June 1, 1965

B6/7 Log

NOTES 6-1-65 BALCH

1. Construction - Progress on the accelerated portions of work continues to be excellent. With few minor exceptions, the requested completion date for brick and mortar are being met by the construction contractor. T-1 Steel piping continues to move slowly. The rate of progress is now limited by the shop fabrication of T-1 fittings. A "Tiger Team" is directing its efforts toward this bottleneck. ✓

2. Contracts - The policy decision from NASA Headquarters which would reverse our plan to contract directly for additional cryogenic cleaning and valve installations has cost approximately 10 days of time. The delay was further compounded by G. E. s hesitancy to move once they had been informed that the work would be handled through them by a subcontractor. It was reported that G. E. preferred to add this work to their subcontract for Repairs and Alterations (Allied - Webb). On our urging, G. E. has begun negotiations with Glantz on the contract package which we had developed. I see nothing wrong with the headquarters policy regarding G. E. 's role in these activities. It is unfortunate that the policy was not available before the fact instead of after. We had committed ourselves to a different course of action. ✓

3. Management Review - On May 28, five major points were discussed with Colonel O'Connor, Mr. Gorman, Dr. Rudolph, Colonel Yarchin and others:

a. Organization and management concept - accepted in principle pending resolution of detailed organization and of working relationship with Sat V stage manager. ✓

b. Completion of the 2nd S-IC test position - referred by I-DIR for a program decision regarding the scheduled use for the position. ✓

c. Relationship with Mobile District, Corps of Engineers, resolved by designation of the site manager as the authority for dealings with the Mobile District Engineer. ✓

d. Limitations of G. E. total manpower - Colonel O'Connor authorized the site manager to approve increases above 1231 in increments of 100 when justified in specific areas. The limit of such allowable increases is 1487 and negotiation of the FY-66 contract supplement should be completed prior to G. E. s reaching the strength of 1487. ✓

e. Nature and status of G. E. /MTSO contract negotiations - Colonel O'Connor approved the principle of extending the current G. E. contract on a monthly basis pending preparation and negotiations of a statement of work which more properly represents the services which the Government desires during activation of the site. ✓

NOTES 6-1-65 BELEW

S-IVB ULLAGE ENGINES - ROCKETDYNE/GEMINI A technical meeting between MSFC, RKDNE, MAC and DAC was held on May 25. The primary purpose of the meeting was to establish the corrective action to be taken prior to starting the formal MSFC Qual vibration and shock testing.

After considerable discussion, it was agreed that Rocketdyne would modify one engine to effect a reduction in stress concentration at the trunnion and nozzle exit flange areas of the metal shell. This modification will be performed on the third MSFC Qual engine that has successfully completed four mission duty cycles (2600 seconds total burn time). After modification the engine will be returned to MSFC for vibration testing. If successful, the fourth MSFC Qual engine would be modified for the formal program.

Parallel with the Rocketdyne effort, DAC is to review the production module design to determine if changes in the module structure can be made to minimize the module amplification factor.

F-1 ENGINE A major milestone was accomplished with the successful completion of negotiations for conversion of the F-1 R&D contract from CPFF to CPIF. Overall, the conversion negotiations went smoothly and the settlement is considered very fair.

Engine F-4017 (first flight engine for S-IC-2) has experienced a series of between-tube leaks in the thrust chamber during acceptance testing at RETS, EAFB. Decision has been reached to replace the thrust chamber. Engine delivery will slip from mid June 1965 to late July 1965. It appears that Qual and ME Labs can, by work arounds, prevent any impact on S-IC-2 stage.

Engine F-3016 (completes S-IC-1 flight set) arrived at MSFC May 25.

RL10 ENGINE Douglas is investigating the possibility of using RL10 "vernier" engines starting in the "low-idle" mode and running at 10% thrust as a back-up or follow-on for ullage control, de-orbiting, vector control, and tank pressurization for the S-IV-B Stage. H_2 would be bled from the engine for H_2 tank pressurization.

J-2 ENGINE The first FRT engine, J2022, has completed hot fire acceptance testing and is presently undergoing post-test electrical and mechanical checkout. Initiation of FRT is presently scheduled for June 9.

Engine J-2021, the fourth S-II All Systems engine, was delivered to S&ID on May 27.

Formal negotiations with Rocketdyne for the incentive conversion of the J-2 production contract were completed a week ago. However, Dr. Mueller's incentive conversion team has some questions regarding the "hot test" risk clause and our target cost and fee. We have been in contact with Roy Seccomb on these items and hope to have them resolved this week.

GENERAL Reference Dr. Geissler's Note #3, May 17, regarding engine uprating analyses. I realize the impact on Aero's workload brought about by changes in engine performance numbers. To keep these changes at a minimum, we are working with the IO vehicle offices and R&DO to establish a procedure that will insure adequate coordination within Marshall before any engine performance numbers are published.

Lee I would very much like to have a thorough briefing on the entire APU complex; Small engines and their problems for Sat IB and V. Tanks, bladders, pressurization, fill & drain, Include Qual testing, HSV test program, etc. Please organize thru Bonnie. Suggest 1½ hr total

Tw 6/7

NOTES 6-1-65 CLINE

B 6/7

NEGATIVE REPORT

NOTES 6/1/65 CONSTAN

S-I/IB

Status of S-I-10 - Was shipped from Michoud Operations to KSC on May 26, 1965.

Engine Damage - A letter was transmitted to Mr. Doug Lowrey requesting full report regarding damage to H-1 Engine on the S-IB-2 Stage.

Fwd

B 617

NOTES 6-1-65 DANNENBERG

1. Experiment Evaluation by Bellcomm - In accordance with present practice, MSFC has to submit the experiments proposed in the last MSFEB meeting to Bellcomm for an independent evaluation. In compliance with this, we have given background material to Dr. Pearse, Bellcomm.

2. POGO Instabilities Measurements - IO and R&DO representatives discussed on 5-25-65 the measurement requirements and how to implement them on the Saturn V vehicles. It was agreed to add the recommended measurements on 502 and 503.

3. Hydraulic Actuator System Review - Review of the systems by Dr. Rees on 5-28-65 revealed: (a) All stages appear to be in a satisfactory state of progress; (b) Improvement is needed in qualification testing and in backup solutions; (c) S-II testing at the systems level needs improvement; (d) S-II and S-IVB component and systems tests scheduled for MSFC performance will be funded by IO to R-P&VE; (e) The auxiliary motor pump for S-IVB does not have a qualified motor. R-ASTR and R-P&VE will prepare a program to develop a backup motor for the S-IVB auxiliary motor-pump that can be qualified to the required level of performance.

4. Incentive Arrangement for Boeing Contract - The 5-25-65 organizational meeting of the task team formed to develop an Incentive Arrangement for Schedule I of Contract NAS8-5608 with the Boeing Co. assigned action to handle the definition of specific incentive criteria in following areas: (a) Schedule - IO; (b) Cost - IO; (c) Technical Performance - IO/R&DO.

5. S-II Quarterly Review 5-25/26-65 - Some salient points presented in the meeting were as follows: (a) S-II-T and S-II-1 are on schedule; (b) The common bulkhead test tank is moving to Santa Susana for 3 months of testing starting 6-30-65; (c) S-II-1 weight status is presently out of control, but prospects are bright for weight reduction; (d) Problem of making interface changes at MTF was raised by S&ID and referred to a high level committee. It seems there is no procedure for changing S&ID delivered equipment at the MTF test stand site.

6. S-II Stage GFE - Representatives of IO, MTO, MILA, and R&DO will meet on 6-4-65 to discuss method for insuring timely procurement and delivery of GFE to MILA and MTO.

7. Configuration Management - Engineering Bulletin 33 has been approved by R-DIR. This bulletin provides a standard procedure for referencing the IU Configuration Control Board Directive (CCBD) authorizing release of DRLs, EPLs, and EOs applicable to SA 201 and subsequent vehicles.

8. Crew Safety - In reference to the presentation given you last Thursday, you will receive a short summary of the explosion situation (1 page) which may be useful for possible discussion with Mueller/Phillips on this subject.

NOTES 6-1-65 GRAU

1. PEGASUS PROGRAM: The Electronic Canister for Pegasus C has completed testing at Bladensburg and was shipped to Hagerstown May 26, 1965. Installation into the structural portion of the Spacecraft is underway. Checkout of the complete Pegasus C Spacecraft is scheduled to begin at Hagerstown this week.

2. SATURN IB/V ESE: Equipment delivery has increased at the depot. Due to heavy schedule pressure, some equipment is being routed to the checkout areas in an incomplete condition. This compounds the effort required of this Laboratory to keep records straight and insure quality hardware. The best estimate on the availability of ESE for IU 201 checkout at IBM is now July 1, 1965.

3. S-I-10 CHECKOUT: Michoud Operations, CCSD has rechecked and/or retested all components and systems possible prior to final preparation for shipment. These areas include Helicon connectors, distributors, J-boxes, cabling and piping. This retesting was necessary because of the numerous modifications and personnel traffic on the stage since final checkout. A large volume of discrepancies of the type found on S-1-8 at KSC should be eliminated. The stage was shipped to KSC May 26, 1965.

Fw 6/1

B 6/7

NOTES 6/1/65 HAEUSSERMANN

1. IBM STATUS REPORT: Mr. Cooper advised today that all delivery commitments are on schedule as reported in 5/24 notes. No further impact problems are anticipated.

2. SA-8 Guidance Accuracy: According to best available data at this time, the injection velocity on SA-8 was approximately 0.9 m/s lower than desired. This velocity error resulted in an orbit apogee which is 3.5 km low. By considering the known error characteristics of the SA-8 stabilized platform, however, the actual injection velocity and apogee altitude were predicted within approximately 0.15 m/s and 1 km, respectively. It appears, therefore, that a substantial portion of the orbit inaccuracy could have been prevented by considering the characteristics of the particular platform in deriving the flight computer presetting. This possibility is being further analyzed for possible application on future flights.

NOTES 6/1/65 HEIMBURG

B 6/7

1. F-1 ENGINE STTW:

Two tests (TWF-056 and TWF-057) were conducted on May 26, 1965 and May 27, 1965 respectively. TWF-056 was a 35 seconds calibration test which became a requirement due to the gas generator injector change.

TWF-057 was a 95 seconds high LOX pump inlet pressure performance test.

2. S-IC:

The S-IC-T fuel tank was entered for the purpose of making repairs to the slosh probes. The on-board fuel and LOX tank pressurizing systems will not be active for test S-IC-07 due to the lack of qualified hardware. The next test is scheduled for June 3, 1965 for 90 seconds of mainstage.

3. S-II BATTLESHIP:

Preparations are on schedule for the 25-seconds firing planned for June 3, 1965. The water spray heat shield is not installed and will not be used for this test.

4. S-IVB:

Electrical power was applied to the stage this week and checkout in progress for a July 8, 1965 firing.

Two 1

B 6/7

NOTES 6-1-65- HOELZER

1. ADP WORKLOAD CONTROL SYSTEM: Headquarters has been unable to meet the schedule established for the design of a computer costing and control system. Mr. Costantino, OMSF, has informed this Laboratory that no detailed procedures or guidelines will be furnished because of the varying requirements of each Center. He further stated that the Computation Laboratory should develop and implement its own proposed method of control. No difficulty is foreseen in accomplishing this by July 1, 1965.

2. ADP RESOURCES SHARING:

The General Services Administration Regulation Number A-1 establishes an ADP Resources Sharing Program among the Government agencies.

Mr. E. D. Dancy, Manager of GSA Resources Sharing Region 4 in Atlanta, Georgia, visited with the Computation Laboratory last week for discussions of reporting system, briefing of our operations and a tour of our facilities.

Reports of our GOCO facilities (Slidell) have been submitted. An inventory of facilities and reports of our equipment sharing activities will be reported according to the plan.

3. DECENTRALIZED EQUIPMENT STUDY: Computation Laboratory has received final report on a study contract with Booz-Allen Applied Research, Inc. This study, titled, "Design Criteria for Remote Data Acquisition", is quite broad and includes all known remote scientific data sources and decentralized computing facilities. The results of this study will be a great aid to the laboratory in the establishment of a more efficient centralized facility.

fw 6/1

NOTES 6/1/65 JAMES B 6/7

S-I-10: A meeting was held last week at KSC to review the documentation and configuration status of S-I-10. All the UCR's that were written against the S-I-8 stage were reviewed against S-I-10. All corrective actions which were required on S-I-10 have been accomplished. The stage is expected to be off-loaded at KSC today. ✓

SIVB-201: Installation of parts which were short at the time of shipping continues on the stage at SACTO. Some few non-flight stage components may have to be used during static firing and replaced by flight components later. Check out continues and "power on" was applied Saturday. ✓

IU-201: The GE ESE still appears to be the pacing item in the delivery of 201 to the Cape. We have been trying to target in on a delivery date within the late September to early October spectrum. With the delivery date of the ESE to IBM predicted for late June, the October IU delivery date is indicated. We are continuing to review the actual IU check out plans and schedule. R-QUAL has a problem due to personnel shortages with respect to working the IU check out as a two-shift operation and continue, simultaneously, work on IU-500 FS. ✓

II fw Pegasus B: On Friday a problem developed with the Pegasus B communication system involving the loss of PAM information on the beacon transmitter. Over the weekend it was determined to be an onboard failure. The beacon system was shut off for approximately 24 hours and turned on again Saturday afternoon. We recovered the total communication system for approximately one orbit and then lost PCM. Of the redundant systems PCM provides the least information and is the least painful of the two systems to have out. All other systems appear to be operating satisfactorily. We are still investigating ways of possible recovery of the PCM system. ✓

Large Guppy Aircraft: We are working with R-P&VE and Douglas to provide a flight type SIVB stage in the time frame of mid-August to use for a qualification flight of the Large Guppy. There is some concern for the effect of vibration on the SIVB insulation. It appears that within the present program schedules that either the facility stage or possibly SIVB-202 might be used for this purpose.

LBJ

→ I asked Jack Brownlee about this and he was not aware of any such concern

B

fw 6/1

NOTES 6-1-65 Koelle

B 6/7

No NOTES this week.

NOTES 6-1-65 KUERS

1. Manufacturing Milestone for S-IC-502: The close-out weld including T-stiffener welding for the fuel container for 502 has been completed on schedule. This is the fifth and last fuel container ~~we are~~ fabricated ~~here~~ at MSFC for the S-IC program. The Lox container for 502 is well under way.

2. S-IC Change Statistics: The following is a listing showing totals of certain categories of EO's released through May 21, 1965:

CCA Category of EO	Released this Report Period	Previously Released	TOTAL
5001 (Paper Change)	208	10483	10691
5002 (Hardware Change)	417	25880	26297
5003 (Instrumentation)	0	4	4
5004 (GSE)	607	14205	14812
5005 (MSFC Issued)	0	242	242
Other (CAM Generated)	578	21976	22554
	1810	72990	74600

3. Facilities Program Status:

a. Our new big assembly hangar, the "Multipurpose Vehicle Technology Facility" is now progressing very well after some hold-ups because of late steel and crane deliveries. We hope for one bay to be complete for joint occupancy by July 19, 1965. Our plan is then to make the final assembly of 501 in this building. Advantages: Overhead cranes can be used for assembly and complete environmental control can be utilized. This facility had been funded and justified for support of the S-IC program.

b. Conversion of 4707 into a facility for bonded structures has been started. The foundation for the new big autoclave (18 feet diameter and 57 feet long) is 50% complete. Erection of the autoclave will start in June. This facility modification is for support of the S-IB/Centaur project and is on schedule.

4. Insulation of Command Module and Escape Tower for SA-10: ME Laboratory is engaged in bonding a cork insulation on the entire outer surface of the boiler plate Command Module for SA-10 and also in applying a rubber insulation to the Escape Tower. This work had been delayed because of lack of information, specifications and material from NAA. For several weeks we are working 2 shifts, 7 days a week, on this job which is now nearing completion.

NOTES 6/1/65 MAUS

1. MSC EXPERIMENTS PROGRAM OFFICE - In last week's NOTES (5/24/65) I discussed the MSC proposal to Dr. Mueller for establishment of an Experiments Program Office. General Bogart in a letter received by datafax last Friday, May 28, has requested your and Dr. Debus' opinion on this proposed reorganization. Specific questions asked include:

   - If the MSC organization changes are approved, will there be any significant changes required in this Center's management, manpower, or facilities?

   - Will there be an increased requirement to provide coordination between the centers on experiments programs?

   - Do we see a need for similar organization change, or would we recommend a different approach to the problem?

   General Bogart requests preliminary comments by June 8. We will coordinate the development of an MSFC position and arrange for a discussion with you prior to June 8.

2. APOLLO COST STUDY - Per your request on my 5/24/65 NOTES (copy attached), we have arranged an appointment to discuss the Apollo Cost Study with you, June 2, 3:30 p.m.

3. DOD CONTRACT ADMINISTRATION SERVICE SUPPORT - Mr. Gorman has appointed Mr. Chauncey W. Huth as focal point of contact at Marshall on all matters relating to DOD Contract Administration Services, (Project 60); General Bogart has been notified by letter.

4. WEBB VISIT TO ALABAMA - Mr. Webb has requested that Ray Kline come to NASA Headquarters on June 7 and 8 to assist in preparing Mr. Webb for his visit to Huntsville on June 8.

5. APPOINTMENT OF DEPUTY DIRECTOR - I have appointed Mr. J. N. Foster to the position of Deputy Director, Executive Staff, during the extended temporary duty of Mr. C. E. Andressen on the MTF Task Force.

Jun 6/1

B 6/7

NOTES 6-1-65 McCARTNEY

1. MEETING WITH DR. MUELLER: In preparation for your coming meeting with Dr. Mueller, a manpower analysis is being developed based on total R&D Operations' manpower requirements. These include both present programs and new starts and will also consider skills distribution. This study is now in draft form. After approval by Mr. Weidner and Mr. Maus, it will be submitted to you in time for your meeting.

2. STATUS OF R&D OPERATIONS TRAVEL FUNDS: Listed below is the status of R&D Operations FY-65 travel funds. The laboratories are performing maximum control and scrutiny of all travel requests. Lateral distribution of funds among the laboratories is being effected by this office in conjunction with Financial Management Office. Even with all possible controls being applied, it is quite possible that, during the last two weeks of June, the entire R&D Operations force will be present for duty at MSFC.

Laboratory/Office	Uncommitted Balance, Week ending 5/14/65	Uncommitted Balance, Week ending 5/28/65	Unobligated Commitments in Blanket Orders, 5/21/65
R&D Operations	8,626.42	8,183.87	3,614.82
Future Projects	2,261.03	1,927.13	
Research Projects	773.54	444.33	
ME	10,069.95	6,901.02	
ASTR	10,187.62	4,892.76	
P&VE	12,111.90	5,958.48	5,251.62
QUAL	8,028.63	2,434.46	1,493.00
COMP	4,827.15	4.676.36	
AERO	7,699.05	7,514.03	942.00
TEST	-11,022.00	-15,729.74	60,339.88*
TOTAL	43,493.34	27,202.70	71,461.32

* Test Laboratory has initiated action to transfer blanket travel order funds to eliminate their deficit in general travel money.

3. CONTRACTUAL OVERRUN COSTS: Recently, one of our contractors exceeded contract requirements without advising the Contracting Officer or receiving his approval. The contractor submitted a request for substantial overrun cost. To prevent payment of unwarranted costs resulting from such overruns, the laboratory Contracting Officer Representatives will recommend, in writing, that portion of the additional costs which should be paid. The specific overrun situation referred to above is being examined - at our request - by Mr. Buckner's office.

NOTES 6/1/65 RUDOLPH

1. S-IC-2 Stage Status - The Fuel Tank close out weld has been completed on schedule. The LOX Tank polar cap is being welded into the lower bulkhead six weeks behind schedule. No program impact is expected at this time.

2. S-II All Systems Stage Status - Structural buildup of the stage was completed by circumferential welding of cylinder #2 to #3 on May 26, 1965. High pressure pneumatic testing of LH_2 and LOX tanks was completed on May 27, 1965. The stage has been transferred to Station II of the Vertical Assembly Building for systems installation. The third J-2 engine has been received.

3. S-II Common Bulkhead Test Tank (CBTT) Status - Manufacturing was completed on May 26, 1965. Expected arrival of the CBTT at Santa Susanna for testing is June 3, 1965.

4. S-IVB Battleship Stage Status - Installation of J-2 engine #2020 continues as scheduled at the Sacramento Test Site. First firing is scheduled for June 17, 1965. No problems are foreseen in meeting this date.

5. S-IVB/V-1 Stage Status - Tank structural fabrication is proceeding on schedule, with tile fitting in process in the insulation chamber at Huntington Beach. Structural fabrication of the forward and aft skirts appears to be falling behind schedule. This problem is currently being evaluated.

6. IBM - Huntsville - Quarterly Review Meeting - Main emphasis was placed on Saturn IB-201 status. The Saturn V-501 schedule has the RCA-110A and GSE delivery as critical and pacing items.

7. SA-501 Payload - MSC has cancelled the LEM Flight Test Article #1 (FTA-1). The Flight Mechanics Panel and Mechanical Panel are presently evaluating the hardware required to replace FTA-1. FTA-1 is basically a full LEM structure and configuration. The hardware required to replace FTA-1 will have to simulate structural weight and responses and not necessarily configuration.

8. Saturn V Program Review - Our regular monthly Saturn V Program Review is scheduled for today (Monday, June 1) and Thursday (June 3). General Phillips and Colonel Seccomb from NASA Headquarters will attend the Review today (Monday, June 1).

9. Operations Support Requirements Office (OSRO) Representative - Mr. Arthur D. Rowan, Chief, Saturn V Flight Operations Office (I-V-F), will be at NASA Headquarters for approximately four weeks in an interim assignment as MSFC OSRO representative. Recruitment is currently underway for a permanent MSFC OSRO representative.

NOTES 6/1/65 Stuhlinger

1. PEGASUS A: The 1.5 mil panels continue to work properly. It seems now that it will be possible to derive directional effects of the meteoroid flux from the 1.5 mil data.

2. PEGASUS B: After a few days of excellent operation, difficulties arose in the beacon transmitting system. As a result of the attempts to analyze and remedy this situation, some memory readouts were lost. At the present time, the situation is as follows:

Beacon PAM: normal operation (housekeeping data)
Beacon PCM: operation discontinued (hit register)
Memory readout: Operation is again normal

The roll rate of Pegasus B is now about 7 degrees per second. Temperatures are within the expected ranges; as in Pegasus A, the Service Module Adapter is again "running hot", but it is still within acceptable limits.

3. BROADCASTING SATELLITES - REPLY TO YOUR QUESTION OF MAY 10 ATTACHED): OSSA (Dr. Jaffe, Mr. Andrus) obtained authorization to launch five Atlas Agena-boosted Satellites to test components for broadcasting satellites. OSSA will be responsible for transponder, data handling system, antenna, command system, etc.; OART will furnish power source, attitude control, orbit control, etc. Mr. Andrus showed great interest in Saturn-boosted satellites for further component testing. I will meet with him in the near future for further clarification and definition of test objectives. Possibly, some of them lend themselves to AES-type orbital testing on Saturn payloads as discussed by Dr. Mueller during the Pegasus B launch.

4. RESEARCH ACHIEVEMENTS REVIEW # 4: Our fourth Review (Materials; Manufacturing Research) was attended by about 95 members of MSFC. Headquarters and the military were represented.

June 7, 1965

NOTES 6-7-65 BALCH B 6/9

1. Construction - Accepting joint occupancy of four areas of the S-II test stand for installation of technical systems. The Navigational Lock is operational, pumping to fill canals to five feet by June 10, and 15 feet by June 15. At five feet, dredge can be brought for completion of S-II canal work. Lack of sufficient vacuum jacketed pipe is delaying completion of the cryogenic barges, nitrogen portion of the High Pressure Gas Facility expected to be available next week.

2. Activation - Dates and conditions for partial completion of construction which the S-IC pertinent work requires to meet the S-IC4 test requirements were provided to the Area Engineer on June 2. We expect incremental replies as to feasibility and cost, but their total reply is not expected until July 1.

3. Labor Relations - The one day walk out of electrical workers on the S-IC stand apparently resulted from premium time being available on some parts of the job but not on others. This is a risk inherent to selective acceleration of critical portions of the work. The Business Agent will attempt to rotate crews so that more of the workers will have an opportunity to earn some of the overtime pay.

4. Other Activities - As reported verbally last week, there has been no real difficulty with proselyting on the site. However, we have since learned that GE has recruited 32 Chrysler employees from Michoud. Chrysler management is most disturbed and intends to include this situation as a topic for their next meeting of the Chrysler Board of Directors. This creates an interesting situation since Chrysler shares several directors with the GE Board. Mr. Wible has informed Eaton of Chrysler's displeasure and requested cooperation to avoid extension of the practice. If this reminder does not curb GE's recruiting from Michoud, we can take steps through the Contracting Officer to be more positive.

There is increasing evidence of willingness on the part of large private investors to initiate real estate developments. However, there is not yet any such promise with regard to adequate schools.

NOTES 6-7-65 BELEW B 6/9

S-IVB ULLAGE ENGINES - ROCKETDYNE/GEMINI The third MSFC Qual, that has successfully completed four mission duty cycles (2600 seconds total burn time), was returned to Rocketdyne for modification. After modification the engine will be returned to MSFC for vibration testing. Vibration testing is scheduled during the week of June 14.

RL10 ENGINE Post firing parts inspection of a development RL10A3-3 engine, after 65 firings for 6,045 seconds, revealed no parts failure or indications of significant problems.

Two injectors with high mass flow in outer row produced Isp performance of 446.0 and 444.6 seconds.

J-2 ENGINE Both production engines for FRT have completed hot fire acceptance testing. The first FRT test was successfully conducted last Friday in the simulated altitude test stand.

The negotiated production contract incentive conversion should be forwarded to Rocketdyne for signature this week, provided Dr. Mueller's incentive contract team gives their approval to it. It is my understanding we are awaiting word on this from General Bogart through Harry Gorman.

H-1 ENGINE Outboard H-1 engine H-7053 previously reported damaged at Michoud has been removed and returned to Neosho for repair. The work is being performed on an expedited basis and the engine will be available approximately June 25 to support the SA-202 static test.

GENERAL In preparation for the J-2 Ground and Flight Environmental Test Program presentation to you on June 10, considerable benefits have resulted, such as a much clearer understanding of the capabilities and activities within P&VE and RPL in the field of space environment. On June 2, Dr. Stuhlinger, Mr. Heller, Mr. Paul, Charlie Woods, Bud Drummond, myself and others concluded that the outcome of the June 10 presentation would be the basis for deciding what supporting tasks RPL might assume. We also plan to arrive at a center position on the J-2 environmental test stand situation. Test and P&VE are pulling this together.

In response to the NASA Apollo Executives Meeting held at KSC in March, a briefing was given to some 30 presidents of Rocketdyne first tier sub-contractors. I attended and feel the meeting did much to pass on the NASA message to top management of the companies. See attached agenda.

I recognize the extreme importance of the MTO activation; however, certain actions are beginning to hurt other areas, such as: I learned today, Monday, that Mr. Herb Kitchens the engine's price analyst, for all Rocketdyne engines, will be pulled out of engines today for a 60 day assignment to MTO. Mr. Kitchens has worked for several years in our engine projects acquiring a broad background that I feel is necessary for the heavy incentive contract conversion workload this year (a total of approximately six contract conversions). His removal without training of a replacement will jeopardize our commitments to convert the J-2, F-1 and H-1 contracts.

Harry Gorman

Please look into this

B 6/9

NOTES 6-7-65 CLINE B6/9

NEGATIVE REPORT

NOTES 6/7/65 CONSTAN

B 6/9

1. MICHOUD S-IC STAGE STATUS

S-IC-D - All major components consisting of the thrust structure, forward skirt, fuel tank, LOX tank, and intertank have been assembled in the VAB Vertical Assembly Position.

S-IC-F - The "F" fuel tank close-out weld is in the process of being x-rayed. It is anticipated that installation of the LOX tunnel assemblies will begin by Monday, June 7, 1965.

One half of the LOX tank (one bulkhead with two skins attached) is in Position # 3 (Repair Station) for ring baffle installation.

The thrust structure is on the rotary inspection turntable undergoing inspection.

The forward skirt is approximately 80% complete in the forward skirt pickup position.

The intertank is approximately 25% complete in the intertank tool.

S-IC-503 - One skin section is in the process of being welded to the upper fuel bulkhead and the exclusion riser is being installed in the lower fuel bulkhead.

The thrust structure is being fabricated in the thrust structure tool and is approximately 20% complete.

2. MICHOUD S-I/IB STAGE STATUS

S-IB-1 - Electrical modifications and rework continues in accomplishing the post-static operations. Fuel tank baffle installation is being inspected and CCSD is starting on the final shakedown in bay areas.

S-IB-2 - Damaged # 3 engine has been replaced and optical alignment is underway on the replacement engine. Modifications are being incorporated. The painted vehicle is in the "touch-up" process and CCSD is starting shakedown. S-IB-2 will be shipped Wednesday.

S-IB-3 - Shakedown inspection of bay areas being accomplished by CCSD and NASA. Installation of tubing and strain gages and incorporation of modifications underway; optical alignment of engine and accelerometers completed.

S-IB-4 - All four LOX tanks have been clustered and CCSD is ready to cluster the fuel tanks.

NOTES 6-7-65 DANNENBERG B 6/9

1. Experiment Coordination - To determine the requirements for satisfying the action items from the 5-17-65 Experiment Board Meeting, it was decided that:

(a) R-P&VE (Mr. Nein) will prepare the feasibility reports on MSFC #3, "Determination of Propellant Mass," MSFC #4 "Interface Stability," and investigate the possibilities of combining these experiments.

(b) R-P&VE (Mr. McKannon and Mr. DeSanctis) will prepare report on MSFC #1 "Evaluation of Dielectric Materials," in conjunction with the standard experiment module.

(c) R-P&VE (Mr. Thompson and Mr. Loy) will report on their continuing efforts to define an experiment compartment, containing experiments monitored and operated from the LEM ascent stage cabin. ✓

2. S-II Stage GFE - In meeting on 6-4-65, representatives from IO, MTF, KSC, and R&DO devised a method for controlling approximately 2000 GFE items for the S-II stage. To ensure timely delivery, groups of GFE items have been assigned to specific persons of IO and R&DO for tracking control. First status report on all items is expected in about 45 days. ✓

3. Data Management - R&DO Management Directive 25-10, "Implementation of Data Management within R&D Operations," has been published. ✓

4. Interface Control Documentation (ICD) - Data resulting from a review meeting with KSC will be used to update the ICD Log and the Interface Matrix for the June Panel Review Board Meeting. Detailed problem areas defined in the recent ICD reviews between KSC-MSC-MSFC revealed many deficiencies in both the SA-200 and SA-500 series, but only a few ICDs are incomplete for SA-201 hardware. Follow-up action is being taken to ensure timely correction of these deficiencies. ✓

NOTES 6/7/65 GEISSLER

B 6/9

1. Plans for Spectacular Missions for Saturn IB & V: Re: Notes 5/10/65 Geissler, and your comment to item 4 (above subject), wherein "Capture of earth satellite" was listed as one spectacular mission being considered. Last available Explorer I orbital data (Mar. '65), showed a perigee and apogee of 349 km and 1581 km respectively, with reentry predicted for Mar. '68. Preliminary studies show that IB without LEM can achieve Explorer I orbit via parking orbit for rendezvous. IB with LEM can probably also perform sufficiently to achieve rendezvous, but this case needs to be checked further. Primary rendezvous problems would be to find the satellite, since current ephemeris must be based on optical sightings or NORAD passive tracking devices. An estimate of ephemeris accuracy achievable by NORAD is not readily available, however, it would probably not be better than 100 km, and the dominant error would be in the position along the orbit. SA-204, 205, and 207 appear to be only possible candidates. Present Apollo spacecraft (CSM-LEM) does not carry a radar suitable for terminal tracking of Explorer I. SA-207 does carry a LEM equipped with the Apollo rendezvous radar, but this radar requires a beacon which is not present on Explorer I. If problems of satellite location and rendezvous were overcome, capture problem would still remain. If Explorer I's angular momentum has not decreased in last 5 years, it is now tumbling at 36 deg/sec. Capturing the satellite and stopping its rotation might be a problem. Storing the satellite in the Command Module would be difficult, due to personnel, instruments, and equipment in the new compartment. Please see attached sketch. In summary, it appears that the recovery of Explorer I would be quite difficult, and the immediate efforts required would be large due to Explorer I's short remaining lifetime.

Why ? → Pegasus probably simpler! B

2. AES Procurement Actions: FY 65 funds for AES were received late in Fiscal year, as follows: From Advanced Studies (OMSF) $1.7 M in March, Supporting Development (OMSF) $1.771 M in April, OSSA $.485M in April (received by -RP). All above funds committed to procurement actions, mostly to existing contract modifications. All should be obligated by June 30. Initiation authority for $1.9 M was also received from Supporting Development (OMSF). Funds to cover these procurement initiations will be available after June 30. Actions for $1.735 M of the $1.9 M are now in procurement. Procurement action list attached.

3. High Reynolds Number Facility: On June 2, Aero. personnel and Messrs. Dykes and Shepherd met with Hq. Facilities Review Board (chaired by Mr. Lilly) to present MSFC position on the High Reynolds Number (H.R.N.) Facility. Hq had not as yet approved the $50,000 C of F money for Feasibility Study and Preliminary Engineering Report due in Hq. in Sep. '65 for FY 67 budget submission. Presentation was well received by the board, with some opposition from Eggers (OART) and Flemming (Dr. Seamans' staff). Hq. was finally convinced that the H.R.N. Facility proposed by MSFC was not the old Fluid Mechanics Facility in disguise and that it would not duplicate existing tunnel capabilities. Lilly indicated after the meeting that the $50,000 study money would be approved.

NOTES 6-7-65 GRAU

B 6/9

1. S-IC CHECKOUT STATION: Installation of this Laboratory's S-IC Checkout Station has been completed, and checkout of the station is now in progress. We wish to acknowledge the assistance rendered by the Michoud organization under Dr. Constan in expediting the equipment to Huntsville. Without this help the objectives would not have been met.

2. S-IC-I LOX TANK: In reply to your comment on NOTES 5-24-65 GRAU (copy attached) relative to the S-IC-I LOX tank contamination problem; the chemicals used have been used in combination on previous programs. The tank concentrations required to operate the level probes had been coordinated with Dr. Lucas and approved by him. The problem was created when we dissolved the two chemicals together in a 400 gallon mixing tank and the much higher concentration in the mix tank caused the precipitation. This combination of the two chemicals was a change to the procedure, and was not properly coordinated with Dr. Lucas. Procedural changes which will prevent reoccurrence have been coordinated and approved by Dr. Lucas.

The water calibration of the S-IC-I LOX tank was completed May 27, 1965. Preliminary analysis of the test data indicates that the actual total volume of the tank is greater than the theoretical volume by 0.14%. (The accuracy required is $\pm$0.15%).

ATTACHMENT: NOTES 5-24-65 GRAU (Copies to Dr. von Braun and Mr. Weidner)

NOTES 6/7/65 HAEUSSERMANN B 6/9

1. ST-124M SLED TESTS: Components of the ST-124M were tested in late 1964 at Holloman AFB with the results of those tests being used in the final design of the platform system. A series of ten tests is scheduled for the period 6/11 to 7/15 at Holloman. This is the only series of sled tests planned for the full flight type ST-124M system. Following this series, the platform and associated ESE will be taken to KSC for azimuth alignment tests utilizing the S-IB Wet-Test vehicle on Pad 34. The alignment tests are scheduled to be completed by 9/1. ✓

NOTES 6/7/65 HEIMBURG

B 6/9

1. S-IC:

Test S-IC-07 is scheduled for Tuesday 6/8, for 90-seconds duration. Both gox and helium pressurization systems will be inactive on this firing because of lack of serviceable parts from Boeing. We have a strong feeling that there is no sense in going for a full duration firing until these systems are activated. Most primary test objectives after the 90-second firing deal with the functioning of these systems. The Stage Office has scheduled a meeting with Boeing 6/10 to iron out these problems.

2. F-1 STTW:

Engine F-3012 was removed from the Static Test Tower West on 6/1, and F-3011 was installed on 6/2. This engine will be subjected to a 40-second calibration test on 6/7.

3. S-II BATTLESHIP (SANTA SUSANA:

A second attempt on 6/4 of test No. 009 was unsuccessful when electrical problems were experienced. The test is rescheduled for 6/7.

4. S-IVB (SACRAMENTO):

Stage 201 - Buildup and checkout for firing is progressing slowly. Several modules were "borrowed" from the Battleship stand to allow checkout to proceed, but slowed down buildup on the Saturn V configuration of the Battleship.

Regards Lee James notes of 5/24 on subject of lack of Laboratory support at Sacramento. We had two Test Laboratory test engineers at SACTO during this period. Some of the contractor personnel who were mentioned came from this Laboratory. They are the GE personnel who have a mission to assist Test Laboratory in the design of computer programs for static test sites. In addition to DAC they also visited NAA.

5. S-IVB (MSFC):

LOX and LH_2 systems were both flushed with LN_2 this past week. Only minor leakage was noted.

6. KSC BARGE:

Repairs to the KSC barge were satisfactorily carried out, and the vessel was towed to Cape Kennedy, 6/4.

NOTES 6/7/65 JAMES B 6/9

Harry Gotwald FYI B

General: We are experiencing some of the same problems which Dr. Geissler mentioned earlier with respect to losing personnel to STL. Mr. Gene Rowden of our Resident Office at Huntington Beach recently announced his intentions to resign and accept a position (increase in salary) with STL on the Technical Staff of the Minute Man Division.

S-IB: A letter from the Contracting Officer concerning the recent damage to an H-1 engine on S-IB-2 in the Michoud plant has been forwarded to Chrysler. This letter directs that a comprehensive investigation be made to provide information to the government to assist in determining liability for the damage. It is quite possible CCSD may pay for this mistake.

S-IVB: Static firing is scheduled for July 8. At present, it still appears that some non-flight configuration components must be utilized for this firing and that a few flight components will not have completed qualification testing by the time of the firing. We have a meeting scheduled with R&DO this week to review the status of this hardware and to coordinate the issuance of the necessary waivers to DAC.

ESE: We continue to work problems daily as they arise regarding the delivery of ESE from GE. Delivery of equipment to IBM (for IU checkout), to Breadboard Facility (for program verification), and to KSC (for the launch complex) all restrain the current SA-201 launch dates. I plan a comprehensive review of this total problem with my people this week at which time a firm assessment of the schedule will be attempted. We may be approaching the point where some rather drastic "work around" schemes are our only hope to hold the launch date. Should this become necessary, I will subject any such plans to a comprehensive Center review prior to implementation.

SA-10/Pegasus C: At the request of Gen. Phillips (TWX from Phillips to you) we have coordinated an MSFC feasibility study for a change in Pegasus C orbit. The study has indicated the feasibility of changing to permit a near circular orbit of 270 nm after one year without any detrimental effects to the Pegasus C mission or the overall program. Hqs. has been advised of the results of the study and we have requested that a firm decision be made by June 7 if they desire to implement this change.

NOTES 6-7-65 Koelle B 6/9

1. SENATE CRITIQUE OF FUTURE PROJECTS TASK GROUP REPORT: The Summary Report, "Future Projects Task Group," directed by F. B. Smith, Langley (answering the President's inquiry for post-Apollo missions) was severely criticized by the Senate Space Committee. Points of dissatisfaction were:

a. "Alternatives are presented, but no criteria are given as to how a selection would be made.

b. No cost information is given.

c. There is no indication of the other resources that would be required to accomplish the various alternatives, such as manpower, facilities, and management.

d. There is no indication of when the decisions should be made.

e. There is only brief mention in Mr. Webb's letters of military considerations and coordination with the DOD.

f. There is little or no discussion of foreign programs or about how they might affect U. S. post-Apollo programs."

The committee is giving serious consideration to holding open hearings this Summer or Fall to get a better picture of NASA's post-Apollo plans.

HHK Frank D.

You will recall that FPO's Space Program Planning Procedure gives quite detailed answers to items a. thru d., and some insight on items e. and f. Ed Gray and some of his people (e.g., Dr. S. Ross) should be aware of this.

Let's discuss this.

B

NOTES 6-7-65 KUERS

B 6/9

1. Fuel Tank – Thrust Structure Assembly, 501: The PVC Support Link Assembly Bracket, 7075-T86 forgings, supplied by Boeing, showed cracks first noted on the single engine test stand. The -T was inspected, and no cracks were found; however, the S-IC-501 showed cracks in five of these same forgings. The Tail Structure Assembly contains sixty each of these brackets. Determination of the origin of the cracks and possible schedule impact for 501 is in evaluation with Boeing engineering, P&VE, Quality, and Test Laboratories.

Furthermore, forty-two operations are now stopped or cannot be started due to missing parts. Engine cables supplied by Boeing show an extremely high rejection rate, causing extended rework at ME prior to vehicle installation.

2. Lox Tank, 501: The joining of forward skirt to the Lox Tank was completed on schedule.

3. S-IVB: DAC is currently faced with a large number of shortages affecting electrical manufacturing schedules. At present, some 900 welded modules are held for various purchase parts and engineering changes.

A decision has been made by ME Laboratory to permit DAC design modifications of tube flaring machines in an attempt to meet the MC-146 tube flaring specification.

DAC has completed their evaluation of the G.F.E. electro-magnetic hammer, and the hammer has been successfully utilized to remove two cans caused by weld heat shrinkage in a forward dome gore segment fitting area.

NOTES 6/7/65 MAUS B 6/9

1. AES PAYLOAD INTEGRATION TASK TEAM - The AES Payload Integration Task Team presented a dry run of their findings to E. Z. Gray and representatives from the three MSF Centers on June 3. Six management options for payload integration were studied by the task team. Although no firm recommendation was made, it was stated that the option where MSC would integrate payloads into the spacecraft, and MSFC into the launch vehicle and LEM Shelter, appeared to have the most advantages versus disadvantages. This was presented as the approach favored by both MSC and MSFC. The main disadvantage given was that this option would concentrate the bulk of the integration activity at MSC. Some apprehension was evident concerning the complexity of the interface with MSC, if MSFC is assigned payload integration for the LEM Shelter.

The manpower availability figures presented were those submitted by the MSF centers in POP 65-1. Both MSC and KSC showed a personnel requirement above their present ceilings in FY 67, and subsequent for their presently approved programs. However, MSFC showed personnel available in FY 66, increasing thru FY 69. This availability will be decreased, of course, when Saturn IB Centaur requirements are considered. Ed Gray pointed out this obvious difference in the manpower picture for the three centers and stated that he and Dr. Mueller feel that the availability of manpower is one of the major factors in deciding where the AES payload integration is performed. Mr. Gray also stated that we urgently need much better information on manpower availability for the MSF "hideaway" meeting than we have now.

One important point made clear during the meeting was that AES Program, as presently defined, includes only 8 manned flights per year of the total of 12 which are made available by the annual production rate of six Sat IB's and six Sat V's. This means that there are 4 unmanned Sat IB flights per year not included in the AES program. Even with the proposed Voyager program, there still remains an average of three unmanned Saturn IB's per year without missions.

The next presentation to Ed Gray is scheduled for June 9 with the final report to Dr. Mueller on June 15.

2. MECHANIZATION OF PROGRAM OPERATING PLAN - Last year, MSFC mechanized its internal budget collection system. Subsequently, the budget submission to MSF was also mechanized; R&D POP 65-2 was our initial submission. MSF has decided to employ the mechanized system for development of total MSF POP 65-3 for R&D, (due in MSF early August).

A meeting, with MSF, MSC, KSC, and MSFC, was held here June 3-4 to discuss the system and its advantages; problems in mechanization process were resolved; and format and uniform guidelines were established for POP 65-3. Since MSF's large computer will not be available until August, MSFC agreed to act as an agent of MSF for preparation of the total POP 65-3; other centers will send their computer tapes to MSFC for consolidation.

B 6/9

NOTES 6-7-65 McCARTNEY

1. REVIEW OF SINGLE SUPPORT CONTRACT STATUS: A series of meetings have been scheduled from June 24 to July 16 between the Responsible Officials, Center Management, and top contractor officials of the single support contracts. Purpose of the meetings is to discuss major problem areas encountered during the transition to the new support contractors.

2. FY-66 CofF: FY-66 CofF R&D Operations projects, totaling $4,776M, are included in the present budget before Congress. The House has reduced that total by 10% ($484,900) without specifying reduction to individual projects. The Senate Committee on Aeronautical and Space Sciences has recommended deletion of the High-Pressure Gas System and the LOX Storage projects, plus a reduction of $121,550 to the remaining three projects (the TEST Engineering Building Extension, the Addition to the Materials Laboratory, and the Non-Destructive Testing Laboratory). NASA Headquarters is now seeking to have both deleted projects reinstated by the House-Senate Conference Committee.

3. HIGH REYNOLDS NUMBER SIMULATION FACILITY (FY-67 CofF): On June 2, MSFC representatives met with the MSF Facilities Review Board and other NASA representatives to justify the High Reynolds Number Simulation Facility as a FY-67 CofF project. Funds for criteria studies of the project were not approved at the time study funds for other FY-67 CofF projects were allocated. AERO made a well-received presentation of the facility and its proposed use, and, as a result, it is expected that study funds will be allocated soon.

4. OPERATIONS MANAGEMENT SEMINARS: As reported in my 5-3-65 NOTES, the Harbridge House course of instruction on single support contract management was critiqued in late April and modified to improve course effectivity. The revised course will be presented as a series of five 35-hour seminars, the first of which begins today. R&D Operations will have 16 people attending each of the sessions.

B 6/9

NOTES 6/7/65 RUDOLPH

1. S-IC-T Captive Firing - The 90-second firing scheduled for Thursday, June 3, 1965, has been postponed until Tuesday, June 8, 1965.

2. S-IC-1 Stage Status - Joining of LOX Tank and Forward Skirt began on Wednesday, June 2, 1965, two weeks ahead of schedule.

3. S-II Common Bulkhead Test Tank (CBTT) Status - The CBTT arrived at Santa Susana on June 3, 1965.

4. S-II Battleship Stage Firing - The scheduled 25-second S-II Battleship test was not conducted Friday, June 4, 1965, due to problems requiring extensive repair. The major problem was in a connection in a flight instrumentation package causing intermittent shorts. The connection has been replaced and several engine sequence tests completed. Battleship firing of the 25-second duration test has been rescheduled for 3:30 pm, CST, today, June 7, 1965.

5. S-IVB Battleship Stage Status - Conversion to Saturn V configuration is continuing with major effort scheduled to be completed on June 4, 1965. Electrical and pneumatic checkouts are scheduled to begin June 7, 1965. The first firing is still scheduled for June 17, 1965, but the schedule is becoming tighter due to the magnitude of the remaining work.

6. S-IVB Stage Configuration Management - On May 28, 1965, a review of DAC's Supplement to NPC 500-1/ANA Bulletin was completed. This supplement contains equivalent exhibits to those of NPC 500-1 and ANA Bulletin 445 and it lists by paragraph number those paragraphs of NPC 500-1 and ANA Bulletin 445 which apply or are waived or reflect deviations. The protions of the Supplement which are waived or are deviations from the basic NPC 500-1 have been agreed to among DAC and Colonel Taylor/NASA Headquarters, Major Jeancon/I-RM-C and this office. This provides a complete interpretation of NPC 500-1 for use in the S-IVB contract. DAC is currently pricing out this Supplement which is to be submitted to us by ECP in July.

The procurement package for the nine additional Saturn V S-IVB Stages was temporarily delayed in NASA Headquarters on May 27, 1965, due to the fact it did not reflect incorporation of configuration management disciplines. Colonel Taylor provided valuable assistance in assuring the Headquarters personnel that we will have an operational status on 500-1 for the follow-on stages.

NOTES-6-7-65-SHEPHERD B 6/9

Negative Report.

NOTES 6-7-65 Stuhlinger

B 6/9

1. PEGASUS B: All the systems have been working properly. Temperatures are relatively high because of 73% time in sunlight. The louvers are efficient in keeping temperatures within permissible limits. Spin rate at present is about 6.5^{o} sec^{-1}. One 8 mil panel shorted; it was disconnected by command (blowing of fuse). Some of the 16 mil panels are again plagued by spurious pulses from unknown sources. These pulses can be distinguished from real meteoroid pulses through telemetered hit data. Two groups of 16 mil panels, which experienced intermittent pulsing, had to be disconnected by command. Recorded hit data so far are agreeing well with Pegasus A data.

2. AES STUDIES: Evaluation of contractor proposals for two more 1965 AES studies was completed (Surface and Subsurface Probes, and Environmental Effects on Instruments). It is expected that contracts will be let soon.

3. OMSF SUPPORTING TECHNOLOGY PROGRAM: Our 1966 Supporting Technology Program has not been accepted yet by OMSF. Admittedly, we interpreted a little liberally the guideline to include only tasks in direct support of Saturn, and showed also tasks which had been rejected by OART because they were "too much project-oriented". OMSF and RPL will have another day of negotiation this week.

4. PREP-STUDY: Time spent on the PREP-Study by RPL amounted to about 210 manhours this week.

June 14 1963

NOTES 6-14-65 BALCH

B 6/18

III

1. A construction employee - of Malan-Koppers Co., a sub-contractor of a prime Corps of Engineers contract was killed at approximately 1:45 p.m., June 10, 1965 from an electrical shock while using a portable electrical tool. An investigative board has been established by the Corps.

III. The Aerojet strike which began may 30 continues. Unless settlement is reached by June 19, slippage in the Astron work on the S-II stand at MTF will occur.

NOTES 6-14-65 BELEW

B 6/18

RL10 ENGINE

We are working with the Navy to obtain DOD inspection services on the RL10 Project at West Palm Beach, Florida to save 6 to 8 MSFC spaces. We foresee a peak of 12 people for this operation over the next few years, since production rates are as low as one or two engines per month. Main objectives of the discussion is to obtain a smooth phase-in of DOD inspection services with minimum program impact. ✓

H-1 ENGINE

A procurement plan covering 22 follow-on H-1 200K engines was submitted to NASA Headquarters on April 20. An agreement between MSFC and NASA Headquarters on the contents of the plan was reached on May 18. Since this date, numerous follow-up calls revealed that the plan was being prepared for final signature. A continued delay in receiving approval may impact the production effort due to the long lead items necessary. ✓

S-IVB-ULLAGE ENGINES-ROCKETDYNE/GEMINI

Detail stress analysis conducted by Rocketdyne, indicated the preliminary fixes proposed are marginal in accomplishing the necessary stress reduction required at the trunnion and nozzle exit flange areas of the engine metal shell. A study of alternate design modifications is scheduled for completion next week. No delay of the Saturn V/S-IVB is presently anticipated. ✓

I

J-2 ENGINE

Production engine J-2013 completed the planned test program on the S-IVB Battleship stand at SACTO and has been shipped to MSFC (received 5/31/65) for actuation of the MSFC S-IVB Battleship stand.

Production engine J-2024 was accepted by NASA on May 28, and delivered to S&ID on June 12. This is the last S-II All Systems engine.

Production engines J-2025 and J-2026 are presently undergoing acceptance testing. J-2025 is scheduled to be delivered to MSFC Test Laboratory and J-2026 is the first engine for vehicle 501. ✓

F-1 ENGINE

MSFC, Air Force, and Rocketdyne personnel met at MSFC on June 9, to investigate West Coast LOX logistics problem which has nearly doubled as a result of the increased R&D testing under the Incentive Contract. It appears that the current LOX short supply status will be greatly improved in July and later.

Engine F-3014, with a replaced turbine manifold, is on T/S IC NASA/RETS for acceptance testing. This engine, a spare for S-IC-I, has been behind schedule because of manifold failure.

Engine F-4017, with a replaced thrust chamber, is at NASA/RETS for acceptance testing on T/S ID. This is earlier than expected and this engine is now almost on the original schedule. ✓

NOTES 6-14-65 CLINE

B 6/18

1. S-IC-T ACTUATOR RETURN DUCTS FAIL DURING STATIC FIRING: The ducts which failed had been qualified. MSFC has previously notified Boeing that the flexible portions of the ducts were not located in the proper plane and that the solid portions could fail. No actions resulted. The ducts on two positions have been replaced by flex hose; the remaining replacements will be made as soon as hose can be procured. ✓

II

2. ATTEMPTED 25-SECOND MAINSTAGE S-II BATTLESHIP CLUSTER FIRING: The S-II battleship cluster attempted a 25-second mainstage firing on 6-9-65. Actual duration was 7.84 seconds of mainstage. Reason for cutoff is unknown at this time; however, review of the strip charts revealed that nothing was wrong with the engines at the time of cutoff. ✓ It is planned to attempt the 25-second firing again on 6-14

Problems were again encountered with the LH_2 recirculation pumps. Failure of their operation was quite random. As a result, the overboard bleed configuration was used for the firing mode. The LH_2 recirculation system which is flight type has been used on previous tests successfully; however, their operation continues to be quite erratic. The vendor supplying the recirculation pumps has been contacted and appraised of the problem. ✓

The 25-second test will be performed as soon as reason for cutoff is determined and recycling is accomplished. ✓

3. 350K HIGH PRESSURE LH_2 PUMP: A successful 60 second test was run on 6-10-65 on the 350K high pressure LH_2 pump. ✓ The pump developed 2000 psi at a flowrate of 7,000 gallons per minute and a shaft speed of 24,500 revolutions per minute. All performance and vibration data appears satisfactory. Testing will progress to the nominal 5500 psi discharge pressure at 13,000 gallons per minute and 40,000 revolutions per minute during the next several weeks. ✓

NOTES 6/14/65 CONSTAN B 6/22

Negative Report

B 6/22

NOTES 6-14-65 DANNENBERG

1. Experiment Coordination - Bellcomm representatives (Dr. Pearse and Mr. Hillberg) will be at MSFC on 6-16-65 to discuss with P&VE representatives the MSFC experiments required to satisfy the action items from the 5-17-65 Experiment Board Meeting. ✓

2. Test Documentation - R&DO Directives establishing policy for standardizing the preparation of test reports and test procedures have been issued. These directives apply to qualification, reliability demonstration and acceptance tests, and will provide for uniform preparation of required documents. These test reports and procedures will hereafter be identified as MSFC Test Documents handled by MS-AD (Mr. Garrett). ✓

3. Evaluation of Boeing Proposal for Implementation of MA-2 Schedule on Saturn V Systems Support Contract - R&DO technical managers have evaluated the Boeing proposal. In no case was additional cost considered allowable for the change (stretch-out) in schedule. IO was advised on how to reschedule contracted manpower to cover the tasks that would be affected by the change in schedule. Where the contractual deliveries were not tied to the vehicle schedules R&DO insists on maintaining present delivery dates. ✓

4. ICD Operations - An agreement was reached between Dr. McCall and Dr. Rudolph concerning the assignment of work to provide technical and program management of Saturn ICDs. A Task Team has been established under IO's chairmanship with representatives from R-SA and R-P&VE.

The SA-201 material is being updated to cover the Launch Operations Panel's new inputs. These items will be used for monitoring the Apollo ICD program. ✓

NOTES 6/14/65 GEISSLER B 6/22

1. Automation of Evaluation, SA-8: The "Automation of Evaluation" program, developed by RCA was used for the first time on SA-8. The program shows much promise for early assessment of all telemetered data. Measurements failing for 6 seconds were called out as failed measurements, these were then correlated with related measurements. Approximately 350 flight measurements on the S-I stage and instrument unit were analyzed with about 40 measurements indicating failures or partial failures. The S-IV stage was not run because of extremely noisy data obtained from KSC. ✓

E.G. What does that mean. B

2. SA-8 Flight Evaluation: The vector sum of angle-of-attack to be used for EDS agreed with computed values to within 0.3 degrees. This was the first flight test of this measurement. The reason for the comparatively large guidance deviation from predicted in cross range (4 m/s), throught to be due to an incorrect sign on predicted guidance errors, has not yet been resolved with R-ASTR. A final SA-8 trajectory is now being constructed. Problems exist due to the limited amount of tracking data in the latter portion of the S-IV powered flight. ✓

3. Ablation of Tektites: Re your question on item 2, this subject, Notes 5/31/65 Geissler, (see enc. 1): We still have one man who has a working knowledge of ablation analysis. We are remaining alert for any new mission assignments which might require this experience, hoping that this occurs before the know-how is lost completely. At this time we cannot afford the manpower required to remain active in this field simply for the sake of maintaining the skill. ✓

4. Design Considerations for S-IVB LH_2 Vent Sequence: In reply to your questions on this subject at the Saturn IB Design Review, June 9, 1965, The attached summary is furnished, (enc. 2). ✓

5. Plans for Spectacular Missions for Saturn IB and V: Re: Notes 6/7/65 Geissler, (enc. 3) and your comments to item 1 (above subject), wherein problems associated with recovery of Explorer I were discussed. Storage of the Explorer I in the Apollo Command Module would appear to be difficult because of the 80 inch length of Explorer I as compared to the 81 and 82 inch dimension of the CM Crew Compartment (see attached sketch). The Crew Compartment is roughly a cylindrical enclosure 81 inches in diameter and 82 inches high. Contained in this enclosure are the three couches, three men, and miscellaneous protruding equipment, display panels, control panels, etc. There would appear to be very little room for maneuvering Explorer I in and securing it (probably on the floor) against the reentry forces. Whether it could be done could really be well evaluated only on a scale mockup, but storage appears difficult. Rendezvous with Pegasus would be simpler due to the larger optical and radar tracking size, the longer remaining orbital lifetime, and the smaller angular rate of the satellite. It is now planned at HQ request to launch Pegasus C on a 95.2 deg flight azimuth and into a 535 km circular orbit to facilitate later rendezvous operations, possibly with a Gemini spacecraft in 1966. ✓ Good.

NOTES 6-14-65 GRAU

B 6/22

1. IU 201 CHECKOUT: We have decided to go on two 10-hour shifts for the IU 201 checkout in order to hold the schedule. This operation is presently scheduled to begin on June 28 and end on September 20, 1965.

2. NPC 500-5 IMPLEMENTATION: We met with Colonel James, Mr. Lemke, and others from NASA Headquarters to indoctrinate them in our Quality and Reliability efforts on the S-IB program and to negotiate the kind of Quality and Reliability reports that can be submitted to meet the requirements of NPC 500-5 without additional effort. The meeting was rewarding since they agreed to accept those reports already existing on the S-IB.

3. F-1 ENGINE EQUIPMENT: Corrective action has been initiated to eliminate high rejection rates (approximately 85%) at MSFC of loose equipment for the F-1 Engines. The rejections have been caused by contamination and/or packaging. In most cases the discrepancy is so severe that visual inspection alone requires rejection of the equipment. As a result of the action initiated, the Government Agency at Rocketdyne, Canoga Park, will perform 100% inspection until the problem is resolved.

NOTES 6/14/65 HAEUSSERMANN B 6/22

1. IBM LVDC STATUS REPORT: During vibration of LVDC TMR No. 1, IBM experienced failure of the memory module. X select wires were broken close to the solder connection due to vibration. Securing wires to core plane frames with Sylgard (polyurethane) had been abandoned some weeks ago to avoid its flow into the magnetic cores; it will now be applied carefully again to reduce vibration effects. ✓

2. S-IC ACTUATOR MALFUNCTION - STATIC TEST 6/8: Approximately 3.30 seconds after engine cutoff, the ground hydraulic supply was connected to the engine gimbal control system; engine number 3 yaw actuator (MOOG S/N 21) malfunctioned driving the number 3 engine to a hard over position in the yaw axis. By applying a 28 millamp signal to the servo valve, the engine was returned to the neutral position. The actuator was returned to ASTR hydraulic Laboratory. An investigation revealed that the lower feedback spring had become disengaged from the cam follower feedback mechanism. Moog Servocontrol Inc. and ASTR personnel are still investigating the malfunction. The opinion is that a minor modification of the cam follower feedback mechanism will prevent this type of malfunction. Complete vibration qualification tests will be run after modification. ✓

B 6/22

NOTES 6/14/65 HEIMBURG

1. F-1 ENGINE: F-1 engine F-3011 was tested for a mainstage duration of 36 seconds on 6/9 at the Static Test Tower West. This engine was removed and shipped to ME Lab, and engine F-2009 was installed. Testing will begin on this engine on 6/16.

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201 Vehicle has approximately one-half the pre-static checkout procedures in progress. Parts shortages continue to hamper completion of checkout. Approximate one week delay in the 7/8 static firing is anticipated.

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In a meeting between Boeing and MSFC on 6/10, it was decided that full duration firing would be delayed to 7/15, because of lack of Boeing hardware. ~~Review of test objectives has shown no good reason for performing a short-duration firing prior to full duration.~~ Emphasis during this down period on S-IC-T will be switched to activation of West Area F-1 Test Stand to support investigation of engine actuator problems.

5. HOLDDOWN ARMS: Testing of the first Saturn V holddown arm was completed on 6/1. The second arm was installed in the test fixture on 6/2.

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NOTES 6-14-65 HOELZER B 6/22

INTEGRATED DATA PROCESSING SYSTEM FOR FINANCIAL MANAGEMENT OFFICE (FIN): Through an agreement reached between the Computation Laboratory and the Financial Management Office (FIN), all computer programs now operating on the 1401 computer at FIN will be converted for operation on the centralized 1410 computers of the Computation Laboratory. The 1401 computer at FIN will be converted to a smaller peripheral 1401 computer for use as an input/output device. Considerable savings are anticipated from the conversion. ✓

NOTES 6/14/65 JAMES

SA-10 Launch Schedule: Due to the close proximity of launch between SA-10 and GT-5, the Range has requested that rescheduling be attempted to provide about seven days between the two flights to allow re-configuration of the ground operational support systems. We received a TWX from KSC requesting some advancement in the delivery of Pegasus C, service module adapter, command module, LES, guidance control computer data, and the range safety data to accommodate an earlier (approximately 1-1/2 weeks) launch of SA-10. We will respond favorably to this TWX today.

Pegasus C: Final testing and installation operations are being completed. The unit is scheduled to be shipped by Guppy to KSC about June 21. This schedule can support the advanced SA-10 launch date.

S-IVB 201: Installation of parts and performance of checkout continues at SACTO. We met with R&DO last week to discuss the possibility of firing with some non-flight components and some non-qualified components. Due to the parts availability problem, the projected status for the firing is changing rapidly and will be reviewed again with DAC at the Quarterly Review this week. We plan to follow this situation closely but it will be necessary to revise plans and make last-minute decisions right up to the firing date. Completion of checkout is paced by hardware shortages. Some slippage in the scheduled July 8 static firing date is indicated at this time.

SA-201 Launch Schedule: (Reference My Notes 6/7/65) I conducted a detailed review of the ESE delivery status and its related effect on IU-201 delivery, LC ESE availability, and availability of ESE at the Breadboard for program verification. The review revealed that hardware and software "need dates" previously established by KSC to support an "early part of the month" launch date could not be met. This situation was further reviewed with Dr. Rees, Mr. Weidner, and other R&DO personnel at which time we agreed to advise KSC of our current assessment of delivery dates for the hardware and software. We will ask KSC to use these new dates to revise their planning to permit a launch date in the latter part of the month, currently planned for the launching.

Attachment: My Notes 6/7/65 (on Dr. von Braun's copy only)

NOTES 6-14-65 Koelle B 6/22

1. LUNAR STUDIES: We have received authority to proceed with four lunar systems studies which are designed to assist in defining the interface between the lunar AES program (as presently envisioned with a maximum 14-day staytime) and any follow-on lunar exploration program. The resources allocated to these industry studies are as follows:

a. Mobility Systems (follow-on to MOLAB studies) $500,000 ✓

b. Lunar Shelter Concepts $200,000 ✓

c. Lunar Exploration Modes (total system evolution including logistic support) $900,000 ✓

d. Scientific Lunar Missions (continuation of last FY's work) $200,000 ✓

Headquarters considers these studies as an essential complement to the AES program definition. ✓

2. MILITARY USE FOR SATURN V: In trying to find a larger market for Saturns, I have been able to identify only one potential military use, but it could be an important one. It is a modification of Dr. Mueller's idea of a synchronous scientific laboratory. I could envision that, if the cold war gets hotter, a manned surveillance satellite in a synchronous orbit covering Russia constantly might become attractive. With a 55° inclination such a manned satellite would do a figure eight over the ground, touching Moscow at the upper end of the eight. To have a permanent surveillance one would want to have two satellites in orbit at one time. Aside from the military value, I consider the potential psychological value even more important. I would think that the average Russian would feel very uncomfortable if he were constantly watched by "Big Brother." A combination of Saturn V, Apollo, and MOL should do this trick. If such a mission should materialize, at least eight Saturn V's per year (3-month staytime, two satellites in orbit at one time) would be required. Because such a mission might be a bread-and-butter project for our Saturn contractors, I would suggest that you discuss this possibility with the right people at the right time. ✓

3. NOTES: These are my last NOTES to you and my best wishes will be with you and your team in the future: Good Luck! ✓

NOTES 6-14-65 KUERS B 6/22

1. Visit of Tulsa Plant: Last week I visited with a group of our people the Air Force (now DOD) plant at Tulsa which is at the present utilized by DAC (70%) and NAA (30%). DAC has mainly aircraft modification work (B-52) in their part of the plant but also some interesting S-IVB development work for stage and panel separation techniques. NAA is building here--as you certainly know--complete thrust and skirt structures for the S-II, IU panels for IBM, and the second block LEM Adapter panels for Apollo. These panels are of a honeycomb construction. Their tooling and process control in bonding techniques seem to be excellent. ✓

2. Major Events and Development of S-IC-501:

a. The cracks detected in the PVC Support Link, 7075-T86 forgings, appear to be induced by stress corrosion. It has been decided, therefore, to exchange all 60 links on 501 by new forgings on which excessive stresses in the defect area will be avoided by tolerance changes of interference fits and by shot peening. The removal and replacement of these link assemblies, which must be exchanged only one at a time for each PVC, has started. The first replacements were received June 9. No impact on schedule is predicted. ✓

b. After successful completion of all qualification tests and rework of weld joints between Inconel 718 and stainless steel bellows, the Lox PVC's for 501 have finally been shipped. We hope to install these crucial items next week. ✓

c. General Outlook: We still suffer in our 501 assembly work from insufficient supply of parts for systems installation caused by delay of basic design and engineering changes. I believe, however, that we have this parts delivery problem now under control. Most disturbing is still receipt of many components which have passed qualification and acceptance tests at the vendors' places and are officially accepted by the Government, but are rejected after receipt at MSFC. The most critical area is the engine build-up and modification where the flow of engineering changes and uncertainty of design definition in the insulation area prevent any firm planning of assembly operations. ✓

NOTES 6/14/65 MAUS

B 6/22

1. APOLLO PROGRAM PERT -COST CORRELATION AND EVALUATION TECHNIQUE - MSFC has been requested to participate in a pilot test of a new management system being developed by headquarters for schedule/cost correlation. Objective of the system is to develop a technique for:

   - PERT/SARP/COST correlation
   - evaluation of work accomplished versus actual expenditures
   - evaluation of projected runout costs
   - evaluation of contractor performance

   The pilot test is planned for this week utilizing the Saturn V top level network and a computer program developed by Lewis Research Center.

2. CONTRACT COST MANAGEMENT SEMINAR - Dr. Ralph Reid of A.T. Kearney Company and Messrs. Dittenhofer and Maroney of NASA headquarters will be here this week to review with various people of MSFC, the work done thus far on the "Integrated Cost Study", which is a part of the Contract Cost Management Seminar being developed by Kearney for NASA. Tom Smith is coordinating MSFC participation.

3. MSFC ORGANIZATION AND FUNCTIONS - We have received advance copies of the MSFC Functional Statement and the new MSFC organization chart which were approved by Mr. Webb on May 26. The chart shows the new Manpower Utilization and Administration Office, Michoud Assembly Facility, and Mississippi Test Facility. The submission on Saturn IB Centaur Program Office is still in the headquarters approval channels.

Harry G. Looks like we have to change a few hundred signs. Please implement. B

4. END OF YEAR PROCUREMENT PROBLEM - At Mr. Gorman's request, we are developing a "position paper" on the end of year procurement problem that MSFC has in the small procurement area. This paper is to be completed in time for the June Management Council Meeting, and it is to include Supporting Development and Advanced Studies as well as procurements for the major programs. Suggestions and proposals have been solicited from: R&DO, IO, FIN, and Mr. Buckner's office. Most of the suggestions thus far relate to internal MSFC improvements.

NOTES 6/14/65 McCARTNEY B 6/22

1. RESOURCES STUDY FOR HIDEWAY MEETING: R-RM has completed a study of the total R&D Operations' resources versus future requirements in meeting new programs, such as AES, Saturn IB/Centaur, Cislunar Pegasus, etc. This study considers all of our present Saturn mainstream requirements and their phasing over the next few years, as well as proposed new starts. It examines all known sources of manpower to be applied to these requirements, as well as job classification (skills) within the total R&D Operations complex. The results of this study are being given to Mr. Maus for inclusion in the material being prepared for your "hideway meeting". ✓

2. REVIEW OF SINGLE SUPPORT CONTRACT ADMINISTRATION: As you are aware, a series of conferences have been scheduled between the Single Support Contractors and Center management, beginning the latter part of this month. The purpose of these Conferences is to review operations under our single support contracts to date and to iron out any problem areas. ✓In addition, this office has reviewed the work which has so far been placed by the Laboratories in an effort to determine compliance with Center regulations and our approach to Single Support Contract Administration. Results of this review indicate several instances where Schedule Orders and Technical Directives issued under the contract require modification to comply with Center Policy. These instances will be followed up and adjustments made as required. ✓

NOTES 6/14/65 RUDOLPH B6/22

1. S-IC-1 Fabrication Status - The Thrust Structure/Fuel Tank assembly is reported to be 14 weeks behind current working schedule; however, no stage delivery slippage is expected. All 60 propellant duct support link assemblies must be changed because aluminum forgings are breaking at bushed mounting holes. The rescheduling of installation of the redesigned assemblies is presently being worked out by ME. The LOX Tank/Forward skirt mating operation was completed two weeks ahead of schedule.

2. S-IC Acceptance Test MTO, Position #2 - A review of the requirements for Position #2 was conducted during the past week. The need for that test position was reaffirmed and correspondence initiated through General O'Connor to Mr. Balch to implement that decision.

3. S-II Battleship Firing - On June 9, 1965, a 25-second firing was initiated at 11:44 am, CST, for approximately eight seconds in duration. Automatic cutoff occurred from undetermined cause. Evaluation is being made to determine the cause. A retest is scheduled for today, June 14, 1965, if sufficient confidence as to corrective action is known.

4. S-IVB Facilities Checkout Stage - The Facilities Checkout Stage left Courtland Dock on Thursday, June 10, 1965, and is expected to arrive on dock at KSC on Thursday, July 1, 1965.

5. Saturn V Propellant Loading Investigation - Saturn V Propellant loading has been under investigation for some time. Although disagreements have come up between centers, it has not yet been possible to get a single MSFC position. Action is underway to reclarify the loading control system and expect to give you details in two weeks.

6. Low Bay Checkout Definition - A detail compilation of actions, follow-up, controversial memorandum, etc., have been assembled in chronological order and furnished to Dr. Hueter/Dr. McCall by the Saturn V Test Office. This package provides an insight into conflicts of opinion and the official actions taken to date. Dr. McCall has accepted an action item within the Technical Systems Office to reestablish a firm position by June 18, 1965.

NOTES 6-14-65 Stuhlinger B 6/22

1. PEGASUS A: Hits on 1.5 mil panels continue to be registered. The 8 mil and 16 mil panel systems no longer produce meaningful data. ✓

2. PEGASUS B: Memory and telemeter systems have been working satisfactorily. Temperatures and spin rate are within acceptable limits. Spurious pulses ("intermittent operation") were observed on one 1.5 mil panel group, and on two 16 mil panel groups. The two 16 mil panel groups were disconnected. Two individual 16 mil panels, and one 8 mil panel experienced shorts (for unknown reasons).

I

Results so far from Pegasus B:

1.5 mil:	0.12 penetr. per m^2 and day*
8 mil:	0.02 penetr. per m^2 and day
16 mil:	0.004 penetr. per m^2 and day

*Pegasus A yielded 0.11 penetr. per m^2 and day.

E.S.

16 mil = 0.016 inch × 25 = 25/150

i.e. 1 m^2 of 0.400 mm material is penetrated once every 250 days. Is this conclusion right? What material? Soft Aluminum? What would corresponding steel skin figures be? B

1/0.004 = 250

3. AES LUNAR SURFACE PROGRAM: RFQ'S for the following tasks of the 1965 program were evaluated last week. Contract negotiations will begin immediately:

Environmental Effects on AES Instruments
Surface and Subsurface Probes
Emplaced Scientific Station ✓

The evaluation team for the Lunar Drill task will convene June 14; completion of the evaluation is expected by the end of the week. ✓

4. AES PROGRAM ACTIVITIES AT MSC: As we learned recently, MSC endeavors to obtain the assignment of responsibility for the entire AES program with the arguments that (a) all the AES projects include men and life systems, and (b) manpower will soon become available at MSC. It is expected that MSC will submit a strong bid for the entire AES program at the June 19 meeting.

They didn't. B (Haven't got the manpower)

5. TOTAL ART/SRT STATUS:

	Annual Plan	Authorized	Processed To FMO	Obligated
OART	15,305,000	15,305,000	14,877,014	6,234,452
MSF	22,000,000	22,000,000	21,292,719	9,934,633
OSSA	1,413,000	1,413,000	1,407,994	149,734
OTDA	2,000,000	2,000,000	1,999,665	990,995
TOTAL	40,718,000	40,718,000	39,577,392	17,309,814

✓

NOTES 6-14-65 BALCH B 6/18

1. A construction employee - of Malan-Koppers Co., a sub-contractor of a prime Corps of Engineers contract was killed at approximately 1:45 p.m., June 10, 1965 from an electrical shock while using a portable electrical tool. An investigative board has been established by the Corps.

NOTES 6-14-65 BELEW B 6/18

RL10 ENGINE

We are working with the Navy to obtain DOD inspection services on the RL10 Project at West Palm Beach, Florida to save 6 to 8 MSFC spaces. We foresee a peak of 12 people for this operation over the next few years, since production rates are as low as one or two engines per month. Main objectives of the discussion is to obtain a smooth phase-in of DOD inspection services with minimum program impact. ✓

H-1 ENGINE

A procurement plan covering 22 follow-on H-1 200K engines was submitted to NASA Headquarters on April 20. An agreement between MSFC and NASA Headquarters on the contents of the plan was reached on May 18. Since this date, numerous follow-up calls revealed that the plan was being prepared for final signature. A continued delay in receiving approval may impact the production effort due to the long lead items necessary. ✓

S-IVB-ULLAGE ENGINES-ROCKETDYNE/GEMINI

Detail stress analysis conducted by Rocketdyne, indicated the preliminary fixes proposed are marginal in accomplishing the necessary stress reduction required at the trunnion and nozzle exit flange areas of the engine metal shell. A study of alternate design modifications is scheduled for completion next week. No delay of the Saturn V/S-IVB is presently anticipated. ✓

J-2 ENGINE

Production engine J-2013 completed the planned test program on the S-IVB Battleship stand at SACTO and has been shipped to MSFC (received 5/31/65) for actuation of the MSFC S-IVB Battleship stand.

Production engine J-2024 was accepted by NASA on May 28, and delivered to S&ID on June 12. This is the last S-II All Systems engine.

Production engines J-2025 and J-2026 are presently undergoing acceptance testing. J-2025 is scheduled to be delivered to MSFC Test Laboratory and J-2026 is the first engine for vehicle 501. ✓

F-1 ENGINE

MSFC, Air Force, and Rocketdyne personnel met at MSFC on June 9, to investigate West Coast LOX logistics problem which has nearly doubled as a result of the increased R&D testing under the Incentive Contract. It appears that the current LOX short supply status will be greatly improved in July and later.

Engine F-3014, with a replaced turbine manifold, is on T/S IC NASA/RETS for acceptance testing. This engine, a spare for S-IC-I, has been behind schedule because of manifold failure.

Engine F-4017, with a replaced thrust chamber, is at NASA/RETS for acceptance testing on T/S ID. This is earlier than expected and this engine is now almost on the original schedule. ✓

NOTES 6-14-65 CLINE

B 6/18

1. S-IC-T ACTUATOR RETURN DUCTS FAIL DURING STATIC FIRING: The ducts which failed had been qualified. MSFC has previously notified Boeing that the flexible portions of the ducts were not located in the proper plane and that the solid portions could fail. No actions resulted. The ducts on two positions have been replaced by flex hose; the remaining replacements will be made as soon as hose can be procured.

2. ATTEMPTED 25-SECOND MAINSTAGE S-II BATTLESHIP CLUSTER FIRING: The S-II battleship cluster attempted a 25-second mainstage firing on 6-9-65. Actual duration was 7.84 seconds of mainstage. Reason for cutoff is unknown at this time; however, review of the strip charts revealed that nothing was wrong with the engines at the time of cutoff.

Problems were again encountered with the LH_2 recirculation pumps. Failure of their operation was quite random. As a result, the overboard bleed configuration was used for the firing mode. The LH_2 recirculation system which is flight type has been used on previous tests successfully; however, their operation continues to be quite erratic. The vendor supplying the recirculation pumps has been contacted and appraised of the problem.

The 25-second test will be performed as soon as reason for cutoff is determined and recycling is accomplished.

3. 350K HIGH PRESSURE LH_2 PUMP: A successful 60 second test was run on 6-10-65 on the 350K high pressure LH_2 pump. The pump developed 2000 psi at a flowrate of 7,000 gallons per minute and a shaft speed of 24,500 revolutions per minute. All performance and vibration data appears satisfactory. Testing will progress to the nominal 5500 psi discharge pressure at 13,000 gallons per minute and 40,000 revolutions per minute during the next several weeks.

NOTES 6/14/65 CONSTAN B 6/22

Negative Report

B 6/22

NOTES 6-14-65 DANNENBERG

1. Experiment Coordination - Bellcomm representatives (Dr. Pearse and Mr. Hillberg) will be at MSFC on 6-16-65 to discuss with P&VE representatives the MSFC experiments required to satisfy the action items from the 5-17-65 Experiment Board Meeting. ✓

2. Test Documentation - R&DO Directives establishing policy for standardizing the preparation of test reports and test procedures have been issued. These directives apply to qualification, reliability demonstration and acceptance tests, and will provide for uniform preparation of required documents. These test reports and procedures will hereafter be identified as MSFC Test Documents handled by MS-AD (Mr. Garrett). ✓

3. Evaluation of Boeing Proposal for Implementation of MA-2 Schedule on Saturn V Systems Support Contract - R&DO technical managers have evaluated the Boeing proposal. In no case was additional cost considered allowable for the change (stretch-out) in schedule. IO was advised on how to reschedule contracted manpower to cover the tasks that would be affected by the change in schedule. Where the contractual deliveries were not tied to the vehicle schedules R&DO insists on maintaining present delivery dates. ✓

4. ICD Operations - An agreement was reached between Dr. McCall and Dr. Rudolph concerning the assignment of work to provide technical and program management of Saturn ICDs. A Task Team has been established under IO's chairmanship with representatives from R-SA and R-P&VE.

The SA-201 material is being updated to cover the Launch Operations Panel's new inputs. These items will be used for monitoring the Apollo ICD program. ✓

NOTES 6/14/65 GEISSLER B 6/22

1. Automation of Evaluation, SA-8: The "Automation of Evaluation" program, developed by RCA was used for the first time on SA-8. The program shows much promise for early assessment of all telemetered data. Measurements failing for 6 seconds were called out as failed measurements, these were then correlated with related measurements. Approximately 350 flight measurements on the S-I stage and instrument unit were analyzed with about 40 measurements indicating failures or partial failures. The S-IV stage was not run because of extremely noisy data obtained from KSC. ✓

E.G. What does that mean. B

2. SA-8 Flight Evaluation: The vector sum of angle-of-attack to be used for EDS agreed with computed values to within 0.3 degrees. This was the first flight test of this measurement. The reason for the comparatively large guidance deviation from predicted in cross range (4 m/s), throught to be due to an incorrect sign on predicted guidance errors, has not yet been resolved with R-ASTR. A final SA-8 trajectory is now being constructed. Problems exist due to the limited amount of tracking data in the latter portion of the S-IV powered flight. ✓

3. Ablation of Tektites: Re your question on item 2, this subject, Notes 5/31/65 Geissler, (see enc. 1): We still have one man who has a working knowledge of ablation analysis. We are remaining alert for any new mission assignments which might require this experience, hoping that this occurs before the know-how is lost completely. At this time we cannot afford the manpower required to remain active in this field simply for the sake of maintaining the skill. ✓

4. Design Considerations for S-IV B LH_2 Vent Sequence: In reply to your questions on this subject at the Saturn IB Design Review, June 9, 1965, The attached summary is furnished, (enc. 2). ✓

5. Plans for Spectacular Missions for Saturn IB and V: Re: Notes 6/7/65 Geissler, (enc. 3) and your comments to item 1 (above subject), wherein problems associated with recovery of Explorer I were discussed. Storage of the Explorer I in the Apollo Command Module would appear to be difficult because of the 80 inch length of Explorer I as compared to the 81 and 82 inch dimension of the CM Crew Compartment (see attached sketch). The Crew Compartment is roughly a cylindrical enclosure 81 inches in diameter and 82 inches high. Contained in this enclosure are the three couches, three men, and miscellaneous protruding equipment, display panels, control panels, etc. There would appear to be very little room for maneuvering Explorer I in and securing it (probably on the floor) against the reentry forces. Whether it could be done could really be well evaluated only on a scale mockup, but storage appears difficult. Rendezvous with Pegasus would be simpler due to the larger optical and radar tracking size, the longer remaining orbital lifetime, and the smaller angular rate of the satellite. It is now planned at HQ request to launch Pegasus C on a 95.2 deg flight azimuth and into a 535 km circular orbit to facilitate later rendezvous operations, possibly with a Gemini spacecraft in 1966. ✓ Good.

NOTES 6-14-65 GRAU

B 6/22

1. IU 201 CHECKOUT: We have decided to go on two 10-hour shifts for the IU 201 checkout in order to hold the schedule. This operation is presently scheduled to begin on June 28 and end on September 20, 1965.

2. NPC 500-5 IMPLEMENTATION: We met with Colonel James, Mr. Lemke, and others from NASA Headquarters to indoctrinate them in our Quality and Reliability efforts on the S-IB program and to negotiate the kind of Quality and Reliability reports that can be submitted to meet the requirements of NPC 500-5 without additional effort. The meeting was rewarding since they agreed to accept those reports already existing on the S-IB.

3. F-1 ENGINE EQUIPMENT: Corrective action has been initiated to eliminate high rejection rates (approximately 85%) at MSFC of loose equipment for the F-1 Engines. The rejections have been caused by contamination and/or packaging. In most cases the discrepancy is so severe that visual inspection alone requires rejection of the equipment. As a result of the action initiated, the Government Agency at Rocketdyne, Canoga Park, will perform 100% inspection until the problem is resolved.

NOTES 6/14/65 HAEUSSERMANN B 6/22

1. IBM LVDC STATUS REPORT: During vibration of LVDC TMR No. 1, IBM experienced failure of the memory module. X select wires were broken close to the solder connection due to vibration. Securing wires to core plane frames with Sylgard (polyurethane) had been abandoned some weeks ago to avoid its flow into the magnetic cores; it will now be applied carefully again to reduce vibration effects. ✓

2. S-IC ACTUATOR MALFUNCTION - STATIC TEST 6/8: Approximately 3.30 seconds after engine cutoff, the ground hydraulic supply was connected to the engine gimbal control system; engine number 3 yaw actuator (MOOG S/N 21) malfunctioned driving the number 3 engine to a hard over position in the yaw axis. By applying a 28 millamp signal to the servo valve, the engine was returned to the neutral position. The actuator was returned to ASTR hydraulic Laboratory. An investigation revealed that the lower feedback spring had become disengaged from the cam follower feedback mechanism. Moog Servocontrol Inc. and ASTR personnel are still investigating the malfunction. The opinion is that a minor modification of the cam follower feedback mechanism will prevent this type of malfunction. Complete vibration qualification tests will be run after modification. ✓

B 6/22

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B 6/22

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Pegasus C: Final testing and installation operations are being completed. The unit is scheduled to be shipped by Guppy to KSC about June 21. This schedule can support the advanced SA-10 launch date.

S-IVB 201: Installation of parts and performance of checkout continues at SACTO. We met with R&DO last week to discuss the possibility of firing with some non-flight components and some non-qualified components. Due to the parts availability problem, the projected status for the firing is changing rapidly and will be reviewed again with DAC at the Quarterly Review this week. We plan to follow this situation closely but it will be necessary to revise plans and make last-minute decisions right up to the firing date. Completion of checkout is paced by hardware shortages. Some slippage in the scheduled July 8 static firing date is indicated at this time.

SA-201 Launch Schedule: (Reference My Notes 6/7/65) I conducted a detailed review of the ESE delivery status and its related effect on IU-201 delivery, LC ESE availability, and availability of ESE at the Breadboard for program verification. The review revealed that hardware and software "need dates" previously established by KSC to support an "early part of the month" launch date could not be met. This situation was further reviewed with Dr. Rees, Mr. Weidner, and other R&DO personnel at which time we agreed to advise KSC of our current assessment of delivery dates for the hardware and software. We will ask KSC to use these new dates to revise their planning to permit a launch date in the latter part of the month, currently planned for the launching.

Attachment: My Notes 6/7/65 (on Dr. von Braun's copy only)

NOTES 6-14-65 Koelle B 6/22

1. LUNAR STUDIES: We have received authority to proceed with four lunar systems studies which are designed to assist in defining the interface between the lunar AES program (as presently envisioned with a maximum 14-day staytime) and any follow-on lunar exploration program. The resources allocated to these industry studies are as follows:

a. Mobility Systems (follow-on to MOLAB studies) $500,000 ✓

b. Lunar Shelter Concepts $200,000 ✓

c. Lunar Exploration Modes (total system evolution including logistic support) $900,000 ✓

d. Scientific Lunar Missions (continuation of last FY's work) $200,000 ✓

Headquarters considers these studies as an essential complement to the AES program definition. ✓

2. MILITARY USE FOR SATURN V: In trying to find a larger market for Saturns, I have been able to identify only one potential military use, but it could be an important one. It is a modification of Dr. Mueller's idea of a synchronous scientific laboratory. I could envision that, if the cold war gets hotter, a manned surveillance satellite in a synchronous orbit covering Russia constantly might become attractive. With a 55° inclination such a manned satellite would do a figure eight over the ground, touching Moscow at the upper end of the eight. To have a permanent surveillance one would want to have two satellites in orbit at one time. Aside from the military value, I consider the potential psychological value even more important. I would think that the average Russian would feel very uncomfortable if he were constantly watched by "Big Brother." A combination of Saturn V, Apollo, and MOL should do this trick. If such a mission should materialize, at least eight Saturn V's per year (3-month staytime, two satellites in orbit at one time) would be required. Because such a mission might be a bread-and-butter project for our Saturn contractors, I would suggest that you discuss this possibility with the right people at the right time. ✓

3. NOTES: These are my last NOTES to you and my best wishes will be with you and your team in the future: Good Luck'. ✓

NOTES 6-14-65 KUERS B 6/22

1. Visit of Tulsa Plant: Last week I visited with a group of our people the Air Force (now DOD) plant at Tulsa which is at the present utilized by DAC (70%) and NAA (30%). DAC has mainly aircraft modification work (B-52) in their part of the plant but also some interesting S-IVB development work for stage and panel separation techniques. NAA is building here--as you certainly know--complete thrust and skirt structures for the S-II, IU panels for IBM, and the second block LEM Adapter panels for Apollo. These panels are of a honeycomb construction. Their tooling and process control in bonding techniques seem to be excellent. ✓

2. Major Events and Development of S-IC-501:

a. The cracks detected in the PVC Support Link, 7075-T86 forgings, appear to be induced by stress corrosion. It has been decided, therefore, to exchange all 60 links on 501 by new forgings on which excessive stresses in the defect area will be avoided by tolerance changes of interference fits and by shot peening. The removal and replacement of these link assemblies, which must be exchanged only one at a time for each PVC, has started. The first replacements were received June 9. No impact on schedule is predicted. ✓

b. After successful completion of all qualification tests and rework of weld joints between Inconel 718 and stainless steel bellows, the Lox PVC's for 501 have finally been shipped. We hope to install these crucial items next week. ✓

c. General Outlook: We still suffer in our 501 assembly work from insufficient supply of parts for systems installation caused by delay of basic design and engineering changes. I believe, however, that we have this parts delivery problem now under control. Most disturbing is still receipt of many components which have passed qualification and acceptance tests at the vendors' places and are officially accepted by the Government, but are rejected after receipt at MSFC. The most critical area is the engine build-up and modification where the flow of engineering changes and uncertainty of design definition in the insulation area prevent any firm planning of assembly operations. ✓

NOTES 6/14/65 MAUS

B 6/22

1. APOLLO PROGRAM PERT -COST CORRELATION AND EVALUATION TECHNIQUE - MSFC has been requested to participate in a pilot test of a new management system being developed by headquarters for schedule/cost correlation. Objective of the system is to develop a technique for:

   - PERT/SARP/COST correlation
   - evaluation of work accomplished versus actual expenditures
   - evaluation of projected runout costs
   - evaluation of contractor performance

   The pilot test is planned for this week utilizing the Saturn V top level network and a computer program developed by Lewis Research Center.

2. CONTRACT COST MANAGEMENT SEMINAR - Dr. Ralph Reid of A.T. Kearney Company and Messrs. Dittenhofer and Maroney of NASA headquarters will be here this week to review with various people of MSFC, the work done thus far on the "Integrated Cost Study", which is a part of the Contract Cost Management Seminar being developed by Kearney for NASA. Tom Smith is coordinating MSFC participation.

3. MSFC ORGANIZATION AND FUNCTIONS - We have received advance copies of the MSFC Functional Statement and the new MSFC organization chart which were approved by Mr. Webb on May 26. The chart shows the new Manpower Utilization and Administration Office, Michoud Assembly Facility, and Mississippi Test Facility. The submission on Saturn IB Centaur Program Office is still in the headquarters approval channels.

Harry G. Looks like we have to change a few hundred signs. Please implement. B

4. END OF YEAR PROCUREMENT PROBLEM - At Mr. Gorman's request, we are developing a "position paper" on the end of year procurement problem that MSFC has in the small procurement area. This paper is to be completed in time for the June Management Council Meeting, and it is to include Supporting Development and Advanced Studies as well as procurements for the major programs. Suggestions and proposals have been solicited from: R&DO, IO, FIN, and Mr. Buckner's office. Most of the suggestions thus far relate to internal MSFC improvements.

NOTES 6/14/65 McCARTNEY B 6/22

1. RESOURCES STUDY FOR HIDEWAY MEETING: R-RM has completed a study of the total R&D Operations' resources versus future requirements in meeting new programs, such as AES, Saturn IB/Centaur, Cislunar Pegasus, etc. This study considers all of our present Saturn mainstream requirements and their phasing over the next few years, as well as proposed new starts. It examines all known sources of manpower to be applied to these requirements, as well as job classification (skills) within the total R&D Operations complex. The results of this study are being given to Mr. Maus for inclusion in the material being prepared for your "hideway meeting". ✓

2. REVIEW OF SINGLE SUPPORT CONTRACT ADMINISTRATION: As you are aware, a series of conferences have been scheduled between the Single Support Contractors and Center management, beginning the latter part of this month. The purpose of these Conferences is to review operations under our single support contracts to date and to iron out any problem areas. ✓In addition, this office has reviewed the work which has so far been placed by the Laboratories in an effort to determine compliance with Center regulations and our approach to Single Support Contract Administration. Results of this review indicate several instances where Schedule Orders and Technical Directives issued under the contract require modification to comply with Center Policy. These instances will be followed up and adjustments made as required. ✓

NOTES 6/14/65 RUDOLPH B 6/22

1. S-IC-1 Fabrication Status - The Thrust Structure/Fuel Tank assembly is reported to be 14 weeks behind current working schedule; however, no stage delivery slippage is expected. All 60 propellant duct support link assemblies must be changed because aluminum forgings are breaking at bushed mounting holes. The rescheduling of installation of the redesigned assemblies is presently being worked out by ME. The LOX Tank/Forward skirt mating operation was completed two weeks ahead of schedule. ✓

2. S-IC Acceptance Test MTO, Position #2 - A review of the requirements for Position #2 was conducted during the past week. The need for that test position was reaffirmed and correspondence initiated through General O'Connor to Mr. Balch to implement that decision. ✓

3. S-II Battleship Firing - On June 9, 1965, a 25-second firing was initiated at 11:44 am, CST, for approximately eight seconds in duration. Automatic cutoff occurred from undetermined cause. Evaluation is being made to determine the cause. A retest is scheduled for today, June 14, 1965, if sufficient confidence as to corrective action is known. ✓

4. S-IVB Facilities Checkout Stage - The Facilities Checkout Stage left Courtland Dock on Thursday, June 10, 1965, and is expected to arrive on dock at KSC on Thursday, July 1, 1965. ✓

5. Saturn V Propellant Loading Investigation - Saturn V Propellant loading has been under investigation for some time. Although disagreements have come up between centers, it has not yet been possible to get a single MSFC position. Action is underway to reclarify the loading control system and expect to give you details in two weeks. ✓

6. Low Bay Checkout Definition - A detail compilation of actions, follow-up, controversial memorandum, etc., have been assembled in chronological order and furnished to Dr. Hueter/Dr. McCall by the Saturn V Test Office. This package provides an insight into conflicts of opinion and the official actions taken to date. Dr. McCall has accepted an action item within the Technical Systems Office to reestablish a firm position by June 18, 1965. ✓

NOTES 6-14-65 Stuhlinger B 6/22

1. PEGASUS A: Hits on 1.5 mil panels continue to be registered. The 8 mil and 16 mil panel systems no longer produce meaningful data. ✓

2. PEGASUS B: Memory and telemeter systems have been working satisfactorily. Temperatures and spin rate are within acceptable limits. Spurious pulses ("intermittent operation") were observed on one 1.5 mil panel group, and on two 16 mil panel groups. The two 16 mil panel groups were disconnected. Two individual 16 mil panels, and one 8 mil panel experienced shorts (for unknown reasons).

E.S.

Results so far from Pegasus B:

1.5 mil:	0.12 penetr. per m^2 and day*
8 mil:	0.02 penetr. per m^2 and day
16 mil:	0.004 penetr. per m^2 and day

*Pegasus A yielded 0.11 penetr. per m^2 and day.

16 mil = 0.016 inch × 25 = 25/150

i.e. 1 m^2 of 0.400 mm material is penetrated once every 250 days. Is this conclusion right? What material? Soft Aluminum? What would corresponding steel skin figures be? B

$\frac{1}{0.004} = 250$

3. AES LUNAR SURFACE PROGRAM: RFQ'S for the following tasks of the 1965 program were evaluated last week. Contract negotiations will begin immediately:

Environmental Effects on AES Instruments
Surface and Subsurface Probes
Emplaced Scientific Station ✓

The evaluation team for the Lunar Drill task will convene June 14; completion of the evaluation is expected by the end of the week. ✓

4. AES PROGRAM ACTIVITIES AT MSC: As we learned recently, MSC endeavors to obtain the assignment of responsibility for the entire AES program, with the arguments that (a) all the AES projects include men and life systems, and (b) manpower will soon become available at MSC. It is expected that MSC will submit a strong bid for the entire AES program at the June 19 meeting.

They didn't. B (Haven't got the manpower)

5. TOTAL ART/SRT STATUS:

	Annual Plan	Authorized	Processed To FMO	Obligated
OART	15,305,000	15,305,000	14,877,014	6,234,452
MSF	22,000,000	22,000,000	21,292,719	9,934,633
OSSA	1,413,000	1,413,000	1,407,994	149,734
OTDA	2,000,000	2,000,000	1,999,665	990,995
TOTAL	40,718,000	40,718,000	39,577,392	17,309,814

✓

June 21, 1965

PS 6/22

NOTES 6/21/65 BALCH

B 6/24

1. Waterways Operations - The canal system, navigation lock, and bridge and cryogenics piers are sufficiently complete to accept stage and cryogenics barges. Several vessels have processed through the navigation lock.

2. S-II Test Control Center - Deficiencies of the air conditioning system are being corrected and the beneficial occupancy date is June 22, 1965.

9VB 6/22

NOTES 6-21-65 BELEW

B 6/24

F-1 ENGINE

Engine F-3014, the spare engine for S-IC-1, and engine F-4017, the first engine for S-IC-2, have completed acceptance firing and are in second E&M inspection at Canoga Park. Expect acceptance of these engines in June which puts F-1 engine deliveries back on schedule. The remaining engines for S-IC-2 are on schedule.

RL10 ENGINE

We are looking into the possibility of using Hastelloy N as a thrust chamber material for the RL10 engine in place of the 347 stainless steel currently used. Analytical work and laboratory tests have shown that this material will provide additional heat transfer and performance margin. One engine has been built up with a Hastelloy N chamber and was fired successfully last week for 470 seconds.

C-1 ENGINE

The revised proposals for Phase II were received today. During the next ten weeks, the two contractors (RMD and STL) will be evaluated; the findings will be presented to you, Dr. Mueller and Mr. Webb; negotiations will be consummated with the selected contractor; and the contract will be submitted to Headquarters for approval. We are still working toward having a Phase II contract by September 6, so as to maintain program continuity.

S-IVB ULLAGE ENGINES - ROCKETDYNE/GEMINI

A study of design modifications to effect stress reduction in trunnion and nozzle exit flange of the engine metal shell was continued.

The present schedule for completion of MSFC Qual program is August 15. During S-IVB stage program review at MSFC on June 17, DAC indicated the first modified Gemini engine would be needed for APS testing on February 1, 1966. No problem in meeting this requirement is anticipated.

J-2 ENGINE

Negotiations with Rocketdyne on the production incentive contract conversion have been reopened per direction in Dr. Mueller's letter to you of June 12. We see no problem in restructuring the schedule incentive from a four-month evaluation period to a one-month period. However, resolution of the "hot test" risk clause wording may reach the Mueller-Atwood level. If we reach an impasse with Rocketdyne, we will prepare a letter to Dr. Mueller for your signature outlining the facts.

S-IVB Battleship test was initiated June 19. The engine was shutdown six seconds after main stage due to a faulty facility sequence timer. Next test is scheduled for June 24.

9VS 6/22

NOTES 6-21-65 CLINE

B 6/24

NEGATIVE REPORT

NOTES 6/21/65 CONSTAN

1. Swamp Pay - Boeing and Chrysler management have expressed considerable concern over the policy of NAA (S&ID & Rocketdyne) to pay employees at Mississippi Test Site a premium of so-called "swamp pay." As we understand it, this premium for working at a remote location is 54-1/2 cents per hour for "hourly" employees and $100 per month for "exempt" employees and is applicable to new hires of local personnel as well as NAA employees transferred from other locations. Boeing is especially concerned, since they have already lost some employees who resigned to go with NAA, and they will be at MTF doing an equivalent job utilizing very much the same types and skills as are used in the S-II program. I have asked CCSD and Boeing for more detailed information with respect to types of people, skills, pay rates, etc. of personnel involved. When this information is received, it will be forwarded to I-DIR.

2. CCSD

Incentivizing Chrysler Contract NAS8-4016 - On June 9, 1965, a RFQ for incentivizing the contract was delivered to CCSD. On June 16, 1965, a meeting was held with CCSD for the purpose of clarifying several points in the RFQ. Providing it is acceptable with higher authority, the RFQ will be modified to eliminate structuring the contract around the sub-system concept with the exception of the technical areas.

3. Boeing

CAMS - In consonance with the effort to incentivize the Boeing contract, four change orders have been issued implementing approximately 32 CAMs and two change orders are in work to implement three CAMs. This effort is necessary in order to prepare an up-to-date Part I CEI Specification. Approximately 15 of the above were controversial (MSFC did not consider work to be out-of-scope); however, this will be reconciled during negotiations.

JDB 6/22

NOTES 6-21-65 DANNENBERG

B 6/24

1. Manned Space Flight Experiments Board Procedure Change - The Executive Secretary of the Experiments Board, Mr. Denicke, informed of a new ground rule in the Board's operation. The MSFEB will no longer assign approved experiments to specific vehicles; this will be left to Dr. Mueller and to the Program Office. The Board will only recommend experiments to Dr. Mueller and assign relative priorities. After the experiment is conducted and the results evaluated, the Board expects a brief report. The Board will make its decisions based upon the Form 1067 (Experiment Proposal Form) with a presentation to the Board by the sponsor or the experimenter. ✓

2. Feasibility Studies on MSFC Experiments - It has become evident that it will not be possible to complete the feasibility studies on the three MSFC proposed experiments in time for the 7-19-65 MSFEB meeting. The Apollo Program Office and the Executive Secretary of the MSFEB have been informed that this information will be forwarded to them by 8-16-65, in time to be included in the agenda for the September meeting. ✓

3. Interface Control Documentation - A thorough review was made of the ICDs by MSFC and MSC during meetings the week of 5-9/15-65. The overall results being presented to the PRB 65-3 on 6-21-65 are that some 150 new ICDs were identified in the Launch Operations Panel area, due primarily to the recent physical transfer of Mr. Poppel's group to KSC. These ICDs include 6 which were transferred from the Mechanical Integration Panel. One ICD was deleted; 6 new ones were defined. These changes have been included in the latest repository Log and will be reported at today's PRB meeting. ✓

NOTES 6/21/65 GEISSLER 9A6/22 B6/29

1. Apollo Command Module-Service Module Interface: A meeting was held Monday, June 14, with personnel of MSC and NAA regarding the problems encountered in the Apollo Command Module-Service Module interface during Saturn IB dynamic testing. Several salient points brought out were: (1) no such behavior was noted during MSC-NAA testing; (2) the connection is extremely sensitive to installation procedures; (3) all indications are that Chrysler installed the connections properly (supervised by NAA personnel); (4) visual inspection indicates two of the three connections are now seated improperly; (5) MSC and NAA are aware of the low torsional stiffness but stated that this met all design requirements. It is satisfactory from a control standpoint for the system to be used for Saturn IB. Simple static tests of the connection using strain gages will be performed (probably during the week of June 20), with NAA cognizant personnel participating, to check the adequacy of the connection and the installation procedures. Results of these tests will be available immediately after the tests are made. If the connections or procedures are inadequate, simple fixes can be made easily without substantial cost or delay. One possibility is to strain gage the tension ties and take measurements during installation to insure proper tension. ✓

2. SA-10: The final SA-10 predicted trajectory and guidance terminal conditions have been derived for insertion of the S-IV/Pegasus C combination into a 535 km circular orbit. The launch azimuth has been revised from 105 degrees East-of-North to 95.2 degrees East-of-North in order to provide an orbital inclination of 28.87 degrees. Official authorization to proceed with this mission has been received from NASA Headquarters. ✓

3. Reference Trajectory Sub-Panel Meeting: The Sixth Reference Trajectory Sub-Panel meeting was held at MSC on 6/16/65. The primary point of interest was that MSFC and MSC will jointly publish a new nominal design reference mission document for the LOR mission. This will be based on the SA-504 L/V. A number of meetings are tentatively planned with MSC for working out details and ground rules, possible "de-bugging" of the joint computer program for computing the trajectory to be included in the document, and generation of the document itself. ✓

4. Guidance and Performance Sub-Panel Meeting: The twelfth Guidance and Performance Sub-Panel meeting was held at MSC on 6/15/65. Some of the noteworthy points of the meeting were: (1) "Wind-biasing" SA-201 was discussed with MSC (in order to insure that there is no repeat of the "SA-6 situation"), and the emphasis was primarily on our method of biasing and gains in launch capability. It was noted that our present capability is about 50 m/s and wind biasing will give an additional 12-15 m/s. (2) MSFC emphasized the importance of some very detailed discussions in the LV/SC guidance interfaces including aim vector, and second opportunity out of orbit. The MSFC definitions of the geometry for cut-off parameter, aim vector, etc. were given. ✓

NOTES 6-21-65 GRAU

WVS 6/22 B 6/24

1. RL10 ENGINE: With regard to Lee Belew's Notes 6-14-65 (copy attached), we are planning to retain a nucleus of three people (cutting back six) at Pratt & Whitney to assure that the quality is not degraded.

2. J-2 AND F-1 ENGINES: As a result of a recent manpower survey of Air Force Plant Representative Office (AFPRO), Rocketdyne/Canoga Park, it was determined that an additional 34 personnel were required to perform quality assurance and reliability functions on MSFC contracts. This is 23 over and above the total manpower previously requested. If these additional personnel are assigned to AFPRO, the overall manpower at Canoga Park will be 115. Deficient areas which require additional coverage are: Receiving Inspection, Machine Parts, Santa Susana Field Laboratory, J-2 and F-1 Final Assembly and Reliability.

3. SATURN IB/V ESE: All ESE panels required for the IU Checkout Station at IBM have been delivered from the subcontractor to GE and are in the process of being inspected and routed to the Manufacturing Checkout area in Building 4373. Present plans call for round-the-clock checkout operations until completion.

4. LABORATORY MTO ACTIVATION ACTIVITIES: We are presently heavily involved in the MTO activation activities. These activities require essentially seven of our people full time and we have 11 Air Force support people on board with 17 additional either in transit or expected on board by June 27. These people are actively developing procedures, doing receiving inspection and accomplishing acceptance inspection at the field sites and in the component clearing areas.

ATTACHMENT: NOTES 6-14-65 BELEW (Copies to Dr. von Braun and Mr. Weidner)

NOTES 6-14-65 BELEW

B 6/24

RL10 ENGINE

We are working with the Navy to obtain DOD inspection services on the RL10 Project at West Palm Beach, Florida to save 6 to 8 MSFC spaces. We foresee a peak of 12 people for this operation over the next few years, since production rates are as low as one or two engines per month. Main objectives of the discussion is to obtain a smooth phase-in of DOD inspection services with minimum program impact.

H-1 ENGINE

A procurement plan covering 22 follow-on H-1 200K engines was submitted to NASA Headquarters on April 20. An agreement between MSFC and NASA Headquarters on the contents of the plan was reached on May 18. Since this date, numerous follow-up calls revealed that the plan was being prepared for final signature. A continued delay in receiving approval may impact the production effort due to the long lead items necessary.

S-IVB-ULLAGE ENGINES-ROCKETDYNE/GEMINI

Detail stress analysis conducted by Rocketdyne, indicated the preliminary fixes proposed are marginal in accomplishing the necessary stress reduction required at the trunnion and nozzle exit flange areas of the engine metal shell. A study of alternate design modifications is scheduled for completion next week. No delay of the Saturn V/S-IVB is presently anticipated.

J-2 ENGINE

Production engine J-2013 completed the planned test program on the S-IVB Battleship stand at SACTO and has been shipped to MSFC (received 5/31/65) for actuation of the MSFC S-IVB Battleship stand.

Production engine J-2024 was accepted by NASA on May 28, and delivered to S&ID on June 12. This is the last S-II All Systems engine.

Production engines J-2025 and J-2026 are presently undergoing acceptance testing. J-2025 is scheduled to be delivered to MSFC Test Laboratory and J-2026 is the first engine for vehicle 501.

F-1 ENGINE

MSFC, Air Force, and Rocketdyne personnel met at MSFC on June 9, to investigate West Coast LOX logistics problem which has nearly doubled as a result of the increased R&D testing under the Incentive Contract. It appears that the current LOX short supply status will be greatly improved in July and later.

Engine F-3014, with a replaced turbine manifold, is on T/S IC NASA/RETS for acceptance testing. This engine, a spare for S-IC-I, has been behind schedule because of manifold failure.

Engine F-4017, with a replaced thrust chamber, is at NASA/RETS for acceptance testing on T/S ID. This is earlier than expected and this engine is now almost on the original schedule.

VTB 6/22

B 6/24

NOTES 6/21/65 HAEUSSERMANN

1. BACKUP FOR PUMP MOTOR OF ENVIRONMENTAL CONTROL SYSTEM IN THE INSTRUMENT UNIT: We have investigated the use of a brushless DC or an AC motor to replace the present standard-type DC motor. The power requirements are so high (4 1/2 HP) that for the given voltage supply (56V) a reliable and quality acceptable motor cannot be expected for SA-501. Anyway we intend to start a development program to improve the state of the art for future applications. ✓

W.H. Sounds not so good B

2. ST-124M SLED TESTS: The first two successful sled runs were made with the ST-124M platform system at Holloman Air Force Base. The maximum acceleration was 6g built up in 8 seconds. ✓ Except for drop-outs of telemetry links (one link momentarily on the first run, a complete loss of another link on the second run after +4 seconds) the system worked very satisfactorily. ✓

3. SINGLE SUPPORT CONTRACTOR STAFFING: Sperry has now achieved 85% of the required on-site staffing and has indicated 95% staffing by 6/28. The intense recruitment effort by Sperry has resulted in good quality personnel which should permit rapid orientation to laboratory mission requirements. ✓

(computation Lab)

4. STATUS OF FLIGHT SIMULATION FACILITY IN BUILDING 4663: The overall simulation system (laboratory facilities, second generation attitude motion simulator, and celestial body motion simulator) is completed and is available for operational use. The completion date, which I have indicated to you in the notes of 1/18/65 was met by concerted efforts. If you are interested in a presentation, I would like to invite you in about 3 to 4 weeks when we can demonstrate the investigation of a typical problem. ✓

W.H. Yes. Please arrange von Braun B

NOTES 6/21/65 HEIMBURG

1. F-1 ENGINE:

After two unsuccessful attempts to fire on Friday, 6/18, a successful 90-second lox depletion test (TWF-061) was made with engine F-2009. Purpose of test was the investigation of demonstrated inconsistencies in performance noted in previous firings on this engine. Unsuccessful attempts were caused by facility operational malfunctions. Engine baffle damage encountered on last test will cause engine to be removed. Engine had 8 starts and 400 seconds of mainstage time prior to this failure.

2. S-II BATTLESHIP - SANTA SUSANA:

Firing attempted on 6/14 was scrubbed due to numerous problems. Test was conducted on 6/15 for 5 seconds duration with premature cutoff. Trouble shooting system took place 6/17, with another firing 6/18, which was aborted at 600 milliseconds after mainstage command. At the request of the stage manager, a group of Test Laboratory personnel will visit Santa Susana on Wednesday and Thursday of this week to discuss means of assuring better test operations with S&ID. Our recommendations have been forwarded to S&ID and deal primarily with cleaning up their electrical control operations and philosophies.

3. S-IV BATTLESHIP:

A 6.7-second test was made on 6/19, and was cut off due to loss of "Facility Prep Complete" when switching relay system tied in with the start bottle re-pressurization system dropped out the firing control circuits. Modifications are being made to allow checking this sequence and plans for TR-1036 are being made for 6/24.

4. F-1 TURBOPUMP:

An F-1 turbopump test was conducted on 6/18, using pump 4o56890-1 (Block $2\frac{1}{2}$). The test was the first test of the POGO series with both fuel and lox discharge pulsers activated. Preliminary data indicate that the discharge pulser provides a sufficient pulse for POGO analysis.

9 B 6/22

NOTES 6-21-65 HOELZER B 6/24

1. COMPUTATION LABORATORY SUPPORT TO NASA HEADQUARTERS FOR THE IBM 1410 INSTALLATION:

a. In recent weeks the Computation Laboratory has been giving technical assistance to NASA Headquarters in preparing for installation of their IBM 1410 computer. By sharing with them our local experience with this equipment and its associated software, their conversion problems can be minimized.

b. Locally-written standards concerning use of the 1410 Operating System, MSFC modifications, operations run book forms, and IBM 1401 utility programs have been provided and explained.

c. Also, the MSFC Computation Laboratory system for recording and reporting computer utilization and cost distribution was presented in Washington last week. This system is being reviewed for implementation at NASA Headquarters and possibly other NASA computer installations. ✓

2. FACILITY MANAGEMENT INFORMATION SYSTEM:

a. At the request of the Facilities and Design Office, Computation Laboratory representatives participated in a survey with General Services Administration on June 7-11 to determine the facility data requirements of R&D Laboratories and the Facilities and Design Office. The ultimate scope of this project is to develop an integrated Facility Management Information system to provide physical and fiscal information on facilities and equipment inventory, capability, and utilization. ✓

b. A summary of findings and recommendations will be submitted to the Facilities and Design Office by July 16, 1965. ✓

NOTES 6/21/65 JAMES 6/22 B 6/24

S-IB Stage Spider Beam: As you will recall, we experienced considerable difficulty with the structural qualification of the lightweight spider beam for the S-IB stage. This beam is essentially a weight reduction redesign of the S-I spider beam. A series of failures in structural tests and follow-on "fixes" have plagued this development item for some time. With the final fix applied, Chrysler successfully tested the beam with 140 ~~pounds~~ percent load factor.

S-IVB 201: As we mentioned last week, slippage of the static firing date appeared imminent. This is due primarily from delay in completion of stage buildup and checkout occasioned by parts shortages. The probable date for static firing now appears to be July 21.

IU: We were advised last week by IBM of a general strike by workers at AVCO (Nashville). This strike effected the availability of cold plates for IU-202 assembly and was apparently settled over the weekend. This strike was about three weeks in duration and IBM is currently assessing the effect on 202 delivery.

CM/SM Dynamic Test Problem: In the Saturn IB Design Review we related to you a potential structural problem at the CM/SM interface discovered during dynamic tests. At your request a letter was sent to Dr. Shea concerning this matter (signed by Dr. Rees). On Tuesday representatives of MSFC, MSC and North American met to discuss the matter, examine preliminary test data and inspect the test hardware. MSC felt that there was a possibility that the hardware used in the dynamic test may not have had adequate crush washers in securing the CM tension tie rods to the SM ~~radio~~ radial beams or that some other improper assembly method had been applied to the CM/SM interface. (North American personnel were at MSC to supervise this assembly during the dynamic test operations). The assembly is being re-examined and instrumentation (strain gauges) will be applied to the tension ties for the follow-on upper stage testing. MSC and North American personnel will be here to observe these tests.

NOTES 6-21-65 Koelle

JS 6/22 B 6/24

No NOTES this week.

NOTES 6-21-65 KUERS 6/22 B 6/24

1. S-IC-501:

New and improved PVC Support Link forgings were supplied by Boeing and the change-out of all 60 was completed over the weekend because Boeing needed our old links for the -F stage, after proper rework.

A severe stranded copper wire shortage exists on a national basis, which might impact the program. Coordination with Boeing Design has produced agreements on wire and connector substitution, and a flood of waivers is being issued to cover shop fabrication.

Delivery of pressure switches from Southwestern Industries is delayed. Deviations exist on all of them. The vendor has requested blanket coverage, but P&VE has refused to approve blanket deviation coverage, making it extremely difficult to expedite the over-due delivery. The development of the pressure switches has not reached a state where they can be readily manufactured.

The portable clean-room system for entry into the fuel tank and the platform inside the tank have been installed, waiting for components to go in.

2. IU Ground Test Program:

The facility checkout IU for KSC, S-IU-500F, including a transporter and handling fixtures, was shipped last Friday ahead of schedule. Due to availability of barge, the IU will go to the Cape via Michoud to arrive at KSC by August 15.

It was found that replacement of bonding of brackets for cold plates by bolting increased the thermal conductivity of the structure approximately 25%. In order to make ground systems testing similar to flight conditions, we have now also to convert the S-IU-500FS--planned for vacuum chamber testing at DAC--to the bolted bracket design. This requires complete disassembly of the IU and will have an effect on the delivery schedule.

W.K. 201 affected? B

3. SA-10 - Pegasus:

The Service Module modification was completed for delivery.

The insulation and modification of Command Module - Escape Tower and Motor Case was completed for final inspection. Shipment on June 26 as planned.

NOTES 6/21/65 MAUS 6/22 B 6/24

1. MISSION OPERATIONS - Dr. Gilruth has signed and returned the charter and agreement for the MSFC Flight Control Office at MSC. Copies are being distributed within MSFC.

2. POP 65-3 - Internal guidelines for preparation of POP 65-3 for the AES program were distributed this week. Emphasis was on consideration of the total AES program to assure that all MSFC requirements will be included in the submission. Experiments and payload development, procurement, and integration, as well as launch vehicle procurement requirements for earth orbital, lunar orbital and lunar surface activities are all to be included in the submission.

   MSFC has agreed to provide programming and computer services to consolidate, for MSF, the first MSF mechanized POP (65-3). The consolidated MSF POP will be due in MSF no later than August 9.

3. FY 66 AUTHORIZATION - The FY 66 Compromise Authorization Bill was approved by both Houses of Congress on June 17 and has been sent to the White House for President Johnson's signature. Total authorization is: $5,190,396,200, as follows:

R&D	$4,537.	Million
CofF	62.	"
AO	591.	"

   The total is $69.6 Million less than the President requested. $30 Million of the cut was in Apollo. Nuclear Electric Systems was increased $6 Million over the President's request, to provide funds for SNAP-8. The bill directs that these funds shall be utilized for no other purpose.

   Chemical Propulsion was increased $137 Million for M-1 engine and the 260 inch solid. The Authorization bill specifies that $7.5 Million will be expended for the continued development of the M-1 engine. A reduction of $10.8 Million was made in Centaur Launch Vehicle Procurement, by the House and the Senate, for different reasons. The compromise bill directed NASA to administer this reduction as they see fit within the total Centaur procurement program.

   The Senate Appropriation Hearings were completed June 16; the committee report has not been issued, but it is expected to be issued later in this week.

9S8 6/22

B 6/24

NOTES 6-21-65 McCARTNEY

1. PROJECT MANAGER MATRIX: R-RM is in the process of updating the listing of responsible technical personnel within R&D Operations for project, stage, and subsystem management. (Cook matrix) This revised listing will include the project personnel outlined above and will also include a listing of the senior R&D Operations' technical personnel required in your Guidelines of February 19. It is planned to publish this listing as an R&D Operations Management Directive which will provide visibility for Center Management and will conform to Dr. Mueller's policy on subsystem management.

2. FINALIZATION OF FY-66 SATURN PROGRAM FOR R&D OPERATIONS: R&D Operations negotiations with IO have been completed for the FY-66 budget. R&D Operations presented requirements of $142,710,000 ($135,000,000 within guidelines and $7,710,000 over guidelines). Against those requirements, IO has agreed to fund $129,063,000 for Saturn V. IO had previously approved $88,000 for Saturn I, $35,400,000 for Saturn IB, and $962,000 for Engines, making a total approved FY-66 R&D Operations Budget of $165,493,000.

3. OPERATION OF SUPPLY SUB-STORES IN LABORATORIES: Over the past several months action has been underway to transfer routine shop supply operations from the laboratories to the Technical Materials Branch of Technical Services Office. This approach has permitted a better consolidation of supply functions, reduced excess stocks and released laboratory personnel for more direct mission assignments. The service provided by Technical Materials Branch in this respect has been excellent.

NOTES 6/21/65 REINARTZ 6/22 B 6/24

STUDY CONTRACT WITH GD/C: The design study scope of work for GD/C which MSFC forwarded to LeRC on 3/25 has still not been contractually implemented. This study is required in order to verify the detailed design on the shroud, fairing, adapters, etc., for Saturn IB/Centaur. LeRC has revised the scope of work and it was being reviewed by LeRC management late last week. The revised scope of work contains approximately 60% of the initial study effort which MSFC requested. In view of the continued delay we have encountered in initiating this study, Colonel Russell, MSF, gave verbal approval to LeRC for the revised scope in order to get a contract signed. It is hoped that additional effort can be added as required to meet all the requirements which MSFC requested initially.

CISLUNAR PEGASUS: Dr. Mueller has stated that he expects to get a decision on Cislunar Pegasus sometime this week. This decision is urgently needed in view of the phaseout of Fairchild/Hiller engineering personnel who will be required to conduct the initial Cislunar Pegasus engineering effort.

SATURN IB/CENTAUR DESIGN REVIEW: The first Saturn IB/Centaur Design Review is scheduled for June 30 at 8:30 a.m., 10th Floor Conference Room, Building 4200.

JPL/MSFC PANEL MEETING: The first JPL/MSFC Panel Meeting is scheduled for July 7,1965, at JPL. The agenda for this meeting will be drafted and coordinated the week of June 21.

NOTES 6/21/65 RUDOLPH JVB 6/22 B 6/24

1. S-IC-1 Stage Status - The Thrust Structure/Fuel Tank assembly is behind schedule due to shortage of parts. This assembly is now pacing S-IC-1. Recovery is considered to be possible. The LOX Tank/Forward Skirt/Intertank was joined three weeks ahead of schedule.

2. S-II Stage Ullage Motor - The first S-II Ullage Motor will be fired under altitude conditions at the Ordnance Aerophysics Laboratory (OAL) in Dangerfield, Texas on Wednesday, June 23, 1965. Environmental test of early motors show signs of propellant cracking. Mr. J. Odom, S-II Stage Office, and Mr. Sanders, R-P&VE, will witness the test at OAL and then go to McGregor, Texas to investigate cracking problem.

3. S-IVB Battleship Stage - Conversion of the stage to Saturn V configuration has been completed. The first Saturn S-IVB/V firing, scheduled for Thurs, June 17, slipped to Saturday, June 19, 1965, due to a leak in the LH_2 pressurization line. The leak was satisfactorily repaired. The first Saturn S-IVB/V firing was attempted Saturday, June 19, 1965, automatic cutoff occurred after approximately 7 seconds of mainstage because of an incompatibility between the GSE start bottle pressurization network and the engine start bottle repressurization network. This was the first restart engine tested by DAC. This test successfully demonstrated a fuel lead start as required for an S-IVB/V restart. The next firing is scheduled for Thursday, June 24, 1965.

4. RCA 110A Computers - Acoustical tests at Wyle Labs have been completed. The Computer is scheduled for relocation to R-ASTR this week. The delivery of the RCA 110A computers to R-TEST and Michoud is forecast for July 1, 1965 and July 19, 1965, respectively. The RCA Logistics Plan is under review by MSFC. A pre-negotiation conference is planned for July 15, 1965.

NOTES 6-21-65 Stuhlinger MSC/22 B 6/24

1. PEGASUS B: After a period of excellent operation, Pegasus B developed irregularities last week. Part of the beacon transmissions dropped out. The reason for the partial beacon failure is not yet known. There are indications that the cause may be a faulty connector. The remaining part of the Pegasus B system still makes the Satellite a very valuable and successful collector for meteoroid hit data.

2. AES: All the FY 1965 studies on lunar surface scientific mission support are now either under contract, or in contract negotiations. Negotiations of the last study, the Lunar Drill, began last week with the winner of the bidding, Northrop, after a very careful technical evaluation jointly by members of the Corps of Engineers, Bureau of Mines, MSC, JPL, GSFC, OMSF, and MSFC. When negotiations began, we were informed by Northrop that the company could not make the expected arrangements with Ingersoll-Rand as sub-contractor. Teaming up with this sub-contractor had been one of the major reasons why Northrop won the bidding contest. Post-evaluation elimination of this sub-contractor creates an unusual and difficult situation for the contractor evaluators and negotiators. We have requested Purchasing to formally advise us of legal, ethical, and other implications of this situation, and of the proper steps to be taken.

3. SUPPORTING RESEARCH AND TECHNOLOGY: OMSF (E. Z. Gray) directed us this week to reduce our FY 1965 OMSF Apollo Supporting Development Program (904) by $1.3M from $17.8 to 16.5M. This reduction is necessary because funds are urgently needed for the Apollo Mapping and Survey System. At present, an uncommitted amount of $0.67M is available, mostly from contracts whose negotiations came out a little lower than anticipated. The residual amount of $0.63M must be obtained by decommitting tasks already committed. We recommended to Ed Gray that under these circumstances we should not let the Lunar Drill contracts with FY 1965 money as previously planned, but should wait a few weeks until we receive the FY 1966 funds. Ed agreed to this proposal verbally.

4. TOTAL ART/SRT STATUS:

	Annual Plan	Authorized	Processed To FMO	Obligated
OART	15,380,000	15,380,000	14,951,234	6,978,850
MSF	22,000,000	22,000,000	21,280,000	12,817,097
OSSA	1,313,000	1,313,000	1,299,717	347,637
OTDA	2,000,000	2,000,000	1,999,665	1,137,751
TOTALS	40,693,000	40,693,000	39,530,616	21,281,335

June 28, 1965

DFR

NOTES 6/28/65 McCARTNEY

RS 7/2

1. PROJECT SUPPORT AGREEMENTS (PSA's): In response to your February Guidelines for Cooperation between IO and R&D Operations, a specific proposal has been developed for implementing the "Work Package" concept. This proposal was presented to the R&D Council and, separately, to IO early in April. With some modifications, the proposal has now been embodied in a draft MSFC Administrative Regulation and Procedure which is awaiting Center Management approval. In this same connection, we have developed an R&D Operations' internal Authority System which will be used to activate and carry out PSA's within R&D Operations. The main obstacles to immediate preparation of PSA's are: (1) an identification of subsystems; and (2) a determination of the impact upon our accounting processes that a change in subsystems might occasion. IO is currently attempting to resolve the subsystems identification problem. When IO has been able to make a definite proposal on this point, R&D Operations will review it and FIN must look into its impact on our accounting processes.

2. FY-67 CofF: The NASA Facilities Review Board will meet at MSFC on July 28 and 29 to review proposed FY-67 CofF projects. Laboratories concerned have been requested to prepare substantiating presentation materials for the scheduled review.

Marta, I suggest that we (Gorman, Stanley, Neubert, Mann and I) review this before July 28. Ueidman ought to be present. Please, get in contact with him. He should consider AES requirements also. May be v. Braun wants to participate.

AES review July 14

E. Rees

7/2

19 notes

B 6/28

B 6/30

NOTES 6-28-65 BALCH

1. Contracting - Negotiations were commenced and completed on Contract NAS8-14014 for acceleration of the installation effort on S-II Test Stand. This effort amounted to $933,089 for acceleration and changes in scope to insure timely completion of the installation of GSE required on the S-II A-2 test stand.

Contract NAS8-14118 was executed June 21, 1965, with Southern Bell Telephone & Telegraph Company for telecommunications services to Mississippi Test Facility (on-site) at an estimated annual cost of $450,000.

2. Transportation - The chartered air plane continues to be a critical item, as the current contract expires on June 30, and Headquarters has not given a go-ahead. Davis Foxworthy is going to Washington to try to resolve next Monday.

Shep

What's the issue here?

B

NOTES 6-28-65 BELEW

F-1 ENGINE During testing of F-1 engine 2009 (spare for S-IC-T) at MSFC, injector failure occurred in the form of baffle erosion. Preliminary investigation indicates two areas and two causes of erosion; one caused by insufficient braze bond between the baffle base and injector face, and the second due to a LOX ring-to-land separation. These types of failures have occurred separately on other injectors, and fixes are in progress.

Engines F-3014 (S-IC-1, spare) and F-4017 (first engine for S-IC-2) are in final checkout at Canoga Park. Acceptance of both is expected by June 30.

H-1 ENGINE The procurement plan covering 22 follow-on H-1 200K engines was approved by NASA Headquarters on June 17, and received at MSFC on June 21.

The four SA-205 production engines scheduled for delivery this month will be accepted on time. All four engines will be shipped to Michoud during the week of June 28.

RL10 ENGINE An RL10A3-3 experimental engine satisfactorily completed model specification gimbal tests. The engine is now undergoing vibration tests.

Assembly of the first turbopump for the A3-3 prototype engines was initiated this week.

S-IVB ULLAGE ENGINES - ROCKETDYNE/GEMINI A modification to effect stress reduction in the trunnion and nozzle exit flange of the Gemini engine metal shell has been selected. The modification consists of a "T" ring reinforcement welded between the two trunnions and "U" channel reinforcement in the flange area.

A modified engine for vibration testing at MSFC is scheduled for delivery the week of June 28.

J-2 ENGINE A successful restart was conducted Saturday on the J-2 engine in the S-IVB Battleship. The restart was made after a 165 second first burn and a 100 minute hold. The engine was shutdown after four seconds of mainstage in the second run due to a gas generator overtemperature condition. The cause appears to be faulty instrumentation.

A S-II Battleship firing was attempted Saturday. The J-2 engine was shutdown 1.6 seconds in mainstage due to a gas generator overtemperature condition. Examination of the gas generator revealed partial blockage of the injector. The foreign material is believed to be teflon. Further investigations are underway.

The two open items on the production contract incentive conversion, the "hot test" risk clause and schedule incentive, are still being iterated with Rocketdyne. We intend to have our negotiated position by the end of this week.

C-1 ENGINE Dr. Mueller, John Disher, Charles King and Bill Brown visited RMD on Friday to review their progress in Phase I of the C-1. The same group will visit STL this Friday to look at their Phase I C-1 progress. Dr. Mueller feels that early C-1 availability and capability of doing the Apollo Service Module APS job are prerequisites for the Phase II program.

NOTES 6-28-65 CLINE

1. S-II BATTLESHIP PROGRAM: S&ID attempted eight tests in an unsuccessful effort to achieve 25-second cluster test during the past 15 days. Only two of the eight attempts achieved mainstage and operated 7.8 and 5.0 seconds respectively. Tests have mainly been terminated by number of automatic cutoffs failures in electrical circuits and dropouts of facility water diffuser pressure switch. S&ID has a total of 250 automatic cutoff circuits. Recent meeting was held at test site to review problems (6-23-65). S&ID was requested and is in progress of significantly reducing the number of automatic cutoff circuits. Also, the hydrogen recirculation pumps have been failing during these tests. The recirculation pump is not the exact flight configuration but an early prototype. Problem has been erratic and is apparently binding or freezing of the pumps. Investigations are underway by S&ID, Pesco, and MSFC to determine failure. S&ID will attempt to perform the 25-second test on 6-25-65.

2. F-1 ENGINE: Self induced instability on SIC-T Spare Engine 2009 occurred approximately 4 seconds in mainstage on Engine 2009 and damped in 60 milliseconds on 6-18-65. The test continued for a total of 120 seconds. Post test inspection revealed baffle erosion in two areas. LOX ring to land separation was found adjacent inner baffle can. Poor braze and inspection techniques are suspected of being the cause. Injector is being submitted to Rocketdyne for further analysis to determine cause of instability.

3. S-II MATERIAL AND PROCESS SPECIFICATIONS: The emergency review of North American Aviation (NAA) multiple application material and process specifications is continuing. The last conference is scheduled to begin on 6-25-65. The total quantity of specifications to be reviewed was 63, but this week increased to approximately 107 and appears to be leveling off. A total of 65 specifications has been completed leaving 42.

NOTES 6/28/65 CONSTAN B 6/28 B 6/30

Status of S-IB-1

Post-static checkout is continuing. Overall testing is approximately 50% complete.

Status of S-IB-2

Vehicle is at MSFC-Huntsville for static firing.

Status of S-IB-3

Vehicle moved into checkout on Friday, June 18, 1965. Pre-static checkout has begun.

Status of S-IB-4

Assembly operations continuing. Fuel and Lox prevalves in process of being installed. Tubing being installed throughout vehicle. Fuel pressurization manifold being installed on spider beam.

NOTES 6-28-65 DANNENBERG

NEGATIVE REPORT

NOTES 6-28-65 GRAU

1. R-QUAL GROUND SUPPORT EQUIPMENT: The R-QUAL GSE Complex was turned over to this Laboratory on June 21, 1965. There remains a considerable responsibility on Boeing to incorporate all outstanding engineering changes into the GSE prior to first stage checkout, and substantial number of test procedures have not yet been accepted by this Laboratory. It appears, however, that the complex activation schedule will be maintained.

2. PEGASUS PROGRAM: Pegasus C completed checkout at Fairchild Hiller Corporation, Hagerstown, Maryland and was shipped to KSC June 22, 1965.

3. MSFC FAILURE RATE NOTEBOOK: A study of failure rate sources has revealed that the failures contained in the FARADA (Failure Rate Data) Notebooks, generated by the U.S. Naval Fleet Missile Systems Analysis and Evaluation Group, are the most generally applicable for reliability prediction work in the Saturn vehicle. We have requested a set of computer magnetic tapes containing this data, for possible use in compilation of a MSFC Failure Rate Notebook.

4. S-IU-201 ELECTRICAL SUPPORT EQUIPMENT: Systems Checkout of the ESE for IU 201 began in building 4373 June 17 on a 24 hour/day basis, but was terminated June 21 due to numerous difficulties. The main and miscellaneous power-up procedures were run which amounts to about 20% of the total volume of testing to be performed. Checkout resumed June 24.

NOTES 6/28/65 HEIMBURG 6/23 B 6/30

1. S-IC: To date the hardware required to complete the on-board fuel pressurizing system has not been received from Boeing. The next static firing scheduled for 7/15 is predicated on the timely delivery of this hardware. Minor hardware changes on S-IC-T are being accomplished during this waiting period. GSE elements for the automatic configuration are in the process of installation.

2. F-1 (MSFC): Engine F-2009 was removed from the Static Test Tower West, and the main injector was removed for inspection. Preliminary investigation of the two burned areas of the baffles indicates that this injector may have had poor baffle-to-ring braze. The injector was returned to Rocketdyne for further investigation. This engine will be reinstalled with a new injector on 6/28. Engine F-1002-3 was installed in the F-1 Test Stand in the West Area, and preparations were begun for an initial firing on 7/7.

3. S-II BATTLESHIP (SANTA SUSANA): An attempted 25-second firing was aborted after 1.5 seconds of mainstage on 6/26, at 3:25 p.m., by the No. 5 engine gas generator over-temp automatic cutoff system. All five mainstage P_c pressure switches picked up, indicating a successful start was made. The gas generator from engine 5 was removed on 6/27, and disclosed particles of Teflon clogging the fuel injector holes. Further looks showed the main chamber fuel injector holes clogged also from the stage fuel pre-valve lip seal particles. S&ID is planning to replace the No. 5 engine with the spare engine as well as replacing the pre-valve. Other general tasks, such as replacing the recirculation pumps, are also planned, which indicates a delay of approximately seven days before another firing.

4. S-IVB BATTLESHIP (SACTO): A firing was performed on 6/25, at Sacramento, with a successful first burn of 170 seconds, a simulated coast time of approximately 90 minutes, and a second burn planned for 340 seconds, which was aborted after 3 seconds of mainstage because of gas generator over-temperature cutoff (thought to be an erroneous measurement).

5. S-IVB TEST STAND AT MSFC: A satisfactory LH_2 loading test of the S-IVB stage was conducted on Thursday, 6/24.

6. SATURN IB SWING ARMS: The test of swing arms 1, 2, 3, and 4 for LC-34 was satisfactorily completed last week. Arms 1, 2, and 3 have been shipped to KSC. Arm 4 is being prepared for shipment. The Apollo access arm for LC-34 is scheduled to be received for test on 8/8/65.

Visit to S-II BATTLESHIP (SANTA SUSANA) (Attachment to DIR and I-DIR, only)

NOTES 6-28-65 HOELZER JSB 6/28 B 6/30

1. AIR CONDITIONING FAILURE: A failure of the air conditioning equipment in Building 4663 occurred on June 17, 1965 at approximately 4 a.m., resulting in the shut-down of the IBM 7094 computers, IBM 1401 peripheral computers, and the EAI Analog computers. Analysis of the failure indicated the following sequence of events. A pressure relief valve in the steam line failed, allowing water to accummulate on the basement floor. The float valve that activates the sump pumps also failed, allowing the water level to rise. When the water had reached a level of eight to ten inches, it entered a conduit. This resulted in an electrical short of the cables supplying power to the 4160 volt panel.

By using the chilled water by-pass recently installed in the equipment room of the B-wing extension, it was possible to restore air conditioning by 8:30 a.m. However, because of the "drying out" process of the computer rooms and subsequent shut-down later in the day to repair the pressure relief valve, a total of approximately 10 hours of down time was recorded against each piece of computing equipment installed in the B- and C-wings.

Such failures cannot be tolerated with the centralized concept of 3rd generation equipment. We are working very closely with the Facilities and Design Office to insure the proper modularity in our air conditioning and power to supplement the modularity of this 3rd generation computing equipment.

I most certainly agree B

2. ATOLL II IMPLEMENTATION: Implementation of ATOLL II (Acceptance Test or Launch Language) for KSC was begun in June, 1965. Completion date is December 31, 1965. The effort is being co-ordinated between Astrionics and Kennedy Space Center, and the co-operation at all levels is excellent.

HH.

Looks like your sophisticated gear is subject to rather unsophisticated dilemmas! B

NOTES 6/28/65 JAMES

6/28 B 6/30

Prime Contractors' Efforts at KSC: I have become very concerned with a series of events in recent weeks that tend to indicate increasing cost estimates for our prime contractors' efforts at KSC. I recognize our responsibility to fund for a portion of this effort but manpower estimates quoted by the contractors in response to KSC issued RFQ's (and apparently KSC instructions) appear to include manning for considerably more than the effort we require at KSC. It is very difficult to determine just where we should draw the line as to what we fund and what KSC covers. The clearest point seems to be at the stage level. I am taking a position to Gen. O'Connor that we fund for theeffort required for stage preparation and checkout and do not cover any overall vehicle effort or any direct support to any organizational element of KSC. Such KSC work should be paid for by them along with other more appropriate KSC efforts negotiated into the supplements. Incidentally, Dr. Shea, in conversation with me recently, alluded to similar problems with KSC. He has a meeting scheduled with his people on this subject on Wednesday and Mr. Hardy from my office will attend. Gen. O'Connor has assigned me action to establish a position on this.

SA-201 Cape Checkout: One of the sub-agreements being prepared by MSFC and KSC covers the procedure for establishing philosophy, requirements, specifications and procedures for test and checkout of the launch vehicles at KSC. This agreement will specify the responsibilities and timely actions required of each Center. We expect to be able to follow in sequence all the provisions of this agreement for SA-203. For SA-201 and SA-202 we intend to follow the philosophy of this agreement and all the provisions even though it will be necessary to do some of them out of sequence. In this regard we held a meeting with Dr. Gruene and his top people last week to review the philosophy and requirements for SA-201 and the status of test and checkout procedures. Saturn V and the Labs were well represented. We feel this meeting was very fruitful and plan similar meetings during this period of transition to a "new way" of doing business.

Pegasus "C": Pegasus "C" arrived at KSC last Tuesday. The spacecraft is presently located in Hangar D and is undergoing tests. A pre-flight readiness review is scheduled at KSC for Thursday. Mr. Milton Ames and I will co-chair this review. Gen. Phillips plans to attend.

that 222 B

S-IVB 201: Stage buildup is progressing satisfactorily at SACTO. Parts shortages no longer appear to be a problem. DAC is working three shifts to complete open work items prior to stage propellant loading. We are studying several alternate plans for post-static checkout and will implement the plan most appropriate for the circumstances (i.e., scheduled date of static firing, degree of success achieved, type of transportation available and Cape need date).

NOTES 6-28-65 Koelle KB 6/28 B 6/30

FY 65 ADVANCED STUDIES: Ed Gray has asked that our FY 65 Saturn Improvement Studies be contracted on a fixed-price basis, rather than CPFF. It appears that this is just the first step and that all advanced study contracts in the future will be fixed price. ✓

NOTES 6-28-65 KUERS 6/28 B 6/30

1. S-IC-1: The Lox Tank Assembly was moved from the vertical assembly tower to Building 4705, and horizontal mating to the Fuel Tank/Thrust Structure assembly is underway. This operation is 3 weeks ahead of schedule. The pacing item is still the Thrust Structure due to shortage of parts. The long delayed Lox PVC's are now available from Arrowhead; installation has started.

2. Advanced Technology: A 20-inch manhole outlet was successfully flared into the full hard skin of the experimental Torus Tank by local magneto-motive tooling. This operation could not be duplicated by any known conventional method.

Application of the new process will eliminate the critical welding of heavy forgings for outlets into bulkheads of future vehicles. Analytical studies were done with Republic under P&VE supervision, because valid theories did not exist covering the interaction between the flare and the primary shell. The test phase of the experimental tank later will serve, among evaluation of other advanced features, for evaluation of this new approach for large outlets.

3. Visit by Boeing to the West Coast: Last week I accompanied Mr. G. Stoner and Mr. R. Nelson from Boeing on a short tour of our prime contractors at the West Coast. This was the first time the Boeing people have seen the S-IVB facilities at Huntington Beach and Santa Monica. We visited also the Apollo manufacturing facilities at Downey. We had excellent informal presentations by the prime contractors. Topics of discussion were control of development and qualification testing at sub-contractors and control of part shortages for systems installation. I believe that this visit was valuable and beneficial to Boeing and our West Coast prime contractors.

W.K. Can you make a 60 to 80" manhole into the top dome of the SIVB that way? (Orbital workshop?) B

NOTES 6/28/65 MAUS 6/28/65 B 6/30

1. AUTOMATION OF TREND CHARTS FOR MSF - At the request of NASA Manned Space Flight, Tom Smith's office is coordinating development by MSFC of a computer program for automating the generation of schedule trend charts. Computation Laboratory is providing the programming effort. The program uses PERT data as the source of information and uses the General Dynamics SC4020 Recorder for generating the charts. ✓

   The program is now in the final testing stage and is expected to be ready for demonstration in early July. ✓

2. CONGRESSIONAL ACTION ON FY66 BUDGET - The House Appropriation Committee is meeting today at 11:00 a.m. to consider a "continuing resolution" appropriations measure for FY 66. ✓

   The Senate Independent Offices Subcommittee is meeting today at 2:00 p.m. to perform final mark-up of its appropriations report. ✓

   The full Senate Appropriations Committee is scheduled to vote on the report June 30, but floor action on the bill is hardly possible by July 1. ✓

3. REVIEW OF ADP OPERATIONS AT MSFC - Mr. Gorman has requested the Executive Staff to accomplish a center-wide survey to determine adequacy and effectiveness of present management controls for ADP Operations. The study will be a joint effort of R&DO, Computation Laboratory, Financial Management Office, and other elements of the Center. ✓

   Bob Carlin, of Tom Smith's office, has been assigned as study coordinator. Target date for completion is August 15. ✓

H.M.
I hope you include the 3rd generation, centralized, "dial-in" computer plans of CompLab,
B

NOTES 6/28/65 McCARTNEY B 6/30

1. PROJECT SUPPORT AGREEMENTS (PSA's): In response to your February Guidelines for Cooperation between IO and R&D Operations, a specific proposal has been developed for implementing the "Work Package" concept. This proposal was presented to the R&D Council and, separately, to IO early in April. With some modifications, the proposal has now been embodied in a draft MSFC Administrative Regulation and Procedure which is awaiting Center Management approval. In this same connection, we have developed an R&D Operations' internal Authority System which will be used to activate and carry out PSA's within R&D Operations. The main obstacles to immediate preparation of PSA's are: (1) an identification of subsystems; and (2) a determination of the impact upon our accounting processes that a change in subsystems might occasion. IO is currently attempting to resolve the subsystems identification problem. When IO has been able to make a definite proposal on this point, R&D Operations will review it and FIN must look into its impact on our accounting processes. ✓

2. FY-67 CofF: The NASA Facilities Review Board will meet at MSFC on July 28 and 29 to review proposed FY-67 CofF projects. Laboratories concerned have been requested to prepare substantiating presentation materials for the scheduled review. ✓

B 6/30

NOTES 6/28/65 REINARTZ

SATURN IB/CENTAUR DESIGN REVIEW: A series of meetings have been held between MSFC and LeRC engineers in preparation for the Saturn IB/Centaur Design Review scheduled for June 30 in the 10th Floor Conference Room, Building 4200. The second of these meetings, covering structures, was held on June 23 at MSFC with five LeRC engineers attending. Additional meetings will be held on guidance and dynamic testing.

JPL/MSFC PANEL MEETING: A coordinated agenda has been established for the July 7 panel meeting at JPL. The agenda primarily covers organizational and procedural items and the identification of any critical milestones and action items required by the two Centers.

CENTAUR MOCKUP TANK: The Centaur tank to be used for mockup purposes at Huntsville has been loaded for truck shipment from GD/C and should arrive at MSFC by July 2.

NOTES 6/28/65 RUDOLPH

1. Review of NPC 500-5 - Coordinated MSFC comments to the Draft Apollo Reliability and Quality Assurance Program Plan, NPC 500-5, have been transmitted to Headquarters.

2. S-IC-T Stage Captive Firing Program - The next firing, tentatively scheduled for July 15, 1965, is expected to be full duration (150 seconds).

3. S-IC-1 Stage Status - The forward section was moved from the VAB on Thursday, June 24, 1965. Horizontal mating is scheduled for July 28, 1965, approximately 4 weeks ahead of schedule.

4. S-II Battleship Stage Firing - An attempt was made to fire the S-II Battleship for 25 seconds on Saturday, June 26, 1965. A premature automatic cutoff occurred at approximately 3 seconds due to a gas generator overtemp indication.

Investigation revealed loss of a lip seal in #5 stage prevalve. Bits of the seal were found in the gas generator and in the engine. The #5 engine is being replaced with spare. While the engine is being replaced, the recirc pumps will be pulled and examined. It is expected firing can be resumed in approximately 10 days.

5. S-IVB Battleship Firing - A successful Battleship restart test was conducted Saturday, June 26, 1965. The test consisted of a 170 second first burn - 3-orbit coat, restart with an early cutoff in the second burn due to instrumentation failure in the gas generator.

NOTES 6-28-65 Stuhlinger 6/28 B 6/30

1. PEGASUS A AND B: Upon invitation by Dr. Gilruth, Dr. Johnson and I will give presentations on the Pegasus Project at MSC on June 28. ✓

2. PEGASUS C: A flight readiness review of Pegasus C, hopefully resulting in the buy-off of the vehicle and payload, will be held by M. Ames at KSC on July 1 and 2. At the same time, the future of the SATCON organization will be discussed between OART, KSC, the Pegasus Project Office, and RPL. Col. James has requested that RPL take over SATCON after Pegasus C launch. RPL prepared several "snap-on" panels with a number of thermal coating samples to be attached to Pegasus C. Upon recovery by Gemini, these samples can be investigated with respect to deterioration effects. The panels will be taken to KSC June 28. ✓

3. AES: Negotiations for two more tasks of the FY 65 Program, the Emplaced Scientific Station and the Environmental Effects on Instruments, have been completed, and funds were obligated. Funds for the Lunar Drill study will be obligated early in 1966. ✓

4. PROJECT SUPER MEETING: The second annual Project SUPER Review was held Tuesday and Wednesday of last week. Approximately 40 civilians and officers from the Air Force attended and a few NASA Headquarters people. The presentations by both Marshall and the Air Force were excellent. We might expect a few more Project SUPER tasks to generate between technical counterparts at Marshall and in the Air Force as a result of this meeting. Project SUPER presently consists of 10 tasks. ✓ E.S. Suggest we crank more problems re reusable boosters into SUPER. This has gen. Schrievers fullest blessings

5. FIFTH RESEARCH ACHIEVEMENTS REVIEW: MSFC Research Achievements Review No. 5 was held Thursday of last week. The subjects covered were "Ground Testing Research at MSFC" and "Quality Assurance and Checkout Research at MSFC". Outside visitors included one from MSF, two from the Air Force, and one from NASA Headquarters. ✓

(Discuss w/ Frank B Williams, please)

6. TOTAL ART/SRT STATUS:

	ANNUAL PLAN	AUTHORIZED	PROCESSED TO FMO	OBLIGATED
OART	15,170,000	15,170,000	14,854,941	7,022,820
MSF	22,000,000	22,000,000	21,280,000	12,817,097
OSSA	1,363,000	1,363,000	1,349,247	420,975
OTDA	2,000,000	2,000,000	1,999,665	1,137,751
TOTALS	40,533,000	40,533,000	39,483,853	21,398,643 ✓