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BYE-108972-70
Copy 9 of 13
20 November 1970

MEMORANDUM FOR: Director of Special Projects

SUBJECT : Photo Reconnaissance Systems Report No. 67

1. CORONA

A. Accomplishments

1. QR-2 (Mission 1112) was successfully launched at 1325 hours PST. Operation is normal with AP working personnel and WCPO Duty Officers using the new quarters in the STC. With the exception of the location of perigee, the mission was launched into the planned orbit. Perigee location was intended to be 35 degrees north descending; however, it was rotated to about 7 degrees south descending. The achieved perigee location will be rotated northward on the first DMU firing, and this should correct the problem. The rotation's only impact on the mission will be in higher photography in the prime area until the DMU is fired to rotate the perigee.

2. The switch programmer problem previously discussed was solved when failure analysis indicated a bad switch in the box that was replaced on QR-2. A wire bundle above the switch was riding on the switch when the cover of the box was closed. This was the only box with this type wire bundle routing. The switch was removed, and the wire bundle rerouted, thus solving the problem.

3. CR-8's SRV's were accepted at GE on 12 November.

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CONTROL SYSTEM ONLY

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4. The special CORONA target acquisition software is in final checkout for an initial operating version. This version as well as the minimal documentation should be complete by 31 November.

B. Problems

The CR-15 slope programmer is continuing failure analysis in regard to problem discussed in past reports.

C. Projected Status

1. CR-13. Pre-flight preps.

2. CR-14. Back-up thermal taping.

3. CR-15. Block test.

4. CR-16. Tracking.

5. CR-8. Instrument mods.

II. HEXAGON

A. General

1. The Project Office and TRW personnel reviewed the following spares data packages on 17 and 18 November:

1A4 (Digital Data Acquisition System)

3A1-B (Output-Film Drive Capstan Electronics)

6A1 (Supply Brushless Motor Electronics)

6A2 (Supply Servo Electronics)

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On 19 November, TRW reviewed:

1A2 (Modulation Computer)

5A1 (Articulated Steerer Servo)

5A2 (Edge Sensor Electronics)

All packages were satisfactory but were not tech certified by the Project Office because the appropriate contractor personnel had not signed the tech cert documents. After execution of the tech cert, the spares will be bought off via DD-250 and the spares sent to the west coast. Latest schedule indicates the last spare AVE electronic package arriving at PE in January.

2. The core for the "Watermelon IV" film roll (for supply caging deletion study) was sent to Kodak this week for spooling. The plan is to get the film roll back at PE by 1 December to support the x- and y-axis vibration tests scheduled for December. January 8 is the target date for decision on the caging deletion. EK delivered two "Pumpkin" (110 K feet) rolls, three "Cucumber" (26 K feet) rolls (one is color) and a supply of Versamat B chemistry to PE this week.

3. TRW and PE reliability are working together to have TRW recommend a non-destructive test program for potentiometers which is more stringent than the current potentiometer acceptance test program. In the past, several pots have passed acceptance tests but failed later in system level tests. It is hoped TRW can recommend a test program which will keep this from occurring in the future.

4. The CEI specification for the Forward Assembly Kit has been reviewed and found to contain reference to an

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incorrect part number for the steerer motor. Additionally, there was no reference to a requirement for a "roller run down" test. PE has been advised to correct the deficiencies in a revised spec and to resubmit for approval.

5. Longitudinal color qual tests at the 5th color frequency (blue) on the Optical Bar were conducted and found to be out of spec. Results of other color tests on the bar indicate that the bar should be within spec. PE believes there may have been a problem with the test equipment and is analyzing the tests and the equipment to understand the problem.

6. Qualification certification meetings for eleven electronic packages are scheduled for the week of 7 December.

7. At the Operations Interface Working Group on 12 November, the SPO stated his agreement to share telemetry tapes with PE when they arrive at LMSC and is in the process of arranging the details with LMSC. A subgroup to the Software CCB is being formed to assume the responsibility for recommending which software models will be used for support of a given flight or rehearsal. The SSPO representative recommended that the orbit for the November rehearsal be such that the maximum Vx/h be 0.035 and the scan be limited to ± 30 degrees. [redacted] generated a 125 X 139 NM orbit which met these constraints. The rehearsal went very well, with very complimentary comments from the Technical Adviser with regard to the PE areas of responsibility.

The post-milestone 8 configuration management plan for the flight software is ready for distribution. LMSC is going to provide a tape from the thermal/vacuum tests to the STC for mode validation and rehearsal activities. The establishment of the PCM format subgroup to the Operations IWG and TT&C IFWG was announced. The software with the SS-required modifications will be available for the December

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rehearsal. One flight-limiting software problem remains in the RTS software, which precludes processing the high-sample-rate SS data from the disk on the average of about one out of two attempts. Tests are being run to isolate the problem so that corrective action can be taken.

8. In the afternoon of 12 November, a meeting with SSPO, SPO and Aerospace was held to discuss the PE interface with Aerospace in the TA staff. The coordination role of Aerospace was determined to be in command message checking, specifications of station pass requirements, providing FRT and attitude data, mission profile planning and telemetry mode scheduling, and post-flight critique participation.

On 17 November LMSC presented their plans and procedures for support of the TA staff. The general presentation in the morning showed good thought and was very interesting. LMSC now has a couple of analysts who have worked at the STC in the vehicle analysis group for CORONA who have greatly influenced the mode of operation of LMSC in the TA staff. Arrangements are being made for PE to hear the general presentation. The detailed presentation in the afternoon was not nearly as well thought out and shows LMSC has a lot of detailed planning to do.

In the afternoon of 18 November, an informal discussion between SSPO and SPO resulted in a statement of agreement, satisfactory to both, on the only item discussed in the TA staff relationship meeting which did not conclude with a summary statement of agreement. This item related to contractor support of SCF rehearsal planning. SSPO also reviewed the position statements and summary remarks prior to their being presented at the 19 November Managers Meeting.

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9. With regard to MACFACT and HOPE, the following agreements were reached in discussions between WCPO, TRW, and PE/WCFO:

A. PE/WCFO will be responsible for modification/maintenance of MACFACT software with all modifications approved by WCPO. TRW will continue to support MACFACT as required for development of HOPE software.

B. WCPO will provide all software necessary for interface between the MPR (Mission Performance Report) and HOPE. This will be a minimum software effort involving extraction of clock correlation, rev-op correlation, and orbit parameters from the MPR.

10. Messrs. [redacted] Weiss and [redacted] from ESL visited the West Coast Computer Facility to discuss their processing requirements and to be briefed on the hardware/software configuration of the Computer Facility.

11. The Headquarters Calcomp routines were modified to insure the calling sequences in scale, axis and plots to be compatible with the West Coast 760 Calcomp software.

12. Messrs. [redacted] (D&AD) visited LMSC on 17-19 November to prepare a Block II briefing for presentation at the HEXAGON Managers Meeting. Of the four configurations studied during the past two weeks--with and without added film capability and with and without added orbit adjust propellants--one hardware configuration was selected for additional study prior to asking the NRO in January for funding. The P-13 concept would include:

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A. No additional film capacity.

B. "Super" looper, simplified film transport, brush motors/tachometers, and improved emergency shut down.

C. 150 percent OA propellant.

D. 90-day (84 X 144 NM) to 120-day (88 X 140 NM) missions.

E. Some additional redundancies/simplification to try to achieve a .75 system reliability.

The associated sensor subsystem ROM costs are as follows:

A. Non-recurring $35.3M

B. Recurring:

(1) 4/year $60.4M per year

(2) 3/year 49.6M per year

The PE proposal for units 6-12 contained equivalent 4 per year costs of $62.0M per year.

B. Model Status

1. Development Model (SDV-III)

On 18 November, SDV-III completed day 18 of the thermal vacuum qualification test successfully with rewinds of up to 69 inches/sec being demonstrated. Following day 18,

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RV-3 had been loaded to greater than 26,000 feet and transfer from RV-3 to RV-4 was accomplished. Day 19 (the last day of sensor operation) was completed on 19 November, including rewinds of up to 81 inches/sec (the maximum) and as much as 40 minutes per day of camera operation. SDV-III has now transferred approximately 60,000 feet of film per camera during this test, and performance has been excellent. Quick look data indicates that relative humidity problems may be less severe than anticipated.

2. SV-1 (SN-003)

(A) Midsection

R&I testing has not yet resumed due to difficulties with the looper modification installation and checkout. A problem was encountered late Wednesday evening when the "A" camera "ran away" during a mono creep operation. Attempts to remove approximately 40 feet of loose material from the supply, which resulted from the uncontrolled shut down, showed a foldover in the FEV (Film Exit vestibule). The supply was subsequently removed, resulting in an additional four-day slip.

(B) Forward Section

Articulator steerer SN-5002 has been replaced with the unit previously scheduled for installation in the SV-2 forward section. This replacement was required because a quad ring seal was inadvertently left out of the steerer at the time of manufacture and assembly. Forward section checkout activities resumed with tracking/stacking tests performed on TUA SN-015 (Bay No. 1) on 19 November 1970.

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(C) Aft Section

LMSC problems continue, but the aft section is not on the critical path.

3. SV-2 (SN-002)

SN-002 is experiencing two prime performance anomalies as previously reported:

(A) Metering capstan oscillation at discreet velocities.

(B) Near-saturation of the "A" and "B" supply steerer. Present contractor plans, agreed to by the government, include the incorporation of the looper modification kit and a review before proceeding with the MFN 3.09 test sequence. The Project Office and the contractor have agreed that all efforts will be made to resolve the two prime problems.

4. SV-3 (SN-004)

"B" side platen tests will be complete on 20 November. The remaining subassembly installation and testing for Optical Bar "B" will be complete on 24 November, with clean room testing scheduled for 25 November completion. Two camera assembly vibration testing is scheduled for 3 December, but if PE encounters no problems, they can probably start this test a day or two early. Other schedule milestones remain the same as reported last week.

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(A) Metering capstan oscillation at discreet velocities.

(B) Near-saturation of the "A" and "B" supply steerer.

Present contractor plans include the incorporation of the looper modification kit and then proceeding with the MFN 3.09 test sequence. The Project Office is reviewing the contractor plans.

4. SV-3 (SN-004)

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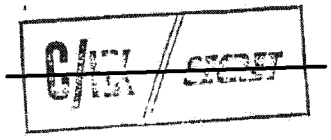

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III. Meetings Requiring Participation of Headquarters Personnel

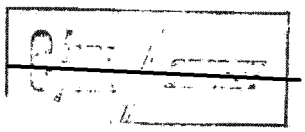
Date	Subject	Attendees
PE	Follow-on Cost Audit	

Personnel

Messrs. will be on annual leave 27 November.

PMO/PRS/OSP

Distribution:
Cy 1 - D/OSP
Cy 2 - ADD/OSP
Cy 3 - D/PRS/OSP
Cy 4 - EO/OSP
Cy 5 - CS/OSP
Cy 6 - C/PAD/OSP
Cy 7 - C/SB/OSP
Cy 8 - C/SS/OSP
Cy 9 - RB/OSP
Cy 10 - PRS/File
Cy 11 - PRS/Chrono
Cy 12 - NEPO
Cy 13 - WCPO



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(b)(3)

IMMEDIATE WAHOO INFO PRIORITY CHARGE, PLUM, PILOT

REAGIA-X

• 1113-1

B. TELEMETRY DATA INDICATES A DISCREPENCY BETWEEN THE "CYCLE COUNT" (CC) MONITOR AND THE "FILM FOOTAGE POTENTIOMETER" (FFP) MONITOR FOR THE FORWARD LOOKING CAMERA. FOLLOWING THE REV 79 OPERATE THE CC MONITOR SHOWED 2475 FRAMES ON THE TAKE-UP WHILE THE FFP INDICATED THAT ACTUAL TAKE-UP DIAMETER WAS 18.63 INCHES (NOMINALLY 2714 FRAMES), A DIFFERENCE OF 225 FRAMES.

C. AT THIS TIME THERE IS NO EXPLANATION FOR THIS DISCREPANCY. POSSIBLE CAUSES ARE INCORRECT TELEMETRY, LOOSE FILM WRAP ON THE TAKE-UP, NON-UNIFORM (LUMPY) FILM WRAP, OR ERROR IN THE FFP. EVALUATION WILL CONTINUE WITH A POSSIBLE SOLUTION WHEN THE BUCKET/FILM IS EXAMINED FOLLOWING RECOVERY.

D. THE FFP CONTROLS TAKE-UP CAPABILITY AND THE MAXIMUM TAKE-UP DIAMETER ALLOWABLE IS 19.75 INCHES (APPROXIMATELY 3125 FRAMES). ABOVE THIS DIAMETER THERE IS A POTENTIAL TO JAM THE SYSTEM CAUSING A CAMERA SYSTEM FAILURE. WE THEREFORE PLAN TO PUT A MAXIMUM OF 425 MORE FRAMES (AS OF REV 80) ON THE FORWARD-LOOKING CAMERA PRIOR TO THE CUT-AND-WRAP OPERATION

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(b)(1)
(b)(3)

E. RECOMMEND WAHOO PLAN ONLY 425 MORE FRAMES (2900 MAX.) FOR 1112-1. THIS WILL LEAVE APPROXIMATELY 3240 FRAMES TO BE WRAPPED IN THE SECOND BUCKET WHICH IS MORE THAN NOMINAL BUT STILL WITHIN THE SYSTEM CAPABILITIES. HOWEVER, THE LAST 100 FRAMES OF THE MISSION WILL HAVE SOME SMALL RISK AS THE SPOOLS REACH MAX. CAPACITY. IF WAHOO DESIRES, 100 EXTRA CYCLES MAY BE TAKEN ON THE AFT-LOOKING CAMERA IN THE (A) BUCKET. THEN THE RISK IS ONLY TO THE LAST 100 FRAMES ON THE FORWARD-LOOKING CAMERA.

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BT