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BYE-107902-70
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24 July 1970

MEMORANDUM FOR: Director of Special Projects

SUBJECT : Photo Reconnaissance Systems Report No. 50

I. CORONA

A. Accomplishments

1. Mission 1111 (CR-12) receiving inspection and mate at VAFB were successfully accomplished by 18 July. The mission was successfully launched 22 July. The system is operating satisfactorily.

2. Move.

a. All WCPO personnel are now located in Bldg. 156. Several test personnel remain at A/P, primarily to accomplish CR-12's payload retrieval. Except for these test personnel and some administrative personnel who are completing "close-out" of A/P, the WCPO is now located in either 156 or 152. Bldg. 152 was accepted for use by LMSC on 21 July.

b. Shaker acceptance tests are being conducted. SRV associated test gear is being installed and calibrated.

c. The first system, CR-15, was moved to Bldg. 152 on 23 July.

3. The A/P 1004 data equipment will be moved during the next reporting period.

4. The Itek West Coast Division component test box has been tested and is now in use.

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B. Problems

1. Ripple filter test results indicate several questionable filters. Replacements will be manufactured locally since the vendor is bankrupt. Availability forecast is approximately three weeks. There is no impact on COROMA Systems availability.

2. Several dual data signal conditioners (DDSC's) have shown susceptibility to pulse slopes resulting in double pulses or none at all. Reevaluation is being conducted and preliminary analysis indicates a transistor change may be required. This problem does not impact CR-13 or QR-2.

C. Future Activities

Mission 1111 PET is tentatively scheduled 25 and 26 August.

D. Projected Status

1. CR-12. Flight Operations.

2. CR-13. Storage (still needs block test).

3. QR-2. Storage (current backup system).

4. CR-14. Storage.

5. CR-15. Training class use.

6. CR-16. Storage at Itek West Coast Division.

7. CR-8. Final acceptance tests. "Buy off" dates 10 - 12 August.

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II. HEXAGON

A. General

1. A preliminary copy of the SSC requalification plan was informally reviewed this week. The plan has not been fully coordinated nor approved by SSC management, but appears to reflect normal SSC test philosophy. It is general in nature but does constitute the first effort toward establishing policy and responsibilities relative to requalification of AVE material. The plan will be released as a separate document, but will be reviewed by Headquarters and related to the forthcoming revised Qualification Test Program.

2. SSC is placing more emphasis on completion of the qualification testing through personnel changes and more attention by higher management. At a Qualification Program working meeting (Headquarters/SSC) this week, it was agreed that SSC would conduct qualification certification meetings for those contractually required compartment electronics boxes but would provide reports (and appropriate discussions or meetings) relative to the other electronic boxes. SSC (through subcontracts management) has increased the emphasis on the vendors, especially PE Aerospace, to expedite qual test and reporting. SSC will make available to Headquarters the preliminary qual test reports as they are received from the vendor.

3. The SSPO met with SP-7 [redacted] on Tuesday afternoon, 21 July, at the STC to discuss space and equipment for on-orbit HEXAGON support. Satisfactory agreement was reached on SSPO space and necessary equipment for the support at the STC.

4. The security alarms for the computer facility are now in use.

5. The computer facility technical staff has written a software module designed to enable fortran coders to sort one or more data sets one or more times within the same job step.

6. Version 18.6 of the operating system - testing is progressing at a satisfactory rate, with minor errors which are being corrected.

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7. P.E. is formulating a position of the use of the Development Model take-ups after the DM completes its testing. It is expected that DM-2 and 3 should be used for R&I on the West Coast (one will be a spare), DM-4 will go to Eastman Kodak as the Operational Readiness Inspection Unit. After this, DM-4 will probably go back for any possible future testing with the DM.

8. Final checkout is underway on the SSTC Kluge box which will allow three commands to be executed from the SSTC rather than the present manual switching. These are the supply fill valve off and on, pneumatics A and B side independent of off and on, and the in-flight changeable filter. The boxes are in SSTC's 1 and 2 now. SSTC #5 is being retrofitted at AC during August with scheduled delivery to VAFB on 1 September 1970. SSTC #2 will be retrofitted, vice the Kluge box, as soon as the SSC schedule permits. SSTC no's. 3 and 4 will also receive the same retrofit.

9. The previously reported problems with film spool structural integrity; uncertainties in the core pressure, side - side gradients of core pressure, and temperature effects on the interlayer pressure continue to impact the program. These problems were addressed at P.E. with EK on 23 July. The conclusions of that meeting are:

a. EK is to engage in a high priority effort to develop a method of measuring the core pressure of each roll of film. A prime candidate is the gage previously developed by [redacted] of SETS.

b. The large diameter film spool (270 psi core pressure) which was to be used for the supply caging deletion tests will be used for a temperature test instead. This will affect both the schedule for the caging deletion tests and the film flatness tests P.E. is conducting in the 10' X 12' chamber. Both of these effects are acceptable, and the caging problem can be worked around.

c. EK will manufacture a new large diameter spool (desirable core pressure is 400 psi) within 10 days.

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d. The two full size SO-280 film spools dedicated to the SDV-III pad test sequence will be shipped to EK for rewinding to a higher core pressure and then shipped back to the West Coast. These rolls will be installed in SDV-III prior to the Chamber "A" test. This is necessary as the two rolls now in SDV-III may have a low core pressure and should not be exposed to a low temperature.

10. The film problems have a possible impact on the Chamber "A" testing of S/N 03 (SV-1). The film stacks presently in this model are suspect, as they were spooled during the period when EK was producing low core pressure. The options open to PRS are:

a. Continue with the present film and accept the risk that mistracking may occur during the 47°F test.

b. Install the two rewound rolls of 1414 on the S/N 02 supply hub and install this stack in the S/N 03 midsection prior to entering the chamber.

c. Hold the two rewound rolls and install in the S/N 03 supply after completion of the MFN 3.09 run. Options b and c have an estimated schedule impact of seven days (P.E. will probably claim more) while option a could cause a delay of from zero up to two weeks. The decision on this will be reported at the Monthly Program Review.

11. A review of the Design Improvement Studies was held at P.E. on 21 July. Highlights are:

a. A failure mode count shows that of 7470 possible critical failure modes, the present ESD will not protect the system from 1670, the improved ESD will not protect for 805, and the improved ESD with early warning detector wilb reduce the number of nonrecoverable modes to 570. The feasibility study is scheduled for completion next month.

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b. The brush motor study is essentially complete. Conversion of all motors to the brush type and replacement of encoders with tachometers except for the platen, O.B., and metering capstan will result in a 3.1% increase in system reliability.

c. The engineering model of the in-flight changeable filter has been completed and qualification testing will commence.

d. The dimensions of the mechanical super looper have been established for a 250 foot capacity. This footage will give the capability to start-stop at will and change scan between frames. P.E. will continue this study on the assumption that the control scheme is based upon coarse film path accelerations during photography. This provides the most flexible operational concept and does not dilute their limited efforts by continuing to look at other schemes.

The slack box studies are progressing slowly, and the control scheme analysis has not yet begun.

e. The caging deletion breadboard test has been delayed because of the other film problems. The result will be that a core will have to be redesigned (addition of side plates) before the results of the breadboard test are in.

12. A review of the current system problems was held at P.E. on 22 July. The cause of the fixed in-track smear ("bias") has not been positively identified. Other bars have not been found to have this problem and the obvious contributors have been checked. In all probability, this bar did not have a proper pin to glass alignment during the manufacturing cycle even though the records show this alignment to have been signed off by Q.C.

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The variable in-track smear is explainable in terms of gravity effects on the optical elements on the O. B. P.E. is to check the S/N 02 bar which had this effect and correlate the smear as measured on film with the measured mirror deflection. Further testing on the mirror mounts is required in order to define a fix, if any (this effect will not be seen on orbit).

There is a high probability that the twice-per-revolution metering capstan error is being caused by large eccentricities or rollers in the fine film path. P.E. has been running bench tests with a metering capstan in a flight platen. The twice-per-revolution error is not present when the metering capstan does not have a film load. When the fine tension sensor rollers were by-passed, the twice-per-revolution error was eliminated. It has been determined that the fine tension sensor rollers were specified to have an eccentricity less than 100 millionths, but, in fact, have an eccentricity of 150 to 250 millionths. When a fine tension sensor roller with an eccentricity of 60 millionths was installed in the bench test setup, the error was reduced. The question of whether out-of-spec eccentricities of idler rollers in the fine path may be adding to the problem is now being addressed.

13. P.E. presented a failure analysis of the P-1 failure to the Project Office on 22 July. As reported last week, the failure was caused by a documentation error at Radiation which resulted in a wrong value resistor being used in the platen recycle mode (2A1) electronics box. The wrong resistor value had no effect on operation at room temperature. However, at low temperature, the circuit was not able to operate with the wrong value resistor.

14. A discussion was held with M. Maguire regarding delivery requirements for systems 1 through 6. Maguire stated that in his interpretation of the delivery requirements of the Contract was that delivery should be in accordance with the specific dates specified in the

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appendix to Amendment 7. It is the Government's position that the delivery dates are in accordance with the delivery adjustments indicated in the Incentive Fee Plan which called for the adjustment of delivery schedules of succeeding units in specific intervals of time following the delivery of the preceeding unit. Under Maguire's proposed delivery schedule, approximately five months would occur between the delivery of unit 6 and the follow-on unit 7. To adjust this schedule to avoid the cost of such a large gap would be in excess of $3 million on which P.E. would request fee. Under the Government's position, the present contract schedule is consistent with the October delivery of unit 7 under the follow-on contract. The Government's position was that there is no need to modify the schedule at this time. Maguire is expected to make a reclama on this decision.

15. An estimate of the cost of manning up to operate a 7-day, 24-hour-day test program at the Integrating Contractors' plant from September through December was prepared by the WCPO. This plan was prepared to conform with the SPO office direction to their contractors to man up for a maximum effort in an attempt to hold the 17 December launch date. Implementation of this plan will be contingent upon the schedule review by the D/NRO next week and the availability of funds to support additional personnel. The cost of such augmentation for SSC has been estimated at $240,000.

III. Model Status

A. SDV-III

During the past week the vehicle has been undergoing acoustic preps in the vertical integration stand (VIS). The EMI filter has been removed from TU 2A, and the A2 electronics has been installed in TU 3B. The detailed planning schedule calls for moving to the acoustic chamber on 25 July with a pre-acoustic check run on 27-28 July and the acoustic acceptance and qual test on 30 July.

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B. SV-1 (S/N 03)

Midsection - MFN 3.09 has begun. The power consumption portion has been completed. This is the system checkout prior to Chamber "A" testing. We appear to be one day ahead of schedule (to a 1 September shipment date) however, the "B" side platen has hit its stops (gently) intermittently. This problem, which only occurs when both cameras are operating, is being thoroughly investigated today. An EMI problem in the 2A1 box is suspected. Both 2A1 boxes are scheduled for replacement anyway, because of a RadInc error in the as-built parts list - an incorrect resistor was used. The boxes for S/N 03 are scheduled to arrive at P.E. on 28 July and 3 August. Their replacement plus the installation of the platen stop switches will undoubtedly consume the plus one day mentioned above.

Forward Section - Preparations for P-1 forward section buildup continue. Replacement of two defective rollers in RV no. 2 TUA has been accomplished. Checkout of AVE electrical cables and articulator R&I are in progress. Necessary rework of active articulator tray began on 23 July.

C. SV-2 (S/N 02)

Rework of the supply, Optical Bar "B", film drives, crossovers, and Looper "A" are proceeding well. Platen rebuild and specifically the metering capstan is the critical path. A number of fine tension sensor rollers are being hand carried to Speedring (vendor) for rework. Speedring has indicated that they can reduce the eccentricity to acceptable limits within 24 to 48 hours. As a result, the platens are probably two to three days late to the rework schedule.

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IV. Meetings Requiring Participation of Headquarters Personnel

Date	Subject	Attendees
SAMSO		
27-29 July	Schedule Discussions with Gen. King, Dr. McLucas and Dr. Naka	Patterson
WCPO		
29 July	QA/QC Procedures and Documentation	
30 July	Test Plan & Procedure Documentation	
31 July	Technical Certification Status of AGE	
P.E.		
29 July	Reliability & LOL Determination	
EK		
30 July	Core Pressure & Spooling Techniques	Patterson,
HQS		
29 July	Near-Real-Time Concepts	Patterson,

PMO/PRS/OSP

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