request of AOMC-DAC on a non-interference basis. AOMC authorized funding to be charged at overtime rates. ✓

3. TESTS OF S-IV CHILLDOWN GASIFICATION (per notes 2-5-62 Heimborg):

During the S-IV stage engine chillover phase, LOX will be exhausted into the S-1/S-IV interstage. The ambient pressure will be below the triple point of oxygen, forming solid particles which are considered impact explosive hazards. M-PEVE-P has proposed evaporation of the solid or liquid chillover oxygen using the sensible heat of a residual GN₂ purge from the S-1 fuel pressurization spheres. GN₂ manifold configurations are being tested to determine optimum shape for effective vaporization, and the effects on the RL-10 thrust chamber walls. Initial tests in this facility demonstrated solid nitrogen formation when exhausting LN₂ through the RL-10 LOX system at ambient pressures below the triple point of nitrogen. ✓

4. NOISE INVESTIGATION:

Evaluation of test SAT-22, 1-18-62, the loudest test run to date per Huntsville, showed that our present horn configuration was 30 db lower than the booster noise (see attached city map of Huntsville). This, of course, is a very preliminary result. So far, no complaints have been received from the City of Huntsville or the surrounding area. Does this indicate that we can slowly increase our noise level from test to test? ✓

5. SA-2:

Shipment of SA-2 is on schedule. ✓

ATTACHMENT 1: NOTES 2-5-62 Heimborg

ATTACHMENT 2: Noise Map of Huntsville

1. PCM FACILITY: The PCM Digital Data Handling System will participate in Orbital checkout operations, as far as reception in Huntsville will permit. On SA-6 an experiment will be made with the System feeding directly into a computer to observe guidance and control parameters. The loop back to the digital command equipment will probably be closed by telephone, but other, more automatic, methods are being considered. We are discussing this scheme with Astrionics, as suggested by you in NOTES 1-15-62 See Attachment 1. ✓

*Wase Neubert
in Eberhard's
absence
please see
to it
that we
will do
some
positive
inclusion
here.
B*

2. PROCUREMENT PROCEDURE: The procurement procedure to implement Bureau of the Budget Circular A-54 mentioned in NOTES 12-4-61, has been staffed through the divisions and in general has met with non-concurrence. Mr. King of TPCO now has the procedure and is to discuss it with Mr. Rees. See Attachment 2.

3. MICHOU D OPERATIONS: This division has generally agreed with the draft of the operations manual for the Michoud Operation. In addition we have furnished Mr. Constan a draft of a proposed manner in which computation and data reduction facilities be set up at Michoud. Essentially we feel that there should be one centralized facility servicing the various contract efforts and furnishing essential management and control data back to MSFC. We have recommended that this facility be set up by this division through contract under direction of M-MICH-DIR. ✓

4. TRANSFER FUNCTION COMPUTER: Arrangements have been made to use the Transfer Function Computer (a special purpose analog device from Gulston Industries) to determine structural transfer functions on the Dynamic Test Vehicle. Thirty-two low frequency vibrations will be taken simultaneously on a special tape recorder (obtainable in five months). The transducers will be distributed throughout the vehicle airframe. Some measurements will be designated as showing forcing functions. The transfer function will represent the response of transducers at other locations to these functions. ✓

Very interesting!

5. ARMY SUPPORT: The Army 7090 Computer is up and running. Our monitoring system (SPOOK) and most of our problems run fine on their machine. We are using their computer regularly, thus providing more flexibility in scheduling work on our machines. We like this arrangement very much. ✓

Attachment 1, NOTES 1-15-62 HOELZER
Attachment 2, NOTES 12-4-61 HOELZER

CONFIDENTIAL

NOTES 2-12-62 HUETER

B
2-12

1. CENTAUR:

a. F-1 Status: The revised launch schedule for F-1 gives a launch date of March 15. Part of the total delay is attributed to three weeks for installing new cable harnesses and repeating certain tests. The launch date is still not conservative inasmuch as we have not reached complete electrical system checkout testing.

b. PTV Testing at 1-1: A static firing was completed at 1-1 on Friday, Feb 9. Results are being reviewed. ✓

c. F-3 Status: The launch schedule of 1 to mid November for F-3 does not appear conservative at this time. Possible delays are attributed to the incorporation of the -3 guidance system and extensive lead time for preparation of guidance equation. This is being investigated and it is being recommended that a -1 guidance system be used for this flight. 22

d. Recommended Centaur Configuration: A presentation was made to Headquarters on Feb 9 and 10 and it was recommended that the Centaur configuration be switched to a separated Beta tank construction and with two burns would be used for all NASA missions and that the same Centaur stage be used with a third stage, possibly the Surveyor bus, to perform Advent missions. It was also recommended that titanium be used in construction of the Centaur fuel tank. A more detailed discussion will be held with Drs. von Braun and Rees during the first part of this week.

o.k. Let's have it. B

2. AGENA:

a. Project FIRE: Personnel from M-L&M-A met on Feb 7, 8 and 9 with personnel from Langley Research Center, Air Force, LMSC, and GD/A to discuss and finalize management responsibilities, communication channels and scope of work for GD/A effort in support of Project FIRE. We feel that a good operational basis has been established for the support of this project.

b. GE Guidance for Atlas Booster: A meeting was held with General Electric at SSD on Feb 6. GD/A has not been able to pinpoint reasons for the Atlas guidance failure during Ranger-3 launch. During the meeting, they proposed a redundant set of on-board equipment be used to prohibit a recurrence of this failure. They are presently preparing a formal proposal on this. ✓

c. QAO: GD/A has completed its design review and has selected the Advent shroud configuration for the Agena-B QAO mission. This will be presented to MSFC during the week of Feb 12, 1962 for study. ✓

d. Nimbus: During Aerodynamic loading test conducted the week of Feb 5, a structural failure occurred in the Nimbus shroud. Marshall personnel will visit LMSC and Douglas Aircraft Company this week to review test results and obtain first hand information on the failure. ✓

e. Agena-B Program Presentation: Detailed status and information on the Agena-B Program will be furnished during the presentation to the Marshall Board which is scheduled for Friday, Feb 16. ✓

→ *Request detailed briefing,
also on re-entry payloads.*
B

CONFIDENTIAL

1. LUNAR ORBITAL OPERATIONS

With lunar orbital operations getting more momentum, I feel we have to make a special effort to control our C-5 weight and performance picture in order to stay competitive. There seems to be a trend that too many people try to put their own safety margins in. This results in one reserve on top of many others and the performance deteriorates rapidly. I am trying to get together with Mrazek and Dr. Geissler in our Performance Review Board. An occasional encouraging word from your side might help.

2. CONGRESSIONAL HEARINGS

In order to be better prepared for congressional hearings, do you think it would be a good idea to personally invite Dr. Ritchie for a detailed technical discussion with system specialists. If you agree, I think I can handle it.

Agree. You have my full blessing! B

I shouldn't invite him under the heading of "forthcoming congressional hearings", because he has made too many rather opinionated statements already. But if you, as head of MSFC's Future Project Office, invite him to a discussion ("as one rocket man to another") to clear up certain questions you have in the area of analyzing complete solid-powered vehicles (incl. thrust vector control, transportation, emergency procedures, the "doubt" explosion criterion problem etc, etc) that'll be just fine. Say we'd like to get to the hard core of the controversy, — the question is not that we doubt you can build big solid motors, but those thousands of unsolved questions. Please keep me posted.

NOTES 2-12-62 KJERS

B₂-12

No report submitted as I am ill.

C-1 Project

Ref. Mr. Constan's Notes 2-5-62 (attached)

We are setting up MSFC groups to review Chrysler's planning and to direct the contractor that:

- a. MSFC established sources will be used for S-I hardware.
- b. Basic Chrysler plant layout is to be for S-I booster production and that if R&D tasks come up later necessary action to provide R&D facilities will be taken at that time.

This policy was explained to Mr. Meldrum during his visit at MSFC 2-9-62. ✓

Ref. Mr. Kuers Notes 2-5-62 (attached)

To cover this shortage sufficient re-programming within divisions was accomplished. Action with Hdqtrs. for approval of re-programming is under way. ✓

C-5 Project

S-IC: Failing to reach an agreement with Boeing on:

- a. Contractor's independent research cost pro-ration.
- b. Contractor's pre-contract costs, charged to separate SATURN cost center from 1-3-62 to date of contract award.
- c. Contractor proposal to include in "relocation costs" a provision to reimburse permanent transferees by \$1,710 for costs of home sales in addition to the ordinary relocation subsidy of approximately \$3,300.
- d. Fee.

and, Boeing's intention to appeal their point to higher authority, P&C, Mr. Davis notified Boeing that MSFC would initiate negotiations with another bidder on the S-IC R.F.O. because the program must move forward.

On 2-9-62, MSFC-DIR concurred with the position taken by the S-IC negotiation team and assured them of his support.

I understand that Boeing gave in on points b. and c. I have no word ~~of~~ about a. and d. but understand agreement has been reached. What agreement?

on all outstanding issues.

B

B2-12

1. MASTER PLANNING ACTIVITIES: A first set of Master Planning Charts essentially based on Golovin Committee and headquarters launch rates has been prepared. These charts incorporate funding and schedule information on all MSFC hardware programs including C-1, C-5, NOVA, Engines, Centaur, Agena-B, Nuclear Systems, Orbital Operations, and Facilities. ✓

In light of recent developments and Mr. Rees' memo of December 10, 1962, attached, we are starting a second cycle of master planning under more realistic assumptions. ✓

2. C-5/NOVA PROGRAM STATUS: It was found by the Ad Hoc Working Group that the large discrepancy between the C-5 NASA Headquarters congressional submission (essentially Golovin numbers) and the current Saturn Systems Office estimates was caused by:

a. Headquarters forecast was based on Golovin Committee estimates of C-4 funding requirements developed in November 1961, while the Saturn Systems Office submission was based on a current analysis of C-5 requirements.

b. MSFC is now considering one more test stage than was planned by the Golovin Committee.

c. S-IVB stage development is scheduled approximately one year in advance of the date specified in the Golovin Committee ground rules.

A memorandum for the record is being prepared to document these differences.

Identification of common hardware, facilities, and techniques for C-5/NOVA is now underway to determine total cost of combined program. ✓

*Cy Orbital op.
item furnished
Dr. Hoag
2/13 JGF.*

Oswald L.
RUSH

3. ORBITAL OPERATIONS: The Orbital Operations Committee is presently reviewing proposals by Lockheed/Georgia for study and test of LOX Tanker concepts. The committee will come up with recommendations on whether to go to industry in addition to efforts now being carried by Mr. von Tiesenhausen's group. ✓

Please discuss this with Mr. Newbert at once!

Attachment 1, Copy of Memo concerning Management Council Meeting in Washington, February 6, 1962

I asked him to prepare a new "study package" in this area. B

Mr. Ramsey of our Technical Services Office had done some work for us on LH₂ facilities. He has been assigned full time to work with me in this LH₂ study.

We have gathered data from Belew, Weidner, M-SAT, M-L&M, M-TPC, and this week will see M-TEST and M-LOD. Our visit to Pratt & Whitney last Thursday and Friday was highly successful. We talked to Pratt & Whitney, Air Products, AF local representative and our local representative (Bostwick).

The main problem there is that the AF LH₂ plant has been much too large for the consumption rate, and there has been too little storage capacity to cushion the supply-demand curves. Production of LH₂ is fundamentally a slowly changing constant whereas usage in an engine development program is fundamentally erratic. Consequently, the cryogenic part of LH₂ is often raised from -420°F. to ambient temperatures and again lowered to -420°F. This chill shock damages the equipment; then repairs must often be done right when LH₂ is badly needed. The solution is more storage capacity at Air Products and Pratt & Whitney. It may be that additional storage at the Cape and possibly even at Mississippi Test Operations will put more inertia into the system. Some additional storage facilities are planned and we are checking to see if they will be adequate. At the moment, LH₂ is hauled from West Palm Beach all over the United States.

The next step is to determine our best guess as to the development and firing schedules of MSFC vehicles using LH₂ for the next five to ten years. We also will look into the LH₂ requirements of organizations other than MSFC but only from the viewpoint of how their requirements might interfere with ours.

On Tuesday, March 6, we will go to the West Coast to make our field survey out there. Shortly thereafter we will go to see Mr. Bass in NASA Headquarters who is in charge of propellants. We do not want to talk to him until after we have made the field surveys.

One management difficulty which appeared at Pratt & Whitney was that the local AF man can call his boss in Harrisburg, Pa., and get a quick and final decision on what can be done to solve problems in Florida. Bass does not have this authority but must check with numerous other people which delays the decision. Secondly, Bass is doing an operating job in addition to planning: he ships tank cars and trucks around the country to handle crises while Mr. Ramsey and I are out doing NASA Headquarters type planning. We may recommend in our final report that the operating responsibility be placed at MSFC and the planning responsibility be placed at NASA Headquarters. We have more and later project type information on which to base LH₂ operating decisions than does Bass.

I have cancelled my planned 10 day trip to Williamsburg, Va., for the NASA Project Management Seminar in view of LH₂ trip to the West Coast. ✓

subscribed in Wozak's Notes (next page)

had

Suggest your final report to me should be suited to be passed on to
 - Holness } so keep it constructive, make
 - D.D. Wyatt } sure Bass knows it in advance
 - Seamanus. } and do your political footwork at Hq. beforehand, so it sells easily.
 Very good. Just keep going!
 B

1. RECOVERY: A discussion was held at NASA Headquarters on the status and position of the Recovery Program within MSFC. Dr. Seamans has assigned John Attinello in Canright's Office to look into the program and either initiate a firm program with full support or stop all program effort for the present. A paper is being prepared attempting to outline the pros and cons of two or three approaches for initiating a recovery program within MSFC. *let's discuss this, 3*
2. THERMAL PROTECTION: The unfired ceramic thermal insulation material (M-31) developed by M-P&VE-M, and programmed for use on SA-5 and subs, was tested successfully on SA-T-23. This material, fibrous potassium titanate in a matrix of colloidal silica, has a density of approximately 40 lbs/cu.ft. and its use will result in an overall vehicle weight saving of some 1000 pounds when compared to the insulation scheme used on SA-1 through SA-4. ✓
3. TITANIUM/LOX COMPATIBILITY: The film and discussion concerning the LOX sensitivity of Ti was presented to Col. Heaton and his staff in Washington on 2-9-62 by a representative of this Division. ✓
4. ADVANCED STRUCTURAL LAYOUTS: Feasibility studies and structural layouts have been started on large vehicle structures (NOVA Class). ✓
5. SA-5: The first structural test has been completed on SA-5 design. The 105" rear skirt was tested satisfactorily. ✓
6. ENGINE PROJECTS:

H-1: All engines for SA-4 have been delivered. ✓

F-1: On 2-5-62, the third turbopump explosion within four months occurred during a LOX/RP-1 green run. 1500K and turbopump testing has been discontinued pending analysis and solution of the problem. Testing will continue at the 1000K level pending close check of the risk involved. ✓

J-2: The first and second tests of the engine system, consisting of Augmented Spark Igniter ignition, were successfully conducted during this period. The current LH₂ shortage has resulted in a much reduced component test program. ✓

M-1: Preliminary negotiations with Aerojet were begun 2-8-62. A schedule, development plan and facilities requirements plus review of the status of technical studies currently underway were discussed. An RFQ will go to Aerojet during the week of 2-19-62.

RL-10: Contract negotiations for the current program with P&WA are complete and the contract documents are being drawn up preparatory to review and signature. The APIX (LH₂) plant, after a 20 day shutdown resumed operation on 2-2-62 but it went down again on 2-5-62 for 55 hours. Operations resumed on 2-7-62 and have continued. Testing has been limited to acceptance only. Engine deliveries should not suffer. Two new 90,000 gallon LH₂ storage tanks will be activated on or about 3-1-62. This will minimize the impact of the plant shutdowns should they occur. ✓

→ Thrust level 1.2M ?

NOTES 2-12-62 RUDOLPH

B₂-12

No NOTES received by 12:00 Noon.

Arthur

How's your staffing
coming along? If I don't
hear about your problems
I can't help you! B

Any news
from Shea?

PERT

SA-5 Efforts are continuing between M-SAT and the various divisions to reduce negative slack on SA-5 network as revealed in January 16, 1962 meeting. The present network with status reported through February 5, 1962 shows a negative 30.1 weeks slack.

Training - P&C is continuing efforts to finalize contract with University of Alabama for Phase II and Phase III of PERT training program. Finalization is expected by the end of February.

Saturn S-II - Meeting scheduled for February 26, 1962 with S&ID personnel to discuss incorporation of PERT reports in S-II contract. Saturn Project Manager, M-TPC, M-FMO, and Headquarters personnel will participate in scheduled discussions. ✓

PLANS & PROGRAMS

All personnel and spaces of Plans & Programs Branch, M-TPC have been transferred to FMO. Future reports on this activity should be from Chief, FMO. ✓

What was that again?

1. SUPPORTING RESEARCH PROGRAM: During the visit by Mr. Dixon and his OART staff, we were requested to furnish comments on the methods suggested by OART for implementing supporting research projects. Our reply will be ready today for your comments, and possibly for your signature.

RPD has requested all divisions to submit their proposed FY 1963 supporting research projects to us by February 20. As usual, the deadline imposed by Headquarters (OART in this case) is very tight, and we must have our complete submission to them by March 1. The request forms designed by OART require more background information than the form MSFC previously used, and thus will require more effort to prepare, but they are generally acceptable.

No decision has been obtained so far regarding MSFC's Orbital Operations Supporting Research Program. ✓

2. ELECTRIC PROPULSION PROGRAM: We have requested authorization from Mr. Schwartz (the NASA Headquarters Program Manager) to proceed with the transfer of the remaining ion and arc technology contracts scheduled to go to Lewis Research Center. Approval is expected within the next week.

As you were previously informed, we were to maintain technical supervision of five electric propulsion research contracts at MSFC. We had assumed that these contracts would expire after their present performance period, but Mr. Schwartz indicates that he wants to discuss plans for funding them in FY 1963. (Approximately \$200,000 would be required.) We feel that it would be desirable to continue our efforts on these contracts. Three of them are with the University of Alabama, one with ARAMA, and one with General Electric using MSFC's 7090 computer. O.K. ✓

3. SATURN THERMAL DESIGN: Members of Mr. Heller's Space Thermodynamics Branch have begun to familiarize themselves with the thermal problems of the SATURN SIVB stage, especially with respect to those problems concerned with Orbital Operations. This work is being coordinated with Saturn Systems Office, Propulsion and Vehicle Engineering Division and Astrionics Division.

4. RADIATION SHIELDING WORK: The question of RPD's continuation of radiation shielding work was further discussed with members of Headquarters, but it was not resolved as yet. We did not get around to discuss this matter

5. SPACE MAINTENANCE AND REPAIR TECHNIQUE (SMART): Five members of MSFC visited Dr. H. Strughold and Col. J. Stapp at Brooks Air Force Base to discuss the SMART program. Many interesting ideas were presented, but the program has not yet proceeded very far. The SMART group would be very happy to have task assignments from NASA. One result of their studies is that orbital repair capability for spacecraft of the Apollo-type is necessary, and that a ground-based repair crew is preferable to a crew permanently stationed in orbit when the stay time of the spacecraft in the Earth orbit is less than 30 to 40 days. ✓

and Douglas,
I hope
B

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Man.
Council
Meets.
Some
ran
out
of
time

FEBRUARY 19, 1962

B 2-19

1. STRIKE OF CUSTODIAL WORKERS - The craft unions working on construction of MSFC projects were out about a day and a half in sympathy. They were back on the job Friday with no appreciable time lost on the construction schedules. Custodial workers continue to picket, with no solution in sight at this time. ✓
 2. RESEARCH INSTITUTE - Met briefly with the committee, headed by Dr. Lundquist, on Thursday of last week. The committee met with Dr. Hermann of the Research Institute to review with him the areas of research which the committee is proposing for the Institute. The Washington office is opposed to a long term contract as a matter of policy -- the long term research grant is preferred. The committee is working toward this end. ✓
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- ** 5. In reference to your comments to my NOTES of 2-5-62 (attached) there has been nothing official from Washington. I expect this matter will be resolved in a matter of days. There is no basic disagreement between Marshall and Siefert. MSC may have some minor differences to work out. ✓

- ** 1. Mr. Hjernevik, from Manned Space Flight Center, visited on Thursday to discuss our relations in the Downey Plant of North American. We are both objecting to the Headquarters' proposal to have WOO represent us to the contractor. There is a meeting on Monday, February 5, 1962, with Mr. Siepert in Headquarters to discuss this problem further. ✓
2. Mr. Jerome S. Adlerman, Chief Counsel for the Permanent Senate Committee on Investigation (McCellan Committee) will be here on Wednesday and Thursday this week. The prime purpose of his visit is in connection with AOMC procurement activities. We think the purpose in visiting us is to meet with you and see our activities. (Not to investigate us.) ✓

J → Last time I talked to A, he was quite curious about our union troubles at the Cape. Suggest Paul S. be ready, in case.

Harry J.

Do you think Siepert's solution, — as presented at no during the 6 Feb meetg. in Washington — is acceptable? B

Answered
2-15-62 Rk
filed in R.F.

Mac but it also contains a lot of very useful info on the Dark Groups!!

February 19, 1962

MEMORANDUM

TO: All NOTES Writers

FROM: OFFICE OF THE DIRECTOR

SUBJECT: Weekly NOTES

Dr. von Braun:

This week's NOTES

~~contain a lot of info~~
~~just on working groups.~~

Therefore, today's memo.

✓ B Jan 2-14

The attached memo dated February 13, 1962, asks that "about once per month the NOTES should contain a brief progress report on the activities of the major working groups. This should be reported by the division director for the chairman of the working group who is employed."

It is intended that all existing procedures regarding the NOTES should still be observed: specifically, the one page limit will still be enforced. The activity of a working group should be one item on the one page of NOTES. If the division director must report on several working groups, this could be done by only reporting on one group in any one week.

The information desired is the following:

- a. Is the working group active; and, if so, how often is it meeting? Three words like "meeting approximately bi-weekly" can provide this.
- b. Is it working well?
- c. What are some (not all) of the major problems being handled by the working group? If Dr. von Braun wants additional information about what is being done on some item, he will ask for it.

If these reports exceed one page they will soon lose all of their value because they will not be read. Your cooperation will be greatly appreciated.

J. C. McCall

J. C. McCall
Assistant to the Director

Attachment:
Memo dtd 2/13/62

Copies to:
All NOTES Writers

B
2-19RENOVATIONS AT MICHLOUD

Office Building: Painting and floor tile completed; cleaning of west end, second floor and equipment rooms completed and preparatory renovation started; began installing duct work for air conditioning.

Engineering Building: Work started on screens and windows; circuitry and lighting in cafeteria started.

Manufacturing Building: Plumbing completed; exterior painting 75% completed.

Boiler Plant: All equipment 95% completed; one boiler needs repair - extent has not been determined. ✓

CHRYSLER PLANT LAYOUT

A meeting between Chrysler and MSFC representatives was held last week and it was determined that Chrysler should proceed with their detailed layout using six bays within the Michoud facility. Meeting is scheduled with Chrysler on February 26 to review the detailed layout and the make-or-buy plan. ✓

BOEING CONTRACT

The S-1-C contract with Boeing for about 9 million dollars was awarded. Boeing is to furnish direct labor toward furnishing management, labor, facilities, materials, tools and equipment. Also to do all things necessary and/or incidental to the performance of preparatory effort toward a project of engineering, fabrication, assembly, checkout, static testing, transportation and launching of the Saturn S-1C vehicle. ✓

A data link will be established between Michoud and Computation Division, MSFC, for transmitting data between the two installations. Initially the system will be used for transmission of supply data with the phasing in of financial and other data reporting. ✓

Representatives of Saturn Systems Office, Financial Management Office and Michoud Operations visited Chrysler Corporation Space Division at Michoud on February 16, 1962 to discuss the new financial reporting procedure. Chrysler was very receptive and offered several suggestions for improvement of the plan submitted. A subsequent meeting with Chrysler will be held at MSFC Headquarters on or about February 20, 1962 to finalize the work elements involved. ✓

NOTES 2-19-62 DEBUS

B₂-19

1. Organization Status: Will brief you personally on the developments. ✓
2. Titan III Siting: NASA is deadlocked with DOD for solution to this problem. A meeting is scheduled today at CCMTA with Holmes, Schriever, Davis and others to present the facts of the case. No action required. ✓
3. Application of Crawler Treads for Transporter/Launcher on Complex 39: Zeiler witnessed a demonstration of a huge strip-mining shovel on crawler treads with a gross weight of 6,000,000 pounds. The operation was very smooth and was judged to be as smooth as our Structure No. 34 movement. Another shovel with a gross weight of 16,000,000 pounds is under construction. We definitely think that this concept has an application for our Concept 39 Complex. The Bucyrus-Erie Company will submit a cost and time estimate for an engineering study by February 28, 1962. *Request a few details. B (pictures?)*
4. Unloading Site and Water Route: Heimburg's memo on problems related to barges, canals, and seaports with respect to transportation of SATURN indicates only a few of the many factors to be considered in the overall problem. Heimburg, Neubert and I discussed memo on 16th. Arranged for meeting at Cape upon arrival of SA-2. We will review total problem as it relates to the new area development and possible use of barges in the 39 concept, then relate these considerations to the total transportation problem to arrive at a coordinated solution. Will keep you posted. ✓
5. Accomplishment: Complete phaselocked UDOP system was operated successfully on Ranger 3 shot for the distance to the moon. I am having Sandler prepare a complete report and data analyses for wide distribution within NASA. ✓
6. Launch Operations Working Group Status: A Launch Operations Working Group Meeting was held in December. Subsequently one panel meeting has been held (the newly created Launch Preparations Panel, headed by Moser) and an Electrical Panel Meeting (Rigell) is scheduled for next week. The small panel meetings have been found to be a more efficient way of working out interface problems than calling frequent meetings of the entire working group. ✓
7. Orientation of Umbilical Tower in Complex 39: A basic difference in the C-5 configuration versus the C-1 configuration makes it desirable for the umbilical plane to coincide with the flight plane. This affects orientation of the launcher/transporter on Complex 39; the main problem for LOD, however, lies with the S-IVB stage, which is part of the C-5 configuration, but which may be used with the S-1 booster where umbilical and flight planes are separated by 58°. Resolution of the problem is in progress. ✓

1. SUMMARY OF ACTIVITIES, SATURN DYNAMICS & CONTROL WORKING GROUP: A meeting was held at DAC on December 4, 1961, with the following major points covered: (a) S-IV engine cut-off impulse and hydrogen chill-down duct impulse. The impulse tolerances about the standard will produce errors in the injection conditions which the guidance system can not correct. The necessity of a corrective device such as a vernier engine will be determined after coordination with the MSC personnel. The attitude control system on the Apollo could be used to correct for the cut-off errors. (b) Possibility of providing an out-put from the P.V. system for instantaneous mass and flow rate to be fed into the guidance system if the guidance equations demand these terms from an accuracy viewpoint. (c) Separation clearance of the S-IV stage at S-1 cut-off. A separation problem exists under the assumption that one S-1 engine is out and the retros are misaligned in the additive direction. The S-1 engines are canted through the center of gravity of the "total" vehicle at cut-off but at the instant of separation, the center of gravity shifts rearward for the separated booster and an overturning moment results if one engine is out. Possible corrective measure would be a 4-2-2 engine shut-off sequence. (d) Review of S-IV base heating test being performed at Cornell. Comparison of the 4 engine-SIV test results from Cornell with the test performed at AEDC agree closely. The six engine S-IV model is now being tested at Cornell. (e) Range Safety requirements for the C-1 vehicle. MSFC requested a component failure analysis of the S-IV stage for input into MSFC's range safety study for allowable flight azimuths for the C-1 vehicles. ✓

A meeting with NAA is planned for the second week in March to discuss interface problems in the area of dynamics and control associated with the S-II stage. The Flight Mechanics Dynamics and Control Coordination panel between MSC-MSFC intends to meet the last week in February. ✓

2. SUMMARY OF ACTIVITIES, SATURN FLIGHT EVALUATION WORKING GROUP: Two Inhouse Working Group meetings were held during the past month. The SA-1 flight evaluation was discussed in detail and improved procedures worked out. Additional equipment requirements were defined and transmitted to M-SAT. Some confusion existed in the polarity of various inflight measurements. Action has been taken to create a standard polarity designation which applies also to the upper stages. Data and tracking requirements for SA-2 through SA-4 had to be revised. A new document was issued to LOD and includes the special requirements for the "High Water" experiment. Several discussions were held concerning the use of Hangar M checkout facilities by DAC for post flight data processing. In view of the very high data requirements it appears indicated that DAC made use of this equipment. M-SAT is coordinating the viewpoints of DAC, M-LOD, M-SAT and this Working Group. First steps are taken to use film storage of future flight data since conventional storage methods are inadequate for the data volume anticipated. A first compilation of errata sheets for the SA-1 evaluation report was published. M-P&VE and M-AERO evaluation groups continued their mutual efforts to reach a better agreement on propulsion system evaluation techniques. The proposed MSFC system of measuring units has been tentatively concurred by M-DIR and will now be published for final comments. Based on the experience with the SA-1 evaluation, the number of permanent members of this Working Group was increased from 9 to 18. ✓

3. S-IV IGNITION AND FLAME-OUT: Dr. B. Lewis and Mr. B. Karlovitz of Combustion & Explosives Research, Inc., visited Douglas Aircraft Co. at the Los Angeles and Sacramento during the week of February 5-9, and at the request of MSFC in connection with ignition and flame-out trouble in the S-IV helium heater at low pressures. Cause of the trouble was found to be excessive injector velocities and inopportune mixture ratios. Remedial steps were recommended and some of them were successfully tested in their presence. The consultant expects that the burner will operate as desired by end of February. ✓

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1. IN-HOUSE IMPLEMENTATION OF NASA POLICY 4-2-2 THROUGH MSFC 4-1 QUALITY ASSURANCE POLICY AS APPLIED TO MSFC PROGRAMS (COPY ATTACHED): Plans are progressing for implementing MSFC Policy 4-1 and NASA Policy 4-2-2 concerning quality assurance requirements for all procurement documents. Present plans call for the placing of Quality Assurance Division representatives in several of the procuring divisions and in P&C for expeditious handling of the procurement requests. A conference will be held with each element to work out details. ✓
2. NASA QUALITY PUBLICATIONS NPC 200-1, 2, 3: We are presently working on examples of a proper quality assurance and inspection plan and a monthly quality status report for fulfilling requirements of the NPC 200-1, 2, and 3 series of NASA Quality Publications. It is anticipated that these, like our Quality Engineering Bulletins, will be adopted for national use by NASA Headquarters. ✓
3. TRAINING: Present status of the School for Reliable Electrical Connections is as follows: The MSFC Huntsville School has trained 591 people, and the MSFC West Coast School has trained 272 people. This Division is planning to open a Crimping School on March 19, 1962, and a Welding School on April 23, 1962. ✓
4. CENTAUR: GD/A has reorganized to increase emphasis on Centaur. Mr. Bill Monroe, the new Manager of Reliability Control (Quality & Reliability) for GD/A, visited our Division on February 2, 1962. Mr. J. Y. McClure, corporate head of Reliability & Quality Control for GD/A, visited us on February 6, 1962. ✓
5. SA-2: SA-2 Booster will require further testing due to modification and incompleteness at the time of shipment. Outstanding work to be performed on this booster at the Cape is insignificant compared to SA-1 booster. ✓
6. SA-3: Considerable problems are being encountered with leaking tubing throughout the various systems, and system incompleteness has hampered testing. ✓
7. ACTIVITIES OF THE TEST AND CHECKOUT WORKING GROUP: The Working Group met for the first time with NAA/SID in December for a review of the Test Plan and Quality Control Plan for the S-II stage. Initial concepting and design of test and checkout equipment for the stage has begun. During January, members of the Working Group visited NAA/SID and have worked since that time partially here, partially at NAA on a preliminary review; this is in agreement with the Electrical Design Integration Working Group. Also, during January, members of the Working Group from the Test Division visited DAC for familiarization with the static firing program of the S-IV. ✓

1. RESPONSIBILITY FOR SIGNAL CONDITIONING OF ENGINE MEASUREMENT: In a meeting with Rocketdyne, NAA-S&ID and DAC, January 16, 1962, it was decided that signal conditioning is the responsibility of the stage contractors. ✓

2. CENTAUR FLIGHT F-1: Mr. O. C. Green, M-ASTR-Gyro Branch, was sent to LOD to assist in checkout of GSE and flight hardware for Centaur Flight F-1. ✓

3. GUIDANCE SCHEME: It has been resolved with Aeroballistics Division that the mechanization of a $\frac{\dot{M}}{M}$ and of the $\frac{F}{M}$ term in the guidance equation

will be accomplished by calculations within the computer. No direct measurements with additional accelerometers or jerkmeters will be made. ✓

B2-19

I. CENTAUR-G&C WORKING GROUP, Chairman: H. Thomason: This working group held five meetings since its start. The main effort of this group was to improve the reliability and performance of hardware to acceptable levels. Recently the area of control has been added to the mission of the group. Some of the highlights are as follows: a. Stabilizer improvements were initiated: (1) New, more reliable gimbal torque motors with higher output rating; (2) New improved sliprings; (3) New temperature control amplifiers; (4) Elimination of gyro block heaters; (5) Accelerometer dither frequency changed. b. Other activities include: (1) Initiated telemetry calibration and limited data reduction at M-LOD; (2) Initiated study for D-value (gyro drift compensation) readout capability; (3) Initiated design of platform shipping containers and handling frame; (4) Initiated quality control checks at Honeywell and Librascope. To indicate the guidance hardware problem the following listing of the status of the first nine systems is given: #1. Inoperative --located at GD/A --Gyros not available --to date 2,600 hours have been logged on system. --GD/A proposed to use as spare parts; #2. Inoperative --located at GD/A --exact trouble not defined --to date approximately 2,500 hours running time logged --GD/A proposed to use as an engineering evaluation unit; #3. Inoperative --platform returned to M-H for replacement of gyro damaged during system checkout at AMR; #4. Flown on piggyback #1; #5. Operative at AMR scheduled for F-1; #6. Returned to M-H --system failed initial acceptance tests; #7. Undergoing acceptance tests at GD/A - San Diego--scheduled for POD #2; #8. Delivery to DG/A --scheduled March 1962 to be allocated to M-ASTR; #9. Delivery to GD/A--scheduled for April 1962 for F-2. ✓

II. VEHICLE INSTRUMENTATION WORKING GROUP, Chairman: O. Hoberg: The last meeting was held January 31 and February 1, 1962 at the DAC plant. (a) Review of design (98.5% complete); (b) Progress was made in solving RF interference problems; (c) Antenna patterns were submitted; (d) Measuring program for SA-5 is considered final by DAC but does not contain measurements requested by MSFC. Lack of funds prohibit additional hardware. The next meeting is planned for February 20, 1962 at Huntsville with DAC to resolve measurement requests for SA-5 and SA-6. March 22 is set for first instrumentation system test. The following points will be discussed. (a) DAC to furnish MSFC TM beat frequency data (March 15); (b) Procurements specifications for measuring components (requested since September 1961.); (c) S-I and S-II separation measurement configuration (requested September 1961). Meetings are planned on S-IVB and S-II for mid-March with DAC and NAA to discuss automatic checkout plans for integration into their stage measuring programs. (As of this date there is no contractual agreement between MSFC and NAA about engine instrumentation authority.)

table #1
Please
straighten
out with
M-SAT
B2-19

III. SATURN-APOLLO ON-BOARD INSTRUMENTATION AND COMMUNICATION PANEL, Chairman: O. Hoberg: Telemetry frequency interference problems for SA-5, SA-6 and SA-7 are still being investigated. Difficulties exist in obtaining information from MSC. The following is required: An MSC organization chart and information in general, scale model or drawings of spacecraft for antenna pattern measurements and a detailed spacecraft measurement program.

Copied marked
item furnished
Dr. Kuetter
H/21

Dr. Kuetter SAT
please straighten out B

1. SHIPMENT OF SA-2:

The booster and upper stages of SA-2 were loaded aboard the "PROMISE" Saturday, 2-17-62, and started on the way to the Cape on schedule. Location at 10:30 a.m. today, 2-19-62, Memphis, Tennessee; average speed: 14.4 knots. This speed is expected to continue for the next 12 hours. ✓

2. SA-T:

The last of the present series of static firings of SA-T is planned tomorrow, 2-20-62, at 4:40 p.m. After post-static inspection and evaluation, SA-T will be removed from the tower to make room for SA-3. ✓

3. I-A TEST STAND DEFLECTOR AT EDWARDS AIR FORCE TEST SITE (for F-1 testing):

On Monday, 2-12-62, a meeting was held at Rocketdyne to discuss the rebuild of the deflector, which was destroyed on 2-6-62 during a run of 96 seconds. Participants from Test Division were Messrs. Tessmann and Chumley. In order to cut down on cost and time, an interim solution was discussed and determined. The solution is very marginal and does not, according to Test Division's experience, bring proper results toward long lifetime. The change will cost approximately \$150,000, and be installed and ready for operation by the end of March. Test Division's proposal for an approved design (30° inclination with a better water and pressure distribution) might go as high as \$300,000 or more, with a build-up effort of 16 to 18 weeks. Since the test stand I-B has the same deflector configuration with an outside organ-pipe cooling system as I-A had, and the fact that Rocketdyne has a very low confidence level on this (in case it goes in the 1.5 million rating tests), it was decided to incorporate the interim solution on this stand also. Should the F-1 test schedule be delayed (to be discussed Tuesday, 2-20-62), Test Division would recommend the 30° deflector configuration.

4. FW-2 FIRING:

Messrs. Tessmann and Carrington attended the Saturday, 2-17-62, tour at Aerojet-General and participated in briefings and the test run of the big solid motor, FW-2. Overall, it was interesting; the test could only be observed over small TV screens from inside of the Blockhouse (no immediate values were shown). Peak chamber pressure 600 p.s.i.; test time 96 seconds as scheduled. A forthcoming film with curves showing thrust, chamber pressure conditions, and other phenomena will be shown in the near future. The Air Force participated rather strongly. Dr. Pickering also was a visitor. ✓

When we have engines coming out of our ears. B₂-19

B₂-19

B₂-19

NOTES 2-19-62 HOELZER

1. ASSISTANT TO ME: I have appointed Mr. Carl Prince as Assistant to the Director for Operations. He is responsible for the Service-Bureau type activities of the entire division. According to this, the position should really be called Assistant Director. An attempt to get this approved failed. See Attachment 1.
2. ARMY SUPPORT: The army is establishing a computer panel to resolve all problems involved in their automatic data processing operations. They have asked that MSFC participate in these panel discussions in an advisory capacity. Mr. Prince has been appointed as our representative.
3. HOUSTON: NASA representatives from Houston have studied various payroll systems in NASA and have selected the system which we installed at the Cape for use in Houston.

Attachment 1 - Memo, Subject: Appointment of Mr. Carl Prince
As Assistant to the Director for Operations of
the Computation Division

1. CENTAUR:

a. F-1: Launch operations, launch checkout and preparation on F-1 are proceeding on schedule. The inhibit circuit and power filter circuit additions are installed for F-1, eliminating the current specific programmer problem. Marshall has established firm procedure control at the Cape for the guidance checkout. The platform which was damaged through inadequate procedures has been repaired and returned. Modifications have been made to the isolation amplifiers and in addition back-up amplifiers from a different manufacturer have been ordered. No extended additional delay is anticipated because of amplifier problems. Cables have been replaced and are being checked out. The current launch schedule is the best information at this time. ✓

b. PTV: Testing at Edwards: A 60 second duration static firing was completed on the PTV at Edwards on Friday, Feb 16, 1962. Initial results and operations appear very good. Data are being reviewed in detail. The countdown from T-95 was accomplished in approximately 120 minutes and without any adverse developments. ✓

c. Program Status: The Centaur program recommended by MSFC to NASA Headquarters on Feb 9 and 10 is apparently acceptable from a technical standpoint. There are expected to be, however, difficulties in obtaining adequate funding to pursue the program as proposed. Consequently, we have been asked to prepare "cheaper" proposals. These we are now preparing, utilizing the philosophy that in no case will we compromise the technical approach. ✓

The same Centaur presentation given NASA Headquarters was given at JPL on Feb 15. There is not yet an official JPL reaction although they apparently recognize that the recommendations are necessary to a sound program. ✓

2. AGENA:

a. Atlas Booster for Ranger 4: The delivery of Atlas 133-D to AMR for Ranger 4 has been rescheduled. Originally scheduled for Feb 22, delivery is now planned for Mar 14. Mr. Cope, LOD, reports that the original schedule contained some padding and this delay will not affect launch. Also, the insulation bulkhead which ruptured in Ranger 3 will be removed at AMR. Autopilot spares, which have been a critical problem in previous Ranger launches, will be shipped to AMR with the booster. Agena-B 6004 is expected to arrive at AMR on schedule. ✓

b. Rescheduling of A-12 Launch Date: Goddard Space Flight Center has sent a letter to NASA Headquarters requesting a rescheduling of the Echo A-12 launch. Since AVT-1 (test sphere) failed to inflate, a delay in the launch of AVT-2 (2nd test sphere) until June 19 was requested. Based on a successful AVT-2 attempt, the Echo A-12 launch would then be launched on Aug 21. This launch was previously scheduled in May. ✓

Enc

Statements on Working Groups

1. CENTAUR:

a. Structures Working Group: GD/A has prepared and presented to the Structures Working Group a complete structural review of the Atlas/Centaur vehicle. Vehicle loads, design criteria, wind criteria, and structural and dynamic analysis were presented to the group. General reaction of the group was favorable. The next task of the group will be to review the structural design of the proposed Beta-split Centaur with Surveyor bus as a single burn third stage. ✓

b. Propulsion Working Group: At the last meeting of the group held on Jan 24 and 25, a review of test results and test plans for the various Centaur static test sites was made. In addition, the recent difficulties with the Centaur boost pump and drive system were discussed and GD/A corrective actions were reviewed. Further review and analysis of the Centaur propulsion system development program is required and will be the major effort of the group. ✓

c. Titanium Steering Committee: The Titanium Steering Committee completed its three month analysis of the acceptability of Titanium for the Centaur vehicle and presented its report to M-L&M on Jan 22. Titanium for the LH₂ tank is recommended but LO₂ hazards appear to preclude its use in the LOX tank. ✓

d. Tracking, Telemetry, Communications and In-Flight Measurements Working Group: This group's current primary concern is the establishment of tracking requirements and possibilities for the various missions versus the schedule due to recent mission shifts. The group is also closely following the establishment of the new Glotrac net and its impact on the Centaur program. ✓

e. Guidance and Control Working Group: The group has been recently concerned with guidance set allocations. This is a critical area due to a shortage of sets compounded by a slow production rate and a high failure rate. The group is now expanding its activities to include the control functions of the Centaur. ✓

f. Systems Checkout and Preflight Test Working Group: This group is currently evaluating a GD/A proposal for a new Atlas/Centaur/Spacecraft checkout facility at GD/A. This new facility would permit the combined checkout of all stages in accordance with MSFC philosophy. ✓ Sounds good to us B

2. AGENA:

a. Agna-B Lunar Working Group for Performance Control, Trajectories, Guidance and Control and Flight Dynamics: LMSC is reviewing data collected on operation of the horizon sensor used in the latest Agna-B launches and is preparing recommendations for changes to be incorporated into the horizon sensor for the Mariner-R launches. AMR Range Safety is being contacted to determine the applicability of the Ranger 3 range safety trajectory volume to Ranger 4. The requirements for a command destruct system on the Mariner-R Agna-B stages are being studied. Results are expected by the third week in February. ✓

b. Satellite Vehicle Integration Working Group: The group has definitized OAO launch vehicle configurations, has coordinated this with gantry requirements, and has investigated the structural adequacy of the A-12, S-27, EGO and Nimbus aerodynamic shroud system. The group has conducted vibration tests on S-27 flight equipment, assisted Goddard in the design and testing of the Nimbus adapter and separation system, monitored Nimbus and S-27 aerodynamic shroud separation tests, and coordinated the inclusion of angle of attack and a structural measuring system into the Ranger 4 and 5 launch vehicles. ✓

H. Huesler
Request more details. (1 page or so)
B2-20

H.H. Has is the Librascope reliability picture & if it hasn't improved, could we replace it with a Titan computer

B₂-20

1. NOVA

We received the Headquarters draft of the rewritten work statement on the NOVA Preliminary Design Study. They have made considerable changes to our proposal. We are willing to go along with many of them in accordance with our desire to create a good "team spirit." However, there are approximately 13 "mandatory" and 8 "desirable" changes, which we will submit in writing Tuesday morning, January 20, by special delivery. ✓

2. ORBITAL OPERATIONS STUDY

Two of our proposed studies, "Orbital Space Station and Launch Support Facility" and "Orbital Maintenance Capsule (Hard Suit," will be financed and supervised by the Office of Manned Space Flight. We will participate in this study and have one or two representatives on the supervisory panel. This agreement was negotiated at the Manned Spacecraft Center by Jim Carter. We still hope to get approximately one million dollars in study money for four studies in these areas:

- a. Performance Manual
- b. Advanced Orbital Launch Booster
- c. Orbital Systems Study (will be emphasized in support of APOLLO)
- d. Maintenance and Repair Requirements (contribution to Air Force study, cost-sharing contract with Bell)

by above
at OMSP?

H.H.K.
Please keep me posted on this
B₂-20

B-20

1. SA-2: Final preservation work on the SA-2 Booster was accomplished and the vehicle was released to Test Division for transportation on February 16. ✓

2. Working Group: The Vehicle Assembly Working Group held meetings with North American and Douglas Aircraft in Los Angeles on Feb. 7 and 8, respectively, to discuss problem areas on welding and fabrication of the S-II and S-IV Stages. NAA, now involved in a R&D problem on welding and forming propellant container components, discussed their manufacturing concepts and anticipated problem areas. Through coordinated efforts of the welding equipment manufacturers and MSFC, equipment developments and changes found desirable at DAC will be furnished NAA at the earliest opportunity in order to expedite the S-II development and engineering program. ✓

Very good!
B

3. Second Shift Operations on SA-5: Effective Monday, February 19, a second shift operation of 10 hours per day and 8 hours on Saturday will begin with an initial work force of approximately twenty-eight (28) employees. This second shift operation, duplicating the working hours of the first shift, is being initiated in an effort to reduce the delay anticipated on the SA-5 vehicle. ✓

4. Regarding Questions About Building 4707 Addition: (a) Redstone Arsenal Master Planning Committee has not finally approved the plans for this building. Mr. Luehrsen stated that according to established rules for this area we can go up to 155 feet above ground on this specific location. This means we could go high enough to take a complete S-1C structure in the tower without engines. (b) With the present layout, however, this building cannot accommodate a complete S-1C stage. Present plans provide for mechanical splices between Lox Container, Connecting Skirt, and Fuel Container which we intend to accomplish in a horizontal manner. By this concept, the Lox and Fuel Containers can be separately fabricated, pressure tested, cleaned, etc. If the Connecting Skirt would become a honeycomb structure (as now planned for operational vehicles) then the joint would very likely become a welded joint. In view of this we layout the foundation and steel structure of the building to be strong enough to carry an extension of approximately 20 feet. We would love to start with a higher building right now, but are afraid to ask Washington for more money at the present time.

Probably
wise!

W.K.

→ Would it be technically possible to raise that roof later on? Wouldn't that stop operations for 6 months?
B

1. General

a. Staff Assignment, Dr. Shratter (Notes 2-12-62 Grau) was discussed and an agreement was reached with Mr. Grau (see attached memo 2-14-62.) ✓

b. Funding: A presentation will be made to Messrs. Rosen's and Lilly's offices on 2-21-62 on the facility modifications required at Michoud for S-I, S-IC, and General Support. \$17 M are required in FY 62 to maintain the SA-10 and S-IC schedules. Funding must be made available by March to maintain this schedule. NASA Hqs. has been requested to reprogram R&D funds to C of F to satisfy this requirement. Mr. Lilly has stated that reprogramming existing FY 62 C of F funds would be extremely difficult.

Please keep me posted. IMPORTANT B

2. C-1

a. S-I: Our effort to reduce the anticipated negative slack in the SA-5 S-I stage as evaluated from PERT has resulted in a reduction from -- 37 weeks to -- 21 weeks. Work is continuing. Report will be made to M-DIR, 3-1-62.

b. S-IV:

→ Good. Target: zero!

1. Action is being taken to increase overtime in specific areas at DAC. ✓
2. Slight creasing of the skin is occurring in fabrication of the common bulkhead. P&VE, QUAL, M-ME are investigating the problem. The possibility of a comprehensive bulkhead test program at MSFC will be explored with M-P&VE, and M-TEST. ✓
3. The first chilldown test with Engine 1708 is scheduled for this week. ✓
4. We are exploring the possibility of starting the BETA Test Stand Complex at Sacramento, in lieu of modifying Stand 2A for S-IV program back-up capability. FY-62 cost to the government would not exceed \$200,000. This would also give an early start to the S-IVB utilization of the BETA Complex. ✓

c. Three-Stage C-1: FY-62, 63, and 64 cost data was given to Colonel Heaton on 2-17-62 for a three stage vehicle S-I, S-IV, modified Centaur program with 4 vehicles in 1965, 6 in 1966, and 5 in 1967. Direct injection, separable payload offered was 6,000 pounds (reduced to approx. 5,000 lbs with waiting orbit.) Modular Astrionics equipment to be developed under C-5 will be utilized.

3. C-5

Aerospace Building

(Dr. Weisner's committee)

A meeting has been established by Dr. Golovin/on 2-23/24-62 for a technical review of the S-II and S-IC development programs. The meetings will be at the contractor's plant. SSO will be represented. Meeting will be held at Aerospace Corporation, Los Angeles, California.

Exploratory meetings between FPO, PL and SAT for the purpose of establishing a coordinated C-5/NOVA plan and schedule has resulted in: 1) task of identifying common hardware development, 2) reconciling ground rules for scheduling & funding, 3) correlating the Golovin Committee funding with updated assumptions.

O.L. Review seems to be a bit early (we are just getting started). Please keep me posted B

O.L. a) Do these payloads refer to Surveyor - type missions? b) What exact missions are planned? B c) What payload diameter?

S-IC: Boeing negotiators in discussion with Mr. Davis, recognized and agreed to the Marshall position relative to the two main factors dead locking the negotiations. Specifically:

a. Boeing Corporation agreed to pay for employee housing costs from corporate funds.

b. All costs incurred by the Boeing Co. from 1-1-62 to date of contract are not allowable.

The fee was agreed at 5.84%.

On 2-12-62, the contract was finalized and signed by the Boeing representatives. PQC dated the contract as effective 2-14-62, and the package was handcarried to Washington the same day.

The Boeing Co. will send approximately 30 technical representatives to MSFC on 2-19-62, to familiarize themselves with the S-IC activities at MSFC and to develop technical contacts. ✓

The S-II S&ID letter contract was extended on 2-9-62 by approx. \$1.5 M which is an increment of the 6 Million required through 5-15-62. ✓

Facilities review for S-II is scheduled for Dr. Seamans on 2-20-62. ✓

S-IVB enclosure covers summary of meeting held at MSC on 2-14/15-62. ✓

The Ad Hoc Committee on the Lunar Funding Module met at MSC on February 14 and 15, 1962. Mr. C. W. Frich, Apollo Project Manager, conducted the meeting and Messrs Hall and Savage of NASA Headquarters attended. Mission modes within C-5 capabilities were examined and tentative conclusions were that the tanking mode may be possible, but that the connecting mode and a staged lunar landing module appeared to offer greater margin. MSC feels that at this stage of development the performance margin should be adequate to allow for a 25% increase in the inert weight of the orbital launch, lunar landing and payload stages, but that 5-engine performance for the S-II should be assumed, and that S-IVB design be based on shortest possible staytime in orbit, so that the combined accumulation of conservatism not kill the system. Ground rules were established for Lunar Landing Propulsion Module Study by Lewis Research Center, and the next meeting of the committee was set for March 5, 1962. Of the ground rules, the following may be of note:

1. LeRC will determine desirability of increasing S-IVB diameter from 220, not to exceed 260.
2. All studies will utilize data provided by MSFC on launch vehicle reference weights and performance including S-I, S-II and S-IVB stages. These data to be available by February 20, 1962. (Aeroballistics and P&VE are providing this)
3. LeRC will examine the lunar landing propulsion module in a stages configuration using the present S-IVB stage as described in item 2 above.
4. MSC assisted by LeRC will provide spacecraft data to MSFC for their NOVA studies. (A tentative spacecraft weight was specified)

SAT
 (assuming you
 authored this
 page)
 Eric

Sounds like an intriguing project!
 B

Has nothing to do with the
 Lunar Landing Module, or is
 combined configuration poor?
 B

OK (Thomas's)
 conclusion was just
 the opposite, wasn't it?

1. REFERENCE MANAGEMENT COUNCIL MEETING 6 FEBRUARY 1962, AGENDA ITEM #8 - DEVELOPING OF SOUND SCHEDULE, DEADLINE 19 MARCH 1962: This planning exercise will be coordinated by Central Planning Office. An Ad Hoc Steering Committee has been established in support of it as follows:

Hans H. Maus	Chairman	Mr. de Fries	Orbital Operations
J. N. Foster	Secretary	Maj. Petrone	Launch Operations
Mr. Bramlet	C-5	Mr. Belew	Propulsion
Mr. Lindstrom	C-1	Mr. Sheperd	Facilities
Mr. Huber	NOVA		

Be-co

A maximum amount of coordination will be exerted with OMSF and MSC during this effort.

2. NOVA PROJECT PLAN AND VEHICLE SYSTEM DESIGN STUDY: A work statement for NOVA Preliminary Design Studies which was worked out by Mr. Rosen's staff has been received for our comments. The proposal:

1. Limits studies to 1 configuration (8 F-1 engines for 1st stage, 4 M-1 engines for 2nd stage with engine out, and 1 J-2 engine for 3rd stage).
2. Recommends a hardware contract effective in September 1962.

We would like to give at least some consideration to other configurations such as 10 F-1 engines in the basement stage and related changes in N-II stage. We would prefer activation of hardware contract not before 1 January 63. The document is presently being reviewed by Future Projects Office, Propulsion & Vehicle Engineering Division and Central Planning Office and Marshall's consolidated comments will be forwarded shortly.

SNAFU: Koelle sent his comments directly to Rosen. I saw them just yesterday and

3. REQUEST FOR APPROVAL OF A MARSHALL CENTRAL PLANNING OFFICE: Jack Young has informed that our official request has been discussed with Messrs. Siepert, Wyatt and Holmes who are in full accord. On this basis Jack Young furnished us a tentative verbal approval. He hopes that final approval can be established shortly, pending availability of Dr. Seamans and Mr. Webb.

o.k. then

4. CONTRACTOR INTEGRATION COST REPORTING WORKING GROUP: The objective is to obtain cost and commitment reporting instead of the misleading obligation and expenditure data now available. A working group was formed with C. Andressen as Chairman and representatives from SSO, Michoud, FMO, Comp Div., TPC and OA. Four sub-groups were formed to work out the work increment reporting breakdowns for the S-I, S-IC, S-II and Mason-Rust Contracts.

This Week: A group went to Michoud to introduce the system to Mason-Rust and Chrysler. Mr. Haase, the Headquarters PERT man requested to be included in the next series of talks. He told C. Andressen that Washington feels it must see that there is a uniformity in PERT and comparable cost reporting in NASA and throughout government. Decision was reached with FMO to require all contractors to start reporting manually immediately on a simplified breakdown.

B2-20

1. ENGINE PROJECTS:

H-1: The 1.5 million dollars to purchase C-1 operation engines have still not been received. ✓ *Effect?*

F-1: All engine systems and turbopump testing with LOX as a working fluid has been suspended temporarily pending analysis and evaluation of the cause, risks and ultimate effect of the turbopump problem on the total engine program. An ad hoc committee was formed and a report will be forthcoming next week. ✓

M-1: Interim contractual coverage is being considered since it appears that a finalized contract will not be available prior to mid-April. ✓

2. C-5: As a result of an extensive accelerated evaluation program, 2219-T87 aluminum has been selected as the basic structural material for the S-IC. This choice of material will result in a vehicle weight saving of approx. 3000 pounds without introducing any manufacturing problems not also encountered with other alloys. (This is the alloy Boeing is proposing.) ✓

3. RELOCATION OF PROPULSION AND MECHANICS BRANCH: On the weekend of 2-10/11-62, the second design branch of this Division was relocated to the HIC. ✓

4. S-II STAGE I/VEHICLE MECHANICAL DESIGN INTEGRATION WORKING GROUP: The next (2nd) meeting of this group is scheduled for 3-27-62 at MSFC. Major activities at present: (a) Study of proper location and sizing of Retro-Rockets. (b) Engine and thrust vector alignment requirements and tolerances. (c) Hydraulic system studies in general and location (engine-mounted vs. stage-mounted), review of actuator control plane location, S-II and S-IVB to J-2 engine interface problems and environments. A meeting was held between S&ID and Mechanical Working Group representatives on the above matters last week. (d) Engine cluster configuration was settled at four engines on 210" dia. and fifth engine in center as opposed to five engines in circle (for control reasons). (e) Separation method and sequence studies are continuing. For the S-IC we have settled on a 1-4 cutoff, which was an important input for S&ID. (f) The control and stiffness requirement for S-II for an engine ~~hand-over~~ case on S-I *hard* has been eliminated. (About a 7000 pound weight difference in the S-II stage.) ✓

5. S-IV WORKING GROUP: The next meeting will be held on 3-13-62 at MSFC. Major items of interest and study are: (a) Change of chilldown sequence; the chilldown of the two propellants on the P6WA engine has been separated by introduction of additional valving. This shortens the LOX chill time to approx. 10 sec. or less. A nitrogen gas-LOX vaporization dissipation system will be installed in the S-I/S-IV interstage. (b) The helium heater is at present the most serious problem. Lighting and sustaining combustion at high altitude pressures are the difficulties encountered. Several schemes of flame holders and injectors are being tested. A modified injector was ignited at 2 psia and maintained combustion at 3 psia. (c) The common bulkhead was fabricated and tested at 24 psia reverse pressure without adverse effects. (d) The 3-dimensional internal insulation was tested in an 8-ft. dia. tank and pressure-cycled approx. 12 times satisfactorily.

I thought Dr. Lewis kicked that out? B (When he was at DAC)

W.M. This means, first-stage hand-over would lead to immediate abort anyway, right? B

B 2-20

1. I certainly appreciate your note to me and thank you so much.
2. Staffing of my office goes reasonably well.
3. Would like to see you for about one hour during this week, at your convenience, to continue clarifying my mission and my operations, i.e.,
 - a. Mission and attitude of Shea, as highlighted in Rendezvous Meeting in his office.
 - b. Support of Shea by reporting problems through me to him without exposing MSFC.
 - c. My contacts with elements of MSFC.
 - d. Strong Project Offices at MSC.

Yes, let's
continue
our
discussion
on 2-20
which was
definitely too
short!
B

B-20

PERT

Efforts are continuing between M-SAT and the various divisions to reduce negative slack on SA-5 network to zero. Computer printout dated 2/14/62 still reveals 26.6 weeks of negative slack. Meeting schedule with LOD 3/12/62 to start PERT applications on AMR facility projects. This effort will not include contractor effort at this time. NASA Headquarters and M-TPC personnel will assist LOD to get started. ✓

PLANS & PROGRAMS

Organization code referenced in last week's notes should have been M-FIN instead of M-FMO. ✓

Attachment No. 1 NOTES 2/12/62 Smith

PERT TASK GROUP

The PERT Task Group was organized in July 1961. Membership consists of a representative and an alternate from each operating division as well as the staff offices which contribute to PERT. The chairman is from M-TPC.

The purpose of the group is to coordinate all PERT effort as it pertains to their division or office, to be the central contact in their organizational segment for integration of networks and to provide bi-weekly reports for updating networks and computer printouts.

For the most part meetings have been held weekly. Much has been accomplished through these meetings such as discussion of mutual problems of networking, standardizing operating procedures, self education through discussion etc. Certainly the majority of progress of PERT to date can be contributed directly to the performance of the working group. ✓

1. ELECTRIC PROPULSION PROGRAM: Authorization has been received from Mr. Schwartz (the NASA Headquarters Program Manager) to proceed with the transfer of the nine remaining ion and arc technology contracts which are scheduled to go to the Lewis Research Center. A target date of February 26 has been established for completion of the transfer.

Mr. Thompson and Mr. Robinson of this Division and Mr. Cagle and Mr. Berg of Astrionics Division attended an electric engine flight test coordination meeting at Lewis Research Center on February 14 and 15. Mr. Harold Gold, Lewis Research Center flight test manager, requested strong MSFC participation at this meeting. Astrionics Division is currently conducting qualification tests on the programmer, on certain special electrical connectors, and on the batteries for the flight test capsule. ✓

2. RESEARCH INSTITUTE: Dr. Rudolph Hermann visited Huntsville on February 14 - 16 to discuss plans for the Research Institute. A comprehensive list of research subjects in which MSFC is interested was discussed and a very good agreement between Dr. Hermann's and MSFC's interests was found to exist. We are trying now to obtain a "Research Grant" for the Research Institute through Dr. Smill's office (Office for Research Grants and Contracts, NASA), patterned after a very similar Research Grant which NASA awarded to the Florida State University in Tallahassee in October 1961. ✓

3. CHARGED PARTICLE SHIELDING: Dr. Shelton and Mr. Keller will visit OMSF (Mr. Low) and OART (Mr. Ames) this week to discuss RPD's present and future work in charged particle shielding. OART is backing us firmly in our desire to continue our radiation shielding work on a basis that includes the RIFT and nuclear stage problems, but also shielding problems arising from the Van Allen belts and from solar flare particles. It is our intention to withdraw from the specific ORNL study which MSC has desired so strongly to take over, but to continue in those areas of radiation effects which still need studying. OART has encouraged us to this approach. ✓

E. S.
 But that's
 still just
 SCOUT
 testing,
 isn't it?
 Does this
 make
 sense?
 B

Very good

OFFICE OF DIRECTOR

MSFC ROUTING SLIP					
	CODE	NAME	INIT.	<input type="checkbox"/>	<input type="checkbox"/>
1		<i>Mr. Gorman</i>	<i>[Signature]</i>	<input type="checkbox"/>	I N F O R M A T I O N
2				<input type="checkbox"/>	
3				<input type="checkbox"/>	
4				<input type="checkbox"/>	

REMARKS

*Re Dr. V B's note on
MTF Coordinator -
Paul Rembling suggests
taking action towards
appointment + then
advising Sen. Stennis.
He believes that this
approach will be
satisfactory to Stennis, also.*

[Signature]

CODE	NAME	DATE
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OFFICE OF DIRECTOR

MSFC ROUTING SLIP					
	CODE	NAME	INIT.	<input type="checkbox"/>	<input type="checkbox"/>
1		<i>Mr. Gorman</i>	<i>[Signature]</i>	A	I N F O R M A T I O N
2				C	
3				T	
4				O	

REMARKS

*Re Dr. v B's note on
MTF Coordinator -*

*Paul Rembling suggests
taking action towards
appointment + then
advising Sen. Stennis.
He believes that this
approach will be
satisfactory to Stennis, also.*

[Signature]

CODE	NAME	DATE
------	------	------

Yes, please B

1. CENTAUR CONTRACTS - MSFC (Hueter, Grau, Davis, Hardeman, Huth, Newby, Gorman, and others) met with Air Force representatives from the GD/A plant (Colonel Moose and others) Thursday and Friday of last week. We hit some rough spots on the role MSFC is to play. Will give you a run-down on this if you desire. Inspection and contract administration are involved. ✓

2. COORDINATING GROUP MTF - Kent was in Washington Friday to deliver our position with respect to community support activities. Copy of my letter to Siepert is attached. Kent was to talk to Carroll Towne (Siefert's expert on community problems) and Paul Dembling. Will give you a report on this at your convenience. o.k. ✓

Harry See my notes on letter to Siepert B

3. ORGANIZATION - Jack Young has concurred in breaking out facilities engineering into a separate office. It is being done because of the increased emphasis on facilities design and construction. The Facilities Engineering Office will be headed by J. T. Shepherd. Davis Foxworthy is to head up the residual functions of the old Technical Services Office, i. e., supply, maintenance, motor pool operations, etc. Chauncey Huth who has been acting chief of Technical Services Office will become a special assistant to me. He will be primarily concerned with management relations with the Air Force and the Army. He will also be responsible for establishing our in-plant project offices such as the project offices at GD/A, Downey, and Pratt and Whitney, and for continuing follow-up and coordination of our business activities at contractor locations away from Huntsville. ✓✓

4. CHECK-OUT BUILDING - Quality Division has made a major change in the instrumentation required in their new addition. We have been unable to reach an agreement with the contractor as to the cost of these changes. We do not have enough money to pay his estimated cost. At this point our only alternative is to drop the entire instrumentation part of the construction program and do it as a separate job when we do get the money. This means that SA-5 will probably have to be checked out using instrument trailers rather than built-in instrumentation. ✓

5. S-II - Mr. Webb has not yet reached a decision on the S-II Site. He is trying to reach a decision as to whether these facilities should be sited at Eglin Air Force Base, or to set up a site selection committee to choose another site. Rosen is going to talk to Dryden again today. *Will be settled Wednesday 28 Feb (hopefully!)* B

6. STRIKE OF CUSTODIAL WORKERS - Although part of the janitors are still on strike, we are 100% manned and in full operation both in the custodial area and the construction area. ✓

→ Dieter Graess

Request a few details in next Notes B

Copy of needed items furnished Mr. Braun off 3/5

NATIONAL
AERONAUTICS
AND SPACE
ADMINISTRATION



GEORGE C. MARSHALL
SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

IN REPLY REFER TO

M-DEP-AIM

2-27-62

(Letter was changed
original dated 2-21-62)

Mr. Albert F. Siepert
Director, Office of Administration
National Aeronautics and Space Administration
Washington 25, D. C.

Dear Mr. Siepert:

It is our hope that the activation of the Mississippi Test Facility and the Michoud Plant will not entail the establishment of a government operated community for those workers required to build and staff the installation. Rather, it is considered preferable that communities in the area provide for these personnel. This will mean in each of the adjacent communities new houses will be built, schools expanded, and utility systems expanded or new ones built. Such an undertaking of self-development will require coordinated effort on the part of the community itself, the state, NASA (MSFC), and other governmental agencies.

At the community level, citizen committees are being encouraged to organize for the purpose of identifying problem areas in terms of housing, schooling, health and recreation, etc., and solutions and plans for action. This approach utilizes the part time gratis efforts of civic minded individuals who are neither elected officials or political appointees, nor represent contractor interests.

It is recognized that such individuals may have limited exposure to the field of community development and certainly not the background of their professional counterparts. Therefore, it may be desirable to have representation at the state level of a person, preferably from such a department as the Mississippi State Agricultural and Industrial Board. This person can coordinate efforts generated at community level, assist in establishing priorities on projects requiring state approvals or financing, and providing assistance to the communities of specialists in such areas as community planning, housing codes, finance, etc.

Harry G.

This is a fine letter. It reflects my own thinking precisely.
How do we make sure that whatever we do pleases
Sen. Stearns? Will Paul Deubling maintain contact
with his office? B 2-26 (I'm particularly concerned about
the Governor's appointment, par 6
next page)

Mr. Albert F. Siepert

The NASA (MSFC) input would be in providing plans, employment estimates, and programs for the facility to the impacted communities. In addition, NASA (MSFC) would endeavor to assist other government agencies to identify and bear upon those community problems relating to their respective functional responsibilities. Other government agencies would assist to the maximum extent feasible in performing surveys and making recommendations for community improvements, and in providing financial grants and loans within presently available statutory authority and responsibilities.

In summation, this Center proposes:

a. To encourage self-development action by local communities to provide necessary housing and related community facilities to meet the needs of Mississippi Test Facility personnel.

b. To recommend to the governor appointment of a state level coordinator to provide advice on citizen organization, coordination of community effort, and assistance of specialists in housing, finance, codes, etc., at community level.

c. Through your office, to seek maximum utilization of services of other government agencies, within framework of their legislative authority, to provide assistance in development programs.

To implement these proposals:

a. MSFC will coordinate requirements and plans with communities and government agencies.

b. MSFC will meet with community leaders and civic organizations to emphasize necessity for growth, and to advise on necessary steps for community improvement.

The above is submitted for your information.

Yours very truly,

Harry H. Gorman
Deputy Director for Administration

I hope the
governor
picks a
man
acceptable
to Sec.
Stamm's
B

RENOVATIONS AT MICHOU

The receipt of an additional \$460,000. C of F funds has permitted the continued renovation of the Office, Engineering, Manufacturing, and Boiler Plant buildings. The following has been accomplished to date:

Office Building: Painting and repair of floor tile completed. Installation of duct work for air conditioning in progress. Installation of new ceilings and lights in progress.

Manufacturing Building: Plumbing work completed. Painting of exterior 75% complete.

Engineering Building: Circuits and lighting in cafeteria area in progress.

General: Major repairs of substations 35% complete. Checking of underground high voltage feeders from Master Substations to Boiler house in progress.

Boiler Plant: Checking and repair of equipment 95% complete. ✓

PLANT MODIFICATION

No FY-62 C of F funds are available for plant modification requirements in the S-1 and S-1C manufacturing areas or the general support area. These funds are urgently needed by both the stage contractors. *Looks like \$2M for design and \$2M for construction can be expected shortly. Remaining \$8M like before.*

CHRYSLER PLANT LAYOUT

Today, representatives of MSFC and Chrysler are meeting at Michoud to discuss details of the plant layout. ✓

"MAKE OR BUY" PLAN

Today, representatives of MSFC and Chrysler are meeting at Michoud to discuss the "make or buy" plan. ✓

*of Supplement (approx May 62)
Please keep me posted B2-27*

COMMON CONTRACTOR FACILITIES

During a presentation February 21, 1962 by Boeing on common facilities at Michoud for standards and calibration it was pointed out that \$500,000.00 could be saved. In view of the money and floor space that could be saved by this type of common facility operation it was recommended to Saturn Systems Office that this information be presented to Marshall Director and division directors. This common facility is highly recommended for it would assure uniform data referenced to the same standard. ✓

PETITION FOR UNION REPRESENTATION

Mason-Rust (Support Service Contractor for Michoud) received notice from the National Labor Relations Board on February 13, 1962 that the Metal Trades Council of New Orleans had asked for certification as exclusive bargaining agent for all Mason-Rust manual (maintenance) employees. Mason-Rust agreed to election procedures as outlined by the NLRB. ✓

The Boeing Company contract NAS8-2577 for Saturn S-1C stage has not been approved by NASA Headquarters in Washington as of February 23, 1962.

*What's holding it up?
B1*

B2-26

NOTES 2-26-62 DEBUS

Meeting with Heimburg on Water Route and Barges

Reference: Last week's "Notes," Item 4, same subject.

Had to reschedule a planned meeting at the Cape with Heimburg to discuss this total problem. Holmes wanted me to be in Washington today (Monday) to go over the Titan III siting problem, also to attend the Council meeting on Tuesday. I talked to Heimburg and explained it to him. We will meet later.

✓

1. APOLLO WIND TUNNEL PROGRAMS: M-AERO personnel, Linsley, Holderer, and Reed visited MSC, Houston, Texas, on February 21, to discuss a proposed dynamic wind tunnel program in connection with the Apollo-Saturn buffeting problem. MSC has directed NAA to design an 8% elastic model of the launch vehicle which will be tested in the 16 ft. transonic tunnel at LRC. Data should be available by Sept. 1962. Additional dynamic programs will be required particularly at Mach numbers above 1.2. MSFC will initiate such programs as required. No progress was made in coordinating the overall MSC and MSFC wind tunnel programs or in firming up the shroud concept for SA-5.

2. LUNAR ORBIT STUDIES: A lunar trajectory deck is presently being programmed, and should be operational by early March. By modifying the program, it can be used for tracking studies. The first objective, prior to undertaking lunar orbit tracking studies, is to gain familiarity with low lunar orbit characteristics such as regression of nodes, perigee motion, existence of stable orbits, error analysis with respect to lunar constants, and secular effects in eccentricity and inclination. ✓

3. C-5 LAUNCH COMPLEX MODEL STUDIES: Aeroballistics Division and Test Division will jointly conduct small scale tests to optimize the C-5 launch complex. Aero. Division will work primarily on model launch deflector configuration studies, using air as the fluid medium, as well as a broad parametric study to be made in Aeroballistics Division's facility. Test Division will conduct hot flow studies on configurations resulting from Aeroballistics cold model tests. Delivery of firm design criteria to LOD is planned for July 1962. I hope LOD is tied in with this program from the outset. B

4. PERFORMANCE COMPARISON OF FOUR OPERATIONAL MODES FOR MANNED LUNAR LANDING: Tanking in earth orbit, connecting mode, lunar rendezvous mode, and a single direct shot were compared. Weight estimates on C-5 first and second stages were based on available C-2, C-4, and NOVA data and are listed in Branch Working Paper M-AERO-D #62-1. The results of the analysis indicate a performance advantage of the tanker mode with some 6,000 lbs. of performance reserve in orbit, whereas the connecting mode appears marginal even with no reserves in earth orbit. For the lunar bug 2,400 lbs. are available for the capsule and all equipment of the excursion vehicle. The direct shot with one C-5 and H₂/O₂ in the return stage would provide about 7,500 lbs. of capsule weight at earth re-entry. Several means of payload increase in earth orbit were investigated: (a) Waiting ellipse with 100 NM perigee and 420 KM apogee in lieu of 225 KM circular waiting orbit (10,000 lbs. gross payload gain), (b) optimization of S-11 stage for five J-2 engines burning (6,500 lbs. payload gain), (c) utilization of high energy propellants for small orbital maneuvers (8,000 lbs. for first shot, 1,500 lbs. for second payload), (d) nominal specific impulses in both stages instead of minimum guaranteed isp (10,800 lbs. payload increase). More recent weight information as obtained from PsVE shows a first stage burnout weight increase of 39,000 lbs. and an S-11 inert weight about 4,000 lbs higher than those quoted in Branch Working Paper M-AERO-D #62-1. Indications are that these weights can be improved upon by utilizing different materials, etc. The case, however, shows the ^{VITAL} need for strict weight control and emphasizes the need for payload growth potential if the lunar mission shall be accomplished with one earth orbit rendezvous.

Killy Mezdek *cy of model item furnished*
Mr. Meach 2/25
 Are you planning to setup a C-5 weight control board with Boeing?
 If so, I'd like to hear details.
 B2-26

1. COMPLEX 37B: A very large effort has been made to support LOD with the Complex 37B Contracts. We have assisted the prime contractor in establishing quality control programs in the plants of major subcontractors and have met with the Corps of Engineers to discuss inspection services at the construction site. We will continue to work with LOD as consultant on this program. ✓
2. ELECTROMAGNETIC INTERFERENCE PROGRAM: Negotiations are in the final phase of study prior to selecting a contractor for electromagnetic interference study within Quality Assurance Division. Also, personnel from the Performance Test Branch of this Division are assisting LOD personnel in performing interference measurements on the Launch Complex No. 34 at Cape Canaveral. This work is being performed at the request of LOD. ✓
3. INTEGRATED CHECKOUT TEAM: One member of the integrated checkout team is now working with LOD personnel on the stabilizer system at the launch site. ✓
4. CENTAUR: Modifications and additions to testing and checkout equipment at GD/A to fulfill MSFC requirements were thoroughly discussed in a meeting at M-L&M on February 20, 1962. A general approach representing a compromise between technical desirability and cost was extended to GD/A for more detailed analysis and consideration. ✓
5. SA-5 PROPELLANT TANKS: M-QUAL-E will monitor the installation of instrumentation on SA-5 propellant tanks at Chance-Vought, Dallas, Texas. ✓
6. GENERAL: Steps have been taken to streamline the organization in Quality Assurance Division. The design efforts which have been handled by the different Branches have been combined in the Operations Office of the Quality Assurance Division. It is anticipated that by better manpower utilization a saving can be accomplished. ✓

B 2-27

1. SPACECRAFT GUIDANCE FOR GEMINI: Mr. Hill and Mr. Troutberg from McDonnell Aircraft Company visited M-ASTR, 2-21, to discuss the Centaur guidance system which is favored by MSC for use in the project Gemini. ASTR discussed the results of investigations of the system for Saturn application and improvements proposed for Centaur. Hill and Troutberg will follow our advice to visit Honeywell and discuss the system in much detail. Before our discussions started, Mr. Troutberg indicated that he favors more the Subrock platform which had been developed by Kearfott. Other discussions with Digesu and Dr. Decker covered such subjects as rendezvous techniques, radar, etc. ✓

Here we go again
B

2. STATUS OF MAJOR FLIGHT HARDWARE PROCUREMENT ACTIONS: a. ASC-15 Computers; action covers additional units, test equipment, documentation and field support, 1.4M (.850 M in FY 62). Release dates: ASTR 2-6 and TPC 2-20. Action presently in P&C for negotiation. b. ST-124 Platforms; (1) Action covers two units, 1.4M incrementally funded. Release dates: ASTR 2-9, SAT 2-19 and TPC 2-21. Action presently in P&C for negotiation. (2) Second action covers seven additional units and related items, also acceleration of delivery of first two units covered in first action. Total estimated, 5.0M, (.955M in FY 62). Release dates: ASTR 2-9, SAT 2-21 and TPC 2-23. Action presently in P&C for negotiation. Valuable procurement lead time lost in this case because procurement plan on requirements estimated at 5M must be approved by HQTRS prior to release of RFQ. ✓

3. STATUS OF FIRST E. P. ST-124: Reutter and O'Connor of E. P. here last week for status review. We have approved E. P. plans for ST-124 servo electronics. First platform to be assembled and ready for functional testing in their Teterboro plant 6-15-62. ✓

4. USE OF FREON #113 FOR CLEANING BERYLLIUM COMPONENTS: Results so far indicate this solvent to be excellent when used in an ultra-sonic cleaner or a vapor degreaser. As compared to Xylene, Stoddard Solvent or trichlorethylene, no films or residues adhered to surfaces after cleaning. From all indications the components are exceptionally clean. Insufficient time has elapsed to realize any changes in the extent of Beryllium Oxide formation during parts storage. No complaints of toxicity, allergies or rashes have been registered. ✓

5. STATUS OF EXPANSION PROGRAM: Algernon Blair, Inc., contractor for the addition to Bldg 4487, was given notice to proceed 2-2. Foundation excavation was started on this date. Completion of the entire contract is scheduled for 2-1-63. ✓

B2-27

1. SAT STATIC FIRING:

Premature cutoff was given at 55 seconds during SAT-24 on 2-20-62 due to temperature rise on fire detection harness. *A hot gas LEAK*
And Evidence of a fuel leak was found, but exact leak has not been located. Analysis of leakage problem has been initiated. (Preliminary draft of information on this problem is attached "in whole" due to lack of time to condense it to "NOTE" form.) ✓

2. SATURN STATIC TEST FACILITY:

Information obtained from design review meeting at AETROS 2-13, 2-14, and 2-15-62: Final design for stand foundation scheduled for completion 3-9-62. Dewatering of existing hole and holding basin, demolition of existing concrete sections, excavation, and the foundation and backfill construction were included in a change order made to the existing contract with Sullivan, Long, and Hagerty. The foundation construction will begin about 4-2-62. ✓

K.H.
West Side
Tower?
B

3. LH₂ FACILITY:

The RL10A-1 cold flow engine was mounted in the test stand and diffusers shroud and seal installed. The thrust measuring load cell was installed and calibrated. The steam boiler was run for 18 hours to build up steam pressure for a blowdown test 2-21-62. A 30-second steam aductor blowdown test was run, pulling vacuum of 0.8 p.s.i.a. on the entire diffuser and engine chamber. The steam throttling valve was oscillating at 1/2 c.p.s. over a 6% range variation indicating minor adjustments necessary. The load cell indicated 7.5K due to vacuum on the engine chamber. ✓

NOTES 2-26-62 HOELZER

B
3-2

Negative report.

Dr. Hoelzer,

Dr. von Braun wanted me to type in the following questions to you:

(1) How is the orbital rendezvous simulation facility in Comp Lab coming along?

(2) How is the ADPS Working Group, of which you are Chairman, progressing?

Handwritten:
banned
3.26

B2-27

1. GOLOVIN REPORT

The final version of the Golovin Report is now at AEROSPACE for final corrections and editorial review. It should go to print within two weeks and be available by mid March. ✓

H.H.K

2. POSITION PAPER ON "SOLIDS vs LIQUIDS"

The status report on "solids", which you requested as preparation for Congressional hearings, is now undergoing the third iteration process. Next Monday we will have a clean draft ready for review by you and the Division Directors. At the present time it is about 20 triple-spaced typewritten pages. ✓

Suggest if you haven't done it to crank into this paper the class 2/

3. APOLLO MISSION PERFORMANCE DISPERSION

A concentrated effort is being made to obtain a better feeling for the total mission performance picture, with emphasis on determining the upper and lower limit of the total tolerance. The total velocity requirements, specific impulses of individual engines, and weight estimates have been varied within the tolerances to be expected. We believe it is not correct to assume that all parameters will build up to the upper limit of the unfavorable side. By doing so in the past we have "proven" that the C-5 is now too small. We have already done this investigation for the connecting mode and find that we can expect to bring down to the moon anywhere between 53,000 to 84,000 lb with 65,000 to 70,000 lb as the most likely weight. This makes, however, one assumption - that we will be successful in telling our engineers how the interrelationships work and that it is not permissible for everybody to put in his personal padding. When adding these "reserves" arithmetically (which is not the proper way) we sell ourselves out of business. We also will investigate the other modes of interest and then prepare a summary report. We hope that this study will result in certain target data for individual design parameters which will distribute evenly, throughout the system, the burden of doing a good job.

Class 2 argument by position backed by remains to want as part of C-5

to Nova solids unless they are officially accepted as Class 2 hazard in presence of doubt. Suggest you check also w/ LOD re siting problems in new Cape area. B2-27

Agree. But organized weight & performance control for all elements is equally important! B

B₂-27

1. S-1C Program: Several meetings have been held with Boeing personnel to establish an approach and the requirements for a tool and facilities plan for the S-1C vehicle manufacturing. The Boeing personnel accepted the structural fabrication approach in the vertical attitude using a rotating ring as the prime mover and the approach advocated by MSFC for welding of bulkhead segments on the exterior. These and similar problem areas will be further resolved over the next few weeks. ✓

2. Second Shift Operation on SA-5: One full week of second shift operations has now been accomplished. Design Engineering and Quality Assurance personnel have been fully supporting this activity. While progress at present is satisfactory, we are not yet back on schedule. We are, however, reasonably confident we will meet the vehicle delivery date for static firing. ✓

3. Regarding Questions About Building 4707 Addition: It is technically possible to raise the roof at a later date; however, we would prefer to accomplish this job before construction is complete. For this reason I will try to obtain supplementary funding approval after construction has actually begun. ✓

W.K. →

Without rocking the boat
so much, — I hope!

B

B2-27

Thank you very much for the way you introduced our new office and explained its functions in the Board Meeting last week. ✓

Judging from the amount of matters referred to us by now, there must have been a need for this office and certainly is an appreciation for its existence. There is still a problem in setting up and staffing our office, since personnel actions, transfers, etc., cannot be affected without approval of the organization. We called this to Jack Young's attention and he advised us to activate our office now and without waiting for final official approval by Mr. Webb. Correspondingly, we are drafting a letter of announcement, inclusive of organization chart, for your signature. ✓

Largest single bottleneck in effectively getting under way: Lack of physical space in 4488. This has been brought to the attention of Mr. Gorman. ✓

Transfer of Joe de Fries to Central Planning: I have not distributed the letter yet which you signed. There appears to be a slight misunderstanding on the part of Dr. Haeussermann on how you want to have the Orbital Operations program coordinated in the future. He was of the opinion that you wanted de Fries to stay in Astrionics Division and have him handle Orbital Operations similarly to the way Dr. Kuettner (under Mr. Mrazek) handled Mercury.

Unfortunately, Dr. Haeussermann did not attend the Board Meeting where you explained Orbital Operations as a part of Central Planning. There are no hard feelings. Dr. Haeussermann and I would like to have a brief appointment with you to get your advice. Meanwhile I will hold the letter. ✓

FY-64 budget submission becomes due in March. This makes it necessary to give the subject of our next in-house project some consideration. ✓

Presently there is a tendency within some quarters of MSFC to prefer the "scallop" tank design for NOVA, (reason: weight considerations) and to do a certain amount of this NOVA development work in-house. In this connection and as requested by your note we will consider the tanker development as a possible in-house project and will furnish our findings to you by 20 March 62. ✓

Orbital Maintenance and Repair Technique Development: The GE visit has been postponed several times, and no further excuses are available. Mr. deFries will visit Valley Forge in the next few weeks. The visit is non-committal in nature but is aimed at avoiding a brusque disruption of contacts. Does this meet with your approval? ✓

→ Yes. But I suggest close cooperation between deFries & Fichtner who is just coming to grips with the problems of GE coordination in the automatic checkout field. B2-27

*Memo
3/2/62
O.K. Make
app't
w/ deFries
B2-27*

1. H-1 ENGINE: (Ref. Par. 1, Notes: 2-19-62 Mrazek, Attached): A detailed analysis of the H-1 propellants and other funding areas is being made to determine whether all or some portion of the 1.5 million dollars reported as a shortage might be made available by reprogramming. (Possibly little effect at this time.) ✓
2. VEHICLE MECHANICAL DESIGN INTEGRATION WORKING GROUP: (Ref. Par. 4, Notes: 2-19-62 Mrazek, Attached): In the original work statement, a requirement was placed on S-II to design for the engine hard-over case as a result of some system malfunction under the worst operating conditions as max. q., max. angle-of-attack, etc. Out of discussions held by M-SAT, a new statement was given S&ID to eliminate this condition, and design for normal operating conditions only. This means abort of mission in case of hard-over. This item has not been discussed in the Working Groups yet and will be on a future agenda of this Working Group to determine details and impacts. ✓
3. S-IV WORKING GROUP: (Ref. Par. 5, Notes: 2-19-62 Mrazek, Attached): Consultations with Dr. Lewis were held and the suggestions (as made known to this Division) appear to be going in the right direction. Tests using different combinations of the injector modifications suggested are in progress and some results are encouraging, although a successful combination has not yet been found. Ignition is still sporadic at the tower end of the 3 to 6 psia range. ✓
4. ATLAS-CENTAUR/STRUCTURAL & DYNAMICS WORKING GROUP: Centaur F-1 has been reviewed with respect to loads and structural strength. In general, F-1 structure appears to have adequate strength; however, Centaur stage intermediate bulkhead problem with buckling of insulation bulkhead, minute leaks at spotwelds, and resulting collapse of thermal insulation is not yet solved. Life-cycling test program with bulkhead of revised design in preparation. ✓
5. USAF/NASA WORKING GROUP ON LAUNCH VEHICLE STRUCTURES: Meeting on 2-15/16-62 was devoted to discussion of items in interim report. Funding difficulties of the structural flight measuring program with Atlas-Agena configurations and other structural test programs were discussed. Prorating of the costs to the minimum of approx. 100 Atlas boosters may be the solution. Considerable time was spent on ground wind and wind aloft requirements. MSFC-AMR Wind Aloft Requirements were presented by M-AERO and Mr. Sissenwine discussed the AF Cambridge Research Lab philosophy on wind aloft requirements. Thin shell stability problems and necessary research in this field were discussed with the secretary of the NASA Research Advisory Committee for Structural Design, Mr. Rosche. It is planned that a representative of this Working Group will participate in a symposium; Subj: Thin Shell Problems, which is being planned by the NASA Research Advisory Committee for 10-62. ✓
6. J-2 FUEL TURBOPUMP: Failure experienced during run at 18 seconds. The pump assembly was not damaged but the turbine assembly was a complete loss. The failure was attributed to the failure of the shroud between the turbine nozzle and the first stage turbine wheel. All engine and fuel turbopump testing has ceased until the cause of the shroud failure has been determined. ✓
7. SA-D-5: The Dynamic Test Vehicle will be fully documented to insure vehicle and GSE compatibility for the loading tests planned at Complex 37B. ✓

Attachment: Notes: 2-19-62 Mrazek

B3-2

1. Personnel Status:

I have presently: - 4 engineers

Forecast: In about 2 weeks - 4 more engineers

In about 4 weeks - 4 more engineers

Total: 12 Engineers ✓

2. Move to HIC: Will slow down my operations buildup and make operations more difficult. - I understand your reasons, though. ✓

Since the effectiveness of my office will depend essentially on good personal contacts I would like to assign a number of my engineers to some of your divisions or offices, i.e.

- 1 to Astrionics Div
- 1 to P & VE Div
- 1 to Quality Div
- 1 to SATURN Office
- 1 to Central Planning Office
- Etc.

By locating them there for most of their time - at least in the beginning - would alleviate the shortcomings of the move to the HIC. ✓

In order that these fellows have a central place to hang their hats, I would appreciate if one room in #488 would remain assigned to me for that purpose.

Max Neubert

Suggest we comply with this very reasonable request.

P.S. Didn't you agree with Mr. Holmes that the Systems Engineering Office be in #488?

F.R.V.

B
3/2

→ I discussed the matter with Shea the other day. He reacted just like you.

NOTES Smith 2-26-62

B₃-2

No NOTES received from Mr. Smith today.

B3-2

1. CHARGED PARTICLE PHYSICS: Dr. Shelton and Mr. Keller visited Hqs. last week to discuss the MSFC participation in the charged particle physics program of NASA. Mr. Dixon and Mr. Ames of OART desire that we continue to contribute to this effort. The division of responsibility between OART and OMSF is uncertain, and MSFC work in this area will depend on how the division is made. Not wishing to be obstructionistic, we have recommended that OMSF go ahead with plans to fund the charged particle shielding program which we began at ORNL. ✓
2. MR. KELLER LEAVES MSFC: Mr. Warren Keller will leave MSFC on March 12. He will join Mr. Ames' staff at OART, where he will be responsible for radiation environment studies. ✓
3. TRIP TO EUROPE: Dr. Dryden, in a very nice letter, told me that NASA will pay for my forthcoming trip to Munich where I am supposed to give a seminar on electric propulsion. At the same time, Professor Biermann from the Institute of Physics and Astrophysics at Munich, and Dr. Hocker from the Atomic Power Plant at Juelich (near Aachen), wish to discuss with me some aspects of the new European Space Research Organization. Dr. Dryden and Mr. Frutkin asked me to see them before and after this trip. I would appreciate it if I could talk about my visits with Dr. Hocker and Professor Biermann also briefly with you.

I will leave around March 29 for Paris, to receive the Galabert Prize, and then continue to Aachen and Munich.

→ Suggest you compare notes with Kees before you leave B (He's more up to date)

E.S.

→ Please prepare a nice farewell letter for my signature

B3-2

by this time I am having just talked over there)