

March 5, 1962

NOTES 3-5-62 GORMAN

NEGATIVE



RENOVATIONS AT MICHOUW WEEK ENDING 3/2/62Office Building:

- a. Installing duct work for air conditioning west end.
- b. Repairs to ceiling in Executive Suite in progress approximately 80% complete.
- c. Electrical work in progress. Roughing in approximately 70% complete. ✓

Engineering Building:

- a. Checking out, repairing circuits, and relamping east end second floor.
- b. Tearing out partitioning, west end, first and second floors.
- c. Replacing deteriorated pipe in all toilet areas, main building. ✓

Manufacturing Building:

Painting of exterior continues, approximately 95% complete. ✓

Boiler Plant:

No work, awaiting delivery of chemical feed pumps and purge units. ✓

General Work:

No outside work this week. ✓

S-I MAKE OR BUY PLAN

Chrysler Space Division (CSD) presented their initial make or buy plan to Michoud Operations and MSFC Division representative on Feb 26, 1962. With a few minor exceptions, mainly concerning whether some few Astrionics items would be GFE or not, the plan is satisfactory, and approval actions are underway. ✓

S-I PLANT LAYOUT

CSD presented a revised plant layout following guidelines mutually established in a previous meeting. Verbal acceptance of functional locations is satisfactory however, some minor changes were agreed upon, and MSFC requests more detailed information and functions supported by some laboratory areas. Approval to permit more detailing of major areas was given. ✓

S-I-C PLANT LAYOUT

Boeing presented their plant layout to MICH on 3/3/62. No feedback data is on hand; status will be covered in the next notes. ✓

S-I RELIABILITY PROGRAM

CSD was requested to prepare a comprehensive reliability program for the S-I stage for submission to MICH by 5/15/61. ✓

ROCKING CONTRACT

The Boeing Company Contract NAS8-2577 covering SATURN Stage S-I-C was approved Friday, 3/2/62 by NASA Headquarters, Washington, D.C. Total contract amount is \$8,910,962. Incremental funding is \$1,000,000. ✓

1. Titan III Siting: (Continuation after our meeting at the Management Council on Titan III siting problem.) Davis contacted Holmes in Washington and relayed what the Air Force position would be. Holmes, thereupon, questioned Davis on the salient features of our analyses. Holmes had understood the fundamental points involved from our presentation; he was, therefore, able to discuss the siting proposed by the Air Force. In the meantime, he wants us to put the case in writing concerning the toxicity and corrosive effects of the N_2O_4 , inasmuch as the Air Force rejected our considerations. The next action will be on the DOD/Webb level. I am on standby expecting a call for this presentation. ✓

2. SA-2 Arrival: During the week, the SA-2 configuration was installed on Pad 34. Daily Status Report will be published by LOD. Available in your office if you desire it. ✓

3. MA-6 Debris: A small, stainless steel, sheet metal section, approximately 5 x 3 feet, of the ATLAS Booster fell in Pretoria, Africa and was returned to me at Cape Canaveral. Positive identification has been made that it was a part of the MA-6 Booster. Action is underway to return it to Headquarters, NASA and thence through the State Department to Pretoria, Africa. It is estimated that, after approximately 5 1/3 orbits, the Booster re-entered. Several loud explosions were reported in the impact area, and the fragment resulted from their investigation. Action is underway with an analysis for Flight Safety. This may have some bearing on future MA shots. ✓

↓ K.D.

I only want to hear about troubles.
In other words, I don't want to
hear anything!

1. S-IV H₂ VENTING: The Weekly Notes of 12-18-61 (attached), paragraph 2, carried a remark on diverging opinions about the hazards of venting of chill-down H₂ from the Saturn S-IV. A check by M-AERO-A with the originator of the remark revealed that the diverging opinions were based on the results of a contract between M-P&VE and American Science and Engineering, Inc. Progress reports and the final report were subsequently secured and checked by M-AERO-A. The check showed that the contractor lacked the qualifications for the job. It may be added that, on the basis of the research proposal, M-AERO-A had advised M-P&VE against use of this contractor. In the course of our work with Combustion and Explosives Research, Inc., it was concluded in Sept. 1961 that, after introduction of the H₂-vent stacks and addition of a warm N₂-purge in the interstage, the Saturn C-1 is free of explosion hazards (see Weekly Note 10-30-61, attached.) ✓

*2. MSFC-MSC AERODYNAMIC TESTING: The Flight Mechanics Control and Dynamics Coordination panel meeting on February 27-28 on the subject of "Aerodynamics" was very satisfactory in terms of reaching mutual agreements, which are, however, as yet subject to both Center's concurrence. The accomplishments of the meeting fall into three areas:

1. A set of ground rules
2. A definition of areas of responsibility
3. Project management

The ground rules cover such items as avoidance of redundant testing, the combination of similar tests into joint ventures, the grouping of projects into categories whose management follows specific lines, information exchange, and unification of symbols and units. The responsibilities were defined along mission aspects of each Center, resulting in three groups; i.e., MSC's business, MSFC's business and joint ventures. Explicit management charts and procedures were established for each of the three cases. (Minutes attached)

NOTES 3-5-62 GORMAN

NEGATIVE

NOTES 3-5-62 GRAU

B3-5

1. CENTAUR: In order to discuss and clarify certain problems arising from transfer of Centaur contracts, a meeting between MSFC and the Air Force Plant Representatives' Office (APPRO) GD/A was held at MSFC on February 22, 1962. Attendees from APPRO-GD/A were Col. H. E. Moose, Chief of APPRO, and the APPRO Contracts, Production, and Quality Control Representatives. NASA Quality Publications 200-1, 2, and 3 will be applied to Centaur. These documents will be discussed in detail as soon as they have been studied by APPRO-GD/A. ✓

* 2. S-IV - AIR FORCE INSPECTION AT DAC: As of Friday, February 23, 1962, the Air Force does not have authority to hire the additional Air Force inspection personnel for Douglas S-IV program. The Air Force is making a nation-wide survey of their new requirement to fulfill NASA's requirements on NASA Quality Publication NPC 200-1. When this survey is completed, the Air Force is to ask Congress for the additional spaces required for the entire Air Force inspection agencies throughout the United States. As a result of this survey, we foresee further delay in getting additional Air Force inspection personnel on the S-IV program. We are presently depending on four full-time Air Force Quality Control people, two Quality Assurance Division people at DAC, and DAC Quality Control Organization to furnish a satisfactory S-IV Stage. ✓

D.F. |
Should like to see a copy B
3. NPC 200-1, 2, and 3: 40 copies of the final draft of NPC 200-1, 2, and 3 (NASA-wide Quality Assurance Documents) were received this week and are being selectively distributed to those most in need of them. Official copies, signed by Dr. Seamans are supposed to be available on March 15, 1962, from the Government Printing Office. ✓

4. C-5: Boeing is working on a checkout and Quality Assurance plan. A draft of the Inplant Test Plan has been received by Quality Assurance Division. Indications are that the Quality Assurance Organization is a strong and powerful part of the Boeing operation. The first Boeing personnel for training should arrive next week. ✓

5. SA-3 PRE-STATIC CHECKOUT: Pre-static checkout of SA-3 is continuing on schedule. Portions of the instrumentation checkout are now being performed using automatic checkout equipment. ✓

6. PRATT-WHITNEY: Members of this Division, together with Engine Management Office personnel, visited P&W recently to discuss an interim Quality Control program to be followed by P&W prior to full compliance with the MSFC QEB #2 requirements placed in the new contract. Progress is being made by P&W, but specific serious problem areas are still unresolved. A team composed of Quality Assurance Division, P&C, and Personnel Branch will conduct interviews with the present Air Force personnel at West Palm Beach preparatory to assuming the Quality Control and Contract Administration missions from the Air Force. ✓

B₃₋₅

NOTES - HAEUSSERMANN 3/5/62

1. CHANGE IN MANNED SPACECRAFT CENTER ORGANIZATIONAL POLICY;

During Mr. Chilton's recent visit he indicated a slight change in the MSC policy. As he described it, project offices will have capabilities to detect technical problems and to direct contractors. Line organizations will have capabilities to solve technical problems. Chilton will remain in the line organization and will still be associated with the guidance development, but not responsible for the administrative and contractual areas. ✓

2. APOLLO GUIDANCE AND NAVIGATION MEETING AT MIT 3/2/62; F. Weber

and H. Taylor represented Astrionics Division at this meeting at which systems studies and investigations, test results of prototype hardware, etc., were the main items on the agenda. Studies are usually conducted by students in their masters and doctors thesis work (eight masters and four doctors theses are presently underway in the Apollo guidance area). Contractors for manufacturing and industrial support have been selected for gyros and accelerometers. Contractors for other components will be selected on 4/4. Aside from the meeting, the following subjects were discussed with MIT and MSC engineers.

H.
I thought you said we have need to MSC phase with the MIT system was a question cut-off first time I hear they want to guide the boosters! I do not concur Let's discuss this 3/7

- a. Input - output signals of Apollo components. Meeting to be held at MSFC late March to discuss concept and system interface of Apollo and launch vehicle guidance.
- b. Data indications for astronaut.
- c. Astronaut control in emergencies.
- d. Back-up of launch vehicle guidance by Apollo system (MSC wants to guide SA-8 or SA-9 booster phase with Apollo system).

3. TORQUE TESTS OF GYROS FOR LONG DURATION SPACE FLIGHT; An AB-5 -

Millipore* - Bearing was tested for torque between 14.7 and 1 p.s.i.a. ambient pressure. The low "g" condition was simulated by a lightweight inner cylinder, representing .19 g. The operation pressure across the bearing was held at 1.5 p.s.i.g. and the air bearing axis was vertical. The torque - measured at various inner cylinder vs. sleeve position changed from a .2 dyne cm. average at 14.7 p.s.i.a. to .56 dyne cm. average at 1.0 p.s.i.a.; no growth of harmonics could be observed. Testing is still in progress. ✓

*Air flow is defused through porous material as compared to present jet - orifice scheme which creates torque.

B_{3/5}

B3-5

K.H.

1. TESTS OF S-IV CHILL-DOWN GASIFICATION:

Preliminary tests of the proposed GN₂ manifold configuration conducted at simulated altitude in the vacuum chamber indicate that the gaseous nitrogen injection is effective in vaporizing both liquid nitrogen and solid nitrogen particles exhausted through the RL10 thrust chamber. ✓

2. SWING ARM PROGRAM:

The three swing arms to be used with SA-5 are now installed at the test facility in various stages of assembly. This includes swing arm No. 2 which was received from Douglas Aircraft Company to service the S-IV stage. The basic arm for swing arm No. 2 was supplied to Douglas by LOD. ✓

* 3. STATIC FIRING OF ENGINE H-08:

H-1 engine No. H-08 was successfully static fired 3/2/62, after the third and final exposure to salt water immersion. One short (10 seconds) and one long (150 seconds) duration firing were conducted without mishap. Cost of cleaning and rework of engine after immersion, prior to firing, is approximately 10% of original cost of engine. ✓

4. SHIPMENT OF SA-2:

The barge "PROMISE" departed Wheeler Dam 2/17/62; arrived at Cape Canaveral 2/27/62.

| | |
|------------------------------|-------------------------------|
| Total time dock to dock: | 9 days, 20 hours, 10 minutes. |
| Total time at anchor: | 1 day, 1 hour, 0 minute. |
| Total time underway: | 8 days, 1 hour, 10 minutes. |
| Total distance dock to dock: | 2,250 miles. |
| Average speed: | 10.6 knots. |

During open-sea passage, vessel rolled a maximum of 16° during heavy weather. Vessel went aground at Fort Pierce, Fla., for 20 minutes. Arriving at Cape Dock, tug struck high spot in channel losing control of tow for approximately 15 minutes. ✓

Could I see a photo of this test set-up?
B
next Notes

B3-5

HHK

Looks like
I will:
present
most
likely
date:
14 March
B

1. POSITION PAPER "SOLIDS VERSUS LIQUIDS"

The draft of the paper will reach you today. Your comments will be appreciated. In case you are not called upon by Congress, I would suggest that we consider distributing this paper through PIO channels.

2. NEXT IN-HOUSE HARDWARE PROJECT

We are now working with Mr. Maus to determine good projects to follow the C-5, as this would require FY 1964 funds. The FY 1964 budget has to be submitted in a few weeks. A policy decision as to which direction MSFC should go will have to be made in the near future because I understand you are trying to get a broader mission statement for MSFC. We are ready to give our thoughts in the form of a presentation any time. ✓

* 3. ORBITAL OPERATIONS STUDY MONEY - (Action Item for Holmes)

We are now in full agreement with Eldon Hall and MSC as to how to spend the 1.1 million dollar study money on orbital operations which Holmes promised to give us during the 3rd Quarterly Review. He still has to find the money and send it down. Eldon Hall will try to get this to Mr. Holmes' attention, but I am afraid that, if you do not take this up with Holmes personally, we will have to wait a long time. At present we have had to stop all out-of-house study efforts in the area of orbital operations; this certainly is not in agreement with the decision to select orbital operations as the primary mode. Unless we get the 1.1 million dollars, we cannot move.

be
pushed
this
on to
Holmes
in my

Notes to him,
with gusto, too!
B

W.K.
Request
to let
B
Make
ppt.
Strawie)
Law
Mans
for info
B

B 3/5

1. S-1C Program: Detailed, realistic scheduling was completed for the manufacture of the S-1C ground test vehicles. The criticalness of the availability of the structural assembly tower and the bulk-head assembly fixture was made more evident. The structural assembly tower should be put on an overtime basis to advance its availability, however, additional funding is needed for this.

* 2. Budget: It is suggested that attempts be made to provide FY-63 funds on an annual rather than quarterly basis. This would eliminate a tremendous amount of paper work throughout the center in re-negotiating and incrementally funding contracts. It would also provide more flexibility - time wise in the ordering of hardware.

Have taken this up with Holmes. Expect partial victory. B

3. R&D: Furnished welding expert to Chance Vought, on their request, to train their welding personnel. ✓

4. Workload - 1964: Another re-evaluation of programmed work for this Division indicates that a major portion of our capacity will be available for additional assignments early in 1964. ✓

5. Facilities: Partial occupancy of Building 4705 tie-in has been accomplished and temporary partition wall removed; however, beneficial occupancy will not take place until April 20, 1962. Erection of new Assembly Station No. 3 has been started in the tie-in building. ✓

B₃₋₅

C-1

1. General: M-SAT project development plan is prepared and will be sent to key personnel for review prior to submitting to Washington. ✓

2. Chrysler Contract:

a. A meeting on 2-27-62 with Mr. Meldrum, CSD, revealed that Chrysler planning is proceeding well. MSFC committees are in general agreement of the plant layout in "make or buy" planning. In the future ME will probably give more fabrication to Michoud. For the definition of the stage for contractual purposes, we will contract on the basis of broad definition and agree to negotiate in the November-December 1962 region. In their development of plans, CSD will probably come in with facility and equipment requirements in static tests and launch operations areas that we probably will not agree with. We will fully coordinate this with LOD and Test. ✓

b. In Part B of the contract, Support Services at Huntsville, overtime authorization and equipment dollars will be added. Efforts in this area at Huntsville will also be increased. ✓

* 3. S-IV Stage: Helium heater problems are still present. PGVE to look at the possibility to form a team including people from Test Div. and possibly Lewis Research Center to look into this matter. Total Douglas funding for this year was increased from 44.3 million to 46. million. ✓

? from

C-5

* 1. Most recent schedules prepared establish start of C-5 launch in Oct. 65 and completion of 10 vehicle program by July, 67 compared to the original plan to start launch in April 65 and complete in July 66. Reasons for resubmission are to propose a realistic approach based on fixed 62/63 funding, unknown location of S-II manufacturing site, less dense launch rate (16 versus 19 mos) and recent facilities actions. ✓

2. General processing of purchase requests is being taken care of with the release of FY 62 advanced SATURN funds, however, some requests will have to be cut back or postponed due to already programmed FY 62 allocation.

3. The Boeing contract is forwarded to HQ's for approval. ✓

I thought it was signed B

4. Weight increases in stage hardware is causing concern. No new official performance are available at this time. ✓

* 5. Current S-IVB plans were discussed with DAC, Mr. Parker on 2-27-62. He indicated that for an accelerated program, automatic checkout, GSE, and facilities could be a critical area, depending upon the philosophy of automation required. DAC was requested to make preliminary analysis of effects of changing diameter to 260 inches. ✓

APOLLO: 1. Technical cooperation between MSC and MSFC is well under way.

2. The first aeroballistic panel meeting on 2-27/28-62 accepted back up configuration for SA-5 and implemented joint wind tunnel test program.

3. We are investigating to use on SA-5 capsule without tower, but with "Q"-ball.

4. Dr. McCall had been requested to take shroud and wind tunnel program off Manag. Council Agenda. Effort to reverse Council Feb. decision on SA-5 is under way. ✓

really? by whom? 9Cm3-6 agenda from SAT would help more response on this

parts
that's good, sound thinking B

please include special briefing in this and what we can do about C-5

1. Discussion With Headquarters On Project Management: Notification was received from Washington that Dixon and several members of Wyatt's and Siepert's staff will come to MSFC in the latter part of March to discuss project management. The program offices will not be represented. They would like to meet with a small group of MSFC top management and have a presentation of how we actually manage C-1, C-5, Centaur, etc. This would include our organization concepts, reporting, and control mechanisms. We have been asked to propose dates when the Director and the Deputy Directors can be present. Also representing MSFC would be FMO, CPO, P&C, SSO and L&MVO. CPO will make arrangements. We suggest a date late in March to allow preparation time. Please note dates you plan to be available.

Suggest you check with Bonnie, let's also have a preliminary meetg. Not complete dry run, but

2. FY-64 Budget Planning: A draft of the FY-64 budget assumptions to the Program Offices was received from Holmes' office on Saturday, March 3, 62. Our office is reviewing them and will develop the MSFC internal assumptions to be published March 9, 1962. A major problem in the assumptions is that the other centers may budget for operational C-1's. We requested that Lilly in formulating program office assumption for the field centers indicate that Washington will consolidate Programs and Vehicle costs as in FY-63. Lilly favors this approach.

compatibility of notes between speakers B

Good! B

3. Realistic Lunar Landing Schedules: This assignment is progressing on schedule (due 3/19/62). Ground rules were discussed with Eldon Hall and Lovejoy last Wednesday and Thursday. Mr. Hall suggested that only first level schedule be made at this time. Detail back-up could be worked out later. He also suggested attempting to coordinate the schedule as closely as possible with MSC before submission but they recognize that there will be unresolved areas. Mr. Risso from Holmes' office will be here Tuesday for further discussions.

Y'all means maybe either an

act as "postillion d'amour" B

*4. Procurement Cycle Study: A presentation was made by CPO to M-DEP-ADM of an analysis of the length of time required to make routine procurement under \$1000. This analysis pointed up some important facts. Most important are (a) Emergency orders average 25 working days from Division request to receipt. (b) Routine orders average 37 working days. (c) Items under \$100 constitute approximately 46% of these items yet, are less than 3% of the material and supply budget. (d) Average cost of clerical handling and purchasing is \$43.3. Purchasing costs were \$35,000 to purchase \$33,000. (e) Costs of program delays were not included in the study because they are intangible.

gross

net

Is that interpretation correct? B

* A network of flexowriter teletype was proposed with direct transmission from the using divisions to P&C, and copies to FMO and TMB. To reduce average elapsed time to five working days Mr. Gorman directed that this equipment be procured immediately.



B3-5

1. RIFT: Phase II of the RIFT Contractor procurement was initiated during the past week. On 2-26-62 the three contractors remaining in the competition, LOCKHEED, MARTIN, & GENERAL DYNAMICS/ASTRONAUTICS, were given the RIFT RFQ. Proposals are due in one month (3-26-62). On 3-1-62 the contractors were given a RIFT program presentation. Each of them made congratulatory remarks on the thoroughness and completeness of the presentation and had no further questions on the RFQ. The senior representative from each contractor is as follows:

- LOCKHEED: Mr. Herschel Brown, Executive Vice President, IMSC
- MARTIN: Dr. Al Hall, Vice President & Gen'l Mgr. Space Systems Division
- GD/A: Mr. Charley Ames, Vice President & Program Dir, Atlas ✓

2. C-5, NOVA: Recently received vibration and acoustic data taken during a static test of the F-1 Engine is the first data of any quantity which will be beneficial in studies of structural excitation and acoustic effects for the C-5 and Nova vehicle. ✓

3. ENGINE PROJECTS:

H-1: A detailed analysis of the H-1 propellants and other funding areas has been made. It is believed that the FY-62 engine funding requirements for the operational SATURN C-1 can be met by reprogramming presently available funds. This reprogramming will be requested at the Fourth Quarter Review. ✓

M-1: The review and evaluation of the Aerojet Development Plan is still in process. Inputs to Aerojet are being made as significant questions arise. The preliminary MSFC Model Specification is being revised and will be definitized as soon as possible. Aerojet's comments to the preliminary draft of the Model Specification are being coordinated. The letter contract is being written and plans are to issue the contract by 3-15-62. A budgetary planning review is presently scheduled for 3-6-62. ✓

RL10: A decision was made by NASA Headquarters, Air Force, and M-P&VE-OEM, in a meeting at the APIX Plant on 2-27/28-62, to provide additional cryogenic storage at the APIX Plant as follows: Hydrogen, 180,000 gal; Oxygen, 28,000 gal; Nitrogen, 28,000 gal. Action is being taken by M-P&VE-OEM to supply funds to the Air Force for immediate implementation of the above requirements. ✓

4. HYDROGEN TECHNOLOGY: The first coordination meeting with participation of all Divisions concerned took place 3-2-62. Many problems were discussed and we are preparing a presentation for you. A tentative date of 3-9-62 has been set for the presentation. ✓

*Copy made
item furnished
Cal. Fellow
M-P&VE*

Scott B

Let me add my own congrats!

B3/5

B3/5-

1. Move to HIC: (Repetition of Note of 2-26-62)

"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 #4488 would remain assigned to me for that purpose."

Would appreciate an affirmative reply.

Arthur:

Please see Mr. Neubert on this problem. We are in agreement already to say yes. JCM 3-5

→ Yes, indeed

B3-5

Maase/Arthur

B3-5

1. OFFICE OF APPLICATIONS PROGRAM: Mr. Thompson has informed Mr. Stoller of the results of our meeting last Thursday and of the decision to establish a five-man Operations Office in RFD for handling the program.

Mr. Stoller requested that MSFC send him a notice to this effect, and also an official reply to the questions raised in the February 9 meeting in Washington. While the informal reply by Mr. Thompson is of value to Mr. Stoller for the March 5 meeting with Mr. Webb, there should be a formal reply for the record, which can then be used as a basis for requesting funds.

If you have any comments to the informal reply prepared by Mr. Thompson (copy given to you at our meeting) please let us know so they can be incorporated into the formal reply now being prepared. ACTION REQUIRED

No, just prepare the formal reply for my sign.

2. OFFICE OF ADVANCED RESEARCH AND TECHNOLOGY PROGRAM: RFD has solicited and received research requirements from all MSFC divisions. The requirements were divided into two groups for submission to OART, as follows:

- a. FY 1962 Supplemental Program - this submission was hand-carried to Washington for delivery today. It amounts to approximately \$5 million; OART may fund this immediately from re-programmed FY 1962 funds.
- b. FY 1963 Program - this program will be submitted to OART by March 15. It will total approximately \$22 million. OART will use it to formulate their own FY 1963 program, and then will probably ask MSFC at a later date to submit an abridged, smaller version of the program for actual funding. We hope very much that only one step of this kind will be necessary. ✓

3. ELECTRIC PROPULSION: At the present time Astrionics Division is conducting qualification tests on the batteries, the programmer, and certain special electrical connectors that will be incorporated in the flight test capsule. A group from LaRC will arrive on Monday to participate in this test program and to take over these activities. Astrionics will also complete their work on the 1 KW arc engine power supply, as previously agreed. LaRC will send a man to MSFC to participate in the completion of this development and to become familiar with the power supply circuit. ✓

4. UNIVERSITY OF ALABAMA RESEARCH INSTITUTE: Drs. Lundquist and Shelton prepared a position paper on the Research Institute, together with a request for funds for submission to NASA Hqs. This paper is presently re-written to comply with the "Svan" concept. ✓

Here signed by B

5. HYDROGEN TECHNOLOGY: P&VE and RFD held a meeting with representatives from almost all divisions and offices on the subject of "Hydrogen Technology". At present, MSFC has 56 different studies underway at companies as well as in-house. Several more contracts are planned in the Orbital Operations Program, and in the FY 1963 LVT Program. A Work Panel under Mr. R. Head (P&VE), with members from other divisions, was established which will gather and review all available knowledge. It will then be decided which new studies must be initiated in order to fill gaps in our existing study program. ✓

6. ORBITAL OPERATIONS SUPPORTING RESEARCH: No reply has been received to our letter of January 31 to Dr. Shea in which we asked for funding support of our badly needed Orbital Operations Supporting Research Program. I prepared a follow-up letter to Dr. Rudolph which I am sending to you first for your approval or for new guidelines. ✓

request list (few pages)

Have pushed this again w/ HQ's

B

March 12, 1962



GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

HHG

THRU: Mr. Gorman
TO Dr. von Braun

DATE March 8, 1962

FROM M-P&C-CH

SUBJECT General Electric Contract

1. Headquarters NASA has urged that MSFC give careful consideration to generating competition for follow-on period.
2. This means, of course, that we may elect to continue with GE if good and sufficient reasons are documented to defend against protests.
3. I am confident that P&C will be able to contract for the service in a way that will be entirely satisfactory to Computation Division, MSFC, and Headquarters.
4. I will secure informal approval of Mr. Ernest W. Brackett prior to formal submission of the procurement action.

Wilbur S. Davis
Wilbur S. Davis

Chief, Procurement and Contracts

Copy to:
Dr. Hoelzer

*Mr. Gorman incorporated in
Notes 3.12.62
Bh*

THRU: Mr. Gorman ✓
Dr. von Braun

March 8, 1962

M-P&C-CH

General Electric Contract

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ORIGINAL SIGNED
WILBUR S. DAVIS

Wilbur S. Davis
Chief, Procurement and Contracts

Copy to:
Dr. Hoelzer

M-DEP-ADM, Mr. Gorman

OFFICE OF DIRECTOR

MSFC ROUTING SLIP

| | CODE | NAME | INIT. | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------|----------------|-------|--------------------------|---|
| 1 | M-P&C | Mr. Bill Davis | | A | I N F O R M A T I O N |
| 2 | | | | C | |
| 3 | | | | T | |
| 4 | | | | O N | |

REMARKS

The attached is extracted from Weekly NOTES submitted by Dr. Hoelzer, M-COMP, 3-5-62, to Dr. von Braun. His office could probably furnish additional information if needed.

| | | |
|---------------|------|----------------|
| CODE M-DIR | NAME | DATE 3-6-62 |
|---------------|------|----------------|

B₃-5-

NOTES 3-5-52 HOELZER

P&C *2.
Bill Davis

GE CONTRACT: Our P&C people have received strong recommendations from NASA Headquarters that our computing service contract with GE be put out this year for open competitive bidding. We feel this matter should be handled very carefully because rumors concerning the loss of this contract by GE could cost us several valuable people. We are writing our P&C people explaining in detail our feelings concerning this matter. Briefly, we feel that if we are to be continually faced with replacing this contractor every 2 or 3 years it would be better to go back to all Civil Service operation or at least to reduce the contract to one of pure button pushing type which could be exchanged readily without serious difficulty to our operation. If you are interested we will send you a copy of our memo to P&C or discuss in detail with you what we feel the ramification of periodic open competition for this contract would mean to our projects.

I think I agree with Dr. Hoelzer on this point. What can we do to stabilize the F.E. position without violating the law?

I am ready to certify that Hoelzer is right and that we just can't afford to go back to Civil Service in view of our many new obligations. B₃/5-

1. GE CONTRACT - Reference your comments of March 5 to Bill Davis regarding Hoelzer's NOTES to you of the same date (copy attached). Bill Davis has furnished a memo to me with a copy to Hoelzer which clarifies P&C's position on this matter. In essence, Bill's position is this: If GE's continuity is vital to the furnishing of computing service, as Hoelzer has indicated in his NOTES, then there would be no problem in either (a) Sole Source justification or (b) GE coming out on top in an open competitive situation. *→ which takes manpower effort to go through. 9cm3-12*
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B3-5

NOTES 3-5-62 HOELZER

copy of needed
item furnished
Mr. Davis
P+C

ADPS WORKING GROUP: The ADPS Working Group has been organized for the furtherment of ADPS activities at MSFC and contractors. As of this date one meeting has been held in which the purpose of the group was discussed. The second meeting has been set for Tuesday, March 6, with an agenda covering: Training in ADPS for the Group, The Contractor Financial Reporting System, ADPS at Michoud, The New Data Center Functions, and Highlights of ADPS at MSFC. The group has been working on a contract for the Systems Analysis and Programming of the Contractor Financial Reporting and the scope of work has already been sent out from P&C asking for proposals. Activity within the near future will regard primarily the new Data Center with prime emphasis on "The Status of the Vehicle" with regard to engineering documentation and reporting. ✓

P&C *2.
Bill Davis

GE CONTRACT: Our P&C people have received strong recommendations from NASA Headquarters that our computing service contract with GE be put out this year for open competitive bidding. We feel this matter should be handled very carefully because rumors concerning the loss of this contract by GE could cost us several valuable people. We are writing our P&C people explaining in detail our feelings concerning this matter. Briefly, we feel that if we are to be continually faced with replacing this contractor every 2 or 3 years it would be better to go back to all Civil Service operation or at least to reduce the contract to one of pure button pushing type which could be exchanged readily without serious difficulty to our operation. If you are interested we will send you a copy of our memo to P&C or discuss in detail with you what we feel the ramification of periodic open competition for this contract would mean to our projects.

I think
I agree
with Dr.
Hoelzer on
this point.
That can
we do

to
stabilize
the F.E.
position
without
violating
the law?

3. MICHOUD OPERATION: As you know, we are attempting to determine the optimum mode of operation at Michoud and the committee which was appointed in Board Meeting last Friday is holding first meeting this morning. Will keep you informed on our progress. ✓

4. ARMY SUPPORT: Shortage in our 1962 rental budget has made it imperative that we use the Army machine since the money we obtained for this was over and above our regular budget. We are starting immediately to utilize the Army machine some 5 or 6 hours a day even if it means arbitrarily shutting down our 90's at midnight. This will permit us to live within our 62 budget easily. ✓

I am ready to
certify that Hoelzer is right and that
we just can't afford to go back to
Civil Service in view of our many
new obligations. B3/5

any money
to spare??
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. J.K. ✓

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)*

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 Grae
Request a few
details in next Notes
B

Copy of masked items
furnished Mr. Brown
JF 3/5

* CORROSIVE EFFECTS OF N₂O₄ VAPORS ON LAUNCH VEHICLES: Relative to the siting of Titan III and at the urgent request of LOD, a two-day literature survey and study was made in order to substantiate an opinion for LOD. A two-page memo with four enclosures was completed on 3-3-62. It is our opinion that even a few parts per million of N₂O₄ in an atmosphere having a relative humidity greater than 65% can increase the corrosivity of the atmosphere substantially beyond a salt spray environment, especially for material used in the electrical system. ✓

LOOSE FITTINGS IN TRANSPORTATION RING SA-2: The noise reported to be caused by loose fittings in transportation ring during SA-2's voyage to the Cape was investigated by Structures Branch. It was determined that no damage to booster resulted. Instrumentation onboard showed maximum .4g lateral and .1g vertical accelerations. It is recommended that barge instrumentation not be discontinued for the R&D phase in order that effects of unusual conditions (collision, bridge interference, rough seas, etc.) may be judged. ✓ *Helmuth for info! B*

DESIGN OF STRUCTURES LOAD ANNEX BUILDING: Vitro is expected to resume design this week after approval of \$40,000 by Washington Hdq. for modification to the load structure due to increased loading conditions. ✓

SOLDERING OF ELECTRICAL CONNECTIONS: MSFC-PROC-158, Soldering of Electrical Connections, has been released. It includes unique requirement for qualification of soldering mechanics. ✓

FAILURE EFFECTS ANALYSIS AS APPLIED TO MAN-RATING PROGRAMS: We briefed representatives from Aerospace Division, Boeing Aircraft Company, on techniques of failure effects analysis as applied to man-rating programs. Boeing presently has an Air Force contract to establish man-rating philosophy. ✓

ORIENTATION OF C-1 VEHICLE ON VLF-37 AND C-5 VEHICLE ON VLF-39: An investigation is being made and results will be presented at next C-5 meeting. ✓

ENGINE PROJECTS:

H-1 ENGINE: First four 188K engines have been received at MSFC; one for Test Division; other three for SA-5. Engine manufacture at Neosho has been initiated. Two H-1 hydraulic systems are being sent to Rocketdyne for testing. One H-1 hydraulic system is being sent to S&ID for evaluation in order to determine the suitability of this concept for S-II Stage. ✓

F-1 ENGINE: The 30% Design Review of F-1 Engine Acceptance Test Stand Complex was held. Action on all decisions and recommendations made at 2-21-62 Management Review Meeting (relative to the turbopump problem) has either been accomplished or is near completion. ✓

J-2 ENGINE: Engine J001 has been removed from VTS-3B for exchange of the chamber. Severe tube damage had occurred to a 6:1, one-pass portion during another thrust chamber/injector test. Means three-week delay in first systems test. Some significant new problems during recent engine testing: pump stall has occurred; insulation improved the gas generator bleed time to one-fifth but it is still excessive. ✓

M-1 ENGINE: Award of the letter contract for initiation of the engine development program is pending approval of the facilities plan, release of funding by NASA Hdq., and completion of a facilities-use agreement with the Air Force. Expedited actions are being taken at NASA Hdq. and MSFC. Propellant cost for one duration test (300 sec) of M-1 engine is approximately \$300,000. ✓

RL10 ENGINE: The APIX Propellant Plant experienced another breakdown on 3-2-62. Operation at 50% production capacity is predicted for 3-9-62. Three A-3 R&D engines have completed tests equivalent to PFRT endurance requirements. Engine P-64122 has completed acceptance test and will be presented for delivery this week. This completes deliveries scheduled through 2-62. ✓

C-5 WEIGHT CONTROL BOARD: We do not intend to establish a Board because a Stability and Weight Section exists in this Division with Center-wide mission to establish and control weights. Furthermore, the Launch Vehicle Integration office (Palaoro) has the mission of weight control. The S-1-C Project Engineer, Mr. McCullough, is the action man and secretary of the Design Integration Working Group. (Reference Geissler Notes 2-26-62) ✓

1. RENOVATION AT MICHOU D WEEK ENDING 3/10/62

a. Office Building:

- (1) Installing duct work for air conditioning west end, approximately 50% complete.
- (2) Repairs to ceiling in Executive Suite in progress, approximately 85% complete.
- (3) Completed roughing in electrical work.
- (4) Patching walls in progress.

b. Engineering Building:

- (1) Checking out electrical circuits in progress.
- (2) Six columns, first floor, found defective and replaced. Two beams supporting second floor deteriorated and replaced.
- (3) Water piping in toilet areas in very bad condition; all cold water piping replaced.
- (4) Elevator repaired and in operation.

c. Manufacturing Building:

Completed except for painting interior of toilet areas.

d. Boiler Plant:

No work, awaiting delivery of chemical feed pumps and purge units.

e. General:

Preparing to replace cable in main sub-station. ✓

2. MICHOU D FLOODING AND CORROSION PROBLEM

Mr. Holmes' office was notified of the recent New Orleans Levee Board action to initiate raising the levees in the Michoud Plant area. ✓

3. * MICHOU D Coff, FY 1962

a. In order to assist MSFC in design and construction of Michoud Plant modification, an Architect-Engineer will be retained. This AE will plan and design all plant wide projects, including utilities, and plan and design major structural changes and additions to the existing manufacturing area. He will also function as a consultant to NASA in the review of AE type work performed by stage contractors or their subs, and perform Title II services for NASA.

b. Boeing and Chrysler will perform (by sub-contract) AE type work and construction which is stage oriented and functionally related to vehicle design and development.

c. It is highly unlikely that more than \$8. M Coff money can be made available this fiscal year. The availability of obligation authority for even this amount is uncertain.

d. Any Coff money made available this fiscal year will be used for modification of the manufacturing area. Construction of office and engineering space is a second priority item in relation to work in the manufacturing area.

e. As a consequence of work postponement in the office and engineering area, Boeing and Chrysler have been notified to take preparatory steps to lease office space in the New Orleans area. ✓

4. S-1 QUALITY ASSURANCE

a. A meeting was held on March 5, 1962 between M-QUAL and M-MICH to formulate plans on GSE and automation equipment for the Michoud plant. M-QUAL will compile a list by March 19, 1962 of GSE and automation equipment which should be GFE to Chrysler.

b. A list of comments on Chrysler Proposal 234 was compiled by M-QUAL and M-MICH on March 10, 1962 which will be used in the definitive contract with CSD and will be submitted to M-SAT on March 12, 1962. ✓

5. PERSONNEL

Mr. Constan left for New Orleans on Permanent Change of Station orders effective March 1, 1962. Mr. Wible will leave on PCS orders March 15, 1962. ✓

1. Organization: I objected to the methods used in making the announcement of the Launch Operations Center; particularly without functions and responsibilities clearly outlined and concurred in by all. My efforts were to no avail. Will discuss this further with you. ✓
2. Titan III Siting: A serious power play by AF has developed. I will continue to keep you posted as this story unfolds because action is required and we are deeply involved. As of yesterday in a meeting with General Davis' staff, all differences in cost and completion schedules disappeared after a joint working group of unbiased people looked at the biased Titan III figures. Meeting planned in Washington on Wednesday with Holmes then later with LOD. ✓
3. Sloan's Visit on Automation: Gruene and I are much impressed with Sloan. I believe he has accepted the MSFC position. ✓
4. Study Contract for Crawler-type Transporter/Launcher: The engineering study for the crawler-type Transporter/Launcher has been prepared. The cost is \$9,500. It is estimated that it will take five weeks to complete by the Bucyrus-Erie Company. Investigation for the railroad track type Transporter/Launcher will be done "in-house." Will be completed in approximately three weeks. You desired briefing. Zeiler will do this at your convenience. ✓
- * 5. Saturn SA-2: Booster checkout is progressing very well and on schedule with a minimum amount of overtime to date. The status and checkout board plans to review the daily schedule to see if it is practical to forecast an earlier launch date than that presently advertised. Will advise. ✓
6. Retrieved Space Debris: The returned piece of sheet metal from South Africa has been positively identified as part of the MA-6 booster. Other items are being returned as well for identification. Hq NASA has entered the picture for control of this problem. Any comments concerning this debris must be referred to Mr. Marvin W. Robinson of the Office of International Programs. ✓
7. Incident: I was confronted with a visit from Dr. Seamans' office here to investigate duplication of photographic facilities. Davis, AMR, had contacted Seamans directly with a complaint. Seamans dispatched Mr. Hodgson to investigate. It seems that Davis had been advised by his staff that NASA had an official position on photographic services which would not utilize the Range. It developed that the "official position" was picked up from two photographers. Obviously, the interpretation was erroneous and Davis had stirred up "much ado about nothing" without the courtesy of checking with me personally prior to his complaint. Seamans now understands. ✓
8. Orientation of C-5 Umbilical Connections: The difference in the C-5 vs the C-1 configuration with respect to umbilical connections remains a problem when considering either the use of the S-IVb and Apollo on Complexes 34 and 37, or the use of the S-1 booster on Complex 39. It appears that special umbilical arms and possibly cutouts in the service structure platforms and clamshells will be required. This problem is to be resolved by March 15. ✓

Bowie Please make appointment
D.K.

* 1. SATURN-APOLLO UNSTEADY LOADS: Representatives of Lockheed Sunnyvale dynamic loads group visited M-AERO for discussion of the problem. This group has been doing outstanding work in the problem area in connection with Polaris and Agena configurations. M-AERO will retain the Lockheed group as consultants in the field. Present plans call for a theoretical analysis to define the problem conceptually followed by experimental work to provide design data. Target date for solution of SA-5 problems is set as September 1. ✓

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W. von Braun

B3-12

NOTES 3-12-62 GRAU

1. CHECKOUT BUILDING: A change in the instrumentation for the addition to the checkout building was caused by more rigid specifications of the Astrionics Division concerning better suppression of electromagnetic interference in racks and consoles; this is essential for the automation effort. In order to stay within available funds, part of the instrumentation has been dropped; basic instrumentation, however, will be furnished with the addition to the building. Negotiations resulting from the requested changes concerning instrumentation are in the final stage. Indications are that a satisfactory agreement will be reached. The checkout of SA-5 will be performed in the existing part of building 4708 as previously planned; i.e., the addition to the building will have no impact on this operation. The checkout of SA-6 and of the instrument unit for SA-5 was supposed to be performed using control rooms located in the building addition; these plans have to be changed now and use of trailers is under consideration which might even be advantageous because of increased flexibility. The schedule for the checkout of SA-6 and later vehicles as well as for the instrument unit of SA-5 and the following units is not endangered. ✓
- * 2. PRATT-WHITNEY, WEST PALM BEACH, FLORIDA: Personnel arrangements for the transfer of six Air Force people stationed at West Palm Beach to the Mechanical Systems Analysis Branch were completed and will be effective March 18, 1962. Concentrated efforts are being made to hire six more qualified people in order to complete the contemplated staffing for assuming full responsibility for quality control, inspection, and checkout of the RL-10 engine. ✓
3. IN-HOUSE AND OUT OF HOUSE TRAINING: The "Basics of Digital Computers" course was concluded after 54 hours of instructions in the Guidance & Control Systems Section. One employee began working full time on design changes of the RCA-110 in Astrionics Division. Two employees are attending the technical school on the Mistram System being sponsored by Astrionics Division. ✓
- * 4. CENTAUR: During hydrostatic testing of the BTA (Bulkhead Test Article) at GD/A on March 1, the intermediate bulkhead was severely damaged. This has been photographed for study. A satisfactory 80 second static firing of Pratt & Whitney engines was performed on the PTV (Propulsion Test Vehicle) at Edwards Air Force Base on March 7, 1962. This is the third successful dual engine firing of Centaur engines at Edwards. ✓
5. ELECTRONIC WELDING TECHNIQUES: Electrical Systems Analysis Branch gave a presentation to Astrionics Division on Welding of electronic components. ✓
6. SA-3 PRE-STATIC CHECKOUT: The pre-static checkout of this vehicle is in progress and continuing on schedule. To date, 542 measurements have been completed out of a total of 673. ✓

1. VLF-37 GROUND FUEL SYSTEM TEST (RP-1):

The checkout of the ground fueling system (RP-1) for VLF-37 was completed on 3/9/62. The main components of the system will now be shipped to the Cape for installation by the Contractor. ✓

2. MISSISSIPPI TEST FACILITY:

Thursday, 3/8/62, a pre-proposal conference was held with Svardrup and Parcel Associates on the A-E contract for the Mississippi Test Facility. Request for quotations was presented, with 3/22/62 as the required submittal date. ✓

3. HYDROGEN FLAME DETECTION:

Investigations are being conducted on the use of closed-circuit television systems for detection of hydrogen flames. One such system will be demonstrated by the vendor on 3/29/62. ✓

4. TESTS OF S-IV CHILL-DOWN GASIFICATION:

Film shown to Dr. von Braun, 3/9/62; substituted for photographs requested per NOTES 3/5/62. ✓

ATTACHMENT: NOTES 3/5/62

B₃₋₁₂

NOTES - HAEUSSERMANN 3/12/62

1. POWER SYSTEM CHANGES FOR SA-5 AND SUBSEQUENT: Recent review of power requirements disclosed a reduced demand by users making possible the following changes.

a. The S-1 electrical power system will consist of: Two 28 volt d.c. batteries and one 450 va static inverter. The Instrument Unit (I.U.) power system will consist of: Two 28 volt d.c. batteries, two 450 va static inverters, and one 56 volt d.c. power supply.

b. For SA-5 and SA-6 only, there will be an additional 750 va rotary inverter. ✓

2. INSTRUMENTATION PROGRAM AND COMPONENTS LIST FOR S-1-5:

Revision B of this list was distributed 3/7. S-1-6 and S-1-7 program and components list will start with what S-1-5 has now. ✓

*3. FORTHCOMING MSFC/MSC/MIT MEETING: Meeting has tentatively been scheduled here for week of March 26. The main subjects on which detailed discussions are planned are: Interface areas Apollo and Launch vehicle guidance and navigation, Displays for Astronauts, practical viewpoints in area of Astronaut override over boost phase guidance, Apollo plans for C-1 and C-5, Reliability and parts qualification, GSE and launch checkout plans, etc. It is realized that working groups and the various coordination offices cover most of these subjects to reach decisions. The intent of this meeting is to get the "working technical people" together to discuss their specific technical problems. ✓

4. STATUS OF PERSONNEL STRENGTH: ASTR presently has authorized manpower allotment of 872 including 10 spaces given us by Neubert 3/1. As of 3/9 actual strength was 844 plus 7 firm and 9 loose commitments for a total of 860. Of the remaining 12 spaces there is one PERT and three reliability spaces uncommitted. Several applicants are presently being considered for all the uncommitted spaces. ✓

Request minutes
of March 26 March meeting
B₃₋₁₂

B3-12

1. ASTRIONICS FLIGHT SIMULATOR PROJECT: Design of the facility modification has been completed. There is a meeting today with Astrionics to assure that the final design meets everyone's requirements. ✓
2. ADPS BRANCH EQUIPMENT: We are planning to replace our 705 with more modern computer. We expect to do this as soon as possible after Army picks up the work on one of the 705's. Army installed their commercial computer, a 1410, in April and expects to be off our equipment by early fall. We have already begun writing the specifications for a new commercial computer. ✓
3. SCIENTIFIC COMPUTING EQUIPMENT: We have placed on order with IBM new components for 7090 computers which will up-date them to 7094's. This will approximately double the computing capacity of the 7090's at an increase of approximately 10% more cost. We will do this in December. ✓

→ 4. PERSONNEL SPACES: We have received our FY 63 allotment of personnel spaces - 2 people! I think we have to talk about this. I cannot continue to do everything with contractor personnel, for two reasons - first, there are some jobs which cannot be given to contractors, such as Michoud Operations, some data reduction work, some ADPS work; and secondly, I feel the GE contract is already out of balance with our Civil Service personnel. To continue adding contractor personnel without adding Civil Service personnel only makes a bad matter worse. I would like to know who allotted these spaces and on what basis. With whom should I talk?

2 people out of 710 total = 0.28%

Make Notebook

How come? Please discuss this with

B3/12

Helmut & try to help him. His arguments are good & sound! Suggest you discuss this w/ McCall also.

1. NOVA

Frank Williams is scheduled to give a NOVA presentation to Mr. Holmes this Wednesday to break the 2.3 million dollars loose. The NOVA Technical Panel has been formed and is in high gear. We have very good cooperation from the Divisions. You will get NOVA news weekly on these Notes, and probably a monthly briefing during the Board Meeting. ✓

2. EVERYTHING ELSE IS MOVING FINE - NOTHING TO WORRY ABOUT

✓

B3-12

NOTES 3-12-62 KUERS

*1. Building 4705: The S-IV and S-V dummy stages of the SA-3 vehicle are now located in Building 4705. The SA-T vehicle will also be placed in the building by Thursday of this week. The presence of these items in the assembly area, as well as SA-4, will make it an interesting area for visitors to NSFC. ✓

1. Michoud Funding - MSFC has received \$900,000 for design of facilities. The problem is that OMSF does not have enough emergency authority to purchase land at AMR and activate Michoud. If FY-62 supplement does not get approved the emergency authority will only be used to purchase land at AMR; only design of Michoud facilities during FY-62 can be conducted, but no actual modification work. ✓
2. C-5
- a. Review meeting will be held on 3-14-62. Director Conf. Room, 9 a.m. ✓
- b. Informal discussions with MSC/MSFC held on 9-3-62 resulted in following:
- (1) Spacecraft development will require vehicle/spacecraft compatibility flights in Nov 66 while C-5 is available in Oct 66 (5th flight) for unmanned and July 67 (11th flight) for manned flights. ✓
 - (2) MSC desires earliest possible manned flight and requests 7th flight in Feb 67 for this. C-1B may be able to reduce by 3 flights the point at which C-5 would be available for manned flight (advanced from Flt. #11, July 67 to Flt. #8, Mar 67). *Don't understand this reasoning. Please explain B*
 - (3) MSC requests experimental non-interference flights as early as possible and possibly prior to flight #5. ✓
- c. To overcome the marginal payload capability of C-5 for certain missions P&VE is trying to decrease the booster weight.
- d. S-IC - Boeing Contract NAS8-2577 was approved by HQ's on 3-5-62. A preliminary manufacturing plan for MSFC and equivalent stages was discussed. Plan was based on (1) 40 hour work week; (2) No overtime; (3) One bulkhead assembly fixture. The pacing item in this plan is the bulkhead assembly fixture which will cost \$200-300,000, and approximately 32 weeks will be needed to complete the first four bulkheads because of this fixture. *Kuers tells me we will have several bulkhead assy fixtures B*
- Completion of design criteria is delayed until decisions are made on:
- (1) C-5 missions and payload requirements.
 - (2) C-5 overall configuration
 - (3) Overall S-IC configuration. ✓
- e. S-II: S&ID engineering staff attended several meetings at MSFC to obtain the latest C-5 design criteria of stages below and above the S-II. Discussed were also the S-II hydraulic system, VLE #39 and Propellant Loading problems. Lack of a decision on facility location is causing delay to April 16 for submittal of the System Data Documents. ✓
- f. S-IVB: Reorganization of the S-IVB Ad Hoc Working Group is under way. A Work Statement for DAC for the period April through July, 62 must be established. ✓

1. FY-64 Budget Guidelines: We have received additional guidelines for FY-64 budget estimates by telephone from Mr. Holmes' Office. The NASA Budget Schedule is supposed to allow two 14 day periods; the first for preliminary budget and the second for the final submission. This is four weeks out of 52 or 8% of the time. We feel compelled to request at least a doubling of this time if our budgets are to be orderly and realistic. As of today, Lilly's written guidelines have not yet been received, while he insists on old deadline. ✓

Funds for procurement of operational SATURN, NOVA, and AGENA vehicles for advanced manned spaceflight program are to be shown on MSC budget submission on the basis of estimates we furnish to MSC. Our estimates to MSC are to be proportion of our total program cost, not an off-the-shelf, per-vehicle cost. We are told by Lilly that MSFC will receive our funding directly, not through MSC. ✓

We ~~are~~ ^{have been} requested to submit the R&D and C of P cost estimates and schedules for manned spaceflight to OMSF by March 19; headquarters plans to review these at the Fourth Quarter Program Review to be held here March 22 and 23. ✓

We have discussed FY-64 budget guidelines with LOC representatives; LOC budget will be separate. We will coordinate to assure that no requirements are omitted. LOC will make a joint presentation with us on March 22 and 23. ✓

2. Presentation on Project Management to Headquarters: We asked Mr. Jenkins in Wyatt's office if March 29 is an acceptable date for the headquarters people to come here for briefing on our techniques of project management. He informed that congressional problems may prevent their visit at that time. He is to send us a letter about the date, names of visitors, and details of what they will be expecting from us. Meantime, we are working on agenda and presentation. ✓

3. Realistic Lunar Landing Schedules: Mr. Wm. Risso, Asst. Director for Plans and Resources in Mr. Holmes' office, was here March 6 en route to Houston. We discussed our approach to the schedules and cost estimates with him, and appraised him of some of our problems. ✓

Col. R. J. Bathurst and Mr. Fernandez, from Mr. Risso's office, will be here Tuesday and Wednesday (March 13 and 14) for further discussion of schedules. ✓

4. Orbital Operations: Mr. de Fries has moved to Building 4488. Work on C-1 Rendezvous Test Program is progressing. An in-between briefing will be arranged with your office. ✓

5. PERT: The meeting for review with your office of SA-5 integrated network has been rescheduled for March 19, and headquarters has been invited to attend.

A letter from Dr. Seamans has been received, outlining policy on PERT and contractor cost reporting criteria.

Discussions are continuing with contractors on both PERT and cost reporting. ✓

Mr. Maus,
Put name farther down page. 90m.

A.R.

Please tell me on next Notes) exactly what is being done now, by whom, and what target dates have been agreed upon. B

Let's discuss this at once B

1. Visited Shea last Wednesday, March 7, in Washington. We discussed:
 a. Backup Configuration (Shroud) for SA-5: For correction of Minutes of Council Meeting I had phoned Shea, had sent him a teletype with suggested correction and background info. Still Minutes arrived without correction. Shea assured me he would issue correction. He had talked to Frick on his trip to MSC, and also got confirmation that NAA had been instructed already to start work on the backup configuration.

b. Minimum guaranteed payload weight C-5 can place in Earth Orbit: Shea had spent two days at MSC and is now quite concerned about above. Obviously MSC had expressed serious doubt regarding the capabilities of C-5. ✓

Shea has asked me to provide him the minimum guaranteed figure.

In your C-5 review on Wednesday, March 14, this minimum should be nailed down for the benefit of all concerned. In this respect, see also par 2, below. ✓

I think you agree that I be in your C-5 review meeting. // Absolutely, Yes!

2. MSC thinking on APOLLO configuration and Rendezvous vs. Direct with C-5:

From Mr. Lord who went with Shea to MSC I picked up two papers he had obtained from MSC:

a. Memo for Director, Subj: Requirement for APOLLO Spacecraft Development Schedules, from Charles W. Frick, Mgr, APOLLO Spacecraft Project Ofc, NASA, MSC, Houston, Texas, Feb 23, 1962.

b. Paper on "Comparison of Earth Orbit Rendezvous Modes for APOLLO Mission." ✓

I have only quickly perused these papers but have distributed copies within MSFC, for instance to Lange, Maus, deFries, Schramm, Hoelker, etc. It seems to me that there is quite a discrepancy in thinking by MSFC and MSC, which needs immediate attention. Suggest that at least a brief be given (by Schramm ?) in your C-5 review. (Maybe Lange can shed some light on it in same meeting after his visit to MSC).

He was!

3. Uniform Design Principles:

I have talked to Shea. I'll have one man working on it. Have gathered available material from Mrazek. Will forward to Shea. ✓

4. Engineering support contract with AT&T is being established by Shea. ✓

1. ORBITAL OPERATIONS RESEARCH PROGRAM: As you suggested in your note to me, we are now considering our reduced Orbital Operations Research Program (3.895M) as an integral part of the MSFC assignment for the C-1 rendezvous experiment. The various technology projects which have been submitted will be accomplished as necessary parts of the engineering and development work to be conducted. By following this approach these investigations will lose their identity as "research" and will become part of our C-1 rendezvous project. We hope that this approach will be more acceptable to Dr. Shea than the previous one. Many of the projects which were presented in our original FY-1962 (6.63M) Orbital Operations - Vehicle Rendezvous Technology Program will be included in our FY-1963 submission to OART. This matter has been discussed with Mr. deFries. He agrees that this approach is the most desirable, and he will try to assure that the essential work gets funded. ✓

*2. QART FY 1962 SUPPLEMENTAL FUNDING: RPD and all the divisions made a crash effort last week to submit detailed Task Forms for a "Supplemental Supporting Research Program 1962" to QART, totalling approximately 5M. Although we met the requirements to the letter and to the hour, we may have very little chance of any success in obtaining funds, as we learned in the meantime. I will keep you informed of further developments. ✓

*3. FY 1963 ADVANCED RESEARCH AND TECHNOLOGY PROGRAM: RPD collected the research requirements under the LWT Program from all the divisions for submission to QART. All of them were carefully screened for completeness, overlap, compatibility with assignments, funding, etc., and then listed under the pertinent Task Area, Sub-Program, and Program. There are about 340 projects for a total of 23 M, in agreement with our guidelines from QART. Your signature is requested under each of them; if you agree, I will sign them (by stamp) as your delegate. Deadline is March 15. Please advise. ACTION REQUIRED. ✓

o.k. B

Yes! Under your own name. 7/2/62

4. VISIT TO WHITE SANDS: Dr. Lundquist, Mr. Hembree and I visited the Dearborn Observatory in White Sands (part of Northwestern University in Chicago) last week where the development of an image amplification system has been underway for some time under a NASA-MSFC contract supervised by Mr. Hembree of RPD. The objective of our contract was to develop an image orthicon system to a point where its technical capability could be determined in connection with an optical telescope suitable for the tracking of space probes. This objective has been successfully met. Combined with a 12" reflector telescope, the image orthicon is capable of showing objects down to about the 17th magnitude, and with an angular accuracy of the order of four seconds of arc. The development has definitely reached a status where the design and manufacturing of an image amplification system for routine use in tracking stations, like Cape Canaveral, should be contemplated. It is our impression that the development of such a system should be initiated now by one of our operating divisions or by Dr. Debus' Launch Operations Directorate. We will discuss this matter with Dr. Debus and keep you informed.

good!

Please let me know what transpired B

March 19, 1962

B 3/19

1. RENOVATION AT MICHLOUD

a. Office Building:

- (1) Duct work for air conditioning west end approximately 75% complete.
- (2) Ceiling in Executive Suite completed.
- (3) Reinstallation of plumbing fixtures in progress.
- (4) Patching walls in progress, approximately 75% complete.

b. Engineering Building:

- (1) Checking and repairing electrical circuits and lights, second floor.
- (2) Reinstalling plumbing fixtures in progress.
- (3) Painting ceilings and walls in east end, second floor.
- (4) Temporary cafeteria moved from second floor to cafeteria area first floor.

c. Manufacturing Building:

Completed.

d. Boiler Plant:

No work, awaiting delivery of chemical feed pumps and purge units.

e. General:

Cable pulled in Main Sub-Station. Terminations or connections remain to be accomplished. ✓

2. PRE-AWARD SURVEY GROUP

A pre-award survey group, established to evaluate Louisiana Area Architect Engineer and their capabilities, has been visiting AE firms in New Orleans and Baton Rouge during the past week. A recommendation for selection for performing plant modification design effort will be submitted this week. ✓

3. S-1 EFFORT

Chrysler Space Division submitted a document "Saturn S-1 Stage and C-1 Vehicle Program Plans, 1961-1966," which covers their submission in compliance with the requirements for certain plans and data by March 15. This includes a plant activation and flow plan, a tool and fixture plan, a facilities plan, a manpower plan, and a "make or buy" plan. ✓

4. *AE AND C OF F REQUIREMENTS

A meeting was held at Michoud on March 14, 1962 with MSFC facility personnel (Shepherd, Lloyd) and NASA Headquarters personnel (Salmonson, Diaz, Canright). The AE and C of F requirements for FY 62 were reviewed with each stage contractor. All requirements were consolidated and this package transmitted to NASA Headquarters under a cover letter to Mr. D. Brainerd Holmes by Mr. Eberhard Rees on March 19, 1962. ✓

5. BOEING

Boeing has submitted the following preliminary plans:

- a. Plant Activation & Flow
- b. Tooling & Facilities

Plant layout will be available for discussion on or about March 28, 1962. ✓

1. Titan Siting. I plan to cover the results of the Schriever/Holmes/Debus meeting of Saturday in much detail in our meeting tomorrow, as well as other items I mentioned in our telephone conversation today. ✓

* 2. SATURN. SA-2 checkout is progressing satisfactorily and on schedule. It is interesting to note that there have been no electrical type EO's submitted to LOD on SA-2 as of this time. Several have been submitted for GSE which have been incorporated. ✓

3. Possible Revival of the Efforts to Modernize the Range Safety Philosophy. On March 14, 1962, Col Gibbs informed Dr. Knothe that the new Chief Scientist at AFMTC is supposed to be charged with reviving the efforts in which the former "Missile Flight Safety Research Group" failed to achieve an applicable solution. ✓

4. Labor Relations Representative Withdrawn. Mr. John Miraglia will leave LOD in May or June and be assigned elsewhere. Mr. Paul Styles will recommend an individual for his replacement. ✓

* 5. Congressional Visit. The Manned Spacecraft House Committee, chaired by Congressman Teague and including Congressmen Daddario, Morris, Riehlman and Fulton will be here Friday, March 23 for a briefing on the construction facilities covered by the 1963 budget. We are to be prepared to answer any questions on the 63 budget. Also the supplemental budget which includes the acquisition of land. ✓

6. CENTAUR. Re-run of FACT Plugs In, scheduled for March 15 was postponed because of a CENTAUR programmer failure. Another programmer was scheduled to arrive at AMR on March 16. The effect of this delay on the launching schedule has not been assessed.

K.D.

Please keep me posted
B

* =
Include in
J.B. Holmes
Notes

B₃/L₉

1. C-1, BLOCK II, AERODYNAMIC STABILITY: Wind tunnel programs are plagued due to the low Reynolds number at which model tests must be conducted. The effects of Reynolds numbers can be quite large on aerodynamically unclean shapes such as Saturn. The unclean shapes make stability predictions more difficult both analytically and experimentally. We have recently developed techniques for artificially simulating the high Reynolds number effects. The validity of such data has been firmly demonstrated during SA-1 flight evaluation which shows excellent agreement of center pressure locations between wind tunnel and flight test data. The subsequent result is that aerodynamic data on Block II and on C-5 may now be used with more confidence. A paper describing the techniques and subsequent test results is in preparation. ✓

2. NOVA STAGING: A performance analysis and stage optimization study for Nova was conducted. 8 and 10 F-1 engines for the first stage were combined with 1, 2, and 4 M-1 engines for the second stage (engine-out for the 4-engine case.)

Payloads were calculated for a 225 Km orbit. Payload in orbit required to bring 150,000 lbs to escape respectively 50,000 lbs to the moon was previously established as 415,000 lbs.

The calculations show a superiority of the 2 engine second stage over the (4-1) (four with engine out.)

Further, the ten engine first stage always is adequate for the single shot lunar mission, while 8 engines are marginal with the optimistic second stage weights, inadequate for the more conservative ones.

3. SATURN FLIGHT EVALUATION WORKING GROUP: Inhouse Activities. A PERT type study of the SA-1 flight evaluation efforts and their sequencing has been completed. A supplement to the SA-1 evaluation report is being prepared. A Datafax machine is being installed between HIC and the nearly complete evaluation complex in Bldg. 4663 to facilitate data exchange. A data link between Green Mountain and Bldg. 4663 is being established. It will permit real time analysis of flight events around S-1 cut-off. A study contract for analysis of engineering camera coverage (skin undulations, inflight separation, etc.) is to start in early April. ✓

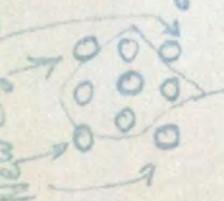
Contractor Interface. A DAC request for additional data processing equipment was reviewed and essentially rejected.

Mr. Shimizu, NAA, was briefed on purpose and objectives of the Working Group. Various misconceptions on his part became evident. It is likely that NAA will have to appoint another representative to this Working Group. ✓

4. FLIGHT EVALUATION REQUIREMENTS: Mr. Kurtz, M-AERO-F, participated in a discussion concerning NASA requirements for tracking ships in Mr. Buckley's office, Washington, on 3-15-62. NASA ship requirements for the next two years will total 10 tracking and 4 telemeter ships. This considers all NASA programs.

Aeroballistics measuring requirements for both SA-10 and subsequent operational flights were finalized. The reduction in number of measurements for operational vehicles is 32% (Aero. only.) ✓

Advantage:



Arrangement like C-5 (plumbing, tail heat, etc)

E.g.

I asked Frank Williams (who handles Nova with his new task group out of Koelle's shop) to also look into a 9 F1 engine configuration

NOTES 3-19-62 GORMAN

B3-19

1. CHIEF COUNSEL - Ed Guilian received an offer to join the Joint NASA-AEC Office in Nevada, carrying a salary equivalent to an excepted position. He has decided to turn it down and remain in Huntsville. *Good.*

2. WASHINGTON TRIP - I will be in Washington Wednesday of this week to meet with Siepert on what has to be done between now and July 1 to make LOD completely independent in the administrative and support activity area on July 1, 1962.

✓ H.G. Suggest you touch base Sta Kurt before you go. B

Mr. Tran
We will hold this
up until next week
for Holmes. JCS-20

D.G.
They is
7 so
important
that in
this area
MSC and
MSFC
apply the
same
stand-
stick?
low
center
organizer
Arons
are
different,
too.
Find so
are
low
jobs.
B

1. QUALITY PROGRAM SUPPORT FUNCTIONS OF THE NASA PLANT REPRESENTATIVE IN THE DOWNEY PLANT OF NAA: This subject was discussed in a meeting in Houston on March 14, 1962, with MSC, MSFC, and WOO participating. This meeting revealed that MSC and MSFC are in agreement on the basic approach but disagree on the amount of support to be solicited from the NASA Plant Representative (WOO). While MSC wants to be supported only by inspectors of a comparatively low level, MSFC feels that a certain amount of engineers are necessary for an adequate job. MSC believes that all engineering type work has to be performed by MSC quality assurance personnel in the plant (15 people are contemplated for this purpose); MSFC believes that some engineering type work can be performed by the NASA Plant Representative without interference with the responsibilities of the Center. It was agreed that NPC 200-1 should be used as a guideline by all concerned and that MSC and MSFC should notify WOO in the very near future concerning the extent to which NPC 200-1 would be invoked by the respective Center in support of the Apollo and S-II Project. This information will be used by WOO for the development of the capability in this field.
2. ACTIVITIES OF THE TEST AND CHECKOUT WORKING GROUP: There have been no activities during the past few weeks, however, a meeting of the Saturn System Checkout and Preflight Testing Working Group with Douglas Aircraft Company on the S-IV Program is scheduled for 9:00 a.m. on April 2 and 3, 1962, in the Test Division Conference Room. ✓
3. S-I-2: One representative from this Division is present at the launch site during mechanical system checkout of this booster. ✓
4. S-I-3 PRE-STATIC CHECKOUT: The pre-static-checkout of vehicle S-I-3 was completed on March 14, 1962; S-I-3 will be moved to the test stand on March 19, 1962. Due to problems which arose during the last week of the checkout (e.g., leakage of pitch actuator of engine No. 1 which necessitates exchange of the actuator at the test stand) certain items will require completion of testing at the Test Division. ✓
5. COMMUNICATION BUILDING 4708 - TEST TOWER: Installation of the hybrid circuits between building 4708 and the test tower has begun which will supplement the present communications to the test area and should be operative for the static testing of vehicle S-I-3. ✓
6. RESIDENT INSPECTORS ON THE WEST COAST: Two additional resident inspectors from this Division have been established to monitor small hardware contracts on the West Coast, one in the Los Angeles area, and the other in San Diego. ✓
7. QUALITY ASSURANCE DIVISION PERSONNEL TO DOUGLAS: Since the Air Force Plant Representative at Douglas has not been able to give MSFC sufficient coverage at Douglas, Santa Monica, California, two inspectors of the Quality Assurance Division will be stationed at Douglas beginning on March 21, 1962, in order to improve the quality of electrical workmanship to MSFC requirements. They will stay until the AFPR has the capacity to take these functions over. Latest information says that 25 of the 50 additional spaces requested by the Western Contract Management Region for improvement of the coverage in the West Coast area have been released. ✓
8. EBW FIRING UNITS: Personnel from Quality Assurance Division monitored the pre-installation inspection and evaluation tests being performed by Astrionics Division on the EBW firing units. ✓

B₃-19

NOTES - HAEUSSERMANN 3/19/62

1. STATUS REPORT - CENTAUR WORKING GROUP: Chairman, H. Thomason. Regarding meeting schedule (frequency and location) - the group meets only when considered necessary to discuss and exchange technical information; meetings are held at which ever location is felt to be of most benefit considering the material and personnel involved. Highlights of group activities since last report: A design - proofing test program has been established at GD/A, San Diego. All sub-contractors will participate in these tests. Scheduled tests at sub-contractor's plants have been cancelled. Data sheets for taking and keeping test data have been established. This information will stay with the system from first checkout at Minneapolis-Honeywell until firing. A platform handling frame has been designed. Several changes were requested after initial review of drawings. Included was the ability to install platforms in the vehicle with use of the handling frame. A reuseable shipping container has been designed and will be built by Minneapolis-Honeywell. A procedure has been established whereby L&M-CE will maintain control over all flight hardware and GSE. An allocation schedule will be issued weekly. ✓

2. FORTHCOMING MSFC/MSD/MIT/NAA MEETING: Set for 3/26 and 3/27. Memo announcing time and agenda will be distributed by 3/22. I hope that you can be in the meeting - at least part time. ✓

W.H.
Could love to see 3/26
Must be in Wash 3/27
B

3. MSFC/JPL CENTAUR GUIDANCE MEETING: Meeting was held here 3/12 with JPL guidance personnel, Astrionics and L&M Office personnel participating. The purpose of the meeting was to exchange information concerning the performance capabilities versus the performance requirements of the Centaur system. A follow-up meeting will be held within the next four weeks, at which time detailed technical data will be presented as a means of providing closer understanding between the spacecraft and launch vehicle personnel. ✓

4. GE RADIO GUIDANCE PRESENTATION: Informal presentation was given here 3/12. GE wants to sell their system for the RIFT Program. GE is presently performing in-house studies on nuclear radiation effects on the radio guidance flight hardware. ✓

Please tie Scott Fellows in B

5. VISIT TO MICHOU D PLANT: F. Weber will accompany W. Peak of M-SAT, 3/20, to become acquainted with the plant operations and facilities. ✓

6. PARTICIPATION AT ARS ELECTRICAL PROPULSION CONFERENCE: E. Cagle delivered a paper at this conference in Berkley, California on 3/14. The title of the paper was "Power Source for a One Kilowatt Arc Engine Test Capsule." ✓

7. FLIGHT SIMULATION FACILITY: Engineering for modifications and building alterations for this facility has been completed. Drawings and data will be used in connection with initiating RFQ's. ✓

B 3/19

1. SA-T3 VEHICLE:

SA-T3 vehicle was removed from the Static Test Tower, Thursday and Friday, 3/16-62 and 3/17-62. ✓

2. S-I-3 VEHICLE:

S-I-3 vehicle will be installed in the Static Test Tower today, 3/19/62. ✓

3. CONCEPT OF STUDIES RELATIVE TO NUCLEAR VEHICLE STATIC TEST FACILITIES:

Studies being performed by Bechtel Corporation are approximately 50% complete. Submittal to MSFC is scheduled for the first week in April. The contract completion date is 6/3/62. Serious question has arisen as to whether the advanced design money will be available prior to FY-63 funds, resulting in a 3 to 4 month delay.

Is this for the Nevada (hot) facility or the MTF (cold) facility? B

Karl,

We will hold (3) until next week's TWX to Holmer after you have answered Dr. von Braun's question.

3/20

B 3/19

1. AUTOMATIC CHECKOUT: Work has been satisfactorily completed on a study project for Quality Division of automatic valve checkout. This is done by recording the sound made by a closing or opening valve. The data are then digitized and predominant frequencies are calculated. These are repeatable as long as the valve works properly. The problem must now be transferred from the 7090 to the checkout computer. ✓
2. CONSULTANTS: Professor I. E. Perlin has been added to the division staff as a consultant in mathematics. Dr. Perlin is research professor of mathematics at Georgia Institute of Technology. He received a Ph.D. in mathematics from the University of Chicago in 1935 and has contributed in various fields of mathematics and physics. This brings to four the number of consultants employed by the division. The others are, as reported before, Professor Baylis Shanks, Vanderbilt University; Professor Nathaniel Macon, Auburn University; and Professor Leland Cunningham, University of California. These consultants are employed approximately six to eight days monthly. We plan to add one additional person in the category. ✓

Interesting!

Memorandum

TO M-DIR - Dr. von Braun

DATE March 19, 1962

FROM M-L&M-DIR - Mr. Hueter

SUBJECT Notes 2-19-62 Hueter

The following information is submitted in response to your comments to the "Working Group" attachment to my Notes of 2-19-62:

a. Propulsion Working Group:

P&WA Test Stand E-5 - The work at P&WA is shifting from the RL10A-1 development to RL10A-3 development. Work on the RL10A-1 is primarily concerned with product improvement, particularly the development of the pneumatic reset thrust control. The original program plan for the E-5 stand has been completed. Seventeen hot firings were attempted, fourteen of which were successful at flight and captive ullage pressures. At present the program is aimed at cooldown optimization and investigation of the high speed stalls which have occurred on E-5. A proposal for follow on work for the RL10A-1 at P&WA has been received (Product Support and Dual Engine Vehicle Compatibility Testing). ✓

ERS-1-1 (Edwards AFB) - Repairs made to the PTV intermediate bulkhead appear to be adequate for the resumption of cold and hot tests. Since the time of the last Group meeting, four hot firings have been conducted and all were successful. The first was aborted at 4.5 seconds by an observer but due to no malfunction of the system. The second was a programmed 60 second duration run, the third 80 seconds and the fourth 15 seconds. The last firing in the present series will be a 280 second duration. These runs have been made at captive ullage pressures. Modifications would then be made to run cold flows at flight pressures and to obtain data of the variation in cooldown with back pressure. ✓

Lewis Research Center - Steady state performance data have been obtained over the design mixture ratio. Data are to be submitted in the next progress report. LRC is planning to run a rapid relight program as requested by this office (simulating a 120 second coast period), after which the hot gimbaling program will be initiated. Environmental tests using a LN₂ shroud followed by system boost pump tests will then be conducted. ✓

March 19, 1962

b. Guidance and Control Working Group:

Librascope Reliability - The Librascope quality has improved considerably in the past few months. In the January 15, 1962 Working Group meeting, a quality survey was recommended as an action item to M-L&M-REL. This quality survey was completed March 3, 1962 and a report made at the March 8, 1962 Guidance and Control Working Group meeting.

At the present time, the failures in the guidance system have been minimized by proper handling and operating procedures adopted at AMR. There has been only one failure of the computer at AMR since the new procedures were adopted. This failure was a high resistance plug on computer card #3. Computer #9 at Librascope has failed vibration testing and is being investigated now.

In reference to the use of the Titan computer, the IBM computer is somewhat larger and the environmental requirements are such that the use of the Titan computer would need additional cooling. A thorough investigation in the area of input-output unit differences would be necessary to determine the amount of jeopardization of the Titan computer to perform the same output functions. However, with the increased quality assurance from Librascope and the expected increase in reliability, it appears that this would tend to make the need for investigation and redesign non-profitable at the present. ✓

Glad to hear this!
B

[Handwritten signature]
Hans Hueter

Director, Light & Medium Vehicles Office

B 3/19

A. FUTURE PROJECT STUDY EXPENDITURES

Here is a summary of our activities and plans as far as money is concerned.

| \$ 10 ³ | FY 62 | FY 63 | FY 64 |
|--------------------|------------|--------|---------|
| Subsystems | 0 | 300 | 700 |
| Launch Vehicles ** | 3, 535 | 1, 500 | 2, 400 |
| Orbital Systems | (1, 100) * | 1, 200 | 2, 400 |
| Lunar Systems | 538 | 1, 350 | 3, 250 |
| Planetary Systems | 310 | 400 | 1, 250 |
| TOTAL | 4, 483 | 4, 750 | 10, 000 |

*Not yet authorized

**Including NOVA

B. NOVA

As scheduled, Frank Williams presented the NOVA Study Plan to Mr. Holmes on Wednesday, March 14 and Dr. Seamans on Thursday, March 15. Each, in turn, signed off on the plan and were very happy with the support that MSFC was giving to NOVA. Dr. Seamans is expected to formally approve the Phase I study effort and release the \$2.3M on Monday, March 19. It is anticipated that the \$2.3M will be released to MSFC about Tuesday, March 20. Present plans call for release of RFQ between March 23 and 27.

C. ENVIRONMENTAL FACILITIES

This office has determined some background information on the need for and requirements of environment simulation facilities. This is a costly and politically potent area. It is felt that NASA management is not yet sufficiently aware of this problem. The main features of this subject are being organized now and a meeting with you for discussion is suggested.

H.H.K.

→ Please lay on ton Bourne, but send me a 1-page proposed agenda first, - with a few days lead

Please do write additional participants.

10 of items
sent to Mrs. Slattery
3/20/62. BSM

B3/19

1. Division Display Area: A display area is being set-up on the mezzanine floor of Building #4705. This area will utilize 1/96 scale models, pictures, projection equipment (movie and slides) plus displays to depict the functions of the division. The area will aid in the briefing of VIP visitors. ✓

2. C-1 Program Assembly Fixture: The No. 1 Station Assembly Fixture and scaffold will not be required for support of the C-1 Program after October 1962. The space vacated by this fixture will be utilized for the assembly of the Static Test Vehicle of the C-5 Program.

As you requested, I have discussed with Mr. H. D. Lowery and Mr. Sheldon of the Chrysler Space Division the feasibility of using this C-1 assembly fixture at Michoud. Both men have indicated interest and Mr. Lowery is scheduled to visit us this week for further discussions on this fixture. ✓

3. Boeing Manufacturing Plans Review: This division is presently reviewing the initial drafts of the various plans as required in the Boeing Contract. This review is a heavy burden, requiring continuous attention of key people. We feel several items would merit more serious investigation, but we can only make a cursory review due to the time element. ✓

Bart Slattery
for info. B

3/19

1. Vehicle Identification - M-SAT sent request to Mr. Holmes on 3-16-62 for a total of \$6,850M for FY 62 including \$,960M for design. The \$6,850M figure is broken down as: \$3,380M - Boeing; \$2,802M - Chrysler; \$,700M Gen. Support and Engineering Services. ✓

2. C-1 Program -

a. SA-2 checkout is progressing satisfactorily. M-SAT is encouraging LOB to launch SA-2 during the official launch week as early as possible. ✓

b. An FY-63 program fund level will be forwarded to the divisions on 3-19-62 asking for their ability to maintain the present C-1 program on the \$170M R&D - and \$85 Operational Presidential Budget. Resubmission of the FY-63 deposit accounts to M-SAT is due 3-27-62. ✓

c. Outline of work statement of final Chrysler Contract will be delayed about three weeks beyond 3-15-62, due to absence of funding resolution. Presentation of the overall C-1 program, including outline of the Chrysler scope of work is scheduled for early April. ✓

d. During hydrostatic test of the All-system S-IV test vehicle, a forward interstage panel buckled. The All-systems schedule will not be affected by the slight crease. DAC is concentrating on a study to investigate the failure. ✓

e. The S-IV actuator problem will be reviewed with DAC at MSFC 3-20-62. ✓

f. HQ's, Mr. Sloop, has requested the 3-stage C-1 Steering Committee including JPL to meet about 3-27-62 at HQ's to informally present the vehicle and program outline to Mr. Nicks, Lunar & Planetary Programs. M-SAT would like to brief you on subject by the end of this week. *o.k. B*

3. C-5 Program

a. S-IC: In the Review Mtg. on 3-14-62 the Design Ground Rules were discussed and agreed on.

With these Ground Rules, the stage - optimizing the cylindrical tank configuration with double bulk-heads - is estimated to a 280,070 lbs total dry weight and a 387,815 lbs cutoff weight. Considering these estimated weights, Aero Div. calculated that under the worst conditions, a 150,000 lbs net payload could be injected from a 420 km Earth orbit into the lunar ballistic trajectory, providing a lunar landing payload of 52,200 lbs. The figures are based on utilizing the orbital rendezvous technique using Lox mode. If a connecting mode is used, the net payload injection would be 168,000 lbs. and the lunar landing payload would be 50,100 lbs. ✓

A new hydraulic actuator for the S-IC was proposed operating at 4,000 psi instead of 1,750 psi. Weight saving was estimated at 1,150 lbs per engine. Investigations are continuing. ✓

b. S-II: Manufacturing site was determined to be built in Seal Beach, California. ✓

C-5, b (2) "C-1B may be able to reduce by 3 flights the point at which C-5 would be available for manned flight (advanced from #11, July 67 to #8, March 67) -- Don't understand reasoning, please explain. B.

MSFC's position is that the 10 flights are required for the R&D phase. Only #11 can be the first manned flight of C-5. - MSC insisted on an earlier manned flight, possibly with #7. The above note implied that the first manned flight of C-5 could be possibly pushed back to Flight #8, if the C-1B tests would obtain sufficient S-IVB reliability prior to that date.

C-5, d, S-1C "The ^{pacing} ~~cost~~ item in this plan is the bulkhead assembly fixture which will cost \$200-300,000 and approximately 32 weeks will be needed to complete the first four bulkheads because of this fixture." --- Kuers tells me we will have several bulkhead ass'y fixtures. B.

→ at MSFC

ME investigation reveals that there is insufficient floor space to set up more than one fixture. Therefore, overtime will be used with one fixture to meet the schedule. Any new fixtures will now be set up in Michoud.

→ Which could be done almost today!! B
So plug is this new "pacing"?

1. FY-64 Budget: The completed FY-64 Budget and the lunar landing program schedules left by special plane for NASA headquarters this morning. ✓

We received OART Budget guidelines Thursday, March 15 which was entirely too late (4 days prior to due date in headquarters) for ample consideration. This included no major items which grossly affect the budget. The format for OART has still not been received. |

So, what are we going to do? B

We received a change from Mr. Holmes which clarified that we budget directly to OMSF for operational Saturn and NOVA vehicles instead of going through MSC. ✓

The budget requirements and related schedule information applicable to OART, OSS, and OA are being compiled and will be mailed separately with separate cover letters. ✓

2. Presentation on Project Management to Headquarters: Mr. Jenkins in Wyatt's office has informed that the visit of the group from NASA headquarters plan to visit here during the last two weeks of April; instead of March 29th. In preparation for making up the agenda we are presently documenting the way we are actually managing our programs. Will study what improvements are indicated and will arrange for briefing with you. Good. B

3. Orbital Operations: The C-1B Orbital Rendezvous study is progressing; the C-5 Orbital Operations Performance (Tanking Model) have been reviewed and polished up with M-AERO and M-P&VE; the results are very satisfactory. 150,000 pounds of mass to escape is entirely practical with even a decent margin. ✓

4. Visit of Mr. Fernandez and Lt. Col. Bathurst: Joseph Fernandez, Director of Master Planning and Scheduling Division OMSF and Lt. Col. R. H. Bathurst, Resources Specialist, discussed scheduling and planning activities at Marshall and were very pleased with our efforts. They plan to prepare a NASA Manual on scheduling, hoping to standardize format for schedules, after visiting several of the Centers. ✓

B3/19

1. SA-5 TYPE LOX TANK STRUCTURAL TEST: First Lox tank of SA-5 type has been received by M-P&VE-SE and is being instrumented for test. ✓

2. S-IV COLD FLOW PROGRAM AND HEATER IGNITION TEST: Douglas has started the cold flow program at Sacramento. Engine 1708 was cold-flown with LH₂ Saturday, 3-10-62. Dual cold flow with LN₂-LH₂ is due late this week. Helium heater has been successfully ignited at 3 psia repeatedly during past week. ✓

3. SPACE MAINTENANCE PROGRAM: Mr. Frank Smith attended a meeting 3-13-62 with representatives from MSC, Houston, to firm up plans for first series of space maintenance studies. First series is scheduled to be done at Rocketdyne. Tasks will be based on servicing J-2 engines. ✓

4. ENGINE PROGRAMS:

F-1: Since recent curtailment of full-thrust testing because of turbopump problems, there have been three successful engine tests at the 1000K level. Considering success of these tests, a decision has been made to advance the tests to 1250K level. Modification of the turbopump test stand has been completed and testing of turbopump #17 with LN₂ will begin next week. ✓

*M-1: Approval of the facilities plan (handcarried to Headquarters 3-5-62), release of funds by Headquarters, and consumation of a facilities-use agreement with the Air Force are still pacing the award of a letter contract with Aerojet.

RL10: The APIX Plant at West Palm Beach, Florida, resumed limited operations (30% capacity) 3-15-62. By 3-17 it is anticipated that plant will be operating at 70/75% capacity. Delivery of engines has not been affected by shortage of hydrogen as yet. However, R&D program for the RL10A-3 engine probably will encounter delay. ✓

J-2: Due to hydrogen plant breakdown in Florida, propellant supply has been diverted from the West Coast. The Linde plant in Torrance, California is also down. Therefore, Rocketdyne will receive no hydrogen from 3-19 through 3-23, and one trailer per day (7000 gallons) 3-24 through 3-31. Effect on program has not been determined, but test effort will certainly be curtailed.

W.M.

I understand AF still has not concurred to suggested plan. Is that right? What's the issue?

→ Mac

See what I mean? What's next to remedy this?

I think this situation calls for drastic emergency type action!

SUGGEST WE MAKE THIS AN ITEM TOP

B 3-19

1. Have moved to MSC Building into former offices of Mr. Cummings of Brown Engineering. ✓

2. Backup Configuration (Shroud) for SA-5:

a. Council Meeting Minutes have still not been corrected, although Shea told me he would do so. (He had talked to Frick, who told him, that NAA had been instructed to work on backup configuration.) ✓

b. Have not been able to determine exact status of work at MSC or NAA.

(1) Agreed with Kaettner that he explore status with NAA visitors who are at MSFC today.

(2) Suggest that Lange also explore with Frick on latter's visit on Tuesday, 20 March 1962. ✓

c. Understand that SATURN Office has requested that backup configuration be put on agenda of next Council Meeting. *This is on agenda.* ✓

This seems good idea: if Lange and Frick are in agreement, then changing minutes should be simple matter, if they do not agree, then discussion in Council Meeting to clarify issue is most important. In latter case technical information on differences must be provided to you by SATURN Office before Council Meeting.

Dr. Lange ✓

Jan 3-19

Let's clarify this since Frick is at MSFC, March 20/21

B

B 3/19

1. SUPPORTING RESEARCH PROGRAM: You probably recall that we submitted a FY 1962 Supplemental Research Program to OART on March 5. We have recently been advised that we probably will not receive FY 1962 funding from OART. They have indicated that, as far as the remaining FY 1962 funding is concerned, a few large items will probably be funded, rather than a number of smaller items. This approach eliminates MSFC almost automatically, because our supporting research program is of the "matrix" type, consisting of many small and urgent projects, rather than a few monumental ones. *Can't you throw in an "emergency list" to catch at least a few?*

The FY 1963 MSFC Supporting Research Program (not including the submission from the Future Projects Office) was forwarded to OART on March 13. The submission totals \$25,109,000 and includes 304 proposed tasks. Both in-house and contractor effort is included. We have just been advised by Financial Management Office that the LVT program for FY 1963 will not exceed \$19,060,000, and \$4,765,000 of this funding will be required for Mr. Koelle's "Advanced Vehicle Studies". Thus it appears that we will soon have to cut our FY 1963 Supporting Research Program (LVT) from \$25,109,000 to \$14,295,000. *Just batting average! B*

We submitted our preliminary FY 1964 budgets (including estimates through FY 1969) for the Launch Vehicle Technology Program, the Research Grants and Contracts Program and the Industrial Applications Program to the Financial Management Office for incorporation into the overall MSFC FY 1964 submission. ✓

2. ELECTRIC PROPULSION: A total of 41 electric propulsion contracts have now been transferred to Lewis Research Center, and two other contracts are in the process of being transferred. After this transfer is completed, only one other contract (batteries for the flight capsule) will remain to be transferred. ✓

3. EUROPEAN VISIT: On my forthcoming visit to Germany, I will be asked by members of the European Space Research Organization whether key members of U.S. space programs might be willing to accept positions in the European organization. I intend to answer that chances are probably not too good, but that members of our organizations might visit European organizations for limited time periods (days or weeks) to act as consultants and advisors. I will discuss this with Dr. Dryden and Mr. Frutkin before my trip, but I would appreciate also your comments. Dr. Raes agreed to this approach. ACTION REQUIRED.

→ So do I, B

4. ARS ELECTRIC PROPULSION MEETING: The Electric Propulsion Committee of the ARS, of which I am the chairman, held a three-day specialists conference at Berkeley last week. Almost 500 specialists attended to hear 74 presentations (6 by MSFC members). Dr. E. Teller gave an excellent banquet speech and professed a strong personal belief in electric propulsion (".....the electric propulsion concept is of much greater significance for space exploration than the Rover program"). *!!*
Dr. Teller sends you his cordial personal regards. ✓ *Congrats*

March 26, 1962

B 3/28

RENOVATION AT MICHLOUDa. Office Building:

- (1) Duct work for air conditioning west end approximately 85% complete.
- (2) Cleaning walls preparatory to painting and finishing in progress.
- (3) Re-installation of plumbing fixtures completed.
- (4) Installing chilled water lines for air conditioning. ✓

b. Engineering Building:

- (1) Approximately 25% of second floor east end turned over for occupancy.
- (2) Repairing of electrical circuits and lighting fixtures in progress.
- (3) Constructing partition center portion in progress (Mason-Rust area).
- (4) Re-installation of plumbing fixtures approximately 75% complete. ✓

c. Boiler Plant:

No work, awaiting delivery of chemical feed pumps and purge units. ✓

d. General:

Installing electrical cables between main sub-station and boiler plant. ✓

2. PRE-AWARD SURVEY GROUP

This group, formed to evaluate the capability of Louisiana area Architect Engineering concerns has submitted their recommendations to M-DEP-ADM and the selection for performing plant modification design efforts. ✓

3. S-1 EFFORT

An in-house review of the contents of the CSD document "Saturn S-1 Stage and C-1 Vehicle Program Plans, 1961-1966" is being conducted in coordination with M-SAT. ✓

4. COMPUTER FACILITIES

It has been decided, that because of lack of funds, that initially no choice other than centralizing computer and data processing exists. A Michoud Computer Steering Committee has been formed from MSFC, CSD, Boeing and Mason-Rust personnel. Meetings to plan implementation are planned for the coming week. ✓

5. CONTRACTS

Requests have been submitted to M-PAC to amend the Chrysler and Boeing contracts as follows:

- a. Provide design criteria for Michoud plant activation. (This permits Boeing to perform design criteria required for submission to A-E contractor.)
- b. Lease office space within the New Orleans area for the period April 1 through July 31, 1962, with option to renew for one year. (Space in the Engineering Bldg. will not be ready for occupancy.) ✓

6. PRESIDENT'S COMMITTEE ON EQUAL EMPLOYMENT

NASA has been informed that Mr. John Freid, Executive Director of Staff, President's Committee on Equal Employment plans to have a conference in New Orleans on April 2, 3, and 4, 1962. This conference will be in three phases:

- a. NASA, Mason-Rust, Chrysler, Boeing and Members of the President's Committee on Equal Employment.
- b. NASA, New Orleans Labor Representatives and Members of the President's Committee on Equal Employment.
- c. NASA, Members Expressing Community Interest and Members of the President's Committee on Equal Employment.

Mr. Al Hodgson stated that he plans to attend these meetings. ✓

Harry S. Do you please do such a delegate from here in case George holds? ✓

B 3/28

1. Subcommittee on Manned Space Flight. The Chairman (Teague) and the other members of this committee were here 23-24 March and this time was spent in review of our functions, operations and plans with emphasis on the FY-63 Budget. I plan to give you a full briefing on types of questions. ✓

I was impressed with their approach to obtain an understanding of our budget requirements so that they can defend it on the floor. On the other hand, they were looking for ways possible to reduce it in FY 63, IF IT WOULD NOT HURT THE PROGRAM. We discussed this at great length and I suggested that if Congress would establish the NATIONAL goal in space for the next 25 years or so rather than just limit us to schedules for the lunar program in this decade, (which is subject to administration changes) then we could apply these goals in the analyses of our facility requirements. ✓

Handwritten notes:
K.D.
tell, we discussed the various aspects of this issue with Hollander concerning his views
B

It appears obvious that we would not use a single fixed pad for NOVA if we had these guidelines, etc. The committee seemed to understand this and would try to obtain some guidelines so that NASA might use the total objective schedule in their plans for development of launch facilities. Will give more details and impressions of the meeting in my briefing to you later. ✓

2. Centaur. Another delay --- uncertain but may be the first week in April, dependent upon delivery of certain hardware. Problems developed during FACT plug-out test (plug drop OAT) on Thursday. This, plus some hardware delivery from San Diego, cause the presently planned, eight day slip. ✓

1. SATURN OPERATIONAL FLIGHT CONTROL: A full Steering Committee (MSFC-AFMT) meeting for Saturn Operational Flight Control was held on March 22, 1962. The RCA contract staff presented the results of the first study phase. Progress and approach were found satisfactory. The next meeting is planned in three months. It is anticipated to invite observers from MSC for the next meeting. ✓

2. STATUS OF HIGH RESOLUTION WIND MEASURING PROGRAMS: The objectives of this program are: (1) Provide an operational system at AMR to obtain wind profiles necessary for first bending mode response studies; (2) provide an all-weather system; (3) provide a system which can be integrated into the Cape Canaveral Instrumentation complex; and (4) develop a system capable of providing data for preflight monitoring of launch conditions. Studies are being conducted on the following: (a) Balloon-Borne Sonic Anemometer - Consists of two sonic anemometers attached to a balloon providing direct measurements of wind shear. Balloon train consists of the balloon, sonic anemometers, radiosonde package for measuring temperature, pressure and humidity, drag fins to damp out undesirable motions, and a telemetry package. Phase 1, a system feasibility study, was completed by Cook Research. The decision to support further development of the balloon-borne sonic anemometer will be made later to take advantage of results of a development program for ground based sonic anemometers being sponsored by the Army Signal Labs. (b) Doppler Radar/Chaff - As proposed by Cornell Labs, a continuous vertical column of chaff would be established by use of a small rocket throughout the altitude of interest, and the movement of the chaff measured by two doppler radars to obtain wind data. The analytical work has been accomplished, a rather detailed error analysis completed, and some of the preliminary design work done. An error analysis of test data indicated the system was not capable of providing required data. Development of this system will be discontinued after Phase 1 is completed. (c) FPS-16 Radar/Spherical Balloon - A radar reflective spherical balloon is tracked with the FPS-16 Radar. Position coordinates are then analyzed to obtain wind profile data. Because of the high volume to weight ratio, the spherical balloon has a high response to winds and wind shears, and provides an excellent tracer. These data have an RMS accuracy in wind speed for 50 meter increments of about 0.6 m/sec, and an RMS accuracy in altitude of about 8 meters in the maximum dynamic pressure region. Accuracy decreases at higher altitudes. More accurate data are desirable. However, this technique employs currently available equipment and provides data more accurately by a factor of about 5 than any other all-weather operational system. Action has been taken with LOC to procure a special FPS-16 Radar system for installation at Cape Canaveral. This radar will be used primarily for making detail wind profile measurements. The system is expected to be completely operational by fall of 63. Limited measurements are currently being made. (d) Smoke and Vapor Trail - This is a joint effort between MSFC and LRC and employs a vertical smoke column dispensed by a small rocket and photographed. Measurements are to begin at Cape Canaveral late this spring. Wind speeds are measured with an absolute accuracy of about 0.75 m/sec, and altitude with an absolute accuracy of about 10 meters. This method provides more accurate data than the FPS-16 Radar Spherical Balloon method, but has the disadvantage that it is limited to clear weather conditions. Also, the cost of expendables per profile measurement is approximately \$3,000 compared to approximately \$75 for the FPS Radar/Spherical Balloon method. ✓

3. SA-5 BACK-UP SHROUD: The decision at the last Space Council Meeting, which reinstated the design of a back-up shroud for SA-5, was apparently not made known to MSC. Mr. Piland stopped work at NAA on the design of the back-up shroud. Only a few days ago this was brought to our attention and Mr. Fricke promised to reinstate work on the shroud at NAA. There appears to be considerable doubt whether the stiffness requirements can be met. We will send people to NAA to find out whether an adequate design study for a shroud which would have a functional capability for manned flight, is undertaken. *Addition info next week please*

Trust I. Please see or call me on this subject at your earliest convenience. Was discussed 28 March 63

B 3/28

1. PRATT AND WHITNEY CONTRACT #8-2690 - I am preparing an Urgent Action on modification 16 to this contract. The modification has been in Washington since March 1. In addition to containing redirection of effort it places an additional \$13 million under the contract. Received an SOS call from Pratt and Whitney to the effect that Pratt and Whitney has spent their own dollars in excess of \$1 million and will have to slow down the effort if they do not receive approval of the modification immediately. ✓

2. GENERAL DYNAMICS/ASTRONAUTICS - Agreement has been reached with the Air Force plant representative at GD/A on the support to be provided Hueter's project office by the Air Force. ✓

3. CENTAUR CONTRACTS - Huth reported this morning that some difficulty exists between Procurement and Contracts Office and Light and Medium Vehicles Office on processing procurement actions. I am personally looking into this matter today. ✓

↑
Harry G.

Please fill me in on action taken.
See also Hueter's Notes 3/26, par 16.
B

B 3/28

1. QUALITY PROGRAM SUPPORT FUNCTIONS OF THE NASA PLANT REPRESENTATIVE IN THE DOWNEY PLANT OF NAA: Concerning your question as to the importance of MSFC and MSC applying the same yardstick, I like to state that it would be desirable from the management point of view to ask for approximately the same support. The Centers can live with the present arrangement; we shall make an effort to get together with the MSC resident manager in Downey as soon as he has been hired. His interpretation of the subject will have a major influence and might lead to a partial reconsideration of the MSC attitude. With the application of an asterisk to the subject paragraph in the Notes 3-19-62, I had in mind to inform NASA Headquarters about the situation because an appropriate word of encouragement for uniform implementation by Mr. Holmes at a convenient opportunity might help considerably. If you like to de-emphasize the disagreement aspect, I offer the following phrasing for the notes going to NASA Headquarters.

OK
9cm
7-21
"1. QUALITY PROGRAM SUPPORT FUNCTIONS OF THE NASA PLANT REPRESENTATIVE IN THE DOWNEY PLANT OF NAA: This subject was discussed in a meeting in Houston on March 14, 1962, with MSC, MSFC, and WOO participating. This meeting revealed that MSC and MSFC are in agreement on the basic approach but that the amount of support to be solicited from the NASA Plant Representative (WOO) will be different. While MSC wants to be supported only by inspectors, MSFC feels that a certain amount of engineers are desirable. MSC believes that all engineering type work has to be performed by MSC quality assurance personnel in the plant (15 people are contemplated for this purpose); MSFC believes that some engineering type work can be performed by the NASA Plant Representative without interference with the responsibilities of the Center. It was agreed that NPC 200-1 should be used as a guideline by all concerned and that MSC and MSFC should notify WOO in the very near future concerning the extent to which NPC 200-1 would be invoked by the respective Center in support of the Apollo and S-II Project. This information will be used by WOO for the development of the capability in this field."

OK
B
If you prefer to omit such a note completely, this is certainly your prerogative. ✓

2. LAUNCH COMPLEX 37B: This Division, at the request of LOD, will supply an on-site advisor for approximately two weeks to the Corps of Engineers when they inspect Launch Complex 37B. Our man will help the COE set up their program and help assure adequacy of the contractors' programs. ✓
3. QUALIFICATION TESTING: Agreement with P&VE has been reached whereby Quality Assurance Division will monitor qualification testing for certain second source items. Quality Assurance Division has done considerable relay qualification and investigative testing for Astrionics Division in the past few months which enables us to utilize in-house capability and flexibility, allows Astrionics to monitor the tests more closely, and saves money which would be required to have this work done at outside sources. ✓

B3/28

1. CANCELLATION OF MSFC/MSC/MIT/NAA MEETING: Planned to be held here 3/26 (mentioned in notes of 3/12 and 3/19), meeting was cancelled by Dr. Weyer, MSC, after he had telephone discussion with Dr. Kuettner, M-SAT. It is very regrettable to see the good relations between technical personnel of these organizations suffer by actions like this.

2. STATUS REPORT- SATURN-APOLLO ON-BOARD INSTRUMENTATION AND COMMUNICATION PANEL: Chairman: O. Hoberg. Meeting was held 3/20 and 3/21 at MSFC. Eight action items concerning distribution of telemetry frequencies, additions to the MSC measurement program and requests for additional information were established during this meeting.

Decisions reached were: the responsibility and authority of the panel, MSC has no additional requests on the MSFC measurement program; MSC will make a sincere effort to restrict themselves to 4 telemetry transmitters on SA-5 and SA-6; MSC will use the upper channels on their command system so as not to interfere with range safety; all C-Band transponders on-board will use the same frequencies (receive 5480 mc/s, transmit 5555 mc/s); on SA-5 and SA-6 MSFC's C-Band transponder will have prime priority for range safety; MSC will have at least a C-Band transponder and a telemetry transmitter operative for at least one orbit on SA-5 and SA-6; MSC realizes there is the possibility of RFI (Radio Frequency Interference) and they will take steps to restrict it on the spacecraft. ✓

Dr. von Braun:

I talked with Kuettner. Weyer was apparently the culprit. He is a very new man at MSC (in charge of systems (dis)-integration). He thought this meeting was out of order so he cancelled it. Haeussermann has not kept Kuettner informed, in writing, which of course is pretty hard to do sometimes.

It is all settled now and will get back on the track. JCM 3-26

Good!

B3/28

B3/28

1. FY 1962 COST OF FACILITIES FUNDS:

Received "Advice of Allotment" on the following FY 62 C of F projects:

- a. F-1 Engine Test Stand (West Area)
- b. Saturn Static Test Facility, C-5, West Area
- c. Modification of West Side of Existing Static Test Stand
- d. Components Test Facility ✓

2. CONCEPT OF STUDIES RELATIVE TO NUCLEAR VEHICLE STATIC TEST FACILITIES:
(per question in NOTES 3/19/62 Holmberg)

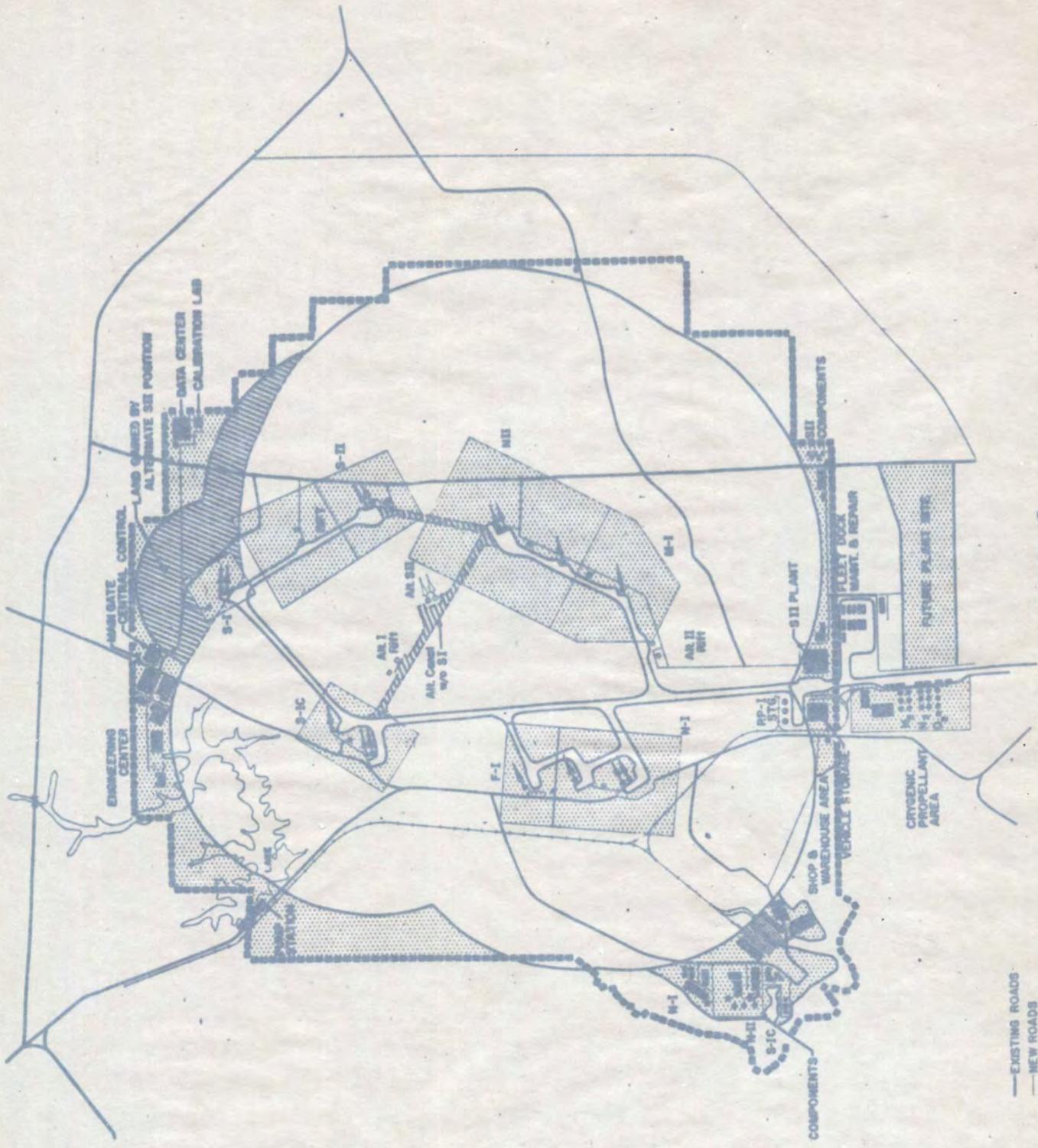
Facilities under discussion are the Nevada (Hot) Facilities. ✓

3. MISSISSIPPI TEST FACILITIES:

Negotiations with Sverdrup and Parcel were completed on Saturday, 3/24/62, for the initial study and design criteria contract for Mississippi Test Facilities. An equitable agreement was reached within the funding which has been received at NSFC. Certain adjustments in the Statement of Work were necessary and some less pressing items had to be deferred to the next phase of the work. Consequently, actions are now being initiated to obtain the remainder of the FY 1962 authorized funds (as modified in the review meeting on Thursday, 3/22/62). Additional funds are required in order to maintain the funding flexibility necessary for an expedited program. Master planning studies have been continuing both in Mr. Lauhrsen's shop and in Test Division. Attached are three of the plans which look favorable without money figures attached to them. Sverdrup and Parcel will study these and others to evaluate costs and other factors to form a basis for a final decision. ✓

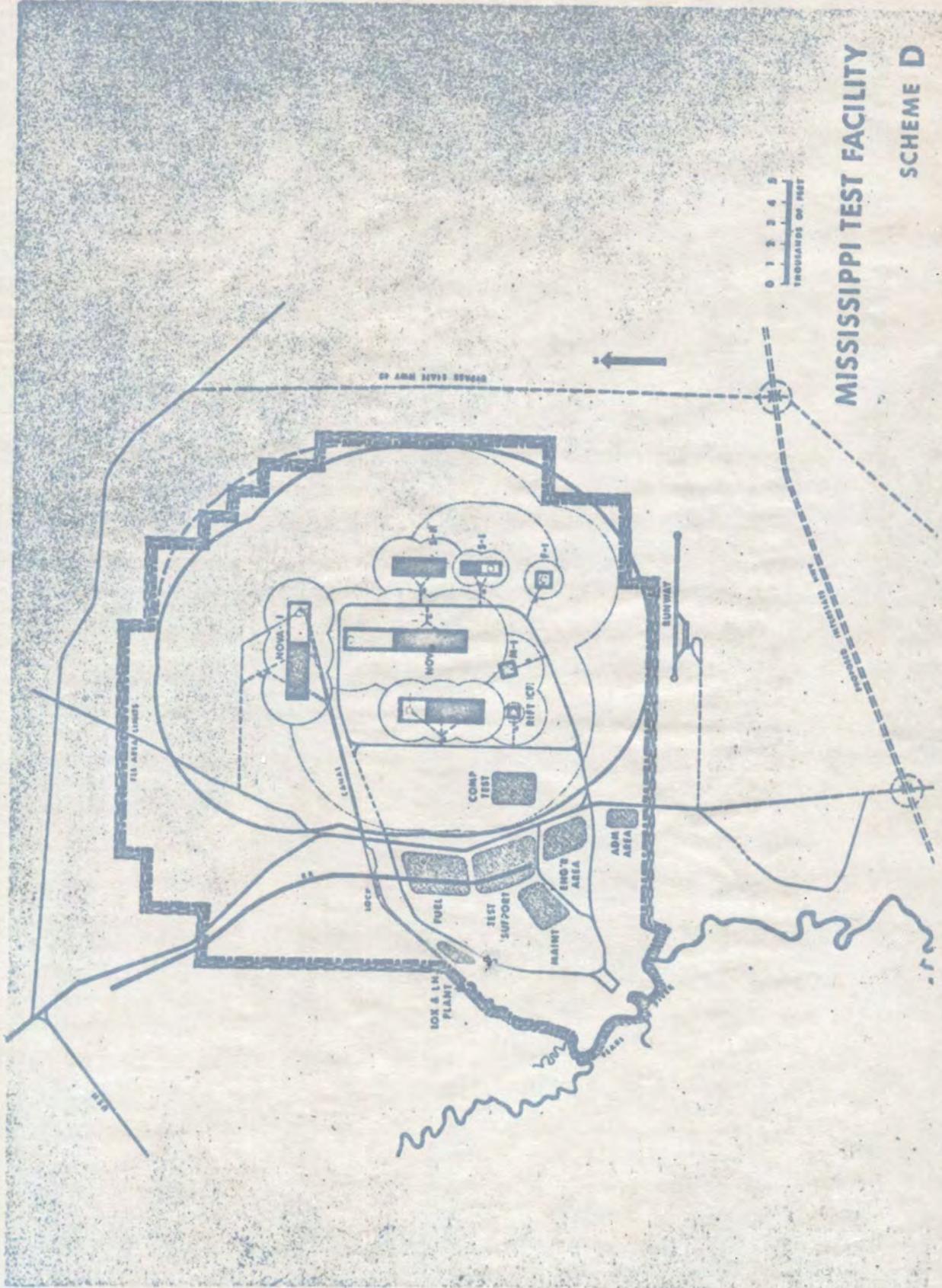
ATTACHMENTS:

1. NOTES 3/19/62 Holmberg
2. Master Planning Plans (3 sheets):
 - a. Plan "C"
 - b. Plan "D"
 - c. Schedule "D"



PLAN C

Att # 2a



MISSISSIPPI TEST FACILITY
SCHEME D

0 1 2 3 4 5
THOUSANDS OF FEET

Att #2c

B 3/28

1. MICHOUD OPERATIONS: This division has arrived at the joint conclusion with Michoud Operations that the requirements of the various groups for computational facilities there, and the deadline for establishing these facilities make it mandatory that a joint effort be begun to establish a central computing facility at the Michoud Plant. George Constan has issued a memorandum dated March 23, 1962 establishing a Michoud Computer Steering Committee to direct the establishment of the central computer facility. The target date for operation is October 1, 1962. Mr. Bradshaw, Computation Division is to be chairman of this committee. The establishment of this computer center will be closely coordinated with the development at the Mississippi Test Center, in particular those things now being developed by Mr. Heimburg. We are in communication with Mr. Heimburg about this computer center. See Attachment I. ✓
2. MISSISSIPPI TEST CENTER: The committee formed to study the computing and data reduction facilities at the Mississippi Test Center is to meet on Thursday of this week. This committee is chairmanned by Mr. Heimburg with heavy participation from our Data Reduction and Digital Branches. ✓
3. COMPUTER FACILITY FOR RESEARCH INSTITUTE: Our division is in communication with Dr. Herman concerning the computational facility to be set-up in the Research Institute. We have been asked by Dr. Pow and Dr. Herman to advise them as to computer capability and compatibility with the Marshall Center. Mr. Bradshaw intends to visit with Dr. Herman in Minneapolis and look at various computing equipment in that area. It should be emphasized that our division is operating here in an advisory and consulting capacity. ✓

Good
9/26/62

Attachment I - Memorandum from Mr. Constan, dated March 23, 1962,
Subject: "Establishment of Computer Facilities
Michoud Operations"

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO Distribution

DATE March 23, 1962

FROM M-MICH

B 3/28

SUBJECT Establishment of Computer Facilities Michoud Operations

The attached letter was forwarded to the companies listed below:

The Boeing Company, Huntsville Office
Chrysler Space Division, Huntsville Office
Mason-Rust, Michoud Plant

G. N. Constan

G. N. Constan
Manager, Michoud Operations

Distribution

| | |
|------------|----------------|
| M-DEP-R&D | Mr. Roelzer |
| M-DEP-ADM | Mr. Bradshaw |
| M-COMP-DIR | Mr. Lloyd |
| M-COMP-DIR | Mr. Fletcher |
| M-FEO | Mr. Dannenberg |
| M-P&C-SM | Mr. Heimburg |
| M-SAT-DIR | Mr. Bailey |
| M-TEST-DIR | Mr. Nuber |
| M-MICH | Mr. Abernethy |
| | Mr. Stevenson |
| | Mr. Smith |

NATIONAL
AERONAUTICS
AND SPACE
ADMINISTRATION



GEORGE C. MARSHALL
SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA
TELEPHONE: JEFFERSON 6-4441

IN REPLY REFER TO

March 23, 1962

M-MICH

B 3/28

Subject: Establishment of Computer Facilities Michoud Operations

Gentlemen:

It is evident that MSFC and the various contractors to be located at the Michoud Facility will require quite extensive computational facilities. These requirements indicate that this computer facility should be available for use in the early fall of 1962.

It has been determined that the computer facilities will be centralized to provide service to the various groups concerned. It is evident that a cooperative effort among the groups concerned will be necessary to find solutions to problems which will arise from multiple use of such a centralized facility. With this in mind I am establishing a committee to be known as the "MICHLOUD COMPUTER STEERING COMMITTEE". This committee is being formed to expedite the establishment of this computer facility. The steering committee will be composed as follows:

| <u>Organization</u> | <u>Number of People</u> |
|--------------------------------------|-------------------------|
| MSFC - Michoud Operations | 3 |
| MSFC - Saturn Systems Office | 1 |
| MSFC - Computation Division | 2 |
| Boeing Company | 2 |
| Chrysler Corporation | 2 |
| Mason-Rust Company | 2 |
| MSFC - Facilities Engineering Office | 1 |

This committee will establish the plan which will lead to the centralized computer facility and will include physical site, computer selection, communication links associated with the Central Computer

March 23, 1962

Facility and supporting functions such as EAM and key punching.

The first meeting of this committee will take place at the Michoud Plant Conference Room at 10:00 am, Tuesday, March 27, 1962.

Very truly yours,

G. N. Constan

G. N. Constan
Manager, Michoud Operations

B 3/28

1. NOVA

Dr. Seamans signed the approval papers for the NOVA Phase I study on March 19 (Monday) and a TWX was received from the Office of Manned Space Flight on March 22 (Thursday) authorizing the study. Although the money has not been received at MSFC to date, it is planned to "borrow" the money from another account until the NOVA money arrives (probably this week) and send out the Request for Proposals on March 26 or 27 (Monday or Tuesday of this week). Action: The method of proposal evaluation and contractor selection, as well as the people involved, should be decided within the next one to two weeks since the proposals will be submitted in four weeks. ✓

Attn: Gorman Jan 26

HHK
Let's clarify this by phone. B

Frank Williams is tentatively planning a review of NOVA study status and plans for the Board Meeting on March 30. He would like to outline plans for developing study guidelines and get the Board's approval. ✓

2. SOLID VS LIQUID

I read in Aviation Week that NASA will be invited to appear before MR. ANFUSO's Subcommittee to testify on this subject. We are now typing the final version of our position paper. Do you want to tell ROSEN, HOLMES and SEAMANS about our position paper and offer it to them in case they need it to testify?

Yes, it might "consolidate" our (NASA) position B

B 3/28

1. S-1C: To insure the availability of components, two approaches for the forming of bulkhead gore segments will be used, namely, explosive forming and hydraulic draw bulge forming. This course of action was jointly arrived at with Boeing. The contract for explosive forming will go to Ryan Aeronautics, San Diego, while hydraulic draw bulge forming will be performed by Boeing. ✓
2. C-1 Program Assembly Fixture: Mr. Lowery visited me this week and stated he would be very happy to get the No. 1 Station C-1 Assembly Fixture and Scaffold for use at Michoud. Mr. Lowery stated that the scaffold would enable him to start the assembly of SA-10 earlier than by use of overhead cranes whose installation is presently delayed by funding problems. *
- * 3. Block II Tankage: I visited Chance Vought this week and expect them to deliver the tankage pretty much on schedule. Of course, they have many minor problems which we are working out together. The integration of CSD requirements with our requirements will be a problem area at this company as well as at other sources because their long lead time demands interfere with our own delivery schedules. ✓
4. Personnel Training: Personnel of MED are presently attending a special training program in adhesively bonded honeycomb and other composite structures at the AVCO Corporation, Nashville, Tennessee. This course will cover all phases of design, manufacturing, and inspection techniques for chemically bonded sandwich structures. The purpose of this training program is to establish basic design, fabrication and quality control know-how in MSFC, relative to this type of structure. ✓

✓ WK

*) I understand he would have been even happier had you agreed to those in certain special tools (which you seem to be unable to spare)

B

B 5/28

1. C-1, S-IV: Dr. Lange, please inform Mr. Ramsey. Jan 3-26

a. A severe liquid LH₂ shortage for the past several weeks is affecting all programs using LH₂. At present Mr. Schenkein, WOO, is establishing priorities between the various MSFC programs on the West Coast. It is felt that a more realistic allocation could be accomplished, if an MSFC committee, consisting of SATURN, Centaur and Propulsion personnel would establish LH₂ priorities and outline these to WOO. M-SAT will report in Notes 4-2-62 on action taken. ✓

b. The hydraulic actuator review meeting resulted in: (1) DAC will incorporate to the present actuator, about three of the suggested 10 MSFC changes, (2) ASTR will submit memo to M-SAT for action suggesting the present actuator, after two years effort, be scraped and DAC be required to secure a completely redesigned actuator from DAC sub-contractor. ✓

c. The all-systems honeycomb panels review revealed that a manufacturing process failure may be prevalent in other vehicle panels. Therefore, all forward and aft interstages and aft skirts will be X-rayed and structurally tested. To eliminate the problem, the manufacturing process is being revised. ✓

d. Following the hydrostatic test on the all-systems vehicle the common dome was pressurized to 50 psi helium inside the sandwich construction around the outer edge, through a blind bolt hole. A three by four foot bubble appeared on the aft side of the common dome. Engineering studies are underway along with the manufacturing and inspection personnel.

Effect on program schedule? B

2. C-5:

a. Major problem is still a resolution of the official schedule agreement with Hqs. and official notification so contractors can plan accordingly.

b. S-IC: An increase in manhours and material for the Boeing contract is being investigated. This increase will be approximately 10% - bringing value of contract through period of July 31 to the accumulated total \$9.9M.

Personnel build-up schedule anticipates a total 1,600 people assigned to the SATURN Program by June 1.

Boeing made a presentation in favor of independent Computer Facilities at Michoud Operations. This is contrary to present plans and there does not seem to be sufficient evidence to date to cause a change in the MSFC policy. ✓

c. S-II: With Seal Beach approval the critical item is release of appropriate funding to reinstate the A & E and construction effort for the S-II facilities. ✓

d. S-IVB: A written coordination is being carried out to establish the S-IVB design parameters as per recent series meeting with you - such as propellant loading, base diameter, etc. - Which is a rough job, apparently!! B

3. Apollo: MSC - MSFC Relations

Technical Liaison is now well underway. Launch Operations, Instrumentation, and Flight Mechanics panels have met so far. NAA (Apollo) is participating. MSFC is getting few answers from MSC but deadlines are being established. ✓

O.L. Suggest to make a "U.F. item" out of this! Urgent Action of this! B 5/28 For Holmes

B 3/28

1. FOURTH QUARTER PROGRAM REVIEW, AND REVIEW OF FY-64 BUDGET ESTIMATES: We are preparing a written report to you on results of these meetings with Mr. Rosen and others from NASA headquarters. ✓

2. PRESENTATION ON PROJECT MANAGEMENT TO HEADQUARTERS: No firm date yet from headquarters for visit by Mr. Dixon and others during the last two weeks in April on Project Management Techniques. ✓

3. CONTRACTOR COST REPORTING: We had a session this week to review progress to date, which is as follows:

- a. We have received NASA Standard contract clauses for contracts and requests for proposals, for contractor cost reporting.
- b. Received letter from Dr. Seamans providing official NASA policy on management reporting by contractors.
- c. We have turned over to Computation Division the Form 533 format for programming.
- d. Status of implementation of this system on contracts over \$500,000 is as follows:

| | |
|--|----------|
| Contractors currently reporting | 13 |
| Awaiting changes to contract by P&C to include implementing language | 4 |
| Pending meeting with contractor on work increments | 12 |
| Service type contractors (unresolved as to how they fit into system) | 13 |
| Contracts nearing completion hence will not be included in system | <u>9</u> |
| TOTAL | 51 |

The major remaining problem is getting together on a uniform definition of work increments that are compatible with PERT and the NASA uniform coding structure; OMSF is now preparing a revised coding system. ✓

4. COMPARISON OF MSC AND MSFC SCHEDULES FOR LUNAR LANDING PROGRAM: In their March 19 submission of APOLLO Program Schedules, MSC presented three approaches - Able, Baker and Charlie. We have compared the MSC and MSFC schedules and funding estimates, and will furnish highlights to you as a separate document. ✓

Attachment - Answer to question on last week's notes.

1. FY-64 Budget: The completed FY-64 Budget and the lunar landing program schedules left by special plane for NASA headquarters this morning. ✓

We received OART Budget guidelines Thursday, March 15 which was entirely too late (4 days prior to due date in headquarters) for ample consideration. This included no major items which grossly affect the budget. The format for OART has still not been received. | So, what are we going to do? B

We received a change from Mr. Holmes which clarified that we budget directly to OMSF for operational Saturn and NOVA vehicles instead of going through MSC. ✓

The budget requirements and related schedule information applicable to OART, OSS, and OA are being compiled and will be mailed separately with separate cover letters. ✓

2. Presentation on Project Management to Headquarters: Mr. Jenkins in Wyatt's office has informed that the visit of the group from NASA headquarters plan to visit here during the last two weeks of April; instead of March 29th. In preparation for making up the agenda we are presently documenting the way we are actually managing our programs. Will study what improvements are indicated and will arrange for briefing with you. Good. B

3. Orbital Operations: The C-1B Orbital Rendeavour study is progressing; the C-5 Orbital Operations Performance (Tankng Model) have been reviewed and polished up with M-AERO and M-P&VE; the results are very satisfactory. 150,000 pounds of mass to escape is entirely practical with even a decent margin. ✓

4. Visit of Mr. Fernandez and Lt. Col. Bathurst: Joseph Fernandez, Director of Master Planning and Scheduling Division OMSF and Lt. Col. R. H. Bathurst, Resources Specialist, discussed scheduling and planning activities at Marshall and were very pleased with our efforts. They plan to prepare a NASA Manual on scheduling, hoping to standardize format for schedules, after visiting several of the Centers. ✓

In answer to your question above, we submitted the OART Budget Requirements using OMSF format, and advised OART accordingly by phone. ✓ B 3/28

1. BOEING PEOPLE ONBOARD: 45 Boeing people are actually onboard as of 3-22-62; total planned by 4-1-62 is 214. ✓ B 3/28
2. ORIENTATION OF G-5 VEHICLE IN VLF 39: Launch Operations Directorate is in agreement with MSFC proposal to locate all umbilical connections on G-5 vehicle to a point 73° from position I. Position I points due East on launch complex. ✓
3. GOX FLOW CONTROL VALVE: The GOX flow control valve (prototype) for G-1 Block II arrived at MSFC on schedule, 3-19-62. ✓
4. S-IV HYDRAULIC SYSTEM: During a meeting with Astrionics personnel, S-IV hydraulic system was discussed in great detail. As a result of this review, it was recommended that the S-IV hydraulic system be redesigned by Douglas. Further meetings with DAC personnel brought out S-IV system deficiencies in greater detail. As a result, DAC was directed to redesign system using qualified vendors. ✓ (Pending go-ahead by M-SAT)
5. LOAD DISTRIBUTION-SA-5 TANK CLUSTER: A refined analysis for internal load distribution in SA-5 tank cluster has revealed a marginal condition for fuel tank aft skirt for Apollo design loads. A special structural test will be performed to check allowable buckling load of skirt. Result of this test will determine whether some restrictions will be required for SA-5 flight. Present thinking is to increase skin thickness in this area for SA-6 and subsequent. ✓
6. *S-1-C STATIC TEST VEHICLE: First requirements from M-P&VE to M-ME have been made relative to S-1-C static test vehicle. Material thicknesses and sizes have been furnished M-ME for container skin and bulkhead sections for procurement purposes. ✓
No. 9/27/62
7. SKIRT SECTION DESIGN: Decision was obtained to use conventional skin-stringer design in lieu of honeycomb for each skirt section. This decision was made because of insufficient assurance of honeycomb characteristics and lack of funds to obtain this assurance through testing. ✓
2 SIC 7? B
8. RANGER 4 INSULATION BULKHEAD: It has been decided to remove insulation bulkhead between LOX and fuel tank of Atlas booster for Ranger #4 presently in preparation for launch at AMR. GD/A and Air Force had recommended that this bulkhead not be removed since the vehicle is already on the pad. MSFC's decision, which has been O.K.'d by NASA Hdq., is based on these facts: (a) water was found again in insulating sponge material, which may indicate a leak (b) removal of bulkhead does not create a performance degradation for Ranger mission (c) bulkhead can still be removed without any slip in schedule (d) our opinion that reliability is not endangered by performing of this work on the pad since the same has been done during Ranger #3 preparation and manned Mercury preparation. ✓
9. MECHANICAL DESIGN INTEGRATION WORKING GROUP: Group met this week. See attached memo for description of important items discussed. ✓
10. BOEING PROPOSAL FOR RIFT TANK STRUCTURE: Boeing has submitted report on feasibility of Boeing Company manufacturing RIFT tank structure and advantages to program that they feel could ensue. This report is currently under evaluation. ✓
11. HAZARDS REPORT ON NUCLEAR DEVICES: The USAF is gathering data for use in preparing hazards report on all nuclear devices planned for launch at AMR. Report is being prepared at the Air Force Special Weapons Center, Albuquerque. ✓
- Attachment: Memo concerning working group meeting

Memorandum

B 3/28

TO Mr. Mrazek, Director,
Propulsion & Vehicle Engineering Div

DATE March 26, 1962

FROM Space System Integration Office M-P&VE-V-5

SUBJECT Working Group Activity

1. The Mechanical Vehicle Design Integration Working Group met in Huntsville on March 21, 22, 1962. The major areas reviewed were:

a. Emergency detection system philosophy and the implementation during the 10 vehicle program. Dr. Kuettnner gave the reasoning behind the various provisions. A discussion of the criticality of certain parameters followed. DAC was instructed to provide 3 pressure switches for ~~data~~ P measurement across the common bulkhead for SA-6. DAC will re-evaluate the requirements for automatic abort signals using the ground rules established during this meeting.

b. A MSFC briefing to DAC on the latest status of SA-5 to bring DAC up to date and the probable mission changes for SA-5 and SA-6 (larger payload, new trajectory, etc.).

c. LOX-GOX vaporization in the S-IV interstage during the chill-down period. 12 GN₂ bottles and 6 ring type injectors are provided in the S-I stage to vaporize the LOX-LOX. Full scale experiments by Propulsion and Mechanics Branch with LN₂ have proven this system very effective.

d. The split chill-down sequence between lox and hydrogen is being incorporated into the stage design for SA-5. It appears at this time, that the lox chill-down time requirement is around 10 sec. nominal. DAC will incorporate flexibility to initiate this between 10 to 20 seconds before ignition.

e. Control and clearance problems during the separation phase. AERO Division presented once more the misalignment and drift factors using the engine out, retro-motor out, and other worst assumptions. The probability of all assumed malfunctions occurring at the same time and in the same plane to cause a mechanical interference is so remote, that the present design and sequence was accepted as satisfactory. Since the engine out on the S-I stage is the major contributing factor, a minor change in the electrical network made a change in the cut-off sequence in case of engine out possible and with

March 26, 1962

a 4-1-2 sequence, this engine out contribution is now eliminated. Under normal conditions the cut-off sequence will remain 4-4. This change in sequence will result in some loss of performance, but in SA-5 and SA-6 an engine out would mean loss of primary mission anyway.

f. The helium heater and igniter design were reviewed in great detail and recommendations for development of a back-up igniter design along the P&W method were made. The helium heater has performed satisfactorily during the last few firings. Ignition was repeatable at approximately 4-5 psia and combustion was sustained to less than 2 psia. The last test run was for 8 minutes with only minor hot spots developed. It appears that a suitable design for the battleship tests is available. Further efforts to increase the safety margins of operation are being pursued.

g. The latest insulation test results were reviewed and it was concluded that the 3D (foam with 3 dimensionally arranged fiberglass threads) insulation method is satisfactorily developed and full production is going ahead. The all systems vehicle is the first full scale test including vibration loads. Another 8 ft tank is being readied for a series of thermo-structural tests to prove production techniques and obtain more thermal data.

h. The S-IV pressurization system was thoroughly reviewed and recommendations for changes were made to provide more flexibility against uncertainties during the initial pressurization phase and possible sloshing induced problems.

i. The Dynamics vehicle and its uses for the dual purpose as a wet test and loading vehicle for pads 34 and 37 acceptance were discussed. This means interrupting the dynamic testing for about 8 weeks and again for the pad 37 tests. Some schedule problems have to be ironed out.

j. During structural load testing of the all systems vehicle, a honeycomb panel of the forward interstage buckled. Investigation showed faulty manufacturing of the panel. All panels are being re-inspected. If more such faults appear, the Dynamics vehicle delivery may be affected. The all systems vehicle has been stiffened by make-shift arrangements.

ac! k. Some of the component testing with hydrogen has been delayed by about one month at Santa Monica due to fuel shortage. All fuel is being diverted to Sacramento to keep this facility going.

B
l. Changes in the design of the actuator have been imposed by MSFC. DAC will subcontract the design and fabrication of the new system and have it available for SA-5, provided immediate authorization from MSFC is obtained. It is rather late to require a redesign of the actuator now that it was finished. Until now, the actuator problem was never put on the agenda of this Working Group by the

SUBJECT: Working Group Activity

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responsible MSFC development organization. I understood the Working Group worked along functional lines instead of organizational. We could have easily effected changes if we would have gotten the word. Now the design responsibility for the hardware has been assigned to the Dynamics and Control Working Group. We will still consider the actuator as a part of the hydraulic system and follow-up on the whole.

m. At this time, the S-IV stage still appears to be on time; but with no margins for any mishaps left.

(1) The first part of the chilldown run has been completed and the turbine spin test is being run today (22 March 62).

(2) Of the 6 A-1 engines, 2 are at Sacramento, 1 is ready at Santa Monica, 2 are being held because of leaks and 1 arrived this week.

(3) A contract has been negotiated by DAC for modification of test stand 2B at Sacramento.

(4) The helium heater tests are being performed at Sacramento and it is believed that present configuration will be satisfactory for flight.

(5) At the component test site, some 100 items have been tested, 200 are now under test, 100 are ready for testing which indicated approximately one half the components testing program is completed necessary for battleship firing.

(6) DAC is presently looking for an early receipt of data from the Cornell tests (base heating, S-IV stage).

(7) Ullage rocket fairings have been shipped to Tullahoma for testing.

(8) The hydrostatic tank has been successfully proof tested.

n. Another splinter meeting will be held in about 2 weeks to discuss structural test programs and review the base protection and thermal environment.

2. In the S-II stage area, preparations are made for the Working Group meeting this week for which the agenda has been published. Some of the major problems to be discussed will be:

SAT
assist
you
resolve
this
issue!
B

SUBJECT: Working Group Activity

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- a. Engine vs stage mounted hydraulic system.
- b. Separation method, single vs dual plane
- c. Retro motor design
- d. Pressurization system
- e. Structural design assumptions, loads, vibrations, materials
- f. P. U. system
- g. Aft interstage thermal environment
- h. Base heat protection
- i. Interface requirements
- j. S-II status report



H. R. Palsoro

Chief, Vehicle Systems Integration Office
Propulsion and Vehicle Engineering Division

B3/28

1. Presentation to Shea on C-5 and Docking Test Program was to my mind a most successful meeting, especially since you, Frick and Mathews were present.

I'll prepare a condensation covering significant facts and actions, as a memory sheet for Shea. It will include my comments.

We are in the process of checking out with deFries and others as necessary before finalizing:

Will send you copy, but prefer to check out with you personally before transmitting to Shea. ✓

2. Working groups and panel meetings are now being attended either by myself and/or people from my office in agreement with SATURN Systems Office.

From all indications these meetings are filling a great need. Since my representatives are observers with a "detached point of view" we will be able to make recommendations to the chairmen, or if it is beyond his area, to higher echelons.

Example: Lack of uniform praxises in documentation (MSFC vs MSC at NAA).

I'm exploring and might be able to tackle it under Uniform Design Principles and Praxises. ✓

↑
Is this a better word than "practices"?

No, it's just misspelled!

B

Hermann, Leave room
for comments. 9/22/22

B
3/28

1. PROPULSION TECHNOLOGY CONTRACTS: With selection of 11 of the 14 FY'62 Liquid Propulsion Technology contractors having been made, 80% of this year's program is committed. It is anticipated that remaining three will be completed by May. "Design Criteria of Zero Leakage Connectors" was signed with General Electric on 3-15-62, for \$210,950. Work will be completed in 12 months. "Torodial Hoop Evaluation" contract was signed 3-15-62 with Rocketdyne for \$202,500. Work will be completed in 8 months. Negotiations have been completed with Aerojet-General on "Staged Combustion Engine" project for \$195,400. Program working period is 8 months. ✓

STABILITY MONITOR PROJECT: H-1 Engine HT 3-1010-B was driven unstable 3-15-62 by pulsing fuel intake manifold after 18 seconds of mainstage operation. Pulsor output of 4300 psi created a 1400 psi surge in P_c above nominal. A 250 cps low frequency instability was detected by the RCC device and caused shutdown. The engine was assembled with a baffled injector, but without LOX dome-through bolts. Testing will continue. ✓

3. ENGINE PROGRAMS:

RL10: Pratt & Whitney has started vibration testing of RL10 engine in order to obtain engine component responses. This, in turn, will aid in providing data for engine vibration specifications. Lewis Research Center verified feasibility of rapid relight with the RL10A-1 engine 3-21 by firing for 20 seconds, shutting down for two minutes, then firing for 20 seconds. Test results were good with all test objectives accomplished without any apparent detriment to engine or facility. Following retanking with propellants, an additional 40 seconds run was successfully made to verify previous data at high O/F ratios. Lewis is now preparing the test stand for a gimbal program which should begin in about two weeks. RL10A-3 Engine, K 128, experienced a turbopump bearing failure during run on 3-20-62. At first investigation it appeared that bearing cage had failed similar to failure on engine 1722. Investigation is continuing to determine exact cause of failure. Engine 1723 scheduled for delivery to GD/A this month has completed green run and is being disassembled for inspection prior to rebuilding for acceptance test. *H.W. please keep me posted.*

F-1: Numerous telephone calls between Saturn Systems Office, NASA Hdq., and Engine Management Office have indicated possible funding cut in F-1 Engine Program. Impact is being studied. Cuts in facilities area may reflect an impact on overall program. Facilities difficulties at the Bravo Area have postponed testing of turbopump #17 with LN₂ until next week. ✓

J-2: First R&D engine was returned to test stand and one ASI ignition test was successfully performed. Present plans are to have a short mainstage test during next report period. Further testing was done with modified gas generators and the ignition problem with low LOX inlet pressures is still not solved. Testing with new design changes will be continued. A porous face injector has been selected for installation into the second R&D engine. ✓

M-1: The facilities-use agreement and facilities funds for the M-1 program still have not been received. Aerojet management is becoming concerned about date of award of letter contract since they are already expending funds in anticipation of M-1 program contract (MSFC has not encouraged anticipatory spending). I will be in Washington Monday (March 26) to discuss this project. ✓

Have knife - will travel

Whatever that is!

B

B 3/28

1. SATURN WATER DUMP: On March 15, a meeting of agencies participating in the High Water project on SA-2 was held at Patrick Air Force Base. At this meeting, a detailed list of ground and aircraft instrumentation was developed. A re-evaluation of scientific objectives was also completed based on preliminary results from the release of 40 pounds of water from a sounding rocket shot at Wallops Island. The instrumentation list and a refined statement of scientific objectives was forwarded to the Office of Space Sciences on March 22. Plans for the High Water experiment are proceeding satisfactorily. Would you like to have detailed information on the experiments? ✓

Yes B
(1/2 hr briefg)

2. UNIVERSITY OF ALABAMA RESEARCH INSTITUTE: Drs. Shelton, Lundquist and I met with Dr. Hermann and Mr. Kenneth Thompson (from University of Minnesota, to be Dr. Hermann's Deputy Director of the Institute). We asked Dr. Hermann to prepare a proposal to NASA describing the work of the Institute under the planned grant. ✓

3. VISIT BY QART REPRESENTATIVES: Last week four members of the office of Dr. Al Kelly, Electronics and Control, QART, visited MSFC to discuss details of research tasks proposed in bur FY 1963 Launch Vehicle Technology Program. The main purpose of their visit was to become familiar with MSFC and with our research requirements. We held a one-half day briefing of the overall LVT program in RFD, a one-half day tour of the divisions, and one day of detailed technical discussions in Astrionics, Aeroballistics and Propulsion and Vehicle Engineering Divisions. The visitors were satisfied and emphasized that this visit was very beneficial, and that we might expect similar visits from other QART people in the future. They mentioned that NASA-wide responsibility for specific areas (such as gyro technology or masers) may be assigned to field centers with the requirement that the work be closely coordinated with Headquarters. ✓

E.S.
Please see me on this - I had an interesting talk with Dixon about NASA guidance capabilities B

4. COOPERATION WITH MANNED SPACECRAFT CENTER: Dr. Charles Frick from MSC and I had a short discussion on aspects of the lunar program. He expressed a strong desire for continuous and intimate cooperation between his Center and ours. ✓

5. EUROPEAN TRIP: I will spend March 29 with Dr. H. Dryden and Mr. A. Frutkin in Washington, and then travel to Paris, Muenchen, and Stuttgart. Will probably return on April 9. ✓

CONFIDENTIAL

Bowie

Please arrange for a final "all still going" check prior to take-off tomorrow (with info available at HSV airport)

1. CENTAUR:

Hester

a. F-1 Status: The launch schedule for Centaur F-1 is still Apr 4 between 12:00 Noon and 4:00 P. M. The Composite Readiness Test (final test) is scheduled to be run today. Press kits relative to the launch have been released.

b. F-2 Status: Centaur Vehicle F-2 completed preliminary acceptance tests Mar 29. MSFC personnel at GD/A reported that this was a very "clean" vehicle. F-2 will now go to Sycamore S-4 for propulsion tests after which it will be returned to the factory for final assembly, systems checkout and final acceptance.

CONFIDENTIAL

*See Clerk's Office
Gray*

To: _____
By Authority of _____
Date 2/2/72 By _____

and (in case of a scrub) call to my house. In the latter case, am I all set up to go to Washington?

B&15

~~CONFIDENTIAL~~

NOTES 4-2-62 GORMAN

B9/4

CENTAUR CONTRACTS (See Notes 3-26-62 attached) As we agreed last week, I am going to get involved personally in the Centaur contracts problem. I plan to talk to Bill Davis today and work out a way to accomplish this. ✓ *H.F. Please keep me posted. B*

PRATT AND WHITNEY CONTRACT - Modification #16, the subject of an Urgent Action last week, has been cleared and released to Pratt and Whitney. All is well, at least for Modification #16. ✓

PRESIDENT'S COMMITTEE ON EQUAL EMPLOYMENT (See Constan's notes 3-26-62 attached) In response to your note of last week, Paul Styles will be in attendance at the three day session. Paul is personally acquainted with John Field, Executive Director of the President's Committee. ✓

B 3/28

1. PRATT AND WHITNEY CONTRACT #8-2690 - I am preparing an Urgent Action on modification 16 to this contract. The modification has been in Washington since March 1. In addition to containing redirection of effort it places an additional \$13 million under the contract. Received an SOS call from Pratt and Whitney to the effect that Pratt and Whitney has spent their own dollars in excess of \$1 million and will have to slow down the effort if they do not receive approval of the modification immediately. ✓

2. GENERAL DYNAMICS/ASTRONAUTICS - Agreement has been reached with the Air Force plant representative at GD/A on the support to be provided Huster's project office by the Air Force. ✓

3. CENTAUR CONTRACTS - Huth reported this morning that some difficulty exists between Procurement and Contracts Office and Light and Medium Vehicles Office on processing procurement actions. I am personally looking into this matter today. ✓

↖
Harry G.

Please fill me in on action taken.
See also Huster's Notes 3/26, par 1b.
B

B 3/28

RENOVATION AT MICHLOUD

a. Office Building:

- (1) Duct work for air conditioning west end approximately 85% complete.
- (2) Cleaning walls preparatory to painting and finishing in progress.
- (3) Re-installation of plumbing fixtures completed.
- (4) Installing-chilled water lines for air conditioning. ✓

b. Engineering Building:

- (1) Approximately 25% of second floor east end turned over for occupancy.
- (2) Repairing of electrical circuits and lighting fixtures in progress.
- (3) Constructing partition center portion in progress (Mason-Rust area).
- (4) Re-installation of plumbing fixtures approximately 75% complete. ✓

c. Boiler Plant:

No work, awaiting delivery of chemical feed pumps and purge units. ✓

d. General:

Installing electrical cables between main sub-station and boiler plant. ✓

PRE-AWARD SURVEY GROUP

This group, formed to evaluate the capability of Louisiana area Architect Engineer-concerns has submitted their recommendations to M-DEP-ADM and the selection for performing plant modification design effort. ✓

S-1 EFFORT

An in-house review of the contents of the CSD document "Saturn S-1 Stage and C-1 Vehicle Program Plans, 1961-1966" is being conducted in coordination with M-SAT. ✓

COMPUTER FACILITIES

It has been decided, that because of lack of funds, that initially no choice other than centralizing computer and data processing exists. A Michoud Computer Steering Committee has been formed from MSFC, CSD, Boeing and Mason-Rust personnel. Meetings to plan implementation are planned for the coming week. ✓

CONTRACTS

Requests have been submitted to M-P&C to amend the Chrysler and Boeing contracts follows:

- a. Provide design criteria for Michoud plant activation. (This permits Boeing to perform design criteria required for submission to A-E contractor.)
- b. Lease office space within the New Orleans area for the period April 1 through May 31, 1962, with option to renew for one year. (Space in the Engineering Bldg. will not be ready for occupancy.) ✓

PRESIDENT'S COMMITTEE ON EQUAL EMPLOYMENT

NASA has been informed that Mr. John Field, Executive Director of Staff, President's Committee on Equal Employment plans to have a conference in New Orleans on April 2, 3, and 4, 1962. This conference will be in three phases:

- a. NASA, Mason-Rust, Chrysler, Boeing and Members of the President's Committee on Equal Employment.
- b. NASA, New Orleans Labor Representatives and Members of the President's Committee on Equal Employment.
- c. NASA, Members Expressing Community Interest and Members of the President's Committee on Equal Employment.

Mr. Al Hodgson stated that he plans to attend these meetings. ✓

Harry S.

Do you plan to send a delegate from here in case George needs help? B