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21 October 1968

TO: Distribution

FROM: [redacted]

SUBJECT: 1048 Forward Instrument Failure Analysis Summary

A. During the 1048 Mission PET Meeting, several failure modes were analyzed in an effort to establish the cause of the forward looking instrument flight failure. The included table lists the most likely possibilities and data for supporting and/or non-supporting these possibilities.

B. It should be noted that considerable weight was given to the belief that an abrupt stopping of either instrument should have been detected on the vehicle guidance telemetry. It was also assumed that the instrumentation would also respond in the same manner as it has in the past during similar ground test experiences.

C. Camera Failure Analysis (See attached chart)

D. It was the consensus of the investigating team at the PET Meeting that the camera failure mode most generally acceptable to all of the conditions is the loss of a pin in the main drive assembly.

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Attachment
cc: [redacted]

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HANDLE VIA [redacted]
CONTROL SYSTEM ONLY

[redacted]

C. CAMERA FAILURE ANALYSIS

[redacted]

Cause	Supporting	Non-Supporting	Comments
1. Film Transport	a. Torn Film b. Camera Non-functioning c. Repetitive nick & crease pattern on film (very remote).	a. Vehicle Guidance T/M indicates no abnormal perturbation. b. Normal current loads (no fuses blown) c. Shuttle in 99% position d. No T/M indication on two continuous channels (Lens Rotation & Center Format)	Minimum film metered - 37 inches Maximum film metered - 62 inches Film tear appears to have taken place between I.R. assembly and the air twist after the shuttle.
2. Pin Loss in Motor Drive	a. No T/M indication on two continuous T/M chan. (Lens Rotation & Center Format). b. Operative Motor & Tach c. Tach Response follows V/H input. d. Shutdown had minor effect on guidance. e. Current load was normal. Camera failed to shut down, no action of S-107 shutdown switch.	a. Torn film was not necessitated by failure.	a. The splice that passed on Rev. 180, Frame 23, possibly loaded the system such that a pin or pins were partially fractured that finally severed at the time of failure.
3. Torn Film from Supply Cassette	a. None w/o further analysis	a. Good photography to point of tear. b. T/M indicated supply spool was not rotating. Torn film would result in spool rotating continuously.	

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CAMERA FAILURE ANALYSIS (CONTINUED)

[redacted]

Cause	Supporting	Non-Supporting	Comments
4. Miscellaneous			
A. Single Drive Belt Breakage	None	Loss of lens rotation & C.F. T/M requires two (2) belts breakage.	No belt failures have been experienced on any M/J1/J3 System
B. Frame-Metering Wrap	None	a. Missing T/M would be available. b. Camera could be shut down. c. Vehicle Perturbation should be noted at jamb-up.	
C. Input Metering Mistrack	None	a. No evidence of mistrack on film. b. Load on instrument of magnitude to shear pin in the mnotor should cause vehicle perturbation.	
D. Tach Failure	Time word indicated 3% speed up frames (68 to 69)	a. Frame 70 photography indicates normal speed.	Further time word analysis will be performed.
5. Wrap/Mess in Take-Up	None	No. 2 camera operated throughout mission.	The Wrap/Mess was an effect and not cause of the camera No. 1 Failure.

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