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29 October 1971

MEMORANDUM FOR: Director of Special Projects

SUBJECT : Photo Reconnaissance Systems Report No. 116

I. CORONA

A. Accomplishments

CR-16 (Mission 1116) system pyro installation and checkout has been completed. Capsule readiness is in process. The system is proceeding on schedule to an R-14 status, at which time it will hold as a backup to the HEXAGON mission launch.

B. Problems

The CR-16 capsule readiness may have to be rerun due to out-of-date thermal modules. Quality Assurance is checking the LOL/LCL status of the modules.

C. Projected Status

1. CR-16. Flight preps.

2. CR-8. Pre-storage preps.

II. HEXAGON

A. General

1. [redacted] returned from the search for Mission 1201 RV-3. Pictures taken from the "towed fish" show the RV to be considerably damaged but mostly intact. It is impossible to determine from the pictures whether the

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take-up is still in the RV. The position of the RV on the ocean floor makes it appear likely that the TU is in the RV. Recovery action by the Trieste will begin about 4 November and should be completed about 7 November. Delivery of the RV to EK should occur about 11-12 November. It appears highly probable that the RV capsule containing the film is ruptured and that the film will have some exposure to light from the search picture taking and from the Trieste recovery operations. [redacted] will accompany the Trieste on the recovery mission.

B. Advanced Planning & Management Support Activities

1. The HEXAGON and CORONA FY 1972-FY 1978 budgetary requirements document requested by the NRO was completed and forwarded to SAFSP and the NRO on 26 October. This budget will be incorporated into a total HEXAGON/CORONA budget being prepared by SAFSP for submission to the NRO on 1 November.

C. Engineering

1. A review at PE was held on the color film test planning. The primary emphasis is being placed on air bar investigation and pneumatics analysis. Final preparations are being made for the next series of E-Model tests. The FEV from P-8 is installed and the tests will be run at 3.5 and 7 psi. This test series should be completed in mid-November. Simultaneously, abbreviated film path tests (AFP) will commence in early November which will allow comparative air bar studies. Photonic sensors will be used on the AFP to determine film lift-off as a function of air pressure.

2. A meeting was held with PE and TRW to discuss a spares recycling plan. PE has done no planning on this subject but now has an action item to draft a proposed plan. It is planned to discuss this plan with the west coast people on 10 November.

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3. Four flight rolls for SV-2 are being delivered to the west coast. The two test rolls for P-6 reload will be delivered to PE next week.

4. Discussions were held this week with WCPO personnel on the P-13-18 change candidates. It has been decided that since the Block II effort is being worked with a P-19 effectivity in mind, those P-13 change candidates which would be expected to change again at P-19 would not be pursued. Exceptions will be considered where the return is high for the cost involved.

5. Tests on SN-007 have identified a potential problem with the On-Orbit Adjust Assembly O^2A^2. It appears that a marginal design exists in a pulse shaping network within the OB encoder. The marginal design results in occasional losses of encoder counts which in turn result in significant velocity errors in the metering capstan. Since the OB encoder output is an O^2A^2 input, there is some concern that the O^2A^2 may be aggrevating the marginal condition. The plan to retrofit the O^2A^2 on SV-3 is being re-evaluated in light of the above.

6. Specific system level tests have been defined to identify the source (s) of the mean smear levels being experienced with the current system design. Essentially, these tests evolve around identifying the source of high frequency perturbation on the metering capstan summed error as measured on the TM and Chamber A photographic tests to sort out handling of the gravity induced image motion errors.

D. Operations and Systems Analysis

1. Further work has been performed to quantify the impact of film tilt on system performance. Film tilt causes an averaging effect on the optical transfer function due to film passing through focus during exposure. For forward-looking

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cameras with wide slit photography, the effect is approximately 3% at the 100 c/mm level. At higher performance levels (i.e., with smear levels down to the point where we can achieve 180 c/mm with wide photography), the loss due to film tilt will be 10%. This effect is not considered a serious problem at present as long as it remains no worse than the current measurements indicate. In the future, when the large degrading factors are minimized, film tilt will become more significant.

2. An analysis is being conducted on the resolution data from the through temperature 0.3" versus 0.6" slits. Large variable smear values have been measured during portions of this photography. The lower resolution values and the distorted shapes of the through focus curves are attributed to this variable smear input. One case in point, during the 93° F 0.3" slit through focus run, the mean smear values for both flight and scan direction changed by 0.100 inches per second over a span of 50 frames. It is very difficult to make an assessment of the camera performance from acceptance material influenced by this type and magnitude of smear.

3. The primary role of the LSFS on orbit should be: (1) to reset focal plane position based on TM-indicated changes prior to receipt of through focus imagery at the BRIDGEHEAD PFA breakdown, and (2) to detect any further significant changes in focus for the duration of the mission. To date, the LSFS output has been found to vary as a function of primary mirror mounting point distortion, V_x/h and IMC enabled versus disabled, though with no change in "real" focus.

A test has been designed that will record LSFS data as a function of temperature with a different mirror mount location. This would verify the LSFS validity.

Present plans are to record the TM counts from Chamber A-2 data in the SV-2 Flight Readiness Report and to compare these with the TM counts received from orbit

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on 1202. Any change will be used to compute a new focus plane position; however, a focus shift will not be made based on this computation. The computed shift will then be compared with the image focus at the PFA breakdown of the first bucket and correlation may be established. Consistent correlation over the first few flights will establish confidence in the LSFS signal in spite of the mirror mount distortion that does change with temperature. Ultimately, focus shift could be made during the first and subsequent buckets' operations based on LSFS data.

E. West Coast Project Office

1. The two-rev loading exercise for Mission 1202 started Tuesday, 26 October, and will end on Friday, 29 October. Loading cycles appear to be going well. It is understood that some problems have developed in the selection software; however, this is not associated with the two-rev loading cycle.

2. The latest version of the FIDAP program for smear prediction was sent to Westover, Headquarters and Danbury on 28 October. This version allows input of reticle tilt measurements and accounts for this tilt in smear prediction output.

3. Orbit library case 201 was received by WCPO on 26 October. This is the second of three cases available for Mission 1202. Orbit data for Headquarters software will be transmitted by WCPO on 29 October.

4. Preliminary layouts have been reviewed for the establishment of a balancing, vibrating and testing line for take-ups in Building 152. The SPO is also evaluating the move of the APSA work into Building 152. These two functions would be moved into the clean bay and office areas now assigned to the CORONA Program. A final decision is expected next week.

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F. Model Status

1. SDV-III (Development Model)

Phase I of the SPAT-II test has been completed and the system is now being configured for Phase II. Phase II is scheduled to begin 3 November.

2. SV-2 (MS SN-002)

The in air sequences of the A-2 Chamber test were completed on 28 October. The vacuum run is scheduled for the evening of 31 October. The film from the A-2 test is now scheduled to be available for shipment to Westover (for evaluation) the evening of 3 November. A date of 8-9 December is still reasonable time period for the launch of the system.

3. SV-3 (MS SN-004)

No activity. OOAA cabling installation to begin 1 November. The OOAA box and RV-4 installation are scheduled for 8 November.

4. SV-4 (MS SN-005)

a. Forward Section

The 4 RVTS is being mated and aligned to the F/S pylon in preparation for functional testing scheduled to begin on 29 November. The estimated completion date of F/S testing is now 12 November. LMSC reports that neither the ECS nor ARM will have completed the necessary testing at the time of the scheduled SV mate. Non-flight items will be used for vertical baseline testing.

b. Midsection

LMSC is presently working on the M/S in preparation for mating.

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5. SV-5 (MS SN-006)

The system is in temporary storage in Danbury.

6. SV-6 (MS SN-007)

Investigation continued this week on the metering capstan resonance problem. A very preliminary thought is that one of the electronic boxes may have to be modified to solve this problem. In an effort to determine whether or not other systems exhibit this same problem, a special test was conducted on SV-2. The metering capstan resonance was present in a lower magnitude than SN-007. Nevertheless, MFN 3.05 and the mini-format hopefully will be conducted today and MFN 3.09 perhaps will be done next week.

III. Meetings Requiring Participation of Headquarters Personnel

PE

2 Nov (AM)	Electronic Qual Certification Meeting
2 Nov (PM)	Brush Motor Meeting
3 Nov	Light Emitting Diode Proposal Review

SETS

1-2 Nov	Electromechanical Photo Correlation Meeting

SAMSO

2-3 Nov	Mensuration of Mission 1201 Materials

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WCPO

3-5 Nov	Electromechanical Photo Correlation Meeting with WCPO and PE	

HQ

4 Nov	Advanced HEXAGON Planning	
4 Nov	System Glass Status Review	
5 Nov	Monthly Program Review	Staff

D/PRS/OSP

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