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~~CORONA~~ ~~HEXAGON~~HEX-11079-69
Copy 10 of 14
19 December 1969

MEMORANDUM FOR: Director of Special Projects

SUBJECT: Photo Reconnaissance Systems Report No. 19

I. CORONAA. Accomplishments

1. The REAGIN-31 report on the A bucket of Mission 1108 indicates fair to good photography, though some focus variability was noted in the forward instrument photography. An MIP rating of 105, the third highest in the J-3 series, was assigned. Recovery of the B bucket is scheduled for rev 276 at 1830 EST Sunday, 21 December 1969.

B. Problems

1. Mission 1108 (CR-9) link I failed; therefore, complete temperature data can not be monitored. Link II backup is functioning properly, and diagnostic telemetry indicates that all is well. On rev 223 the DISIC failed after expending about 79% of its total film load. V/H Programmer (pre-launch), link I and DISIC failures are under investigation.

C. Projected Status

1. CR-9 (Mission 1108-2). 11-21 December.
2. CR-10. Pre-chamber preps.
3. CR-11. Blocks preps.
4. CR-12. Day 3 HIVOS through rev 10 and 2 Dr. "A" tests.
5. CR-13. System testing.

~~CORONA~~ ~~HEXAGON~~~~SECRET~~GROUP 1
Excluded from automatic
downgrading and
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1. [] and representatives from SETS and SSC participated in discussions with [] on 17 December regarding those items identified by HTC which are specified in HSSDP and not implemented in the software. The items were placed into categories of relative importance for purposes of negotiating ECP action.

2. The Project Office decided during the week to change the processing chemistry from the modified versamat B to the standard MX 641. The 641 offers better shelf life, is cleaner, will give some increase in gamma, and overall appears to be satisfactory. After P.E. gathers some additional data, a meeting will be held to compare notes, correct the Processing Specification and define processing procedures.

3. Core overpressure winding tests performed at Eastman Kodak have shown that the builder roller force calibration has been erroneous and is suspected to be the culprit in the wide data spread. Windings under two separate conditions are tightening this data spread considerably, but the formal variables in the spooling operations can still be expended to contribute possibly as much as ± 150 psi on the core. Eastman Kodak is planning two additional winding series to develop a more predictable model and will then be in a position to recommend a winding technique which will assure a 95% confidence level of not exceeding P.E.'s 550 psi maximum core pressure. The current schedule for this recommendation is mid-January. The winding techniques will then be qualified by probably two rolls.

4. The two large rolls of 40% RH development model material were delivered to the West Coast via milair this week. The two smaller rolls (38,000 feet and 42,000 feet) of 40% for the development model Chamber "A" tests will be delivered to P.E. on 22 December.

5. Material requirements were reviewed at both Eastman Kodak and Perkin-Elmer during this week to clarify the situation in view of the fluid test schedule.

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6. Bids for fixed price proposals for the following subassemblies for the follow-on effort (Flights 7-12) have been sent to the indicated potential bidders, with responses due by 15 January 1970:

- a. All electronic boxes - RadInc, P.E. Aerospace, and AC Electronics.
- b. Take-ups - RCA and OTD.
- c. Encoders - Litton, Gurley, Boller & Chivens, and Dynamics Research Corporation.
- d. Motors 1, 2, 4, 5 and 6 - Macbar, G.E. (Erie, Pa.), Singer, General Precision, and OTD.
- e. Motors 1, 3 and 6 - MTL.
- f. Pneumatics and Valves - LMSC, Kidde and Hamilton Standard.
- g. Optical Bar Tubes - LMSC, Budd, and Republic.
- h. Frames - LMSC, Budd, Kaman, and Republic.

OTD, P.E. Aerospace and Boller & Chivens will submit estimated costs vice fixed price costs. The Project Office is directing P.E. to include G.E. (Reentry Systems) and McDonnell in the bidders list for take-ups.

7. RadInc is making every possible effort to deliver all flight hardware by the end of this fiscal year. They are already building and testing modules for flight unit #3. P.E. (McCabe) estimates that total RadInc costs will be in excess of 32 million dollars. RadInc is presently carrying an estimated cost at completion of 30.7 million dollars; however, they are reestimating production contract costs and it will probably result in an increase. In addition, RadInc does not include repair and retrofit costs, which could easily amount to a few thousand dollars. P.E. subcontract department has been budgeted \$30.6 million for the RadInc program and \$30 million cumulative through this fiscal year. P.E. is considering placing a funding

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limitation of \$30 million on Radinc this fiscal year. P.E. placed a limitation of \$19 million for fiscal year 1969 as a part of Plan B and subsequently claimed at the negotiations that the funding limitation had increased the Radinc contract by some \$4 million. When queried as to the possible impact of a \$30 million limitation, Radinc responded that the program delay might well double those costs in excess of \$30 million. Therefore, if \$30.7 million was the right number for fiscal year 1970 program completion, the limitation would drive the total cost up to \$31.4 million. Radinc also indicated they might consider accepting some risk if P.E. would agree to allow Radinc to dispose of excess materials in the event of termination. As of 12 December, Radinc expenditures including fee were approximately \$28.4 million.

8. A meeting on AVE and AGE spares during the week resulted in Headquarters approval of the recommended Perkin-Elmer AVE list. The Project Office rightly felt that extra AVE charges for manufacturing conditioning and separate buy activities were incorrect. These costs are being reworked and will be resubmitted. The AGE list worked out as follows:

a. Electronic Breakout Boxes (PM-X to be submitted with description) (built to STE standards)	2 Lots
b. Test Data Management System (TDMS)	1
c. Sensor Subsystem Test Console (SSTC)	5*
d. Supply Test Station	1**
e. Take-up Test Station	2
f. SS Electrical Simulator	1
g. Take-up Simulator (for MS R&I)	1
h. Test Data Evaluation Station (Long Light Table)	3
i. Auxiliary Take-up	2
j. Film Loading Set	2
k. Four-RV Test Station	1

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1. Pneumatics Test Set (Kidde equipment)	1
m. Format Illuminator	2
n. Power Bus Simulator	4

- * FACI will be held on SSTC #2
- ** The second SUTS for Danbury may be developed from Factory Test Equipment but shall be functionally equal to the first. The LMSC procured SUTS shall be used at SVIC.

Regarding AGE spares, Perkin-Elmer is preparing a breakout by line item as opposed to the original budgetary submission. These will be addressed when submitted.

9. A review of the SSC acceptance and qual test documentation status is being conducted. Correlation between documentation availability and the actual test schedule is difficult to achieve. This is due partly to the "dynamic" nature of the test schedules and partly to the organization of the test documentation. The effect is the difficulty in acquiring and reviewing the appropriate test plan type information prior to the conduct of the test.

10. Sticking tests at Wright-Patterson Air Force Base during the week to recheck the controversial 60°/80° RH data point indicate faulty equipment. This week's tests were conducted in another chamber under the following conditions - temperature varied slightly from 58° to 60° and the RH from 74% to 82%, but there was no evidence of sticking. Another roll will be run this week to confirm the data.

B. Engineering Model

The chamber was opened Monday, 15 December, to reposition the nonfunctional optical bar, remove the TU (EM-3) and film, and assess the problem in the nonfunctional film path. The rework necessary to begin to identify the problem in the film path was too extensive to allow

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time for a fix. Therefore, the thermal testing is continuing with no further functional testing. The test film has been developed, and the target images appear to have been properly recorded, but the data reduction has not yet proceeded to the point of determining resolution.

C. Development Model

Several minor problems have developed, and the effected items are being repaired in the TCA before it is installed in the midsection. A leak has been found in the twister, and the "B" side is torn down to replace it. The drive capstan on the "A" side is being replaced because of a noisy bearing. Integration of the TCA in the midsection is to begin Sunday.

D. Flight Article

The model is not yet in Ready Room "B" due in part to a cleanliness problem in the ready room. The model should go into the ready room on 19 December. Little AVE progress was made during the week. Three of the four platen "A" light pipes were found to be inoperable. A solid week of rework is now required to clean up the flight model after Ready Room "B" tests. Both platens, both loopers, and the optical bar 4-inch bearings will be replaced.

III. Administrative

Meetings Requiring Participation of Headquarters Personnel

<u>Date</u>	<u>Subject</u>	<u>Attendees</u>
<u>PERKIN-ELMER</u>		
22 Dec (PM)	Consultants Review (Garwin/Shea)	Patterson
23 Dec	Supply Qualification Data Review	

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23 Dec

RFP Review

Patterson, [REDACTED]

[REDACTED]
PMO/PRS/OSP**Distribution:**

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cy 3 - D/PRS/OSP
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cy 6 - CB/OSP
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cy 8 - C/SB/OSP
cy 9 - C/SS/OSP
cy 10 - OSP/RB
cy 11 - OSP/PRS/Flt
cy 12 - OSP/PRS/Chrono
cy 13 - [REDACTED]
cy 14 - [REDACTED]

DDS&T/OSP/PRS [REDACTED] /X5725 (19 December 1969)

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24 December 1969

MEMORANDUM FOR: Director of Special Projects

SUBJECT: Photo Reconnaissance Systems Report No. 20

I. CORONA

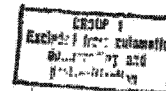
A. Accomplishments

1. Mission 1108 Evaluation

The REAGIN 31 message for Mission 1108-1 stated that "instances of image smear (scan direction) and severe out-of-focus imagery are apparent intermittently throughout the mission". To the user community, the word "severe" used in this context usually means that the out-of-focus condition is evident at 7X and above. A Project Office representative viewed examples from Mission 1108 and found that the out-of-focus could be detected only at 25X or above. The NPIC records (including the REAGIN 31) indicate that this is really an out-of-focus band about one inch wide across the entire frame and appears approximately 12 inches from the take-up side. These bands are present only on frames three and four of each pass. The Project Office representative's opinion is that the word "severe" is a bit harsh for describing the conditions that exist. Both the REAGIN 31 and the coordinated PI statement indicate "soft imagery", seen only at 50X and above, from the forward-looking camera.

As a part of this review, it was learned that the Director of NPIC has been provided the following statements:

- a. Both 1108-1 and -2 are about 85% cloud free.
- b. The PI suitability ranges from fair to good. The reduction in the scale because of higher-than-normal mission altitude (after pass D40) reduced the effectiveness of this mission.

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c. The SO-242 color record looks good; however, it generally appears slightly underexposed. The color balance is good, and the material is sharp and in focus. No static or fog traces were noted on the material.

2. 1108/CR-9 recovery was successful (21 December) after a total mission of 17 days. Last two days were devoted to utilizing 800 feet of color film in 14 foreign and one domestic operation. The total accomplished photographic footage for the mission was approximately 15,700' (fwd-looking) and 15,400' (aft-looking); the aft-looking camera had 300 feet less than the fwd because of the additional thickness of the color film.

B. Problems

1. Dr. "A" data on CR-11. Westover has reduced the UTB film flatness from HIVOS Dr. "A" tests and has forwarded the results to Itak. Itak is key punching the data for computer analysis. Initial correlated data may be available by 26 December with a preliminary report expected during the week of 29 December.

2. Switch Programmer. Analysis is continuing on this anomaly. Fortunately the erratic behavior of the switch programmer in the automatic mode was able to be handled operationally by real time commanding.

C. Projected Status

1. CR-9. Mission 1108 PET at NPIC, 13-15 January.
2. CR-10. Pre-chamber preps.
3. CR-11. Block preps.
4. CR-12. Chamber complete; retrieval in process.
5. CR-13. Functional testing.

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II. HEXAGON

A. General

1. The review of the Qualification Test Data for the Supply was held at P.E. on 23 December. The data presented for the tests which had been conducted was extensive and did indicate successful completion of the tests. This review did not cover thermal vacuum test results and was not a complete review of the vibration/acoustic results for the following reasons:

a. P.E. did not measure the deflection of the compliant layer of the core as previously requested by the Project Office.

b. P.E. did not measure the edge profile of the film stacks before or after the tests. This had been required in an early version of TQ-1003 (Test Requirements), but was deleted during a revision by P.E. This was not picked up by SETS or the Project Office prior to the tests, as the Test Procedures document had not been released to the Project Office prior to the tests.

The meeting was concluded with the Project Office signing a preliminary concurrence of the qual test results, subject to resolving the above deficiencies plus a master track frequency anomaly on the supply encoder.

B. Engineering Model

1. The thermal tests were terminated at 1800 hours on 23 December. No further tests are planned at this time because of the need to install verification packages on the Chamber A collimators and the requirement for the Development Model to enter Chamber A on 16 January 1970 if it is to be shipped on 27 February.

2. No information was obtained on transient response, which would allow an evaluation of the launch thermal transient, nor on the film sticking characteristics of the system.

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3. The chamber utilization schedule is being re-evaluated to determine if some further testing can be accomplished at a later date.

C. Development Model

Integration and checkout of the TCA in the midsection is continuing. The supply is scheduled to be installed in the midsection on 26 December.

D. Flight Article #1

1. The model went into Ready Room B on 19 December. Both optical bars have been checked out with their servos. Double commutation of the optical bar motor has not yet been incorporated. The bars do not meet the ramp-up time requirements with the single commutation, but there is apparently no problem in proceeding with the tests.

2. P.E. is evaluating the impact of running a 32 calendar-day test in Chamber A on P₁. The Chamber A tests would include photographic performance at 40, 47, 70, 93, and 100 degrees fahrenheit. They are also evaluating the impact of performing the 20 critical test point EMC test on P₁.

E. Flight Article #2

One of the optical bars failed Chamber D optical tests. The surface flatness of the fold mirror degraded for $\lambda/13$ in Chamber C to $\lambda/7$ in Chamber D. A coating anomaly appears to be the problem. The bar has been sent back to OOD.

F. Program

1. A meeting was held on 16 December with General King and Col. Buzard regarding the realism of the present Development Model schedule. The outcome of the discussion was that Col. Buzard and Mr. Patterson would review the schedule with the contractors and that General King would sit in with the Managers' Meeting on 18 December and determine whether or not any change should be made in the Development or Flight Model schedules.

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At the schedule review, the various SPO contractors stated confidence in being able to meet the existing schedules and therefore General King was advised that the SSPO would take all the steps that were reasonable to hold to the same schedule. It was agreed that some of the steps to be taken were the transfer of the optical qualification testing from the Development Model to the First Flight Model, and that the EMI critical test point measurements would be moved to the First Flight Model if, at the time of EMI testing of the Development Model in mid-January, other contractors were still on schedule. It was apparent from the schedule review that the Development Model is the pacing item in the program and that there is considerable slack in the present First Flight Model schedule. All parties except the SPO and Aerospace felt that the 75 days allotted for pad checkout were excessive and that at least 30-45 days could be taken out of that time. No agreement was reached on this matter. At the end of the schedule discussions, General King transmitted a TWX to Dr. McLucas stating that he considered the 17 December flight date still valid and that the program offices would take such steps as were necessary to maintain that date.

2. Also discussed with General King on 16 December, and with Col. [] Major Rosenberg and Captain [] was the software development program at TRW. Several of the sensor subsystem software commands were not included in the software program. These were reviewed in some detail and it was apparent that some of them were very important to the operation of the sensor while others were only of convenience. No estimate was available on the cost or schedule impact of incorporating the various items in the program. It was finally agreed that [] and the SSPO would review all of the items and would categorize them into (1) Mandatory, (2) Major Impact on Performance, (3) Desirable for Operations, and (4) Can Be Omitted. A meeting was held at LMSC on 17 December at which time all of the items were placed in the above categories. It is expected that [] will negotiate a change in their contract with TRW to incorporate categories 1 and 2 into the IOC and category 3 into the FOC. These changes will be reviewed at the time of the CDRs on respective software packages.

3. A draft of the RFP for follow-on procurement was reviewed by OSP personnel and Mr. Mayhew of SETS. Several changes were recommended to the draft and these are being incorporated. It is hoped that the RFP

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will be revised and ready for issue early in January. It is understood that the contractor is submitting a TWX stating that late receipt of the RFP may impact his ability to respond by 30 April. Normally, a 90-day period for such response should be adequate, however,

III. Administrative**A. Meetings Requiring Participation of Headquarters Personnel**

<u>Date</u>	<u>Subject</u>	<u>Attendees</u>
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SPO

30 Dec	TRAT Comments Consolidation	
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ITEK

30 Dec	Tech Data Book Update	
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B. Annual Leave

1. The following personnel will be on annual leave for the period 29 December through 2 January.

	A. R. Burks	
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2. Mr. Patterson will be on annual leave on 2 January.

MERRY CHRISTMAS!

PMO/PRS/CSP

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