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Copy No. [redacted]

2 August 1967

MEMORANDUM TO HEADQUARTERS

TO: [redacted]

INFO [redacted]

FROM: [redacted]

SUBJECT: Monthly Activity Report - July 1967

1. The following activity report is a summation of important events in the development of the CORONA system which occurred during July. The chronological order of events are summed in the Weekly Activity Reports.

2. CR-1 - In the June HIVOS test instrument no. 303 of CR-1 exhibited 2 pi corona marking in the 25 to 30 micron pressure region while instrument no. 302 exhibited only starting corona. The pressure roller spring tension was reduced on instrument no. 303 and a roller misalignment corrected to relieve the corona problem. DISIC S/N 3 exhibited severe corona marking on the stellar film and minor marking on the terrain film. The 35mm rollers and the 35mm metering rollers were all replaced within the DISIC body. The dust brushes in the DISIC film supply chute were removed.

CR-1 went through a compatibility test with the Agena on 11 July. The primary purpose of the compatibility test was to test the distortion of the modified Itek power supplies. The test indicated that distortion on the 400 hz. line caused by the inductive mod supply ranged from 2.1% to 5.6% compared to 8% - 9% for the resistor mod supply. The inductor supply was selected for CR-1 and was utilized with CR-1 for the HIVOS test 14-18 July. Analysis of the HIVOS II materials showed that instrument no. 302 exhibited 2 pi corona marking in approximately the same pressure ranges as noted on instrument no. 303 in the first CR-1 HIVOS test. The pressure roller spring tension on instrument no. 302 has now been adjusted from 60 to 40 oz. as with the other CR units. DISIC S/N 3 had a minor but acceptable level of corona marking on the terrain film and reduced frequency and

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new requirements of 40 oz. The DISIC S/N 2 had corona marking similar to that marking of S/N 3 but on a reduced scale. The rollers were cleaned, the metering rollers sprayed with anti-stat and the stellar platten pressure was reduced from 4 to 1 lb. in an effort to solve the marking problem.

QR-2 went back into HIVOS on 19 July using the inductive mod 400 hz. power supply. This power supply will be removed after the HIVOS run and be used with CR-2. QR-2 will run with the resistive power supply until such time as it is prepared for flight. During HIVOS the main instrument scan head temperature sensor indicated temperature excursions while in the stow position similar to those experienced in CR-1 tests. The problem of shielding and radiation transfer from the A.O. boot to the scan head is now under investigation. QR-2 was returned from HIVOS 29 July, but the photographic materials have not yet been analyzed.

4. CR-2 - Required modifications have been performed on the main instruments which are now undergoing functional testing in the main barrel. DISIC S/N 4 is with the system.

5. CR-3 - The CR-3 main instruments were bought off on 20 July and will be delivered to AP on 10 August after PG calibration and minor adjustments have been completed. Prior to the buy-off extensive testing of the instruments were conducted by Itek. As a result of approximately 160 resolution tests that included re-examination of the lens and its nodal point, film tensions, effects of filter warp, etc. a great deal was learned about the CORONA camera that was not previously known.

During initial testing on instrument no. 307 a pronounced resolution loss occurred during scan. The primary source of this degradation was film motion in the scan direction caused by film sag between the rails interacting with the drum rollers and setting up a standing wave motion as the rollers lift the film. This problem was partially eliminated by raising the eight rollers preceeding the scan head. Further work appears necessary and some additional rollers may be required with UTB. [redacted] contains more detail on these particular tests.) DISIC S/N 5 is scheduled for buy-off the week of 1 August and for delivery to AP on 8 August. The Patio Calibration Test has not yet been performed.

6. CR-4 - The CR-4 camera system is presently undergoing test at the Itek Environmental Test Lab (ETL) in Boston. The CR-4 camera system has incorporated on instrument no. 309 the first improved Petzval lens, glass filters, and shimmed drum rollers. Preliminary dynamic resolution tests are indicating performance in excess of 160 l/mm low contrast for instrument

intensity of corona on the stellar film. Changes to S/N 3 after the second HIVOS included reworking of the skew rollers to remove sharp edges and the placing of grounding and bonding straps to the roller frames and the DISIC chassis. The PMU on CR-1 has been modified to raise the operating pressure from 20 to 50 microns. CR-1 is scheduled to enter HIVOS on 2 August for a 4-day run at altitude on the corona retest.

A problem under investigation during the CR-1 HIVOS III run will be the thermal gradient problem of the scan head. The CR system is designed by means of a surrounding barrel to provide a uniform temperature environment for the entire Petzval lens assembly. Anamolies to this environment may be expected during operate condition due to the albedo and earthshine as the objective lens and scan head are alternately exposed to the earth. However, in the stow position the objective lens and scan head are shielded from any direct solar or earth radiation. The gradient problem arises through the fact that one H.O. boot is heated by the sun and the other H.O. boot radiates to space. These boots are acting in effect as black body radiators and affect the areas of the CR barrel shield that are in a position to "see" the H.O. boots. In turn, the scan head and objective "see" the black painted shields which are actively emmitting or adsorbing heat through the process of radiation and conduction through the shields. This effect sets up thermal gradient for which the lens was not designed. To alleviate this gradient problem, the current CR-1 in HIVOS has had the fiberglass section of the H.O. boots covered inside the CR barrel with aluminized reflective tape. This tape should provide a temporary solution to the thermal problem. Meanwhile, AP is proceeding to design and construct a proper thermal shield which will be placed between the H.O. boots and the lens barrel. A thermal vacuum test on the J-3 Petzval lens to determine its exact response under varying thermal environments has been programmed as a portion of the J-3 Systems Analysis Studies.

The glass filters for CR-1 flight are in house at AP, and at this time the 12 September launch date is still holding good.

3. QR-2 - The first HIVOS run for QR-2 was terminated on 3 July when the take-up in the "B" bucket failed after the cut and splice operation. The reason for this failure has not yet been determined. The take-up unit was removed from the SRV for independent testing and an operational unit reinstalled.

The main instruments during the run exhibited an excessive amount of corona marking. The instruments were removed from the barrel and the pressure rollers replaced and the pressure roller tension adjusted to the

no. 309. No previous CORONA camera has even exceeded 140 l/mm in dynamic operation (CR-2). J-1 camera systems normally have averaged between 120 and 130 l/mm.

7. Managers' Meeting - At the Managers' Meeting on 19 July the following major items were discussed:

a. [redacted] agreed to supply authorization to the Contractors to order long lead items necessary for supplying four additional J-3 systems.

b. All J-3 component and structures have passed qualification except for the switch programmer which is still having timing problems in the chamber. (Switch programmer was qualified on 26 July.)

c. The readiness of CR-1 to fly will be discussed by all managers at the next Managers' Meeting on 22 August.

8. PIBS and Increased Mission Life - A series of discussions were held during July on CORONA mission lifetime and film requirements. The Resident Office provided recommendations to Headquarters on methods of increasing the useable film supply. Included were consideration of UTB, PIBS, H.O. removal and increased film supply. Cost and effectiveness of PIBS was supplied, but it was concluded by both Headquarters and [redacted] that PIBS incorporation should be tied to J-3 extended life capabilities. Other investigations are continuing.

In considering extended duration missions it was concluded that a reduction in the H-timer transport speed would result in a loss of payload efficiency. A dual H-timer mechanical unit was thought to be the best answer to increasing the length of time of H-timer control.

9. Missions 1042-2 and 1043 - Prior to buy-off on J-42 for Mission 1043 a meeting was held at AP with [redacted] from G.E. presenting to [redacted] and the Resident Staff the reasons for the improper re-entry of the SRV from Mission 1042-2. The probable cause as determined by G.E. was a partial failure of the phenolic nylon heat shield which resulted in a fin-like protrusion of the skirt of approximately 4 to 5 inches effective area, at about 20° from the longitudinal axis. G.E. feels that such a protrusion could have produced the torque required for a spin-up to 280 RPM. A spin rate of this magnitude was believed to have been observed on the beacon signal strength records. This spinning could have caused the tumbling which actuated the G switch several times, delaying the recovery programmer time out by 62 seconds. The delay allowed the SRV to fall below an altitude from which an air recovery could be made.

A review of all records relating to the shield manufacture and test history failed to reveal evidence of a defect. G.E. certified the heat shields for Mission 1043 after a close examination. Final readiness and buy-off for system J-42 was held at AP. The system was shipped to VAFB on 28 July 1967 for launch on 1 August.

G.E. will investigate relocating the G switch so as to reduce the possibility of G switch closures. G.E. will also review the manufacturing and testing procedures in order to determine what might be done to lessen future chances of a potential failure.

10. Storage Register - At present the Storage Register has slipped two weeks. The main reason for the slippage has been the transfer of personnel efforts to the CR-1 system in getting it ready to fly. The contractor feels that this lost time can be regained once the CR-1 problems are out of the way. Mid-August should see the start of fabrication and release of all designs.

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