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21 November 1961

MEMORANDUM FOR : Chief, Development Branch, DPD-DD/P

SUBJECT : Trip Report, SETD Meeting on 14 November 1961

1. Purpose: Monthly review of the MURAL program by the SETD and Configuration Control Board. Official minutes will be forwarded by SETD after coordination.

2. General Discussion:

(a) Fixes on Instrument 52 and 57 Effecting the MURAL Program: C''' #52 was at LMSC in acceptance inspection prior to HATS. (Informal flight date set for about 12 December). Mr. John Wolfe went over the Ashenbruner tests and the fixes in great detail. A quantity of significant data is begining to accumulate which increases the confidence in the attainment of the desired system quality. The "outrigger" roller to flatten the wave effect across the slit during scan looks good and the test results of this item (in conjunction with an additional "bobbler" roller and a "dancer" roller for more positive tension control) are satisfactory. The final test can only be the actual use of instrument #52 in flight. Confidence is high and the fixes rather simple and inexpensive if they work as tested. Itek is still working on several more exotic approaches as back up. The Ashenbruner test will be a part of normal acceptance testing.

(1) Evaluation of Fixes on Instrument #52: Even though mid-December gives us our worst sun angles, the general consensus of opinion was to go with SO-132 instead of SO-130 in order to fully prove or disprove the fixes before "H" flys. At noon you will have sun angles at about 12° at 55° north, 7° at 60°north, and dropping to about 0° at 65° north. At 1000 and 1400 hours the sun angles drop to about 12° at 50° north, 7½° at 55° north, and dropping to 0° at about 62° north. Obviously, neither SO-130 or SO-132 could operate above 65° north at noon and I expect SO-132 to provide a satisfactory exposure from 60° north at noon and 55° north two hours each side of high noon. On the other hand, SO-130 should give a satisfactory exposure from 63° north at noon and 60° north two hours either side of noon. Therefore, our maximum loss between the two emulsions is the difference between 55° north and 60° north from a

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period two hours each side of noon. The actual difference between these emulsions may not be this great since we are still dealing with some unknowns. Also, snow cover is increasing the contrast and light reflectivity and NPIC has not been able to verify the exact end points of either emulsion at the very low sun angles since cloud cover has always interfered in checking these conditions on missions received to date. Another factor is introduced when you consider that one side of a frame may be dark while the other side has some image due to the wide swath of terrain covered by a single exposure. In summary, I feel that the additional quality potential in SO-132 below 55° north combined with the unknowns in actual limitations of this emulsion and the need for a full engineering flight on fixes is adequate to justify C''' instrument flying with SO-132.

(2) Horizon Camera: Itek has been conducting studies on improving the quality of the horizon cameras. The appearance of the horizon photos on all C''' instruments with SO-132 has been similar to an out-of-focus condition. The last recovered mission showed an improvement on one side with the only change being a decrease in shutter speed from 1/200 second to 1/100 second. They find that they have a limited amount of freedom in the physical change of focal length (± 0.02 inches) before resolution is changed significantly and also little focus shift with reasonable temperature variations (79°F to 130°F). Therefore it seems reasonable to assume that since the C' horizons were acceptable and the same camera and filter were used on C''', the problem must lie partially in the film-filter area. Itek concurred that the shutter speed could be further reduced to 1/50 second without IMC error. Eastman agreed to attempt to conduct some tests on SO-132 with various filters in the current "Red Dot" series. I made one other suggestion that we try adding a simple lens shade to the horizon optics. One other small improvement in quality was achieved by painting the boot black. This might reduce stray light further and cannot interfere with the system.

(b) Equipment Deliveries by Itek:

(1) Instrument #52 was at LMSC being readied for HATS. It went through check-out in good order except for replacing a few cracked brackets and the digitote failed. Instrument #57 was due on 16 November and is just begining to interfere slightly with the "M" assembly.

(2) The fixes on Instrument #51 will undergo qualification tests as soon as #57 is out of the shop.

(3) The first "M" unit is now working as a system (cassette and instrument).

(4) The first auxiliary frame camera has been delivered and the first flight article was en route. Subsequent items will at least be delivered with their companion main instruments, but probably ahead of this schedule.

(5) Itek expects to deliver one main unit (a pair) per week by mid-January. Parts and sub-assemblies are begining to be stock piled in advance which should increase over-all reliability since past practice of panic assembly as soon as a part was ready is being eliminated to a large extent.

(c) Equipment delivery report on farings, barrels, and clocks by LMSC:

(1) There was a slight slip in schedules due to C''' 52 and 57 being programmed in, but not significant in the over-all plan.

(2) The clock qualification unit was in hand and scheduled for completion of testing on 26 November. FCIC was having some trouble with the oscillator and static logic assembly but no significant problems or effect on schedules.

(d) Equipment Delivery Report On Recovery Subsystem By LMSC: The pacing item on current schedules is the G.E. recovery system. [redacted] and I explained planned action by Headquarters and Dr. Charyk to place priority requirements on G.E. top management to meet schedules.

(1) Aft Cover: After qualification testing of the new aft cover a bonding problem was encountered. A fix has been made and is in test. LMSC found an excellent plastic shop within the company and are now getting this cover "in-house" with excellent deliveries.

(2) Vibration Tests: Scheduled for completion on 26 November. No significant interference with system test due to fix on aft cover.

(e) Ground Handling Equipment and Ground Support Equipment: GHE and GSE for the first two units are in-house. The accelerated schedule requires one additional ground handling dolly.

(f) Parachute Development Program: TD #16 covered the development of a 30.7 foot parachute with a 4.5 foot ribbon deceleration parachute. Tests have been completed satisfactorily with suspended weights up to 221 pounds. (Nominal weight will be

about 168 pounds). A detailed report on this item is on file in Development Branch, DPD.

(g) Structure Test by LMSC: No problems except the bonding failure on the aft cover mentioned above and a fix and retest is required on the ballistic (floatation) system. The "beanie cap" unlatched and broke off during airsnatch. They propose to redesign the spring to increase unlatching force and, as a back up, notch the spring bracket to localize point of failure in event of a break so it drops clear in an airsnatch.

3. New Technical Directives:

(a) TD #31: Modification to Master Operate Control Circuit to improve system reliability by deleting unnecessary switching of the operate signal within the V/H transducer. This is a minor change and can be accomplished within the V/H transducer assembly. It simplifies the system and removes contacts (wafer H) in series with the operate signal. No change in contract scope or cost. Approved by the CCB.

(b) TD #32: Design change in the V/H control circuit of Instruments #1 and #2 (fore and aft main cameras of the "M" configuration) to facilitate proper system operation. Present design permits malfunction of Instrument #1 (master) if a malfunction occurs in Instrument #2 (slave) K 106 operate relay. This change will insure operation of the V/H control circuit to either camera, even though a malfunction occurs in one of the items. No change in contract scope. Approved by the CCB.

(c) TD #34: Extension of system prelaunch stand time of recovery system from current 11 day limit to maximum of 26 days. LMSC proposes to conduct a test and procure modifications, as required, to the recovery battery and cold gas spin system to accomplish this extension. These are the two limiting factors causing a minimum of 7 days delay in rescheduling once R-4 is past. This action would not only provide more flexibility in scheduling, but obviously increase reliability of these components. This TD was approved by the CCB, but is above scope and requires approval of the contracting officer. Estimated cost is [redacted]

(d) TD #37: Design, development and qualification of new film cutter/water seal assemblies for the MK 5A in conjunction with the primary (dual) chute and the auxiliary frame chute. The MK 4 and 5 water seals are suspect from a reliability standpoint due to the criticalness of alignment coupled with the necessity of cutting two pieces of film which could be overlapped. At the present time, the adjustment is a precise art by a single qualified man rather than an assured science. Final action was not decided by the CCB.

Will investigate further. Above scope and cost: [redacted] for the development program and an additional cost for installation and fabrication. Should easily total [redacted]

(e) TD #38: Change in tolerances of the cassette film footage potentiometer minimum reading to higher values since the more stringent specification is not required. Change is from 0.004 volts plus or minus 0.003 volts to 0.008 volts plus or minus 0.007 volts. Readings are not made in the critical range and an unreasonable effort is required to adjust the potentiometer. Approved by the CCB, within scope and cost of the contract.

4. Next Meeting: The next SETD meeting is tentatively scheduled for 14 December 1961 at the new Itek facility in Boston.

5. Action Required:

(a) NPIC and Intelligence have been sent copies of this report. Their comments are requested on paragraph 2(a). Development Branch, DPD, has recommended that Mission 9028 use J-23-7600 (SO-132).

(b) I will follow up on TD #37 and investigate thinking at G.E. on improvement on the film cutter/water seal assembly.

[redacted] JR.
Major USAF

CC: [redacted]

Distribution:

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