Feb 1, 1965

NOTES 2-1-65 BELEW

C-1 ENGINE

Presentations to MSFC Management have been set up for this week concerning the findings of the Source Evaluation Board for the 100-Pound Thrust Engine.

RL10 ENGINE

Regarding your question on last week's notes on the Centaur two-burn mission, see attached sheets.

F-1 ENGINE

During the second acceptance testing of Engine F-3011, after about 190 seconds firings, three outer radial baffles eroded at the baffle base adjacent to the intersecting LOX ring. The erosion is believed due to a crack in the braze between the baffle and LOX ring lands. The injector is being removed for a thorough investigation. This engine is allocated to the S-IC-1 stage and will be delivered about two weeks later than planned. Stage impact is not expected.

Engine F-2005, the first Block II engine to be fired at MSFC and the first S-IC-T engine, is being mounted in the west side of the tower, MSFC for a February 5, 1965 static test. Engine F-2009, for S-IC-T stage, was accepted at Canoga Park on January 27, 1965. Engine F-3012, the second engine for S-IC-1 stage, went into test stand ID, NASA/RETS on January 27, 1965.

J-2 ENGINE

In answer to your question, the previously reported J-2 mixture ratio shifts were caused by fuel turbine wheel radial seal erosion. Modifications were made to the honeycomb seal and retainer and the erosion problem is believed solved. Additional engine system testing is planned for verification. This mixture ratio shift was not connected with the program mixture ratio (PMR) method of operation. The PMR capability of the J-2 engine has been demonstrated satisfactorily without overshoot on the test stand.

In answer to your question, the orientation of the S-IVB stage in orbit will orient the J-2 engine start bottle in a shadow rather than in the direct rays of the sun. The orientation of the S-IVB stage is not based on the start bottle requirements. The orientation of the start bottle is a beneficial fall out of the S-IVB stage orientation.

Acceptance testing of production engines J2007 and J2014 is progressing.

The J-2 Engine Quarterly Program Review will be held at Rocketdyne February 3 and 4, 1965.

H-1 ENGINE

In view of weight increases projected for SIB payloads an increase in performance of the H-1 Engine may be a means to meet added requirements. Current studies and limit tests (up to 216K) indicate that engine performance of 205K for SIB-206 through 208 and engine performance of 210K for SIB-209 and subsequent is probable, assuming some out-of-phase engine installation in the stage at Michoud and project go-ahead by mid-February, 1965.

I am not at all optimistic about increases above these figures for the current S-IB program. It will take added test effort to back up the increases of 5K & 10K, SAT-IB office, Aero, P&VE and our office have been working on this problem.

Lee B

Has Sam Phillips been made aware of this option?

B

NOTES 2-1-65 CLINE

1. CRACK FOUND IN THRUST CHAMBER REINFORCING BAND ON S-I-9 ENGINE: During launch preparation, Engine 5012--position 2--was found to have a crack in the weld on a reinforcing band of the thrust chamber. The weld containing the crack will be ground out and a chamber leak check conducted. If no leakage is noted, the area will be repaired and the engine accepted for flight. If leakage is noted, the spare engine, 5024F, which is being readied for shipment, will be installed.

2. S-IV-9 ULLAGE ROCKET MOTORS REJECTED BY KSC: Four TX-280 motors were rejected for flight use because the adhesive seal on the nozzle closure was unbonded. Replacement motors were visually inspected and are being shipped to Cape Kennedy.

3. S-IC-T LOX PREVALVE MAIN SEAL CRACKS DURING PREFLIGHT CERTIFICATION TESTING: Crack occurred during flow response test at the vendor's facility. Cause being investigated.

NOTES 2/1/65 CONSTAN B 2/6

1. S-I/IB Status

S-I-8 - Minor modifications and open inspection squawks are being worked.

S-I-10 - Post static functional testing is about 35% complete and on schedule.

S-IB-1 - Prestatic functional testing about 95% complete and on schedule.

S-IB-2 - Final assembly continuing.

S-IB-3 - Clustering started and center tank being assembled to spider beam and tail section.

2. S-IC Status

S-IC-D - Five specialists from the Manufacturing Engineering Laboratory are assisting The Boeing Company in the exclusion riser installation in the fuel tank. To date several differences have been encountered between Boeing produced engineering documentation and the MSFC Huntsville developed manner of installing this exclusion riser. These differences are being resolved and potential problems caused by this are believed to be in hand.

NOTES 2-1-65 DANNENBERG

Hans Hueus
Please look into this for possible incorporation in "guidelines"
B

1. Configuration Management - Recent series of changes to S-IV stages underline the fact that additional types or degrees of engineering change controls are required if R&DO is to adequately support IO's launch vehicle program. An engineering change control policy statement is being formulated that may also require some realignment of organizational responsibilities to implement.

2. Data Management - The Apollo Test Requirements Document NPC 500-10 calls for specific documents such as Certificate of Flight Worthiness (COFW) and Mission Directive. Representatives of IO and R&DO met to assess the impact such documents will have on MSFC Data Requirements. It was determined that the Mission Directive is a new requirement. The COFW study has been assigned to R-QUAL for evaluation and recommendation.

3. Sub-Critical Cryogenic Storage Zero 'G' Test - Evaluation of the MSC proposal revealed that the experiment is technically feasible and can be conducted on SA-203, provided it does not jeopardize the primary mission of the vehicle and does not have a schedule impact. MSC, Mr. Faget, has been informed accordingly.

4. Experiment Programs for Space Station - On request of Headquarters, Mr. Raffensberger, a survey has been made of R&DO Design Labs' proposals for experimental programs to be conducted in an orbiting space station for the purpose of advancing MSFC technology. Survey results are being discussed between Mr. Raffensberger and Dr. Kuettner to determine possibilities of program implementation, schedule, funding support, etc.

5. Manned Flight Awareness Program - Astronaut Gordon visited Rocketdyne on 1-20-65 to initiate the company's "PRIDE" program. Astronaut Scott visited Electronic Communications, Inc., on 1-25-65.

NOTES 2/1/65 FORTUNE

1. Hospital rest relaxing, reflective - Keesler Air Force Hospital provided fine care, many patients needing far more care than I did and gave good chance to think over many of our present problems. Mississippi and neighboring states have to face the future in order to properly access their present delima. The higher Universities have already made the decision the school boards are agonizing over right now. I think many of us in MSFC must realize the situations and standards are changing, whether we like it or not. MTO, at least, can fulfill its operational requirements within I.O. average limitations needing only the go-ahead. Hope your throat is responding well also.

2. MTF Planning Board and Working Group contributions were recognized - when the flag was raised in front of the Lab and Engineering Building, the writer wanted to pay particular thanks and gratitude to Heimburg, Shepherd and Tessmann for past efforts and desired help in the future. MSFC, Corps of Engineers and construction contractor representative joined in. This in no way took the place of dedication which should be when the lock becomes operational in 4 to 5 months.

3. State Tax Officials visited us Thursday -to file action against certain construction contractors. They wanted our approval to go in and do this at MTF and told us that any further claims would also be cleared with MTO personnel before going into the field. GE and the major contractors were reported to be cooperative and no problem to the space officials. Ed Ling tells me there are tax difficulties ahead.

NOTES 2-1-65 GRAU

B 2/6

1. S-IC VALVES: In regard to your question on Mr. Kuers' NOTES of 1-18-65 (copy attached), there is apparently a misconception as to the type of testing being performed by this Laboratory on receipt of S-IC valves. Testing on these components is to the same extent as conducted on previous programs and to procedures which are in accordance with design requirements. This testing cannot be compared with the extensive requirements of qualification and reliability testing. The necessity of this testing is evidenced by the fact that 64 valves had to be rejected since they did not perform properly (installation of defective components would have transferred the problems downstream which results in even greater schedule problems or costly failures), not even qualification testing has been performed on these types of hardware, and qualified manpower is not available in sufficient numbers to adequately monitor testing at all vendors. (Recently, due to the magnitude of component failures on the S-IVB Battleship, agreements were reached with the S-IVB Stage Manager to require DAC to conduct testing at DAC on 29 critical components. Previously, DAC had relied entirely on vendor testing and source control.) Failures to date have been primarily due to design inadequacies and vendor deficiencies in manufacturing and assembly processes. Personnel in the Laboratory's component testing section are working seven days a week in an attempt to avoid a bottleneck on the S-IC-T. Waivers are issued whenever R-P&VE and R-TEST can agree to relaxed requirements for S-IC-T.

2. MSFC - GOVERNMENT AGENCY QUALITY RELATIONSHIP: During the week of January 18, 1965, personnel of this Laboratory traveled to the Southeastern area to discuss the NASA Quality program with Air Force, Army and Navy personnel. Presentations on the NASA programs were made, and the film "Moon Mission" and the latest Saturn Progress Report film were shown. The response was very enthusiastic to both the presentations and the films. Many of the personnel had no feel for the Saturn program prior to the discussion. It is believed that this type get-together will help substantially to improve relationship and performance. Personnel from the Kennedy Space Center Quality organization who joined us in this endeavor also expressed approval of meetings of this type.

3. APOLLO STANDARD FOR CLEANLINESS: Representatives from MSFC recently met with NASA Headquarters for the purpose of defining an outline which could be followed in developing an Apollo Standard for Cleanliness. MSFC's contamination control policies and practices were presented and it was decided to formulate the draft of the Standard from the information furnished by this Laboratory's representatives.

Attachment (NOTES 1-18-65 KUERS) Copies to Dr. von Braun & Mr. Weidner only

NOTES 2/1/65 HAEUSSERMANN B 2/6

1. SA-9/S-I PERFORMANCE CONSTRAINTS: Because of a recent decision, a fuel mass of approximately 28,000 lbs. will be off-loaded on the SA-9 vehicle to keep the amount of hydrogen to a minimum during orbit. Our limited investigation and discussions with AERO show this restriction limits the chance for a guidance cutoff and satisfactory orbit for a number of perturbations which have previously been acceptable. There will be no engine-out capability in either stage except very near cutoff. Five percent low thrust or 3-sigma maximum range safety conditions are unacceptable.

URGENT

Herm. Seidues

2. CRYOGENIC GYRO DEVELOPMENT: On 1/26-27/65, I participated with OART and Air Force representatives in a review of the Cryogenic Gyro Program at General Electric. After extensive evaluation of the Mod I cryogenic gyro (designed three years ago and modified meanwhile) and drift constant measurements of .005°/hr on this crude model, Dr. Buchhold recommends a Mod II design which will incorporate new support bearings and optical pickup with cryogenic light-emitting diodes. We agreed with this proposal; the gyro evaluation is foreseen for FY-66. ✓

Sounds rather alarming! I thought this off-loading recommendation had been jointly made by AERO and Astronics!

3. RADIATION EFFECTS: This laboratory plans to extend the Lockheed contract (Dawsonville) for testing equipment and components in a nuclear environment for 9 months; estimated cost is 90K. We have put nuclear specifications on some of our equipment that is presently being micro-miniaturized and will need to evaluate this equipment in a nuclear environment. In addition, we will continue to investigate means of preselection such that transistors which have unusual behavior (1/2% of certain types tested) can be eliminated from flight equipment at a later date. ✓

B

Suggest Jon get in touch with Lee James and call the principals together to review the situation once more)

At the end of this 9-month extension, we will make a decision whether to store government-owned equipment (vacuum chamber) or have equipment shipped to MSFC. Atomic Energy Commission permission to ship chamber to MSFC would depend upon exposure to radiation during the next year. Investigations concerning electromagnetic radiation effects on equipment and components will be continued here at MSFC when our Cobalt-60 source becomes available. ✓

FW 2/1

NOTES 2/1/65 HEIMBURG B 2/4

1. F-1 ENGINE:

Engine F-1002-2 was removed from the Static Test Tower West on 1/29/65. Engine F-2005 was installed on the same day with the first test tentatively scheduled for 2/5/65. This will be the first of the S-IC-T Engines to be tested at MSFC with two tests presently scheduled. ✓

2. S-IC TEST STAND:

Will start load test as soon as weather permits. (The temperature has to be 35°F. or more) ✓

3. S-IVB SACTO:

The engine chilldown program tests utilizing engine 2013 (flight type) are to begin on 2/5/65. ✓

4. F-1 TURBOPUMP:

Three tests were successfully conducted at the F-1 Turbopump Test Facility on 1/22/65, with durations of 6.3, 15.1, and 36.8 seconds, respectively. These were the first tests conducted on the completely rebuilt (by R-TEST) F-1 Turbopump. ✓

JW 2/1

B 2/6

NOTES 2-1-65 HOELZER

1. UPDATING BUSINESS COMPUTER EQUIPMENT: Utilization studies of our two IBM 1410 computers indicate that the on-line processing required by our Data Center mode of operation will overtax the capacity of the existing machines by April 1, 1965. Accordingly, we plan to update one computer by replacing the 1410 main-frame with a 7010 main-frame. This increases the capacity of the machine by almost 2 to 1 at a relatively modest increased rental cost ($4940 per/month), and will require no reprogramming. This interim change should give us enough capacity in the business computer field until the third generation of equipment can be selected. ✓

2. NASA INTER-CENTER WORKSHOP ON ANALOG AND HYBRID COMPUTATION:

The workshop was held at Ames Research Center January 19 - 20, 1965, and attended by representatives of six centers (Ames, F.R.C., Langley, Goddard, MSC, ERC, MSFC, and NASA Headquarters). Mr. Shaver and Mr. Lawrence of Computation Laboratory and Mr. Pavlick, Mr. Tanner, and Mr. Hall of Astrionics were the MSFC representatives. Each center presented a brief summary of its analog and hybrid simulation facilities, equipment, and operations. ✓

The majority of the program was devoted to several examples of the work being done at Ames. The meeting was valuable in providing an interchange of plans and ideas between the centers. Tentative plans were made to have additional workshops at other centers at about six month intervals. Mr. Vacca of OART-REI is to coordinate future plans. ✓

NOTES 2/1/65 JAMES

SA-9: The plug drop overall test for complete vehicle was completed January 25. Propellant loading test is scheduled for February 2.

SA-9 PRELAUNCH REVIEW: The SA-9 Prelaunch Review is scheduled for Wednesday, February 3, 9:00-11:00 in the Center Conference Room.

S-IVB/IB CONTRACT: Negotiations with DAC for the eight follow-on S-IVB/IB stages and a set of GSE were completed on January 27. The negotiated estimated cost was 77.0M plus 5.0M fixed fee.

FLIGHT MISSIONS ASSIGNMENT DOCUMENT: (MRAZEK) Information received from Bellcomm indicates that significant comments which MSFC forwarded to Headquarters will not be incorporated in the revised FMAD scheduled to be published next week. It was indicated that General Phillips did not accept our recommendations that SA-204 not be considered as a sub-orbital backup, that objectives be listed by priorities and that configuration information be deleted.

PEGASUS: Per telephone request from Dr. Mueller on Friday, January 30, the Program Office agreed to additional support of the radiation test at Langley and Dr. Johnson and Mr. Arrendale arrived at Langley January 30. Dr. Mueller indicated that successful completion of these tests would be a pacing item to the launch of SA-9. Dr. Johnson's opinion is that the machine will not be capable of producing clean data until about March 1. We will give you an up-to-date status report on these tests prior to Dr. Mueller's visit here late this week. (Please do not include this item in the weekly report to Headquarters)

Pegasus meeting on the Hack Wilson report originally scheduled for February 5-6 has been rescheduled for February 8-9 at KSC.

SATURN IB DESIGN DATA BOOKS: (MRAZEK) We received word that Dr. Seamans did not agree to the release of the Data Books to Air Force. These books were forwarded in accordance with an urgent request from Mr. D. Lord, NASA Headquarters. They are being returned to MSFC per phone call from Mr. Lord to Air Force.

NOTES 2-1-65 Koelle

1. REUSABLE ORBITAL TRANSPORT: The last week mid-term review at GD/A, Lockheed, North American Aviation and Boeing brought out the following important findings.

a. Lift-to-drag ratio of 1.5 for the second stage is optimum and would permit an ablative heat protection for the bottom of this stage. With this approach, probably the refurbishment cost will increase; however, the initial development cost and development time should be reduced. Eventually, a coated columbium radiation surface can be used for an operational version of the Reusable Orbital Transport.

b. An initial limited operational capability can be obtained by using a combination of 1J-2T and 2RL-10 engines instead of a new high pressure engine. This engine choice for a prototype vehicle would permit early development and flight testing. The structural and operational problems could thus be ironed out in once-around-the-Earth test flights.

c. With removing the two long leadtime items from the early development (high pressure engine for second stage and coated columbium heat shield) in the session discussed above, a relatively short and cheap development program appears feasible and practical. We are now checking out such a program during the next two months to determine how attractive this proposition might be.

You wanted to have a better name for the Reusable Orbital Transport (ROT) for the next study phase. Which one of the following two names would you prefer?

a. Multipurpose Aerospace Transport (MAT)

b. Reusable Aerospace Transport (RAST)

2. ADVANCED SYSTEMS STUDY FISCAL YEAR 1965: It is now February 1, 1965 and we have yet to receive the first dollar for this year in the area of advanced systems study. With the April 1 deadline looming, we will have problems to obligate any funds (we might get) by July 1, 1965. You might want to discuss this problem occasionally with either Dr. Mueller or Dr. Seamans. The outlook for fiscal 1966 is not so good in our area. Only 10 million dollars is listed for all MSF Studies (three Centers and Headquarters), as compared to 26 million the two previous years. Moreover, we are frozen out of all OART studies of similar nature, as they have established their own future projects organization at Ames Research Center, which will be in charge of all advanced system studies.

NOTES 2-1-65 KUERS

1. S-IC-501 Thrust Structure: This Thrust Structure has been received from Boeing on Plan VII Recovery Schedule; i.e., approximately 8 weeks later than the original Plan VII. As reported last week this structure is very incomplete with respect to incorporation of changes. This is a good example of meeting a PERT milestone and how that it can deceive management about the actual status of the project. We have agreed to the shipment of the incomplete Thrust Structure for three reasons: (1) the shipping time could be beneficially used by Boeing for manufacturing and procurement of parts needed for this work; (2) the weather conditions for shipping by barge are usually less good in February than in January; (3) there is a possibility of starting and overlapping our installation work with the Boeing activity. The present situation is very discouraging. The remaining structural work to be accomplished amounts to 3,000 to 5,000 manhours according to present estimate. Boeing sent 75 people here to start this work last Saturday, 1-30-65; however, we found that most of their planned work was based on obsolete documentation resulting in an entire stop of the operation. We are working with Boeing to clarify this situation and find a solution for continuation of this operation.

2. Status of S-IC-S: Here is some good news! We have completed the lower unit for -S, consisting of Fuel Container plus Thrust Structure, 2 weeks earlier than Plan VII Recovery Schedule. This Unit will be moved to the structural test facility today. We will start immediately, i.e., 2 weeks earlier than presently planned, on the final close-out welding of the Fuel Container for 501.

Arthur Rudolph

Can you arrange a comprehensive SIC problems briefing for me and the principals mainly involved. We can't go on like this!

B

Fwy 1

NOTES 2/1/65 MAUS

1. CANCELLATION OF BOGART, RIEKE, JONES VISIT - Due to the schedule conflicts involving the Pegasus Review, the S-II Quarterly Review and Dr. Seamans' meeting with center directors on the Average Grade and Average Salary problem, we have postponed the visit of Mr. Rieke, General Jones and General Bogart to MSFC on February 9 - 10. A new date will be set for their visit as soon as we receive a firm schedule for the Teague Sub-committee Hearings. ✓

2. TRANSCRIPT OF THE ANDERSON COMMITTEE LAUNCH VEHICLE HEARINGS - Bob Freitag received a copy of the transcript on January 29. Due to its classification the document cannot be distributed to the Centers. We have sent Bill Fondren to Washington to prepare an abstract of the transcript. The abstract will be available for your review on Wednesday, February 3. Please arrange with Bonnie Z

3. MANAGEMENT COUNCIL MEETING SCHEDULE - Because the House Space Committee will hold hearings on February 15 and 16, to be followed by Mr. Teague's Sub-committee Hearings on February 17 and 18, Dr. Mueller has re-scheduled the Management Council Meeting. They are now scheduled to be held on Friday, February 19 and Saturday, February 20. ✓

NOTES 2/1/65 McCarth.

B 2/9 Tw 2/1

1. STATUS OF SRT INITIATIONS: As you requested on my 1/25/65 Notes, the following breakdown of SRT initiations is provided (dollars in thousands):

ADVANCED RESEARCH AND TECHNOLOGY

	PLAN	AUTH. REC'D.	INITIATED	BALANCE
Nuclear Electric Systems	290	180	163	17
Nuclear Rocket Systems	900	650	358	292
Nuclear Rocket Propulsion	380	350	280	70
Space Power	2,000	1,820	1,640	180
Space Vehicle Systems	3,054	2,054	1,779	275
Electronic Systems	3,469	2,400	1,902	498
Human Factors System	220	220	170	50
Chemical Propulsion	3,000	1,500	811	689
Basic Research	916	500	292	208
Solid Experimental Engine	592	0	0	0
Total	14,821	9,674	7,395	2,279

TRACKING AND DATA ACQUISITION

Tracking & Data Acquisition	2,000	2,000	1,110	890

SPACE SCIENCES AND APPLICATIONS

Meteorological Systems	120	120	0	120
Lunar and Planetary Exploration, SRT Science	35	35	20	15
Lunar and Planetary Exploration, Adv. Tech. Dev.	500	500	75	425
Geophysics and Astronomy	20	20	1	19
Launch Vehicle Dev.	153	153	113	40
Total	828	828	209	619

MANNED SPACE FLIGHT

Apollo Supporting Dev.	11,000	11,000	10,136	864
Advance Manned Missions	6,000	2,000	1,924	76
Total	17,000	13,000	12,060	940

NOTE: These 18 major categories of work are composed of approximately 450 individual tasks.

NOTES 2/1/65 RUDOLPH

1. S-IC-D Stage Welding - Boeing has begun to show definite improvements in their welding process on S-IC-D. Two fuel tank and one LOX tank bulkheads have been accepted and the remaining bulkhead is being fabricated on the meridian welder. A significant accomplishment was the successful welding of the LOX tunnel stub into the lower fuel bulkhead on the first attempt.

2. S-II Quarterly Review - The S-II Quarterly Review will be held at S&ID, Downey, California, February 9-10, 1965.

3. S-IVB High Force Dynamic Test Program - (Reference Notes 1/18/65 Rudolph, Item 4, copy attached) This test program consists of vibration tests on major structural assemblies (such as, forward skirt assembly, thrust structure assembly, etc.) with dummy components attached to assure structural integrity under dynamic conditions during flight. The term "high force" is used since a high force is required to vibrate the structural assemblies due to their heavy weight. It is planned that these tests be performed by Wyle (Huntsville) as subcontractor to DAC on the same facility as that used for vibration tests on I.U.

4. Vehicle GSE Configuration Control Board (CCB) - An interim CCB is being established to formally process engineering changes to those contracts involving Saturn V Vehicle GSE under Industrial Operation Management. The CCB will be effective beginning February 1, 1965.

Attachment: Notes 1/18/65 Rudolph (DIR, I-DIR and R-DIR's copy only)

NOTES-2-1-65-SHEPHERD

Col. Peacock visited us on January 26. He is the District Engineer at the Los Angeles District, Corps of Engineers, and was formally the Staff Advisor of the Teague Subcommittee. The purpose of the visit was to discuss the status of the F-1 Test Stand contractor's claim of approximately $6.5M. Col. Peacock said there is no validity to the contractor's claim above $200,000. Col. Peacock will be leaving the District Engineers job for reassignment within the next 6 months - apparently a routine personnel change. We expect no difficulty with this move as our work with the Los Angeles District is about completed.

FY-67 CofF Budget: MSF has requested that we submit a list and supporting documentation of our FY-67 CofF Budget. The purpose of this early submission is to obtain MSF approval for Advanced Design Funds so that we may move out on study contracts to better define the projects. The projects are to be submitted against three basic guidelines:

a. support of on-going programs
b. increase our technical capability
c. replacement of substandard facilities

The list being submitted is not final and additions or deletions can be made as appropriate until September 1965. The totals on the attached list of projects which we are submitting are considerable higher than we have submitted to Congress for FY-66, however, the purpose of this submission again is to obtain Advanced Design Funds for studies. We will arrange a briefing for you on these projects if you so desire. Messrs. Rees and Gorman reviewed these projects on January 25.

GAO Report on Seal Beach: A draft copy of the GAO report has been received by NASA for comments prior to the GAO submitting to Congress. The draft report is critical of Marshall in the management of the Seal Beach Facilities. GAO charges that the Navy prematurely procured structural steel for the Vertical Assembly Building and subsequent to their action the design of the steel was changed by S&ID. The results was that the Navy order was invalid and that a net loss was incurred by the Government of $177,000. The incident that they investigated has been previously investigated by the Myers Committee, June 1963 and the Newby Committee, June 1963, with findings and conclusions different than those reached by the GAO. A reply to the GAO report is being prepared for submission to MSF.

Fw 2/1

B 2/9

NOTES 2-1-65 Stuhlinger

1. FLIGHT READINESS OF SA-9: Answer to your question on NOTES 1-18-65 Stuhlinger (attached): To my knowledge, this question between B and M is not yet settled. A project review meeting will be held in Huntsville on February 5 and 6. A decision is expected as a result of that meeting. ✓

2. MEETING IN NEW YORK CITY WITH DR. BISPLINGHOFF: On January 26, Dr. Bisplinghoff and I met for 2 hours to discuss the status of the Pegasus project, and MSFC's comments to the report issued by the Pegasus Review Team. It was my feeling that Dr. Bisplinghoff was greatly interested in MSFC's viewpoints, and that he was inclined to accept our arguments without much reservation. Really?

3. AES PROJECT APPROVAL: Dr. Seamans included the AES in his recent presentation to Congress on the NASA FY-1966 budget. Although in FY-1966 AES is not planned as a major hardware start, the 45-million dollar budget line item for AES is a part of Apollo. Thus, at least in a sense, AES has acquired the status of an approved project. ✓

4. PROGRAM OPERATING PLAN 65-1: The R&D segment of POP 65-1 was completed and delivered to FMO Saturday, January 30, in time to meet the Headquarters due date of February 8. Compilation and consolidation of Laboratory/Office submissions in the ART, SS&A, and MSF (including AES) program areas required a considerable effort. An attempt to computerize the R&D portion of the POP was not too successful; however, benefits may be realized as a direct result of this automation effort in the processing of future quarterly POPs. ✓

5. LUNAR TERRAIN ANALYSIS: As a result of a request by OMSF, a presentation was made at Headquarters on the Lunar Terrain Analysis study being performed under RPL's technical direction by Hayes International Corporation. This study is concerned with identifying lunar terrain features of unique geologic significance, selecting areas on the lunar surface containing a concentration of features of interest, and planning lunar surface traverses in interesting areas. The presentation, which was made by Mr. Scoggins and Mr. Heaps of Hayes, was quite well received, and Col. Evans expressed the desire that we continue this work. ✓

6. SI UNITS: On January 18, Dr. Bisplinghoff directed the five OART Research Centers to use the International System of Units as the primary system in reports and publications of a technical nature. In so doing, he referenced MSFC's lead in adopting SI Units. ✓

1 Enc: a/s

Feb 8, 1965

R&D OPERATIONS

CODE	NAME	INIT.	☐ ACTION	☐ INFORMATION
AST-F	Mr. Shepherd			

REMARKS

Regarding Item 3 in your 2-8-65 NOTES, I was contacted, and I know of others who were also contacted. I found the two situations very similar.

1 Enc:
Mr. Shepherd's
2-8-65 NOTES

Copies to: Dr. von Braun
Mr. Gorman

RECEIVED
FEB 11 1965
DIR

CODE	NAME	DATE
R-DIR	J. C. McCall	2-10-65

MSFC - Form 495-1 (October 1963)

fw 4/6
2/8/65

NOTES-2-8-65-SHEPHERD

S-IVB Facilities, FY-66 CofF: (Reference NOTES-1-4-65-SHEPHERD, attached) I previously reported that MSF had approved and submitted budget requests for facilities for F-I, J-2 and S-II programs but had dropped our $1.9 million request for S-IVB facilities. This $1.9 million was intended for use at Sacramento, largely for instrumentation, modifications and additions to Beta and Gamma test facilities. We anticipate but as yet do not know specific facilities requirements on either the F-I, J-2, S-II or the S-IVB programs. We must await further developments in the R&D effort before requirements can be finalized. As it now stands the failure of Headquarters to reflect to Bureau of the Budget an S-IVB requirement consistent with the others may result in funding any S-IVB requirements when identified either as R&D items or by reprogramming action.

Green Mountain Facility: The lease for the 64 acres on Green Mountain has been executed by Purchasing Office with Lane. We now have a lease until July 1965 at $661.00 per month with yearly options (our option) for 5 years or through 1970. The last three year options are at a monthly rental of $1,375.00 per year.

Boeing Space: Your talk with Messrs. Allen and Wood has stimulated Boeing to reconsider their position in regard to building a facility at Huntsville. The Boeing Board of Directors has not finally decided upon this matter. However, Mr. Beckleman is to go to Seattle February 12 to present to them the minimum Boeing requirements for the new facility. It probably will be in the order of 75,000 - 100,000 square feet. It is safe to assume that the Boeing Board will approve. As soon as the details are available we will brief you. It is interesting to compare the modus operandi of Boeing and Chrysler in regard to the construction of new facilities in Huntsville. To our knowledge Chrysler has not approached anyone at Marshall for any comments on their plans but their building is under construction.

ATTACHMENT (Dr. von Braun's copy only)

NOTES 2-8-65 BELEW

B 2/10

C-1 ENGINE

The C-1 Evaluation Presentation, as presented to you and Dr. Mueller on February 4, is scheduled to be presented to Mr. Webb, February 10, 2 p.m.

RL10 ENGINE

Additional margin has been built into the RL10A-3-3 components to allow firing at higher thrust levels if required. A two-second firing was conducted last week on the dual-position vehicle simulation stand as part of a Centaur boost pump limits test. Nominal thrust level was 17,000 lbs. (RL10 engines have been previously fired at 20,000 lbs. thrust as part of thrust limits tests.)

H-1 ENGINE

II

During checkout of Vehicle SA-9, a crack was discovered on engine H-5012. The crack was located on the sixth reinforcing band down from the fuel manifold on the thrust chamber. The crack was ground out and rewelded without significant schedule impact. Thirty-six hours after the crack was discovered, a plan of action was established, a work crew was flown in and the discrepancy was corrected.

J-2 ENGINE

The J-2 Quarterly Program Review was held at Rocketdyne on February 3 and 4, 1965. Representatives (including Lynn Wilson and Dieter Huzell) were present from Douglas, S&ID, the S-II Stage Office and the S-IVB Stage Office.

Engine J2014, for SA-202, is now on the test stand for hot-firing acceptance tests.

Engine system testing with R&D engine J015 is continuing. This engine has accumulated 5314 seconds in 38 mainstage tests and a total of 56 tests.

Production engine J2007 acceptance testing was completed and the engine has been removed from the test stand for second electrical and mechanical checkout.

F-1 ENGINE

The second of three predeclared bomb tests (part of FRT stability demonstration) was performed on engine 020-1 with damping in about 60 milliseconds. This engine has the new rigid high pressure propellant ducts. The remaining FRT stability test is scheduled in mid February.

I

With the arrival of engine F-2009 on February 4, the complete set (5) of the F-1 engines for S-1C-T has now been delivered to MSFC.

Engine F-2004, an FRT engine, has been moved to test stand 1E for stand checkout. Installation is in progress for firing during February.

Engine F-3011, which was previously reported two weeks late, has been delivered to NASA/RETS for acceptance testing with a new injector. The defective injector from F-3011 is at Canoga Park for analysis of injector erosion problem.

4/3 2/8

B 2/10

NOTES 2-8-65 CLINE

1. CRACKED THRUST CHAMBER BAND ON S-I-9 ENGINE REPAIRED: H-1 Engine 5012, position 2, had a crack in a weld in one thrust chamber reinforcing band. Checks after grinding away the weld revealed no leakage. The area was closed by welding. Engine replacement is not necessary. ✓

2. LOX VENT VALVE LEAKAGE MAY HAVE CAUSED S-IV-7 EXCESSIVE TUMBLING: Telemetry data from Pretoria showed tumbling rates approximately 1.5 times predicted. Visually determined rates at completion of venting were approximately 3.0 times predicted. The specification leakage is of the same order as that necessary to cause this excessive tumbling. Analyses are being performed to determine the effect of LOX Vent Valve leakage on S-IV-9. ✓

III

3. S-IC-T PROPULSION SYSTEM COMPONENT QUALIFICATION SURVEY SHOWS GREATER THAN 60% QUALIFIED (STATUS 2-2-65): Twenty-two of the forty-two "qualification mandatory" components have been qualified. Of the remaining items, ten (mainly ducting) are progressing satisfactorily. ✓

I

4. GAS INJECTION STUDIED AS POGO REMEDY: The injection of gaseous helium into the inlet line of an electrically driven H-1 turbopump demonstrated the feasibility of shifting line frequency by gas injection. Helium injection rates of 0.63% and 1.26% (by volume) decreased the resonant frequency from 6.5 cps to 4.5 cps and 3.5 cps, respectively. This frequency shift would have a significant effect on detuning propulsion and structural frequencies. ✓

Very interesting
B

NOTES 2/8/65 CONSTAN B 2/10

1. VISIT OF R. W. RIEHLMAN, CONSULTANT, NASA HEADQUARTERS

Mr. R. W. Riehlman, Consultant, NASA Headquarters, visited Michoud Operations February 4, 1965. Mr. Riehlman's specific interest concerned educational and training programs at Michoud. He was provided information on types and areas of educational and training efforts being conducted by Chrysler, Boeing, and Mason-Rust, as well as training of NASA Civil Service employees. He was briefed in depth concerning the Manpower Development and Training Program which The Boeing Company now has in progress.

2. S-I/IB

Status of S-I-8 - Fins are being fitted and vehicle is being prepared for shipment on February 22 to the Cape.

Status of S-I-10 - Overall post static functional testing is approximately 50%.

LOX Pump Seal Leakage, S-I-10 - In checkout of S-I-10, a LOX pump seal leak was evident in three engines. The leakage of two engines was within the Rocketdyne specification. Rocketdyne recommends examination of the carbon seal and the lip seal. If gross contamination is found, the seals will be replaced and the penalty hot fire (which is normally required) will be waived.

Status of S-IB-1 - Overall prestatic functional testing is complete, and the vehicle has been moved from the final checkout bay.

Status of S-IB-2 - Wiring is being installed, routed, wrapped, and clamped throughout vehicle. LOX and fuel prevalves are being installed.

Status of S-IB-3 - Is being clustered.

3. S-IC

Reference Notes 2/1/65 KUERS. Mr. Kuers' note indicated the planned work was based on obsolete documentation resulting in entire stopping of the operation. After meeting with R-ME responsible personnel, it was determined that a misinterpretation of the actual condition caused the resultant comment by Mr. Kuers. The 501 Thrust Structure documentation and condition was reviewed by I-MICH, R-ME and R-QUAL personnel prior to shipment to Huntsville. The 501 Thrust Structure was built and accepted at Michoud with reference to the latest engineering release documentation.

NOTES 2-8-65 DANNENBERG

B 2/10

1. Crew Safety - The 11th Crew Safety Panel meeting was held at MSC on 2-2/3-65. New MSC data show that the S/C cannot take inertial loads from all engines hardover. MSFC will verify that the hardover case has been excluded by present design to a sufficiently high degree of reliability. New data from MSC also indicate that the Apollo escape rocket is marginal for explosions of the L/V at certain altitudes. All data need verification before drastic steps are proposed. We will keep you posted on the outcome. ✓

III

2. Experiments - At the recommendation of Headquarters, an entry MSFC In-Flight Experiments was added to the R&D Program Operation Plan - Designator 65-1 (POP 65-1) with a requirement for $1.5 Million in FY 66 and $3.0 Million FY 67. ✓

3. S-II Pilot Project - The S-II pilot project for R&D support of Industrial Operations is progressing well. Communication lines between the stage manager and laboratory project engineers have been opened. This method of R&D/IO coordination may be extended to the other stages of Saturn IB and V. ✓

K.D.

Based on what TNT equivalents?

B

NOTES 2/8/65 FORTUNE B 2/10

1. GAO called on us Wednesday - Messrs. Walter Benson and E. Candilora from the New Orleans Regional Accounting Office spent Wednesday a.m. on an orientation visit. They were not sure when an audit might be scheduled for GE Operations. ✓

2. R. Walter Reihlman, Consultant now to NASA Headquarters, visited Thursday - Frank Henrie drove him over from Michoud after lunch. He spent the afternoon with us, being given a general overall briefing and a tour of the construction sites. He was particularly interested in the "spin-off" (economic impact) effects of our building program and in university relationships. ✓

3. Jackson State College Instructors in Placement Personnel here Friday - Four of the college staff came down to see what cooperative arrangements might be made, with the prime contractors as well as with MTO. We are taking two math students, starting March 15, using them in Resources Management, and helping prepare all the control data to be used in Activation Scheduling and Progress Reporting. ✓

4. Departments of Interior, Fish and Wildlife representatives offer help - It may prove wiser to make a game refuge out of MTO fee area. Federal and State officials have offered to help stock our waters and woods, in Friday meeting, for both conservation and insect control.

Bill F

Do you think the birds will get used to the noise of your "birds"?

B

B 2/10

NOTES 2/8/65 GEISSLER

1. Lunar Touchdown Dynamics Calculations: A three-dimensional touchdown dynamics deck is operational and being used initially in Aero-Astrodynamics Laboratory for correlation of our theoretical results with experimental results obtained by The Bendix Corporation. There are an infinite number of possible combinations of vehicle orientations and directions of the velocity vector, some of which were found to be more critical than the symmetrical landings considered in the past. The experimental results were obtained by Bendix under contract to Bellcomm. If good correlation can be established between the theoretical and experimental results, then greater confidence can be placed on analyses conducted at MSFC on advanced systems such as the Lunar Flying Vehicle.

2. Flight Evaluation Panel: The fifth Flight Evaluation Panel Meeting was held at MSFC on January 28, 1965. A charter for the Data Exchange Coordination Sub-panel was adopted. Sub-panel membership was approved with G. R. Emanuel named Chairman. A presentation on functions and organization of OSRO (Operations Support Requirements Office) was given by Mr. Porter Brown, who heads that group.

3. Satellite Lifetime: The initial efforts of developing an improved atmospheric density model have been completed. The drag factor curve used was derived from G T-1 (Gemini-Titan 1), SA-6, SA-7 and SA-5 data. The factor was assumed constant above the SA-5 perigee altitude of about 260 km. From the analysis to date of decayed Discoverer satellites the density profile below 260 km perigees appears quite good. Three satellites in the altitude region above 260 km indicate that the drag factor continues to decrease to around 0.1 - 0.15 as compared to the 0.25 presently in our profile. Further analysis is in progress to verify these results.

4. Marshall-Langley Slosh Studies: A joint study of slosh in tanks with flexible baffles is being discussed with Langley Research Center. It is planned to use the large-scale test tank facilities of Test Laboratory for experimental support of the analytical work.

NOTES 2-8-65 GRAU

B 2/10

1. S-IU-10 INSTRUMENT UNIT CHECKOUT: The S-IU-10 Instrument Unit has been released to this Laboratory for checkout. The unit was installed on the Saturn Instrument Unit Motion Simulator 2-2-65 and Network Hookup began 2-4-65.

2. S-IV PROGRAM: Post-static checkout of the S-IV-8 stage has been successfully completed with only minor instrumentation discrepancies being noted. Modifications planned for accomplishment at Sacramento have been completed and the stage is scheduled for shipment to KSC 2-23-65.

3. S-IC-T STAGE HARDWARE: The S-IC-T stage has been completely equipped with Lox and fuel prevalves, and all emergency Lox and fuel dump valves have been released for installation.

4. F-1 ENGINE CHECKOUT: Engine F-2007 is installed in the checkout stand and leak and functional testing is in progress. Significant defects noted to date include external leakage at the Lox pump inlet flange (same leakage problem encountered on Engine F-2008), at the GG ball valve to actuator flange, and excessive reseat leakage will require the ignition fuel valve to be replaced.

5. IBM INSTRUMENT UNIT EFFORT: Ten Birmingham Procurement District personnel have reported for duty at IBM, Huntsville. They are now performing functions in procurement review, receiving inspection and some in-process inspection. Training that these people will require in other areas is being arranged.

NOTES 2/8/65 HAEUSSERMANN B 2/10

No submission this week.

B 2/10

NOTES 2/8/64 HEIMBURG

1. F-1 ENGINE:

Test TWF-047 was conducted on F-2005 with a mainstage duration of 101.62 seconds. Cutoff was initiated by an observer before the intended duration was achieved, due to deflector burning. Data from this test indicated that a problem may exist due to a 30-cycle oscillation occurring on all fuel parameters. This is currently being investigated to determine what corrective action, if any, is required. Test TWF-048 is scheduled for February 10, 1965.

2. S-IC:

Load testing of the holddown arms was started Wednesday, 2/3. Cracks have occurred in the load platform and have been repaired. A major crack occurred during thrust loading, and a major crack occurred during rebound loading. The load test is approximately 65% complete, disregarding future cracks.

SATURN V GSE (Attachment to Dr. von Braun and Mr. Weidner's copies only).

NOTES 2-8-65 HOELZER

B 2/10

CONFIGURATION MANAGEMENT STUDY: Computation Laboratory representatives of the Computation/P&VE Laboratories Configuration Management Study Team gave a system presentation to the tenth R&D Operations Configuration Management Committee meeting. As envisioned to date, the system is divided into three phases: (1) establishing the data base, (2) accounting for an Engineering Change Proposal (ECP) through approval, and (3) accounting for the implementation of an approved change. The preliminary system charts were received with enthusiasm. (The chairman requested that the charts be reduced in size for inclusion in the minutes of the meeting).

NOTES 2/8/65 JAMES

B 2/10

SA-9: The overall All Systems Test was successfully completed on 2/5/65. The next key milestone will be countdown demonstration scheduled for 2/12/65.

PEGASUS RFI TESTS: Reference 1/25/65 notes from Mr. Grau and Col. James (copy attached). All FHC Vendor Black Boxes were Qualification Tested for RFI to the requirements of Mil-I-6181-D, and passed. Some FHC inhouse fabricated black boxes have had RFI development testing but have not been formally qualified to Mil-I-6181-D. However, the entire spacecraft has successfully completed an RFI compatibility check against the entire SA-9 vehicle and we are confident that the spacecraft will not cause undesirable interference with the vehicle. It is true that it would be desirable to complete additional RFI tests prior to flight but since the entire vehicle has passed RFI tests at the Cape, I have decided not to hold the flight for these tests.

S-IVB BATTLESHIP: J-2 Engine 2013 has been installed on the battleship and checkout will be completed this week. Countdown for the first chilldown test using the flight configuration engine will begin 2/6/65 and the test is scheduled for Tuesday, 2/9/65.

SATURN IB DESIGN DATA BOOKS: Reference your question on my 1/25/65 notes regarding Saturn IB Design Data Books being furnished to the Air Force. About 3 weeks ago, Doug Lord of E. Z. Gray's office, called requesting these books for the Air Force Space Systems Division, in connection with RFP's for a contractor study on Saturn IB/Apollo vs. Titan/Gemini/MOL. The books were furnished but Dr. Seamans intervened and requested the RFP not be released. Doug Lord agreed the Air Force could retain 5 books for their use and 15 were returned.

LBJ Against Seamans desires? B

RCA 110A COMPUTERS: The Saturn V RCA 110A acoustic machine was shipped from RCA on 2/1/65 and was due to arrive at Wyle Laboratories 2/5/65. The Saturn IB breadboard machine will begin NASA demonstration 2/6/65. The computer for the Saturn IB IU checkout station is scheduled for 2/8/65 and the second Saturn IB breadboard machine is scheduled for demonstration at Van Nuys, California, on Friday, 2/12/65. Meetings were held with RCA during the week of 2/1/65 concerning logistics and spares with the result that RCA will submit a list of items to be purchased immediately to support the NAS8-13007 computers as they are delivered to the field. This list will be presented to NASA on 2/8/65.

B 2/10

NOTES 2-8-65 Koelle

1. Saturn Improvement Studies for 1965: We had a meeting here with Ed Gray, with Mr. Weidner and Mr. Williams participating, in which we discussed the goals, study matrix, and 1965 investment plan on Saturn IB and Saturn V. Mr. Gray stated that Dr. Seamans has approved $1.4 million for this purpose. This money has not yet reached MSFC. We had a good meeting and seem to agree on the basic approach. I will go to Washington next week with a written plan, and hope to obtain Ed Gray's concurrence so that we can begin to spend 1965 money. Ed Gray requested that we include in our compilation of possible changes all the studies by the Laboratories and contractors as insurance for the Apollo, but which are not approved as yet. I intend to approach Dr. Mrazek on this item.

2. Booster Recovery for S-IC: Boeing has recently completed a study on simple recovery systems for the first stage of Saturn V. They have come up with a concept, which is simple enough that it might even work and cheap enough that we can afford it (development cost are estimated to be below $\$50 \times 10^6$). It has a chance to pay off after a very few flights. It works as follows:

The booster decelerates by itself to subsonic velocities, requiring only a modest ablative heat shield. Subsonic deceleration is accomplished by a cluster of conventional parachutes. The water impact is softened by blowing off the bulkhead of the Lox tank and some portholes at the lower end of the tank, thus providing a piston affect which, at the same time, avoids the tip-over loads. The Lox tank is replaced after each flight. The retrorocket and subsonic attitude control system are thus eliminated. We will propose a technology program in this direction and incorporate such a recovery system possibly in any block change after 1970. Do you want to have the summary report on this subject?

HHK Sounds very interesting! Yes, please

B

B 2/10

NOTES 2-8-65 KUERS

1. Manufacturing Technology Review Meeting: This meeting was held at S&ID, NAA, Los Angeles, California last week. The purpose was to review a number of manufacturing technologies, peculiar to our stage programs, which still require special attention for improvement of results. At the same time, we wanted to achieve an exchange of experience and knowledge in manufacturing techniques by our prime contractors. Mr. Werner Gengelbach chaired the meeting with Mr. Van Leuven (S&ID) being the co-chairman. ME Laboratory established and coordinated the topics of discussion for the 10 group meetings which were conducted during the 2 day meeting. The high interest in this exercise was evident by the number and high level of participants. The following companies were represented: S&ID/S-II; S&ID/Apollo; DAC; Boeing; Chrysler; Grumman Aircraft; different laboratories from MSFC; and MSC. Included in the agenda were topics of discussion such as Welding Repair Techniques; Tank Re-Entry Procedures after Cleaning; Forming of Skin Panels, Gore Segments and Seamless Elbows; Common Bulkhead Fit-Up and Bonding Techniques; Magnetic Hammer Application for Correction of Weld Distortion; Tube Flaring Techniques; etc. Also included in this review meeting was a tour of the Seal Beach facility where the structural test vehicle S-II-S was just being removed from the VAB. Many details of information and problems were revealed during the discussions, and many participants regretted that only 2 hours were available for each topic. A certain sound competition between the companies was noticeable as most of the participants appeared to be proud to show their experience and accomplishments. Only the highlights of the topics with a listing of available reports will be published from this meeting.

2. S-IC Manufacturing Milestones: The lower unit of S-IC-S, consisting of Thrust Structure and Fuel Container, has been delivered to the Structural Test Facility 2 weeks ahead of the Plan VII Recovery Schedule. During this week, the final close-out weld for the Fuel Container for S-IC-501 has been completed. This is the fourth Fuel Container manufactured here.

NOTES 2/8/65 MAUS

B 2/10

1. PROGRAM OPERATING PLAN 65-1 - POP 65-1, containing R&D, C of F, and Administrative Operations financial plans, was reviewed and approved by Dr. Rees and Mr. Gorman, and has been forwarded to headquarters. It includes financial plans for balance of FY65 and FY66, and the first official submission (preliminary) for FY67. Summary of content is shown below:

MSFC POP 65-1 ($ IN MILLIONS)

	FY65	FY66	FY67
AO	137.8	137.4	140.0
C of F	106.0	13.3	53.0
R&D	1,468.7	1,677.6	1,651.0
Saturn I	(37.0)	(3.6)	(0.)
Saturn IB	(254.2)	(265.1)	(210.0)
Saturn V	(952.9)	(1,208.2)	(1,167.0)
Eng. Dev.	(166.3)	(150.7)	(137.5)
MSF Suptg. Dev. Advanced Studies, AES	(27.0)	(29.0)	(94.0)
Other Prog. Offices	(31.3)	(21.0)	(42.5)
TOTAL	1,712.5	1,828.3	1,844.0

FY65 and FY66 Funding is within headquarters' guidelines and in agreement with President's budget submitted to Congress. For FY67, POP 65-1 includes $62 M for AES Program; of this $58 M is for lunar surface activity, and $4 M for earth orbital activity. ✓

2. APOLLO X/GEMINI - B - MOL STUDY - The committees set up by NASA and DOD are still working out mutually agreeable guidelines for the Apollo X-MOL Study. The study is to be of total program rather than a spacecraft comparison study. Essentially, NASA will be comparing its entire Apollo follow-on (AES) Program with the military's entire planned Titan/MOL Program thru run-out, assumed 1970 year end.

Present schedule for the study is:

Completion of draft report — April 1
Submission to Dr. Seamans and BOB — May 1 ✓

Objective is to get a presidential decision before July 1 in order to firm up FY66 programs for both agencies. A representative of Executive Staff will participate with headquarters in the negotiations with DOD on the study guidelines, beginning February 10. ✓

NOTES 2/8/65 MC CARTNEY B 2/10

1. Improvement of Supply Operations: Action has been initiated with Mr. Huth, the Technical Services Office, and Laboratory representatives to consolidate further the Supply Operations within R&D Operations. The first step is being directed toward the reduction of stock held by Laboratories and the consolidation of this material in Technical Services Office. This should result in overall reduced inventory, elimination of excess materials, and better utilization of personnel due to consolidated effort. This action is being closely coordinated with the Laboratories and the shift will be accomplished without adverse effect on mission activity. The operation will probably take several months for completion.

2. Evaluation of Support Contractor Performance: R-RM has developed a procedure for evaluation of support contractor performance. The procedure has been staffed and concurred in by Mr. Davis and Mr. Newby. Subject to final approval by NASA Headquarters, each Laboratory and Office Director has been requested to designate a technical evaluation coordinator and be prepared to implement the procedure.

3. Source Evaluation Board: Where two or more contractors were selected for competitive negotiations prior to selection of a single support contractor, Mr. Hilburn has asked that the Source Evaluation Board report back to the Administrator. Accordingly, members of the Board at Marshall have kept abreast of the negotiations and last week reviewed results of Quality Laboratory and Technical Services Office. Reviews of P&VE Laboratory and Management Services Office are scheduled this week. Following these reviews, the presentation material will be completed and a dry run for Center management will be made on February 17. If everything goes well, February 25 will be proposed for the NASA Headquarters review. For those Laboratories and Offices where one contractor was selected for negotiations, presentations should be ready for Headquarters approval by mid-February.

NOTES 2/8/65 RUDOLPH

B 2/10

1. S-II Structural Test Stage - Fabrication and assembly of the Structural Test Stage has been completed at Seal Beach. Installation of the stage in the Structural Test Tower is now in process and instrumentation of stage and tower is required prior to start of structural testing scheduled for April 1965.

2. S-II Stage Configuration Management - Agreements have been reached with NAA/S&ID on S-II Stage Configuration Management as follows:

a. An implementation instruction for NPC 500-1.
b. A specification plan.
c. A Change Procedure for processing Engineering Change Proposals.
d. The need for a uniform internal S&ID Configuration Management operating procedure for S-II and Apollo.

3. First Saturn V/S-IVB Flight Stage (S-IVB-501) Status - The LOX Tank is fabricated and leak checks are being performed on the huckbolting. Several huckbolts have been replaced. The LOX Tank should be completed this week, (February 8, 1965). The Forward Dome remains in the meridian welder where seams welding rework is active. Upon completion of reworking the seams the Forward Dome will be 70% complete.

4. RCA 110A Computer System - The acceptance test on the RCA 110A computer system for R-QUAL, S-IC checkout station was completed on February 3, 1965. Official beneficial use by Boeing began Thursday, February 4, 1965. The equipment is conditionally accepted minus the analog racks and the software (SLAP II programs).

5. Saturn S-IVB Stage Reliability Program Cut - Reference your request for comment on "Notes 1/25/65 Dannenberg, (Copy attached), paragraph 5", the cut in manpower referred to is actually a "stretch out" in manpower buildup. The rephased manpower buildup is a plan arrived at with DAC management that will be accomplished over a one-year period without serious compromise in achieving the NPC 250-1 reliability requirement. The rephasing permitted a .9 M adjustment which was urgently needed to resolve schedule problems in the S-IVB.

Attachment: Notes 1/25/65 Dannenberg (DIR, I-DIR and R-DIR's copy only).

NOTES-2-8-65-SHEPHERD

B 2/10

S-IVB Facilities, FY-66 CofF: (Reference NOTES-1-4-65-SHEPHERD, attached) I previously reported that MSF had approved and submitted budget requests for facilities for F-I, J-2 and S-II programs but had dropped our $1.9 million request for S-IVB facilities. This $1.9 million was intended for use at Sacramento, largely for instrumentation, modifications and additions to Beta and Gamma test facilities. We anticipate but as yet do not know specific facilities requirements on either the F-I, J-2, S-II or the S-IVB programs. We must await further developments in the R&D effort before requirements can be finalized. As it now stands the failure of Headquarters to reflect to Bureau of the Budget an S-IVB requirement consistent with the others may result in funding any S-IVB requirements when identified either as R&D items or by reprogramming action. ✓

Green Mountain Facility: The lease for the 64 acres on Green Mountain has been executed by Purchasing Office with Lane. We now have a lease until July 1965 at $661.00 per month with yearly options (our option) for 5 years or through 1970. The last three year options are at a monthly rental of $1,375.00 per year. ✓

III

Boeing Space: Your talk with Messrs. Allen and Wood has stimulated Boeing to reconsider their position in regard to building a facility at Huntsville. The Boeing Board of Directors has not finally decided upon this matter. However, Mr. Beckleman is to go to Seattle February 12 to present to them the minimum Boeing requirements for the new facility. It probably will be in the order of 75,000 - 100,000 square feet. It is safe to assume that the Boeing Board will approve. As soon as the details are available we will brief you. It is interesting to compare the modus operandi of Boeing and Chrysler in regard to the construction of new facilities in Huntsville. To our knowledge Chrysler has not approached anyone at Marshall for any comments on their plans but their building is under construction. ✓ !

Shep

They can always use a Huntsville plant for their automotive business, if something goes wrong. Boeing can't. B

Shep

Mr. Allen told me that he actually did not need Board approval for this project. He just kept the Board "informed as a matter of courtesy." So, it's really up to him personally.

B

ATTACHMENT (Dr. von Braun's copy only)

(We be glad to call him again if you consider this desirable)

NOTES 2-8-65 Stuhlinger

B 2/9

1. PEGASUS DATA RETRIEVAL AND ANALYSIS: Communications and data link tests for Pegasus for which RPL is responsible, were conducted Friday between SATCON and MSFC. The voice communication circuits are activated and functioning properly. The data link tests were rescheduled to achieve proper signal attenuation for transmission over telephone lines. All Pegasus data processing and operations plans and requirements have been satisfactorily implemented or are progressing on schedule.

2. PEGASUS TESTING AND EVALUATION FOR FLIGHT: Dr. Shelton met with the Headquarters Pegasus Radiation Group this week. He has conducted in-house leakage current measurements on a full scale detector under thermally controlled conditions. Electron radiation exposure for various Pegasus orbits have been computed in preparation for the Pegasus readiness meetings Feb 8 and 9 at MSFC.

3. AES PROGRAM: A two-day AES planning review was held at MSFC on Feb 4 and 5. E. Z. Gray stated that AES has now acquired project status, and that all AES work will be handled and organized in project-like fashion. An AES Program Office, to be headed by Bill Taylor, is being established under Mr. Gray. OSSA will play an important role in the AES program.

RPL submitted to OMSF work statements for seven AES studies on scientific instrumentation and lunar exploration, covering study funds of approximately $1.5 million in FY 1965. Fund authorization was received last week. E. Z. Gray's office seemed to be well pleased with our submission.

4. FY-65 OART PROGRAM AUTHORITY: All OART programs have now been authorized to the annual plan except Space Vehicle Systems; in this program, $1 million are being withheld pending further Pegasus requirements.

Feb 15, 1965

B 2/21

NOTES 2-15-65 BELEW

RL10 ENGINE

The procurement plan for the follow-on R&D Incentive Contract for the two-year period October 1, 1965, through September 30, 1967, was forwarded to Headquarters on January 8. We are not aware of any outstanding problems that will impend the approval of this procurement plan.

Analytical studies by GD/A and LeRC indicate that a net payload gain of 50-60 pounds for Centaur can be obtained by increasing the thrust of the RL10A-3-3 engines to 17,000 pounds. The program impact is being evaluated should this become a requirement. ✓

F-1 ENGINE

Thrust chamber test stand 2A is back in operation. To compensate for the down time, both positions (2A-1 and 2A-2) will be used to support development of a qualification injector and operation will be on a 6-day week two-shift basis.

Upon disassembly and detailed inspection of the gas generator cracks were found in the lox ring-to-land braze. A subsequent check (dye penetrant) on all gas generators revealed a similar condition in several units. Run data analysis reveals no measurable effects. P&VE materials people are working with Rocketdyne on the problem. Braze quality or technique appears to be the cause. All units found to be defective have been returned for rework. Looks like we can work around this with no overall schedule impact. ✓

C-1 ENGINE

The findings of the Source Evaluation Board for the C-1 Engine were presented to Mr. Webb on February 10, 1965. Mr. Webb then selected STL and RMD for negotiation of the Phase I (Definition) contract. ✓

J-2 ENGINE

Production engine 2009 was delivered to S&ID last week. This completes the five engine cluster for the S-II Battleship program. ✓

Production engine 2014 suffered some thrust chamber erosion and two minor tube surface cracks during acceptance testing. This occurred on a 500 second run at high mixture ratio. Subsequent to the 500 second run, adjustments were made to the lox orifices in the outer row of the injector (correction of an out-of-tolerance problem) to provide proper cooling on the thrust chamber tubes. From visual inspection, a 260 second penalty run appears to verify the correction (run last Saturday, February 13, night). In keeping with allocating best hardware for flight use, it is now proposed this engine be scheduled for S-II All Systems test (original allocation was for SA 202). ✓

NOTES 2-15-65 CLINE B 2/21

1. SATURN IB: The vehicle wide propulsion math model for flight controller training is now being debugged on the International Business Machine Corporation 7094 Computer. The debugging problems are centered in the S-IVB Stage. A plotting routine (QUIK) is now ready and will be incorporated into the master program as soon as present debugging is complete. This routine will produce mechanically (SC-4020) plotted graphs of the math model's output data. ✓

2. CENTAUR STUDIES: Layouts are being prepared and coordination is being carried on with various MSFC organizations to identify and propose solutions to problems arising in adapting the Centaur stage to the Saturn IB launch vehicle. ✓

3. FIRE OCCURS DURING S-IVB BATTLESHIP CHILLDOWN TEST: The engine chill program was again attempted on 2-9-65. A "quick look" evaluation of test data indicates a successful test; however, minor fire damage was sustained. The fire occurred during ignition of the fuel dumped through the engine for chilldown. Damage to the stage was limited to the LH_2 pre-valve area when the insulation and wiring caught fire. A LH_2 leak in a stand console package detonated. Several lines and valves require replacement. Testing will resume on 2-16-65.

F.C.

4. F-1 ENGINE FUEL SYSTEM PRESSURE OSCILLATIONS NOTED ON F-2005 TEST: A 30 cps pressure oscillation throughout the fuel system occurred during the first test of a Block II engine at MSFC. Inquiries revealed similar occurrences during several tests of Block II engines at Edwards Air Force Base. Investigation is underway to determine effects on the engines.

Pogo critical? B

5. RL-10A-3-3 PUMP DEMONSTRATES CAPABILITY OF OPERATING AT LOW NET POSITIVE SUCTION PRESSURE (NPSP): Both pump rig and engine tests have demonstrated the capability of meeting the model specification minimum NPSP requirements of 4.0 psi and 8.0 psi for the LH_2 and LOX pump, respectively. Specifically the engine has been tested at NPSP levels as low as 2.5 psi for the LH_2 pump and 3.0 psi for the LOX pump prior to decrease in pump head rise. Testing is continuing to define performance characteristics under all required operating conditions. ✓

!!

6. SA-9: Cracked sleeves found on thrust O.K. pressure switches. These were of old vintage that somehow were not changed. Zeiler replaced all old types and found 50% cracked.

↑ Let's probe what's wrong with our procedures so this could happen B

Fred Cline

In view of the ever-present fire hazard in our LH_2 stages I wonder whether we shouldn't set up a standing working group composed of suitable MSFC, LH_2 stage, and LH_2 engine contractor personnel for the specific purpose of accumulating, evaluating and utilizing all fire incidents and freak effects in unmanned H_2 ignition. Cross-fertilization of all experience in this area may protect us from some serious mishaps. Request comment.

B

NOTES 2/15/65 CONSTAN

1. CHEMICAL WASTE DISPOSAL

In February 1964, a well was drilled to a depth of 6665 for a disposal system for diluted chemical wastes resulting from manufacturing processes (surface treatment, aluminum conversion costing, etc.). At this depth the waste is injected into a strata composed of fine sand, clay and silt. Since July we have experienced periodic injection pressure rises which have been determined to result from "geling," silting up and collapse of some of the casing elements. Periodic rework to correct difficulties have cost us about $225,000, and well over 100 million gallons of chemical waste have been processed. We are studying other solutions, but feel at this time we will have to ask for a second well with improved case design. Note from O'Connor: Dr. Lucas has a chemist at Michoud today to review the problem.

2. DAMAGE TO THE FUEL TANK OF S-I-8

On February 11, 1965, it was discovered that the #2 fuel tank of S-I-8 had been dented. This dent was apparently caused when a Lift-a-Loft was operating adjacent to the stage and struck the #2 fuel tank. This dent is 12" long, 10" wide, and .25" deep at its deepest point. In the center of the dent there are two depressions where from .010" to .013" of material has been removed. CCSD is presently running dye penetrant tests and making X-rays to determine the extent of the damage. It is anticipated that no rework other than pressing the dent out and fairing the scratched area will be required.

3. VEHICLE 501

A meeting was held at MSFC to resolve all outstanding design changes effective on Vehicle 501. There are approximately ten CAMs which are jeopardizing the vehicle delivery schedules. These were referred to The Boeing Change Review Committee for resolution with the MSFC Manufacturing Engineering Laboratory.

4. S-IC-D

MSFC agreed to a significant relaxation of the contractual requirements for S-IC-D. Details of this relaxation are still being worked and are to be completed in a meeting scheduled at MSFC on Wednesday, February 17. Generally, they are outlined as follows: a. No high level cleaning of propellant tanks; b. Deletion of most functional components, as well as pneumatic and electrical control systems; c. Re-evaluation of design changes and designation of most of these from "mandatory" to "nice to have" priority; d. Deletion of requirement for checkout of S-IC-D. It is anticipated that the deletion of these requirements will allow The Boeing Company to get back on Plan VII schedule with the "D" and "F" vehicle.

5. VISIT OF MEMBERS OF HOUSE OF REPRESENTATIVES

On Friday, February 12, an orientation briefing and tour was given to the following Members of the House of Representatives: Roy Taylor (D-N.C.); George E. Brown, Jr. (D-Cal.); William R. Anderson (D-Tenn.), Gale Schisler (D-Ill.); and Barber B Conable, Jr. (R-N.Y.). The congressmen were accompanied by Captain Freitag and Mr. Brown, NASA Headquarters; Mr. Oliver Meadows, Staff Director for House Veterans Affairs Committee; and Mr. William Deachman, Staff Member, Aeronautical and Space Sciences Committee. After completion of the briefing and tour, they departed for a tour of the Mississippi Test Facility.

B 2/21

NOTES 2-15-65 DANNENBERG

R&DO Technical Support to IO - As an expansion of the S-II Pilot project, and in agreement with the IO S-IC and S-II Stage Managers, the R&DO Laboratory project offices have been designated as the single responsible interface for support of the IO Stage Managers for work requiring Laboratory resources. The R&DO Laboratory project engineers, who have been made known to IO, are responsible for effecting full and complete coordination on technical recommendations within their own Laboratory and with other laboratories. R-SA will also assist the IO Stage Managers in program support matters, i.e., design reviews, budget and technical requirements.

B
2/21

NOTES 2/15/65 FORTUNE

1. Activation tempo increases - The Activation Task Force has now firmly established the basis for implementing activation activities. The extent of participation by contractors has been more clearly defined, and steps are being taken to insure that their existing contracts adequately cover this scope of participation. Increased support from all elements of MSFC will be required and requested, the extent of which will be identified to I. O. Director in the immediate future. We are in the process of establishing an ATF control room which should be operational the first week of March, and will be available for reviews by I. O., Programs, Project Directors and others.

I.O. Please tell me when it is ready for a visit B

2. Construction Progress - Although we have had exceptionally good weather this winter as compared to last year, approximately 2 1/2 inches of rain during the past week has slowed outside construction considerably.

3. Visitors to MTO - We were visited by the Federal Bureau of Investigation, _____ and the Teague Committee this week.

NOTES 2/15/65 GEISSLER

B 2/21

1. SA-9 Propellant Loading: Ref. Notes 2/1/65 Haeussermann, item 1, copy attached: Offloading S-I stage of SA-9 by 28,000# was necessitated by need to keep residuals of LH_2 at insertion below 250#. It was agreed in Jan. 26 meeting, attended by Mr. Weidner, Dr. Mrazek and representatives of all laboratories that equalization of risks of exceeding this residual and of not reaching a functional cut-off (depletion) was necessary in view of the objectives of this flight; based on available knowledge, this equalization was achieved with the mentioned offloading. Later analyses (Feb. 9) indicated that a reduced offloading of 22,000# would more nearly equate these risks, and adoption of this trajectory was requested from Cape. Range Safety Officials refused to accept this change in spite of the facts that supporting trajectory data had been sent to them previously and the practical effect of the changed loading is negligible for range safety purposes. Present status: 8.3% risk of depletion of S-IV Stage, 3.4% risk of exceeding 250# LH_2 residual. Chance of performance to give one year lifetime still better than 99%. Engine out capability in 1st stage from 130 sec after take-off, for 2nd stage from 300 sec after take-off to achieve functional cut-off. ✓

2. AES Study Support: Mr. Thomae met with personnel of Advanced Spacecraft Technology Division - MSC (Mr. W. Stoney) on Feb. 10 & 11, re: MSFC vehicle performance support to AES study. Agreements reached on following cases to be furnished MSC: (1) Saturn IB (base point vehicle 208): (a) two stage to 80 & 100 NM circ. orbits with inclinations covering 33 to 90 deg. (b) as above, but with Hohmann injection to 200 NM circ. orbits; (c) secondary importance: IB with Minuteman strap-on performances. (2) Saturn V (base point vehicle 507 for low earth orbital missions, vehicle 509 for synchronous orbital missions) (a) two stage to 80 & 100 NM circ. orbits with inclinations covering 30 to 90 deg.; (b) as above, but with Hohmann injection to 200 NM circ. orbits; (c) three stage vehicle for missions as defined in preceding tasks; (d) three stage vehicle to 24 hours orbits with inclinations from equatorial to polar orbits (utilizing either direct S-IVB burn into Hohmann transfer with S-IVB restart executing circularization and plane change, or two stage vehicle to low waiting orbit with coast and utilization of S-IVB for both Hohmann maneuvers; another case will consider Service Module for circularization and plane change). Range safety data will hopefully be available from KSC for incorporation into study. Deadline for MSFC input is about mid-March, to assure compatibility with overall study schedule. ✓

3. AES FY'65 Funding Status: MSFC FY'65 AES request is 7.55 M$. 2.3 M$ authorized to date. Still pending final authorization is 5.2 M$. Roadblock is that MSF is soliciting OART concurrence. Management authorization for 1.6 M$ of the 2.3 M$ was received here. ✓

4. Lunar Geology: Per request of Mr. Beattie, OMSF, we are preparing a series of lunar geological slides. First slide completed, showing Mount Appeninus Region (print attached), was used in Congressional Briefing by Mr. E. Grey in January. ✓

Electromagnetic Compatibility Control

NOTES 2-15-65 GRAU

B 2/24

1. PROPOSED EMC CONTROL TASK: In regard to your question on paragraph 4 of NOTES 12-28-65 GRAU (copy attached), NASA Headquarters (Dr. Hall, Apollo Reliability Office) still desires to support the EMC effort with GE Daytona personnel; however, further coordination in Headquarters is necessary due to rejection of the task by the EMC Subpanel. Meanwhile, we have a meeting with MSC 2-24-65 in an effort to at least eliminate their resistance, if not get their approval of the task. Further, it is planned to divert SRT funds within the Laboratory to begin two of three phases, which constitute the proposed task, approximately April 1, 1965 unless other support materializes. Positive action on the third phase is being delayed pending further developments. Depending on our success with MSC, a meeting such as you suggest may be beneficial.

Frank G. Please keep an eye on this. If it can't be resolved peacefully maybe we should either write a letter to Phillips or put it on agenda of next Apollo Ex. Council meeting - B

2. S-IC CHECKOUT EQUIPMENT: All S-IC stage weighing equipment has been delivered and installed in the stage checkout area of building 4708. The equipment has been provisionally accepted for engineering evaluation and testing. Preparations are underway to perform an operational check of the equipment using the S-IC weight simulator.

3. S-IC HYDRAULIC DUCTS CONTAMINATION: The magnitude of a contamination problem on Boeing supplied S-IC hydraulic system ducts has expanded to include ducts for 501 and 502. Investigations at the vendor's plant by Boeing and Manufacturing Engineering Laboratory personnel resulted in a report that welding without an inert gas purge is the main cause of the contamination. The contamination, weld slag and oxides cannot be tolerated in flight systems and are very difficult to remove from this type hardware. All shipments from the vendor's plant have been stopped while investigations are underway by Boeing, Manufacturing Engineering Laboratory and this Laboratory to determine the severity of the contamination and necessary corrective action. A timely resolution is necessary to avoid a possible schedule impact.

ATTACHMENT: NOTES 12-28-65 GRAU (Copies to Dr. von Braun and Mr. Weidner)

NOTES 2/15/65 HAEUSSERMANN B 2/21

1. 500 FS CONTRACT WITH DAC: (Reference your comment to Item 1, Notes of 1/25, copy attached*) Normal test program includes vacuum tests through component level. We believe that results of these tests will provide us with reasonable level of confidence that Astrionics systems will perform satisfactorily during the short duration vacuum environment on 201.

2. ELECTROSTATIC PHENOMENA: (Reference your comment to Item 2, Notes of 1/25, copy attached*) Arrangements have been made with Mrs. Holmes to give you this briefing on 3/9 at 10:30. Two NAA representatives and one from MSC will participate. MSFC attendee list is being finalized and will be provided at a later date.

3. LAUNCH VEHICLE DIGITAL COMPUTER - DATA ADAPTER SCHEDULING: In connection with current schedule problems on the digital computer and data adapter, we are carefully reviewing the use of prototype redundant units for SA-201. It should be possible to maintain flight quality in the manufacture of a set of prototype units. Our order of preference for SA-201 flight possibilities is as follows:

a. Production Redundant Units
b. Prototype Redundant Units
c. Production Simplex Units
d. Prototype Simplex Units

The elements which make up the computer have a higher reliability than conventional components, so that even the simplex approach should have a high expected reliability.

From the standpoint of the overall "all-up" approach to the program, we feel that it is highly desirable to fly the final redundant system in SA-201, even if it is not available to be put into the vehicle until September. If the final flight article must go through IU checkout at Huntsville (which we, too, would prefer), then one of the other possibilities may have to fly. Even under normal circumstances, the computer and data adapter are removed after checkout at Quality Laboratory, shipped separately, and reinstalled at the Cape. Our experience on past flights has been that minor changes are always required after Quality Laboratory checkout because of late information inputs.

Frank G. Please prepare a dear George letter to GEM, which explains what I've discussed with IBM scheduling problem for 201 with him and found him quite concerned about the December 65 launch date. B

*Attachments for DIR and R-DIR only.

NOTES 2/15/65 HEIMBURG

B 2/21

1. S-IC:

Completed load testing the holddown arms 2/12/65. Lox system cold shock tests are in progress.

2. F-1 ENGINE:

Tests TWF-048 and TWF-049 were conducted on F-2005 on 2/10 and 2/13, respectively. Principal objective of these tests was to obtain data on the 30-cycle oscillations detected during TWF-047. Test TWF-048 did not yield good data because the fuel pressurizing system did not perform properly. Test TWF-049 verified the findings of TWF-047, and showed that oscillations were sustained at fuel pump inlet pressures of 25 p.s.i. and below. No answer to the problem has been arrived at, pending review of data. Engine F-2005 will be removed and will become the center engine on S-IC-T.

K.H. Is the Pogo group aware of this? Pump potential Pogo impact? B

A problem with gas generator injector ring-to-land cracking caused us to change the injector on engine F-2005 prior to test TWF-049.

All F-1 engines delivered to date for the S-IC-T have cracked injectors. These injectors have been returned to Rocketdyne for repair.

Engine F-2008 is scheduled to be installed on the Static Test Tower West on 2/16, but at the present time a problem exists as to which gas generator injector will be used.

3. S-IVB BATTLESHIP (SACTO):

Slight fire damage was sustained on this test stage and facility due to the generation of a "fire-ball" at ignition start. This unusual occurrence is presently thought to have been caused by 30 to 40 m.p.h. winds blowing up the deflector.

4. NASA WEST COAST BARGE ORION:

This barge was transferred to Project Logistics Office (Mr. Goodrum) on 2/10, after completion of ship yard work (except bottom repairs), and after receipt of seaworthy certificate from the American Bureau of Shipping.

3 ATTACHMENTS: (to Dr. von Braun's and Mr. Weidner's copies only)
1. Activation of MTF
2. Saturn V GSE
3. S-IC Load Platform and Holddown Arms (with attachments)

ATTACHMENT TO NOTES 2/15/65 HEIMBURG (attached to Dr. von Braun's and Mr. Weidner's copies only)

SATURN V GSE:

Representatives from Test Laboratory and Purchasing Office spent last week at the AMF plant reviewing the status of the Random Motion Simulator contract. AMF has done practically nothing on this job since last November, because of the money problem. The total job is about 60% complete, primarily fabrication and installation remaining to be done. It is very evident that the reason for the excessive costs and the schedule slippages has been their management of the job (the move from Stamford, Connecticut, to York, Pennsylvania, switching personnel on the job, moving the job from a "model type" shop at Stamford into a mass production shop at York where it had to compete with many major fixed price jobs taken over from the Navy).

Their whole management and control system at York is geared for production of hundreds-of-a-kind type work, and the motion simulator job is just not compatible. We are paying through the nose for a management system that only hurts our job.

In addition to confirming that management is the major problem, a detailed audit of some actual costs charged to the simulator contract was made. Many instances of gross overcharges were found in their structural fabrication shop (example: 148 hours charged for job estimated at 1.3 hours), and practically all their fabrication shop charges audited were three to four times greater than either their own or our estimate for the job.

The status of the job and our findings were discussed with the AMF management, including Bill Christmas, Vice President and General Manager, and Stan Hillman, Corporate Vice President at York (the man who talked to Mr. Webb).

Mr. Hillman agreed to set up a stronger project organization for the job, reporting directly to Bill Christmas, with the authority to bypass their production system, in order to get the job done, to assign the necessary priority to bring the schedule back to something with which we can live, and to audit their records to prevent overcharge to this contract. He will give us a new schedule by the end of the week.

The contract and their latest cost proposal were not discussed with their top management; however, based on the review of the situation last week, the only way MSFC can make them perform is by making them absorb much more than the $200,000.00 offered and either sign a fixed price contract to complete, or not negotiate with them on the overrun until the job is complete. We will discuss this with Mr. Gorman and Mr. Davis.

Despite this very unhappy situation, our only course of action to meet any schedule is to continue with AMF.

Answered 3/9/65

Harry Gorman

What do you think of a letter from me to the President of AMF, telling him of these difficulties and explaining to him that he is squarely on the critical path of our current funding program? Did we get final cost that Mr. Webb really told Mr. Hillman? B

attachment 2

ATTACHMENT TO NOTES 2/15/65 HEIMBURG (attached to Dr. von Braun's and Mr. Weidner's copies only)

B 2/21

1. ACTIVATION OF MTF:

Since no relief has been given in the S-II vehicle schedule, it has become evident that the first S-II Test Stand (B-2) in Mississippi is on the critical path. For that reason, I brought Gordon Artley on board who, since he left us four years ago, has acquired considerable experience in activating facilities very similar to those we have in Mississippi. Gordon started with enormous drive and push, and made it evident, very quickly, what was necessary and what needed to be done--fast! He succeeded in getting our contractors, Boeing, S&ID, and especially, GE, going, and in the right direction.

Eberhard

I know this has meanwhile been settled. Please send me copy of Activation group's charter. B

Gordon's status in our (Marshall) organization has not been officially expressed as yet to our contractors. I have tried, for many weeks, to get the activation organization established and approved by our top management.

This missing decision has: (1) caused our contractors to tread water; and (2) caused our employees to feel that we are in no hurry and have no sense of urgency. It has, therefore, resulted in an overall loss of enthusiasm and drive.

For about two weeks, we have lost unrecoverable time, day by day, because of this missing decision, and especially with GE. It is, hopefully, expected that a decision will be made this week.

2. QUALIFICATION OF PARTS FOR S-IC-T:

I have told you that Boeing is limping in qualifying parts and that we have a cost of about $1 million for the T-vehicle (design and hardware workarounds) to take care of unqualified parts if we intend to stick to the schedule. We are worse off in valves.

Mr. Fuhrmann has lost 11 people who were not replaced. In order to help out for a limited period of time (about 8 weeks), I have asked Mr. Weidner to get 3 people back to Fuhrmann from Industrial Operations. I have also talked to Mr. Hueter's office. Can you help to push this issue?

NOTE: If we no longer have the capability to quickly respond, as we did not too long ago, then it would appear that our schedules should be measured on the same scale.

Hermann Weidner

Request comment B

Attachment 1

ATTACHMENT TO NOTES 2/15/65 HEIMBURG (attached to Dr. von Braun's and Mr. Weidner's copies only)

S-IC Load Platform and Holddown Arms

The first and second phases of the structural tests on the S-IC load platform and holddown arms have been completed. Monitoring during tests and a quick analysis of data show that the system is ready for receiving the S-IC-T stage. After the stage is in the stand, structural tests on the stage itself will be made. Analysis of situations as they arose, review of design developments, and the structural tests have revealed and highlighted the following:

a. The design of the holddown arm attachments is not good. Heavy welds made on the relatively thin girder webs, coubled with loading across the weakest axis of the material have caused concern. (See sketches 1 and 2.) This has resulted in a re-evaluation of the situation at MTF and a redesign of the method of holddown arm attachment to be used there (sketch 3).

b. Out of tolerance fabrication has complicated the problem here at MSFC. In one position, the load transfer diaphragms (sketch 2) were located as much a 1-3/16 of an inch out of optimum position. This has resulted in high stress in some parts of the diaphragms. Immediate action is being taken to reinforce critical areas with added stiffeners.

c. To provide added safety for the holddown arm weld connection, tension rods are being added to the arms at MSFC. By proper pretensioning, a portion of the critical rebound load will be transferred from the weld, through the rods, to the top of the platform (sketch 1). The attachments at MTF will not require such modification.

d. Developments at the S-IC Stand here at MSFC have shown that we received poor welding in the fabrication of our load platform. All of this information is being used to re-evaluate MTF design and action has been initiated with the Mobile District Corps of Engineers to insure good quality control during fabrication there. Experience of various fabricators, steel company experts, consulting engineers, and our own people is being used to the fullest to assure ourselves that the same mistakes do not come up to plague us again.

K.H. Letter to President of Mahon? B

e. Attached are a few typical welding examples (glossy photographs) in the S-IC Test Stand load platform at MSFC. It is less than encouraging to note that the same company (Mahon) who fabricated the load platform at Huntsville will also fabricate the load platform at Mississippi.

f. Mr. Hellebrand, Mr. Kingsbury, and others from P&VE greatly assisted the Test Laboratory in evaluating the situation and arriving at a solution.

Attachment 3

NOTES 2/15/65 HOELZER B 2/21

1. EVALUATION OF LeRC AND MSC "PERT" SUMMARIZATION COMPUTER PROGRAMS: The MSFC Standing Committee on Scheduling Procedures has assigned MSFC Computation Laboratory, the task of pilot testing and evaluating the LeRC and MSC PERT summarization computer programs. This decision was made by the committee after agreement that the objective of OMSF is to have only one computer program for all network summarization. The testing and evaluation of the two systems is scheduled to begin March 1, 1965, which is the deadline for the transmission of the necessary information and specifications to MSFC. Headquarters Management Information Systems Division and OMSF will develop test criteria and coordinate with Field Centers (including LeRC).

2. AUTOMATION SUB-BOARD NO. 5:

A meeting of Automation Sub-Board No. 5 was held from 1:00 p.m. to 2:55 p.m., February 9, 1965. Purpose of the meeting was to discuss the Automation Sub-Board No. 5 "Launch/Checkout Data Processing Systems Configuration and Control Plan" and the task requirements solicited by letter from all Automation Sub-Board No. 5 members.

Jerry Mac.

FYI
B

Only one response (from Test Laboratory) was received from MSFC members prior to the meeting, although responses were requested by January 26, 1965.

It was again emphasized that no data systems planning can be effected without system requirements from the various laboratories, and members were enjoined to finalize the task requirements as soon as possible and submit them.

The January 1965 preliminary Automation Sub-Board No. 5 Plan was presented and discussed briefly. Comments on the plan were solicited prior to the next scheduled meeting, tentatively scheduled for some time in March.

NOTES 2/15/65 JAMES B 2/21

PEGASUS PROTOTYPE: The prototype is scheduled for shipment to GE on 2/16/65 with vibration testing to begin on or about 2/22/65.

PEGASUS RADIATION TESTING: FHC started testing this week at Ion Physics with a new sample panel in test chamber. These are to determine behavior of the panels over the entire energy range of the Van der Graaff machine and, because of facility cleanup, improved tests are expected. Dr. Bisplinghoff directed Langley to run tests with a 2 volt discrimination level but Langley met only 3.5 volt level with higher hit indications.

S-IV-8: At S-IV-8 Turnover (SACTO, 2/9) the stage appeared in better ship condition than previous stages and some items previously worked at ETR were partially completed at SACTO.

S-IVB BATTLESHIP: A 25 mph wind caused limited chilling to -220°F (-250°F required) but blowdown tests were successful. Some H2 from engine bleed ignited and caused damage but J-2 engine is OK. Polyurethane insulation on LH_2 prevalve burned but hardware was not damaged. Hydrogen pneumatic console "C" lost an access door and valves in a minor explosion; about 3 days were lost for repairs.

S-IVB INCENTIVE CONTRACT: Weekly meetings with DAC on incentive contract provisions are in progress. This activity is being carried on in parallel with major effort directed toward clearing up authorized but unnegotiated changes. Major areas of concern are: (1) Identification and treatment of apparent overrun; (2) Whether present contract definition is adequate for controlling contractor activities under incentive contract; (3) Ability to make changes without having to negotiate schedule delay for each change; and (4) Insuring completed and properly checked out stage capable of adequate performance while conforming to MSF guideline of placing major incentive on cost.

ESE DESIGN MISSION: MSFC/GE have reached general agreement on areas of mission with exception of fee. Contract package will be forwarded to Headquarters when Saturn IB/V systems specifications are finalized. GE should have specifications completed by March 1, 1965.

RCA 110A COMPUTER: Acoustic test computer system is being installed at Wyle Lab and acoustic test requirements reviewed. The 1st IB breadboard computer due 2/15. The local strike (pickets pulled off 2/12) caused about a week delay in pre-installation effort, and IBM IU checkout computer due this week.

SA-8 AND SA-10: At MSC's urgent request MSFC will attempt to incorporate instrumented RCS Quad on SA-8 and -10, providing certain work on SM by MSC at the Cape is agreed to by KSC.

SA-203 LH_2: (MRAZEK) Mr. Schurmeier, JPL, approved by phone use of Ranger test equipment, residual parts inventory and certain GSE at RCA, Heightstown, New Jersey and GSE at AMR.

IB SPEC TREE: (MRAZEK) Review of IB portion of spec family tree is in process this week, with 20 men allocated for 2 months (Part II CCSD contract) supporting this task.

NOTE TO DR. VON BRAUN ONLY, 2/15/65:

B 2/24

DAMAGE TO 70-INCH TANK, S-I-8 STAGE: On February 11, CCSD reported damage to 70-inch fuel tank number 2 on S-I-8. The damage consisted of a dent approximately 12 inches long and 10 inches wide, ranging in depth from 0 to .25 inch. Inside the dent there are two scrapes (gouges) where parent material has been removed. The larger of the two is approximately 2.3 inches long and 0.2 inch wide, ranging in depth from 0.010 to 0.013 inch. The parent material in this area is 0.056 inch thick. The damage is located 120 inches below the forward ring frame and appears to have been caused by a "lift-aloft" which is used to gain access to the booster. The booster is located at the east end of the building in final phases of preparation for shipment. A dye penetrant test and X-ray showed no crack. CCSD's plan, with our concurrence, was to "push-out" the dent, remove the sharp edges of the gouges, X-ray and zyglo to confirm that there is no crack and run pressure test. All these were successfully conducted. The final step is to analyze the adequacy of the remaining parent material. We plan to have the MSFC Structures people review before a final signoff is made, probably by February 16.

LDJ

Since this is CCSD's 300 #3, I think we should really make them use the coats. Has that been done?

B

Taken care of by Ed O'Connor's Special Note 2/15/65

B

NOTES 2-15-65 Koelle

B 2/21

1. SPACE PROGRAM OBJECTIVES: As you know, we have begun to develop a method which can help us to determine the relative worth of two space program plan alternatives. We measure these plans against the (expanded) space program objectives laid down in the National Aeronautics and Space Act of 1958. We have attempted to have these objectives weighted by an opinion poll of knowledgeable people. Half a year ago we conducted such an opinion poll among 70 senior people at MSFC. We have now completed an opinion poll among senior management people in the aerospace industry (8 corporations, 11 divisions) and, in addition, the American Astronautical Society, which has a strong representation of the scientific community. The total size of the sample is 676 people. By averaging the weights of these 10 groups, which are considered a representative cross-section, we have obtained the following "weighted list of objectives" within the National Space Program: (Of particular interest is the average weight resulting from the MSFC poll, as compared with the average total weight, both of which are shown.) Weights are given in percent of total.

OBJECTIVE	MSFC	Total	MSFC Deviation from Total in %
1. Demonstration of U.S. leadership	8.2	9.0	- 9
2. Develop commercial applications of space	8.0	10.3	-22
3. Increase knowledge about life and the universe	6.1	8.6	-29
4. Strengthen defense industry	6.1	7.4	-18
5. Provide incentive for improved education	5.9	4.9	+20
6. Strengthen international cooperation	5.8	4.7	+23
7. Stimulus of pride and performance	5.7	5.5	+ 4
8. Stimulus for investment and employment	5.6	4.3	+30
9. Demonstration of military space applications	5.5	7.9	-30
10. Increase knowledge about the Earth's atmosphere	5.3	5.0	+ 6
11. Strengthen educational facilities	5.2	3.4	+53
12. Strengthen general industrial base	4.9	3.7	+32
13. Provide manned space transportation systems	4.8	4.0	+20
14. Strengthen government competence in technology	4.3	2.8	+54
15. Provide means for arms control	4.0	4.8	-17
16. Provide rapid global transport system	4.0	2.7	+48
17. Stimulus for foreign trade	3.0	2.3	+30
18. Improvement of aeronatical systems	2.8	1.9	+48
19. Provide unmanned space transportation systems	2.6	2.9	-10
20. Exploitation of extraterrestrial resources	2.2	3.9	-44
	100.0%	100.0%	

I think there are reasons for these deviations, because we are primarily a "NASA Transportation Development Team." I also feel that the new enlarged sample produced more representative results.

If one attempts to group these weighted objectives into the prime benefit areas, one obtains the following area weights:

	MSFC	TOTAL
1. Economical Benefits	35.3%	35.2%
2. Political Benefits	18.3%	16.5%
3. Military Benefits	15.6%	20.0%
4. Scientific Benefits	16.6%	16.9%
5. Technological Benefits	14.2%	11.4%
	100.0%	100.0%

NOTES 2-15-65 KUERS

B 2/21

Report on S-IC-501: In our efforts to meet the Plan VII Recovery Schedule for 501, we try to assess and keep under control all possible problem areas. If we can detect areas of weakness or of undersupport early enough, then efforts can be concentrated immediately to avoid such problems of becoming critical. Two areas of great concern stand out on 501: the Thrust Structure and Parts Shortages for systems installation. Although this structure will now be officially bought off by MSFC and Boeing has met a PERT milestone with a delay of only 2 weeks, this acceptance will be only as of the design status of 12-22-64. A number of major changes (CAM's) have not yet been incorporated into this structure. This is a typical example of how easily a report on meeting a milestone can mislead management as to the actual schedule status. The alarming truth is that we cannot proceed with our operations as planned because the documentation and consequently the parts needed for the changes are not available yet. The same causes are found to underlay the parts shortages for the systems installation: lateness of change documentation. There is hardly a single operation that is not affected by change documentation. We have worked with Mr. Dunnigan and other Boeing liaison personnel all week to analyze the situation and determine corrective actions. Mr. Nelson and Mr. Wilkinson are fully aware of the documentation problems. Also, IO, Mr. Urlaub, is fully appraised of the situation. All this strongly indicates that closer control on design engineering and introduction of changes is needed, especially with respect to schedule impact analysis. With approval of the CAM's, MSFC has practically agreed to do 90% of the installation operations out of sequence, i.e., later. I do not believe that we can meet our schedule by standing still in the shop now and hope to do all the work at a later time. We work very closely together with all segments of The Boeing Company and all laboratories to minimize the schedule impact caused by late documentation for design changes.

I.O.

This is not a very rosy picture. Any comments?

B

NOTES 2/15/65 MAUS

B 2/21

1. SATURN/APOLLO DELIVERY, LAUNCH AND MISSION SCHEDULES - A new "Flight Mission Assignments Directive" is to be approved in Headquarters and forwarded to MSFC this week. As of last Friday, the new directive incorporated MSFC's comments submitted in answer to Gen. Phillips' proposal of January 2, 1965. The new directive will specify mission assignments thru SA-207 and SA-502 only, and will not include AES missions thru SA-212 and SA-515. However, a separate letter from Gen. Phillips will contain these missions for SA-208/503 and subsequent vehicles in broad terms; e.g., AES, IB/Centaur, etc.

   We have been informed by MSF that the Saturn I/IB/V delivery and launch schedules proposed by Gen. Phillips' letter of January 2, have been approved by Dr. Seamans. The launch schedule change has been incorporated into the level 1 SARP summary received last week. We are preparing a summary analysis of these new changes, and will furnish this to you later today. Since this is the first official slippage of Saturn IB and V delivery and launch dates since December 1963, there will obviously be an impact on contractual requirements and runout costs. ✓

2. AVERAGE GRADE AND AVERAGE SALARY CEILINGS - NASA Headquarters has recently made a small upward adjustment in the MSC and KSC average grade and salary ceilings. MSC and KSC were able to prove discrepancies in the data furnished Headquarters during a verbal telephone survey on December 1, 1964 and the official NASA submission. We have rechecked MSFC data, found similiar discrepancies, and are requesting headquarters to adjust MSFC ceilings accordingly. ✓

3. S-II MANPOWER AND ACTIVITY SURVEY - The Manpower Survey at S&ID was put to bed last week with the successful settlement of the contractor's requirements. The Manpower Survey was refined and used as a basis for settlement at approximately $51 M less than the original survey total. The detailed manpower data, while still containing some inconsistencies, was useful in providing a basis to review and adjust. Major reductions of approximately $20 M were also made in materials, and approximately $8 M in labor and burden rates. An FY65 contract cost budget of $204 M, including changes to February 1, was agreed to.

   A manpower ceiling of 7,200 was also agreed to; this is considerably less than the November peak of 8,100. We will continue to assist Col. Yarchin in: concluding agreement on the accounting system, revision to 533 Report format, and a system for improving the contractor's internal program budgeting.

   Chris Andressen informs me that the cooperation of all concerned was excellent. A letter is being prepared for Ed O'Connor to send to Gen. Phillips to report the completion of the survey. ✓

NOTES 2/15/65 Mc CARTNEY

B 2/21

1. Source Evaluation Board: Negotiations for the single support contracts are complete. The contracts for the laboratories and offices selected for negotiation are being placed in final form and should be transmitted to NASA Headquarters this week. The Source Evaluation Board has met and reviewed the results of negotiations on the laboratories and offices for which contractors were selected for competitive negotiations, and have completed their reevaluation. The reports of the Board and oral briefing charts are under preparation, with a dry run before Center Management scheduled for February 17 and presentations to Headquarters, Mr. Rieke and Mr. Webb, scheduled for March 3 and 4, respectively. The establishment of a uniform effective date for R&D Operations support contracts will be discussed with Mr. Gorman this week. ✓

2. Conflict of Interest Single Support Contracts: At the request of Mr. Wilbur Davis, this office participated in a joint effort with members of Purchasing and IO to establish a recommended Center policy on the subject item. MSFC's position, after proper staff coordination and approval, will be furnished NASA Headquarters by Mr. Cook with the final Source Evaluation Board presentation to Mr. Webb. ✓

3. Meeting with MSC Manpower Management Personnel: In support of the Executive Staff, this office participated in a meeting on February 9 with MSC manpower management representatives. At the meeting, MSFC's method for managing contractor manpower was reviewed in detail. The main control elements of the MSFC system were discussed, and the eight principal R&D Operations documents, comprising the system, were furnished MSC at their request. The MSC personnel seemed very favorably impressed with R&D Operations manpower management techniques. ✓

SPECIAL NOTE 2/15/65 O'CONNOR

B 2/21

DAMAGE TO FUEL TANK OF S-I-8

While at Michoud on Friday, February 12, I had a heart-to-heart talk with Doug Lowry. I requested a complete explanation of how the accident occurred and what action CCSD is taking so that we can be assured this sort of thing will not happen again.

The tank has been X-rayed and zygloed and is presently good as new as far as usability.

B 2/21

NOTES 2/15/65 RUDOLPH

1. Boeing Office Space Requirements in Support of Saturn V Breadboard Effort - The Boeing Company has evaluated the impact of the provisions by R&DO of only 2700 sq. ft. of office space in Bldg. 4472 for Boeing use in support of the Saturn V Breadboard (located in Bldg. 4708). In summary, Boeing has stated that use of the allocated space will require the location of approximately 30 people at the Boeing downtown facility and that an overall efficiency loss of greater than 20 percent will result due to the location of personnel at two separate sites remote from the Breadboard facility. This inefficiency resulting in increased program costs is unsatisfactory. Mr. Weidner is being requested to reconsider all possibilities for providing the required office space adjacent to the Breadboard facility.

2. Saturn V Display System - The first design review of the Saturn V Display System was held at the Sanders Plant in Nashua, N.H., on February 3-5, 1965. Sanders is forecasting approximately a one month slip from the contract date in delivery of the first Display System. In all probability, this slip will be reflected in deliveries of subsequent units. However, no impact on the program is anticipated at this time since the delay in display deliveries is compatible with the current RCA 110A delivery schedule.

NOTES-2-15-65-SHEPHERD B 2/21

Moffett Field Hangar. You may recall that the Moffett Field Hangar was obtained from the Navy by a use permit (10 years) for use by Lockheed in the performance of their work on the RIFT project. Since the termination of RIFT (December 1963), we have been concerned about the utilizationof the Hangar. Harry Finger had previously desired that the Hangar be retained until after he defined his FY-67 program. Presently, Lockheed is utilizing the Hangar for storage, launch simulator (Air Force/NASA Agena work), weld development for us, and insulation development for Lewis. All of our programs will be completed June 1965.

In a recent meeting in Washington, it was agreed between MSFC, OART, SNPO and Industrial Affairs that NASA would be canvassed for other users of the Hangar and, if this fails to develop a real requirement, then NASA would dispose of the Hangar by July 1965. As we have the operating agreement with the Navy, we are responsible for maintenance and proper utilization. No firm requirement can be identified within Marshall which would warrant continued ownership of the Hangar by us. Therefore, regardless of the outcome of the Industrial Affairs survey, our position should be to terminate the MSFC responsibility for the Hangar by July 1965. ✓

Labor Difficulty. On February 10, 1965, Local 477 of the International Association of Bridge and Structural Iron Workers placed pickets at Redstone Arsenal gates which effectively stopped construction activities at MSFC Huntsville. The union claimed "sub-standard working conditions" as the official reason for the action against Greenhut Construction Company on Contract 2885, Addition to the Transportation Hangar and Components Support Building. Greenhut does not operate a union shop and has been involved over the years in various actions by Labor resulting in work stoppages. The difficulty ceased on Feb. 12 when a Union/Contractor meeting resolved "working conditions" by the Contractor agreeing by handshake to pay the union iron worker rate and fringe benefits and hire union workers for Redstone Arsenal activity. ✓ This relates to current work and to two new MSFC contracts on which Greenhut is low bidder. Out of more than 700 construction type personnel on MSFC work last Tuesday, Feb. 9, only about 160 were working on Feb. 10, 40 on Feb. 11, and 100 on Feb. 12, the day the walkout ended. The work force is at normal levels today. Greenhut has contracts as follows: Contract 12073, Addition to Load Test Annex, Bldg. 4619; Contract 15001, Toilet and Locker Room, Bldg. 4619; Contract 2877, Ext. to Bldg. 4583, Comp. Test Facility; Contract 2885, Transportation Hangar & Addition to Bldg. 4653. Greenhut is low bidder on Contract 15025, Addition to Ground Support Test Facility and Contract 15024, Modification for Computer Area, Bldg. 4674. ✓

NOTES 2-15-65 Stuhlinger

B 2/24

1. PEGASUS DATA EVALUATION: Final plans for receiving, reducing, and analyzing "quick look" real time data from Pegasus A have been implemented by Dr. J. Dozier and his Evaluation group, supported by Computation Laboratory. Simulated data were transmitted from SATCON at KSC over LIEF lines to the Computation Laboratory. Operation of the complete system, including computer display, was entirely satisfactory. ✓

2. PEGASUS DETECTOR PANEL TESTING: Testing of detector panels in high velocity impact experiments, and in irradiation experiments, has continued at NAA, at the Arnold Engineering Development Center (Tullahoma), and at LaRC. These tests confirmed the assessment of the flight readiness of Pegasus A which I offered during the Pegasus Flight Readiness Review Meeting on Feb. 9. ✓

3. SURVEY OF SA-9 PAINT: The thermal control surfaces on the IU, the S-IV, and the SMA of SA-9 (white paint, type S-13) were radiometrically surveyed before and after washing. Their absorptive and emissive properties were found entirely satisfactory. ✓

4. AES SUPPORT FROM JPL: Two gentlemen from JPL, Mr. Hotz and Dr. Bollin, will help us in the evaluation of RFP'S from industry on our Lunar Drill and our Surface and Subsurface Probe studies. Dr. T. A. Clark, NBS, will probably be assigned to RPL during his military tour of duty. He will be a great asset in our planning for Radio Astronomy experiments in the AES package. ✓

5. HEADQUARTERS REVIEW OF MSF RESEARCH PROGRAMS: Dr. Kurzweg will review our research program at MSFC on March 23 and 24. RPL will be responsible for arranging the program. ✓

I would be in HSV on these dates B

6. CENTERWIDE ART/SRT PROGRAM STATUS:

	Annual Plan	Authorized	Processed To FMO	Obligated
OART Total	14,062,000	12,549,000	7,901,332	2,949,566
MSF	19,000,000	15,000,000	14,319,288	247,179
OSSA	827,000	827,000	424,385	1,008
OTDA	1,925,000	1,925,000	1,110,000	927,000
TOTAL	35,814,000	30,301,000	23,755,005	4,124,753

This status report shows only gross figures. If you would like to have more details, please advise. ✓

FEB 23, 1965

SHOW DIR
File
2-23 NOTE 2
3/5

DIR Dr. Wernher vonBraun

McCartney's comments on the trailers appear to be in conflict with Rudolph's -- not really --

MSFC use of trailers has been on the upswing and we put a stop-order on additional trailers several weeks ago. -- Bramlet came in last week with a "heart breaking" story of having no space for Boeing people in support of the breadboard. I have a suspicion that Quality had no incentive to make space available -- so I provided that incentive by asking for a phase out plan for all trailers regardless of where they are, as a condition of approval.

Actually the use of trailers, as you know, can be expensive and inefficient. It has been a growing practice to use the trailers as a matter of expediency, rather than facing up to the more difficult job of planning space utilization across the board disregarding "organizational sanctity".

File B3/6

DEP-A Gorman 3/2/65

NOTES 2-23-65 BELEW

B 2/25

J-2 ENGINE

Acceptance testing of flight engine J2016 is scheduled this week on VTS-2. This engine is scheduled for S-IVB.

S-IVB Battleship blowdown tests are presently being conducted at Sacramento with engine J2013.

Engin. J015 has been transferred from Delta-2A to VTS-3A to obtain comparison performance data between simulated altitude and sea level. Engine J015 has accumulated 5,770 seconds in 64 tests.

RL10 ENGINE

Concerning your questions relative to RL10 capability for Cislunar Pegasus midcourse corrections, the RL10 engine is capable of delivering impulse-bits as low as 100 lbs.-sec. in idle mode operation.

Centaur vehicle AC-5 (Programmed to hit a "paper" moon) will have temperature instrumentation on the RL10 engine turbopumps to determine what warm-up is encountered in the space coast period. If there is little heat input in space, the engine can relight in the idle mode to deliver small impulse-bits without a rechilldown.

Ernst Geissler
This should interest you. It may offer the feasibility of Fitzstaff type trajectories for Cislunar Pegasus on Sat IVB/Centaur
B

F-1 ENGINE

During main injector development testing on RETS test stand 2A-1, a LOX leak developed between the injector and dome, igniting and causing major damage to the thrust chamber, dome and injector. Structural damage to the test stand was light with down-time for repairs estimated at 2 to 3 weeks for position 2A-1, and 2 to 3 days for position 2A-2.

Gas generator injector LOX ring-to-land braze separation has occurred where there is close tolerance between the parts to be brazed and where powder braze material was used. In other areas where wire braze material was used or where there was greater tolerance, no separation of braze from parent metal has occurred. The ring-to-land tolerance has been increased and wire braze will be used starting with engine F-4017. Injectors from five S-IC-T stage engines were removed and returned to Rocketdyne for repair. Three spare injectors at MSFC have been installed in S-IC-T engines. One additional spare arrived on Friday. A repaired injector for the fifth S-IC-T engine is being obtained from Rocketdyne.

Past technical difficulties delayed the production of the heat exchanger and electrical interface panels for F-1 engines. In order to equip the five S-IC-T engines with these items prior to April 1, 1965, it will be necessary to ship several flight engines short of these components. This matter is currently being coordinated with the Test and ME Laboratories.

C-1 ENGINE

Negotiations for Phase I are scheduled for February 23-24 with STL and February 25-26 with RMD. Two of the four engines for the MSFC Qualification program have been received. The facilities have been checked out. Formal testing is scheduled to begin the second week of March 1965.

H-1 ENGINE

The pre-qualification phase of engine qualification is in progress. Environmental tests and twenty-two electrical and mechanical limits tests have been satisfactorily conducted. Procedure and test facility checkout will continue and formal qualification will begin March 1, 1965.

B 2/25

NOTES 2-23-65 CLINE

1. TAPCO BEGINS PRELIMINARY FLIGHT RATING TEST (PFRT) ON S-IVB AUXILIARY PROPULSION SYSTEM 150 LB. THRUST ENGINE: One engine was fired in a pulsing mode until four specification duty cycles (approximately 1230 sec.) were completed. A second engine was fired for ten seconds and then subjected to shock and vibration tests. During vibration the "valve package to injector bolts" backed out, the valve slipped and oxidizer tubes cracked. Analysis showed the bolts had damaged the injector heli-coil insert. This problem will be remedied by lock-wiring the bolts in place with a modified bolt chamfering procedure. ✓

2. S-II PNEUMATIC CHECKOUT CONSOLE: Space and Information Systems Division has forwarded portions of the test and support requirements for the ground support equipment (GSE) low bay pneumatic checkout console. Currently, the GSE console proposal of four pneumatic circuits (1,0-100 psig; 2,0-1000 psig; and 1,0-3500 psig) and one portable pneumatic regulator appears sufficient to meet all of the low and high bay requirements. However, the Kennedy Space Center has requested that the console design be changed for the addition of six to eight extra pneumatic circuits and suggested that 149 portable regulators be supplied by MSFC. It is felt that the additions to the GSE low bay equipment is excessive. We are preparing a memorandum stating that the initial design is sufficient.

F.C.

Suggest we get Gl. Yarchin into the act to settle the argument. The decisive criterion should be: "what is required to implement the MSFC-generated S-II test plan for Complex 39"

B

NOTES 2/23/65 CONSTAN

B 2/25

1. S-I/IB PROGRAM

S-1-8 - The damaged fuel tank, reported last week, has been reworked and the determination has been made by Material Review Board and MSFC engineering personnel that the reworked tank is acceptable. Inspection included dye penetrant and X-ray. Discussions with Doug Lowrey are continuing on damage preventative measures in light of the number of "damage incidents" which have occurred.

This stage will be shipped to the Cape on February 22, 1965.

S-1-10 - Post-static functional testing is about 70% complete.

S-IB-1 - Being prepared for shipment for static test.

S-IB-2 - In final shakedown prior to pre-static functional testing.

S-IB-3 - Clustering operation nearly complete.

2. S-IC PROGRAM

Electrical Cabling for 501 - This is a pacing item for assembly of 501. Continuing engineering release of mandatory changes by Boeing Engineering suggests that it may be recommended to do more fit up and length determination at assembly. We will perform some further study and coordination to insure a time saving before making a firm recommendation.

CAM Status - A review of Boeing generated Change Action Memo (CAM) status reports indicates that 95% of the engineering milestone dates are behind schedule. This is presently jeopardizing delivery schedules on 501 hardware and documentation. Some drastic "T-Bird" type action may be necessary in the near future.

I.O. (Ed O'Connor)

This SIC situation seems to be getting worse from one reporting period to the next. What special action do you plan to get on top of this thing? B

NOTES 2-23-65 DANNENBERG B 2/25

1. Panel Review Board Meeting on 2-18-65 - Chairmanship has been transferred from Dr. Mueller to General Phillips. Along with this transfer, Mr. Denicke has pulled out as Executive Secretary, and will concentrate entirely on the Experiments Board. No successor has been named yet.

A complete survey of all panel activities during the past year was given by Mr. Denicke (statistics) and Dr. Kuettner (technical achievements). Lists can be made available if you desire.

MSFC gave status of Repository (Interface Control Documentation). General Phillips requested completion of all Intercenter documentation for 201 and 501 by 7-1-65.

K.D. Request a concise 20-min briefing on this subject B

General Phillips indicated that he is thinking about merging the Apollo Joint Operations group meetings (under his chairmanship) with the Panel meetings. He also feels that an integration of Panel Structure, Systems Engineering, and Configuration Control is required.

In view of the approaching 201 flight, General Phillips requested presentations of the Flight Mechanics Panel and the Instrumentation Panel at the PRB meeting in April.

2. S-II Design Reviews - The schedule of design reviews for S-II subsystems has been stretched out because of late delivery of data packages from S&ID, and the fact that too many design reviews had been scheduled for the month of February (7). Three subsystems have already been reviewed and the system is so successful that Dr. Rees and Dr. Rudolph would like to extend it to all other stages. ✓

3. S-II Qualification Program - Representatives of IO and R&DO reviewed the progress on S-II Qual program. It was agreed that R-QUAL will compare present S&ID Qualification Program with that requested by R&DO. Net differences will then be negotiated in light of funding, schedule, and other requirements. ✓

B 2/25

NOTES 2-23-65 FORTUNE

1. Activation progress - The Corps of Engineers has joined our Activation Task Force, inviting the ATF to expand methods and objectives of previously established tests to be performed in conjunction with acceptance of Brick & Mortar. They have asked review of contractor's presentations regarding such tests and observation of actual testing procedures involved in Corps acceptance of facilities. As long as they, (the Corps), recognize their responsibilities for correction of construction defects, and work with us in labor interfaces where criteria or design may not have been complete, this is real good. Also, Bill Parker of S&ID gave indication of full support to the ATF last Friday, although he did not want to lead into contractual commitments until cleared with Yarkin and Hirsch, which was done late Friday. ✓

2. Your comment "I don't read you" - reference 2-1-65 Notes on our being able to staff to initial operational levels "within IO average limitations needing only the go-ahead" is symtomatic of MTO's dilemma, and illustrative of our communication problems. For months we have had six key technical positions which directly control operational capability in contention with the MSFC Personnel Office. We have not been able to transfer R&DO nominees for these positions or additional supporting personnel because of Personnel Office low grade classification. IO has concurred in our proposed grade structure and Gorman has indicated certain of our GS-15, 14, 13's seem immediately justifiable with others to be validated by Tabaka benchmark considerations. MTO can and will operate within a reasonable MSFC-wide or IO grade average but not substantially below it, as a step-child, which "I don't read" either.

Harry
Request your comments
B

answered 3/6/65 B

NOTES 2/23/65 GEISSLER

B 2/25

1. Saturn V-Direct Ascent Studies: As a follow-up to the studies on SA-501 (Notes 1/18/65 Geissler), the implications of flying the manned lunar missions without restart have been investigated. Based on existing operational control weight and propellant reserves, a payload of 95,000# can be delivered with daily launch windows in excess of 1/2 hour approximately 9 consecutive days each month, if only the flight safety constraints are imposed (see attachment #1). Payload could even be increased to 101,000# if daily launch windows of 1/2 hour on 6 consecutive days each month were acceptable (attachment #2). Further payload increases by 2 to 3000# are to be expected due to reduced propellant reserve requirements and other savings associated with direct ascent mode. Reduction in launch opportunities per year is drastic if all existing Apollo mission constraints are imposed. Number of days acceptable in 1969 will be reduced to about 20 - 25 % (attachment #3). This reduction will gradually get more severe in following years. In coordination meeting held between AERO, P&VE, and ASTR on Feb. 19, 1965, the following recommendations and conclusions were obtained. (a) The direct ascent mode will be considered only as a backup with the primary mode remaining as orbital restart of the S-IVB stage. (b) The SA-501 and SA-502 reentry missions can be flown with no serious flight mechanical or guidance equation problems using a direct ascent mode. There are no launch window restrictions associated with the 501 or 502 missions. (c) R-ASTR will look into the software problems which are associated with converting from the orbital restart mode to the direct ascent mode assuming a lead time of two (2) months. (d) With the direct ascent mode, lunar mission launch possibilities are limited to only six months out of the year. Daily launch windows are shortened from the present minimum of 2 1/2 hours to 1/2 to 1 1/2 hours. (e) Intensive studies will be undertaken to determine weight savings and performance improvements resulting from selection of direct ascent mode. (f) Investigation will be conducted to determine the possibility of extending hold times on propellants, as well as other critical operational equipment. ✓

2. SA-9: SA-9 Flight Evaluation (all Labs) is on schedule. Highlights of flight are (a) S-IV cutoff by guidance 8.3 sec early, reasons not known yet; (b) S-IV propellant residuals approximately 200 lb LH_2 (below critical design value) and 900 lb LOX; (c) Pegasus/S-IV roll rate after 24 hours was 9.8 deg/sec. This is above the specified 6 deg/sec, but it is estimated by -RP that Pegasus can stand about 14 deg/sec; (d) Retro rocket #1 on S-I malfunctioned without consequences to other systems; (e) New I.U. performed well; (f) first test of iterative guidance mode was successful; accuracy at insertion within 0.6 m/s in velocity amount and 1.3 m/s cross range velocity; (g) Orbital lifetime 1180 days. ✓

3. Guidance and Space Flight Theory Contracts: The 22nd Technical Meeting between contractors and our Astrodynamics & Guidance Theory Division was held Feb. 3 & 4, 1965. Agenda is attached. ✓

E.G. Couldn't give vent to present these findings at the next Management Council Meeting? After all, our Houston friends are spending lots of money to get their results data. Also, this is of great potential importance to PFS and deFiles work! B

P.S. I agree with the recommendation to consider direct ascent only as a backup mode. The additional constraints shown on attachment #3 make it indeed almost impossible to plan on cashing in on these payload gains at this time.

NOTES 2-23-65 GRAU

B 2/25

1. S-IU-10 INSTRUMENT UNIT CHECKOUT: Testing on the shielded cables (fabricated for IU-8) between the guidance signal processor, the guidance computer and DDAS for system compliance with EMI requirements have been completed. Results proved that these shielded cables corrected the radiation problems from the guidance system. Shielded cables have been ordered for IU-10. ✓

2. SATURN IB IU CHECKOUT: Remaining items affecting this Laboratory's beginning checkout on schedule are: definition and delivery of ESE, fabrication of cables for checkout complex (700-800 cables), and delivery of the RCA-110A computer (now scheduled for delivery 3-10-65). ✓

3. J-2 ENGINE PROGRAM: Requirements for acceptance test of the J-2 Engine at Rocketdyne were established at the beginning of 1964. Since that time, we have been unable to obtain a suitable acceptance test and inspection plan. The J-2 Engine Project Office arranged a meeting last week between Rocketdyne, Propulsion and Vehicle Engineering Laboratory and this Laboratory in which Rocketdyne agreed to perform all leak and functional testing required by Propulsion and Vehicle Engineering Laboratory and Quality and Reliability Assurance Laboratory, providing a two-week slip is allowed on the first J-2 flight engines. The S-IVB Stage Manager will attempt to absorb this slip by reducing engine receiving inspection by two weeks at DAC. It is also possible that some of the required tests could be performed at DAC should the two weeks not be provided Rocketdyne. In this case, the first J-2 flight engines for S-IVB would, of course, be delivered without the performance of an approved acceptance test. ✓

4. S-IC-S LOX TANK: The S-IC-S Lox tank was hydrostatically tested and no leaks were noted. ✓

5. SA-9 CRACKED SLEEVES: The mass change out of tubing, (from P&VE memorandum of December 18, 1963) installing the new heat treat type of sleeves was accomplished on S-1-9 January, 1964. At this time it was anticipated that the new thrust o.k. pressure switches would be available for installation prior to static test; therefore, tube assemblies 20M50414 and 20M50837 (part of the mass change) were not replaced since new tube assemblies would be required when the new thrust o.k. pressure switches would be installed. Revision "A" to Engineering Orders deleted the requirement to change from Frebank to Southwestern pressure switches was received on March 14, 1964, and release of S-1-9 by Test Laboratory was made April 8, 1964. By this time, emphasis was placed on official released engineering documentation rather than unofficial memorandums and the change out of the tube assemblies was not accomplished.

Dieter S.

I'm particularly interested in our learning the right lessons out of such occurances, lest similar oversights occur in the future, — and may not be caught in time. Suggest you review our procedures for possible "leaks" of this kind B

NOTES 2/23/65 HAEUSSERMANN

B 2/25

1. LAUNCH VEHICLE DIGITAL COMPUTER - DATA ADAPTER SCHEDULING: The R&DO team which visited IBM, Owego, was able to accomplish a great deal towards freeing a backlog of quality and inspection problems which were hampering production output. Excellent co-operation from the Quality Laboratory representatives was obtained in arriving at acceptable modification and repair procedures, waivers, and reinterpretations of quality specifications. The decisions made were immediately implemented after verbal go-ahead from I.O. Projects and Contracts Offices. The waivers granted resulted from reinterpretations as applied to the particular technology and will not reflect adversely on the quality of the end product.

The overall scheduling problems were reassessed. Conversion of early redundant machines to simplex advanced the schedule only one week and is not recommended. Since substantial advancement of presently promised delivery dates does not look promising, an alternate plan was derived which involves maintaining a prototype system at flight quality. Coupled with certain reallocations, this results in a simplex computer system being available for delivery to IU 201 on 6/10/65, subsequently to be replaced by the flight (redundant) system on 7/10/65, while the IU 201 is still in system checkout. However, this proposed solution does not provide hardware for 500 FS until 7/15/65. A backup plan which would allow flying the simplex system used in the early 201 checkout is being investigated. This system would require certain upgrading modifications before it could be considered for flight and would be employed only if further serious slippages occur.

NOTES 2/23/65 HEIMBURG

B 2/25

1. S-IC-T:

After a discussion with Messrs. Cline, Hellebrand, Paul, and McCool from P&VE, and Mr. Weidner and several people from Test, it was decided to mount all five engines on the S-IC-T right away. The time between 1, 3, and 5 engine firing can be reduced at least by about two weeks. ✓

2. F-1 ENGINE:

K.H.

F-1 Engine F-2005 was removed from the Static Test Tower West on 2/15/65, and F-2008 was installed on 2/16/65. ✓

Serious? Remedy? B

Test TWF-050 was conducted on 2/18/65, for a mainstage duration of 48.00 seconds. The fuel system oscillations that were discovered during testing of F-2005 were present during this test; engine performance was as expected.

Engine F-2008 was removed on 2/19/65, and delivered to R-TEST-SPT for storage until required for the S-IC-T. Engine F-2009 will be installed on 2/23/65, and tested on 2/26/65. ✓

3. S-IC TEST STAND:

The emergency fail-safe system of the deflector and the firex system were checked out on 2/20/65. The system operated satisfactorily. Modifications to the holddown arms will be started today, 2/23/65. ✓

4. S-IC WEIGHT SIMULATOR:

S-IC Weight Simulator was loaded aboard the MTO shuttle barge on Thursday, 2/18/65, and departed for New Orleans on 2/19/65. Estimated time of arrival at Michoud - 2/28/65. ✓

B 2/25

NOTES 2/23/65 HOELZER

1. PERSONNEL GRADE/SALARY EVALUATION:

At the request of Personnel Office, the Computation Laboratory has developed mathematical models to calculate the following:

a. Present average grade and salary.
b. Resultant average grade and salary for certain tentative decisions.
c. Required average hiring grade and salary to meet Headquarters guidelines.
d. Selected combination of grades which conform to hiring averages.

By Gosh!
B

An investigation is presently being made to evaluate the possibility of expressing the problem in a linear programming context. If it is determined that this is feasible, the computer will be able to calculate how many people in each grade could be hired and the averages not be adversely affected.

2. DESIGN REQUIREMENTS FOR FLIGHT DATA STORAGE AND RETRIEVAL SYSTEM:

Design requirements have been completed for the Flight Data Storage and Retrieval System. This computer system, based on the Data Center Concept, is being designed to the specifications of the Aero-Astrodynamics Laboratory. ✓

The purpose of this system is to provide analysis capability as well as specified data as requested. Areas of information cover such items as trajectories, propulsion, guidance control, and instrumentation. ✓

B 2/25

NOTES 2/23/65 JAMES

SA-9: SA-9 flight was successful in all respects. Shroud separation and Pegasus deployment were accomplished without any known problems. Spacecraft motion is about 9.0°/second in the roll axis only, calculation based on SATCON and R-COMP data. The spacecraft is operating as planned and all primary mission objectives were met during the launch and orbital injection phases.

PEGASUS: General Phillips has requested that Dr. Johnson and I come to Washington tomorrow to meet with him and OART and decide what is to be done on the Pegasus Prototype B & C. This will determine configuration, etc., at an early date so we can proceed to implement the decisions made.

SATURN IB SCHEDULES: As you know the new Flight Mission Assignment Document stretched out our schedules for SA-10 through SA-212. General Phillips has suggested that where we are in incentive negotiation, etc., we make the stretchout change to the contracts later. This is sensible but will be tricky to administer.

LEM ADAPTER PANEL DEPLOYMENT: (MRAZEK) Recent correspondence from MSC indicates they have agreed to the panel deployment angle of 45 + 5° from the vehicle centerline for all Saturn launch vehicles. This is in accordance with MSFC's recommendation to prevent I. U. antenna interference.

SATURN IB/V I. U. MISSION CONTRACT STATUS: The I. U. Mission contract negotiations were completed February 18, 1965. The contract is now scheduled for March 1, 1965 delivery to NASA Headquarters for review and approval.

S-IVB FACILITIES CHECKOUT STAGE: The stage arrived at SACTO the night of February 17 and was installed in Beta III Test Stand February 18. Checkout of the stage with automatic GSE was to start on or about March 19 with Propellant Loading Tests to follow. The stage will then be shipped to KSC for facilities checkouts.

S-IVB/IB AUXILIARY PROPULSION SYSTEM TEST PROGRAM: Leak and functional tests of the IB configuration ASP test module were completed at Gamma Complex on February 13. Hot firing of the test module is expected to begin February 24 with completion of IB configuration tests in June 1965.

RCA 110A COMPUTERS: The labor dispute which was reported last week was resolved before last weekend and thus did not impact our breadboard schedule. The S-IB breadboard machine was delivered to site last week and is presently being installed. The operational date for this computer is scheduled to be February 26, 1965. Acceptance testing on the IU C/O station computer was completed on February 18 and the system is presently being packaged for shipment. The operational date for this machine is scheduled for March 10, 1965.

NOTES 2-23-65 Koelle B 2/25

1. Saturn Improvement Studies for FY 1965: I reported to you last week our discussions with Ed Gray regarding FY 65 Saturn Improvement Studies. Subsequent to that meeting, we prepared for his concurrence general statements of objectives and resulting guidance for FY 65 studies, and a proposed breakout of FY 65 study funds, by vehicle or uprating concept. These were presented to Ed Gray and Les Fero on February 15 and 16 by L. Spears of my office and A. Orillion of P&VE. Mr. Gray devoted nearly a full day to discussion of Saturn improvement work, although he was very busy with the IB-Centaur project. There was complete agreement on general objectives; however, we have a little more work to do to reach specific agreements on funds for each configuration. The allocation preferred by MSF at this time reflects a strong concentration on vehicles, using Titan III type solid motors in combination with Saturn IB or Saturn V stages to provide payload capability in the 70 - 100K range. We have pushed for a little more attention to uprating of the basic Saturn IB and Saturn V vehicles as they now exist. The first week in March is our target date to reach compromises acceptable to both of us.

2. Uprated Saturn IB Study Review (FY 1964): This morning we had the final review of one of the IB improvement studies, conducted by Douglas. This was investigating the use of a short 260" solid rocket motor in connection with the S-IVB stage. This configuration is strongly favored by Max Faget, as you may remember. We have also asked Chrysler to give a 30-minute summary status report of their uprating studies on the IB, so that we can present a more rounded-out, overall picture to the audience. The final review of the Chrysler study is scheduled for late-March.

3. Center Planning Report: Within the structure and charter of our Future Projects Center Working Group (established by you in September 1964), we shall write a report which will summarize all pertinent data on this subject. This is essentially an updating and expansion of my January 1964 report (Title: On the Future of MSFC - A Study). This report will be prepared with the assistance of Mr. Williams, Mr. Evans (EX) and Mr. McCartney, thus getting a broader base than that of last year's report. I also will contact all Laboratory Directors on this subject, with detailed questions, in the near future. In this fashion we might obtain a consensus of opinion, but I expect that there will be minority reports because not everybody will agree. We hope to have a draft of this report ready for distribution by April 1.

Frank V. I'd like to discuss this with you, at your earliest convenience B

NOTES 2-23-65 KUERS

B 2/25

1. Visit to Boeing/Wichita: Last week I visited the Wichita plant together with Mr. Bud Coenen. The pipelines for S-IC structures are really filling up. Many components such as Gore Segments, Skins, Ring Frames and Hold Down Posts for Thrust Structure, etc., are being completed for flight #5. Once the first manufacturing problems have been solved and the design has become stable to a certain degree, industry can really produce these parts very efficiently. Work load charts for the whole plant were presented to us indicating that the Saturn total work for the presently authorized program is already running out for next year. It was also evident that the total load for AF, Saturn, and commercial work is rapidly decreasing for the beginning of next year. These charts look very similar to our ME load charts. ✓

2. Welding Problems at DAC: An excessive number of weld defects in S-IVB bulkhead welding were noted during recent weeks. Lack of fusion, burn-through, and weld cracks were found. Most serious is a weld crack which occurred in the T-Ring to Dome weld on the Aft Common Bulkhead for 205. This crack is about 4 inches long and extends completely through the material. It is the result of multiple repairs made on a new automated weld repair fixture. The potential use of 205 Aft Common Bulkhead is in doubt. DAC is presently investigating the feasibility of removing the bulkhead gore segment and T-ring containing the defect area. From our evaluation of the problems, we are led to believe that some small changes in the tooling or welding techniques, or possible change of personnel or laxity of supervision might have caused these defects. We also believe that the welding tooling and processes are basically sound. This is not a matter of lack of quality control but of learning, instructions and shop supervision. On request of Col. Hall, we are sending a welding engineer and one of our best welders from the shop next week to DAC. ✓

3. S-IC-501: The 5 big Tunnels for the Fuel Tank of 501 were delivered by Boeing with oversize in diameters (which are manufactured in one seamless piece by The Parsons Company, Travis City, Michigan, using the flow-turning process). Welding to the lower bulkhead fittings cannot be accomplished without correction. In order to avoid program impact, a major effort was started in making big sizing coils for magnetomotive reduction of the tunnel ends. ✓

NOTES 2/23/65 MAUS B 2/25

1. APOLLO COST STUDY - General Phillips has announced plans for the Cost Study on Saturn and Apollo spacecraft which has been initiated by Mr. Hilburn. The study is intended to provide a base for management decisions on Apollo extensions that are now pending and that will require actions in early spring. Scheduled completion date of the Cost Study is May 15, 1965. ✓

   The Apollo Cost Study is to be conducted in the same manner as the recent National Launch Vehicle Cost Study. Mr. Godfrey E. Barber, of Dee Wyatt's office, has been appointed Cost Study Project Director, and Mr. F. T. Rosenberg of MSF is Launch Vehicle (Saturn IB and Saturn V) Team Leader. Center representatives have not yet been selected. ✓

   A first meeting for briefing and discussion has been called by Mr. Barber for February 26-27 in Washington. Executive Staff has been asked to coordinate MSFC arrangements for this meeting. In addition to MSFC people, Mr. Barber requests that contractor representatives attend from Boeing, NAA, DAC, IBM, CCSD and Rocketdyne. ✓

2. CONGRESSIONAL MATTERS - The Subcommittee on Manned Space Flight (Teague) will hold hearings in Washington on March 3 and 4. On March 3, overall MSF activities and advanced missions will be discussed. On March 4, testimony will center on Gemini, Apollo, Administrative Operations and Construction of Facilities. Headquarters' people will make all presentations. Mr. Teague has reserved March 8 for overflow in case all subjects cannot be discussed on March 3-4. You may be asked to testify on March 8 but at the moment this is very doubtful.

   The Teague Subcommittee will not come to Huntsville either for hearings or tours. The Subcommittee's tour schedule now looks as follows:

February 25	-	McDonnell
March 5	-	MSC in Houston
March 12	-	Grumman
March 13	-	MIT
March 19	-	Douglas at Sacramento
March 20	-	Boeing at Seattle

   On February 17 we received the letter we had been expecting from Mr. Teague requesting certain data for inclusion in the Congressional Record as part of the FY-66 authorization hearings. This data, which has been under preparation for several weeks, is due in MSF on March 3.

NOTES 2-23-65 McCARTNEY B 2/27

1. SUPPORT CONTRACTOR MANAGEMENT DATA: In accordance with an agreement with Purchasing and Financial Management Office, this office is developing a format for collecting monthly report data from each single support contractor. These data include budget and manpower information to manage our single support contracts properly. The format will satisfy requirements for R&D Operations, Purchasing, and Financial Management Office and will be included in all single support contracts prior to implementation.

2. SUPPORT CONTRACT SCHEDULES: March 15 has been established as the date all R&D Operations single support contracts will be placed into effect. This should provide adequate time from the date of presentation to the Administrator, on March 4, to obtain procurement review and approval, by NASA Headquarters, of all contracts involved. Where necessary, current contracts will be extended beyond their current termination date to provide continuity of effort during the transition period. This period will vary from 30 to 60 days, depending upon the laboratory and the contractor selected. All current contracts should be completely phased out by the beginning of the fiscal year.

3. OFFICE TRAILERS: In accordance with a policy established by Mr. Gorman for the phase-out of all trailers in use at MSFC, R&D Operations has prepared a memo requesting each Laboratory to propose a phase-out plan for their respective organization. Upon receipt of this input from the Laboratories, an R&D Operations position and overall implementing schedule will be established with the Deputy Director, Administrative.

Harry -

Do you plan to use the trailers thus freed to accomodate Boeing? See NOTES Rudolph 2-23-65, par. 2.

B

Answered 3/1/65. B

B 2/27

NOTES 2/23/65 RUDOLPH

1. S-IC-501 - Reference: Notes 2/1/65 Kuers, Item 1; Notes 2/8/65 Constan, Item 3; Notes 2/15/65 Kuers, Item 1; see attachments #1, 2, 3. I am aware of the urgency of this situation. I believe that the corrective actions taken since February 1, 1965, (with inputs from the S-IC Quarterly Review on 27/28 January 1965 at Michoud) will relieve the problems encountered in the ME Lab and therefore recommend that your request for an S-IC problem briefing be deferred. Mr. Kuers is in agreement with this position. Should the situation not improve, I will recommend that Col O'Connor establish a briefing to you with the principals involved. A.R. O.K. B

2. Boeing "On-Arsenal" Office Space Requirements - Reference: Notes 2/15/65 Rudolph, Item 1; see attachment #4. The total Boeing "On-Arsenal" office space requirements in support of Saturn V activities were reviewed with Mr. Gorman on February 15, 1965: the critical situation, including the total overflow requirements, was presented by Mr. Cooke of R&DO. A decision was made to utilize trailers to accommodate overflow requirements. Trailers will be located adjacent to the Saturn V Breadboard Facility for use by Boeing in support of the Saturn V Breadboard effort. Noted 3/1/65

3. MSFC Presentation to Presidential Scientific Advisory Committee (PSAC) - A Working Session has been scheduled for March 3, 1965, to prepare for the MSFC presentation to the Space Technology Panel of the PSAC scheduled for Thursday, March 25, 1965. A dry run presentation to MSFC Management is scheduled for Thursday, March 18, 1965.

4. S-II Stage All-Systems Stage - Final assembly operations (weld cylinder #3 to #4) on the All-Systems Stage was started on February 13, 1965, at Seal Beach.

5. Instrument Unit - Mission Contract Status with IBM - The Instrument Unit Mission Contract negotiations have been completed as of February 18, 1965. The contract is now scheduled for delivery on March 1, 1965, to NASA Headquarters for review and approval.

Attachments:
1. Notes 2/1/65 Kuers
2. Notes 2/8/65 Constan
3. Notes 2/15/65 Kuers
4. Notes 2/15/65 Rudolph

(DIR, I-DIR, and R-DIR's copy only)

NOTES - 2-23-65 - SHEPHERD

B 2/27

No Notes

B 2/27

NOTES 2-23-65 Stuhlinger

1. PEGASUS A EVALUATION: After some initial inconsistencies in the telemetered data were resolved, Pegasus is giving now very satisfactory readouts from both the beacon telemeter and the memory readout telemeter. Temperature measurements are being evaluated; most temperatures are within the expected ranges. Radiation intensity measurements indicate the well-known South African anomaly in the Van Allen Belt. Attitude signals indicate a motion which was a pure roll of 9.5° Sec $^{-1}$ around the longitudinal axis on February 18; it is now a precession motion with about 8.5° Sec $^{-1}$ roll. Meteoroid hits from all three panel groups were registered. Their verification and analysis will take some time because of the statistical nature of some of the factors which are needed for hit signal validation.

In general, all systems seem to work properly.

RPL will publish a Pegasus Bulletin approximately once per week.

2. GREEN MOUNTAIN STATION: Our Green Mountain Station, operated by Astrionics Laboratory (H. Haeussermann, O. Hoberg, T. Barr, W. Eden) proved invaluable during the first week of Pegasus operation. Without this station, we would not have a memory readout at MSFC as yet. If commands should become necessary after something has malfunctioned on the Satellite, fast response would not be possible without this station because the Stadan Network furnishes us memory readout tapes only days or weeks after they were recorded.

3. AES STUDIES: Of the nine study tasks in the lunar scientific mission program whose work statement preparation has been assigned to RPL, six were approved by OMSF and OSSA; approval of the remaining three task work statements is pending. Both OMSF and OSSA indicated that RPL should expect substantially larger funding in FY 1966 for continuation of our scientific mission study work.

4. RESEARCH ACHIEVEMENTS REVIEW: The first Research Achievements Review will take place, as planned, at 13:30 in the Morris Auditorium on February 25. We hope that you will find it possible to attend.

E.S. Sorry I couldn't. Can I have a "capsule repeat"?

B