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TOP SECRET

ATTACHMENT A TO BYE 4635-62

BYE 3819-62
18 October 1962

# PHOTOGRAPHIC EVALUATION REPORT

Mission 9044
29, 30, 31 August 1962
1, 2 September 1962 Z

FE No. 35-62



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BYE 3819-62
18 October 1962

PART I - FORWARD CAMERA

Mission No: 9044
Camera No: 92
Slit Width: 0.200"
Film Type: 7J23-7800 (SO 132)
Filter, Main: Wratten 21
Aperture, Main: f/3.5
Filter, Horizon: Wratten 25
Evaluated By: IH, TK, CL, ES

1. Shutter Operation (Horizon Cameras): Operational.

2. Horizon Camera Exposure:
   a. Take-up (Port): Slightly underexposed at f/6.8 with a 1/200 second speed.
   b. Supply (Starboard): Slightly overexposed when image is present at f/6.8 with a 1/200 second speed. Vehicle attitude results in loss of horizon imagery on some passes, most noticeable on ascending passes.

3. Camera Number: Operational throughout the mission where a second or third binary record is exposed at the camera-off position. The number is legible but underexposed.

4. Binary Operation: The binary record functions throughout the film, however, the index lamp is underexposed. Extra binary readings at the camera-off positions do not expose the binary index lamp. Double binaries and single end-of-pass markers are present on 42 frames, all occurring on the last frame before camera-off. Fourteen additional frames throughout the mission have a single binary recording in association with the end-of-pass marker.

5. Film Metering:
   a. The average metering between the supply (port) horizon camera and the following terrain frame is 0.28" except between frames 73 and 74 of pass A65 where metering increases to 0.75".
   b. The average metering between the take-up (starboard) horizon camera and the previous terrain frame is 0.30" except between frames 72 and 73 of pass A65 where metering increases to 0.75". Average metering on previous missions is approximately 0.20".

6. Film Tracking: Normal throughout the film.

7. Timing Pulses: Readable, but recorded as double images. The pips appear outside the format area, terminating as much as 11.3" from the supply edge of the last terrain frame of all passes. The gap in the timing pulses, signifying the center of scan time, is difficult to read, as the lamps continue to glow faintly with a dim pip imaged on the film. The streaked pulse signifying the firing of the framing camera operates on the seventh and eighth consecutive frames on certain passes. Examples: pass A01, frames 9, 10; 16, 17; 23, 24; 30, 31.

8. Fiducials:
   a. Main Camera - The fiducials are slightly ragged but usable.
   b. Horizon Cameras - The fiducials are well defined with little or no flare.

9. Light Leaks: A diagonal light leak consisting of two parallel streaks is present in the second, third and next-to-last frame of some passes, occurring a total of 20 times throughout the film. Equipment image reflections occur on 10 scattered frames, usually on the first or last frame of a pass. Miscellaneous light leaks fog portions of 14 other frames, usually the last frame of the pass.

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10. Static Electricity: Possibly corona static fogging first appears as a diagonal streak on pass D06, frames 3-8, occurring at 6.3" intervals along the leading edge of the film. Static fogging is then present on all other passes, with the greatest degradation on the third through eighth frames from camera-on and gradually dissipating toward the end of the pass. However, the effect becomes more dense and persistent as the mission progresses affecting more frames per pass. Approximately 1000 frames are somewhat affected by this phenomenon. Pass D40 is a representative example of the amount of degradation resulting from the corona static effect on this mission. Edge static occurs intermittently.

11. Pinholes: Pinholes are few in number and scattered throughout the film.

12. Abrasions and Scratches: Present intermittently throughout the photography. Miscellaneous small scratches occur on approximately 55 scattered frames. Numerous light, parallel abrasions, that are continuous, are present on passes A04, A16, A18, D18, A19, A20, D20, A21, D21, A33, A48, A49. These appear to be handling marks introduced after processing and after the material left the processing site. Numerous shiny base rubs are present in a random pattern throughout the film with a specific base rub appearing continuously 0.75" in from the trailing edge on passes A33, A48, A49, D54.

13. Tearing: None. A transparent splice is present on pass D40 between frames 97 and 98. Manufacturing splices occur on pass A21, frame 8 and pass A53, frame 26.

14. Water Marks: Few.

15. Pressure Streaks: None present.

16. Processing Streaks: None can be definitely defined.

17. Blistering and Crimping: Blisters are few and intermittent, occurring on approximately 16 frames throughout the film.

18. Contrast: Low 53%, medium 44%, high 3%.

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19. Apparent Resolution: Image quality is good, comparable to mission 9041. Acuteness of the aft camera appears better than that of the forward camera.

20. Apparent Granularity: Fine.

21. Photo Quality:
    a. Main Camera - Degradation due to corona static fogging, and light leaks results in a rating of "fair."
    b. Horizon Cameras - The port horizon camera imagery is "fair," being slightly underexposed. The starboard horizon camera imagery is "poor" due to out of focus, multiple images that are slightly overexposed.

22. Camera Operation:
    a. Main Camera - A rating of "fair" is assigned to this camera with degradation due to corona static effects, light leaks, underexposed camera number and binary index, excessive metering and malfunctioning timing pips.
    b. Horizon Cameras - A rating of "fair" is given to the horizon cameras since degradation is due only to the poor imagery, possibly the result of filter problems.

23. Suitability for PI: Due to fogging and atmospheric conditions, a rating of "fair" is given to this photography, although imagery not affected by the above degradations is good.

Remarks:

1. Handling marks such as abrasions, crimps and fingerprints are present on numerous passes and may be attributed to film handling prior to evaluation.

2. Foreign matter consisting mainly of small wax deposits and opaquing material from the titling process, is present on approximately 85 frames, and obscures a very small portion of those frames. Examples: passes D40, A51, D53, D55.

3. Emulsion lifted from the base occurs on 37 frames and usually destroys a very small area on certain frames.

4. Creases are present on pass D40, frame 75. Small indentations are present on pass A50, every 8.1" along the leading edge of frames 46-58.

5. Thin desensitized streaks and spots occur on pass D05, frame 31; pass D07, frame 15; pass D20, frame 45; pass D55, frames 115, 116.

6. Skiving marks are present intermittently throughout the film but are of little consequence.

7. Excessive vehicle roll occurred after pass A47.

8. The following are descriptions of overlap and film transport for camera number 92 as determined from approximately the fifth and the last frames of each pass where possible. Cloud cover, low sun angle and no imagery may preclude determination of these values in some passes.

| | Overlap (Percent) | | Film Transport (From Take-Up Side in Inches) | |
|---|---|---|---|---|
| Pass | Beginning Percent | End Percent | First Frame | Last Frame |
| A01 | 3 | 24 | NM | 12.5 |
| A02 | 2 | 4 | NM | 13.0 |
| A03 | 30 | 25 | NM | 12.5 |
| A04 | NM | NM | NM | 13.0 |

*NM denotes "Not Measurable"

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| Pass | Beginning Percent | End Percent | First Frame | Last Frame |
|---|---|---|---|---|
| D04 | 1 | 9 | NM | 17.7 |
| D05 | 15 | 15 | 15 | 17.5 |
| D06 | 12 | 8 | NM | 18.0 |
| D07 | 4 | 4 | NM | 17.0 |
| A09 | 0 | 1 | 15.0 | 6.5 |
| D09 | 4 | 5 | NM | 16.5 |
| A14 | 5 | 5 | 14.5 | 9.3 |
| D15 | 0 | 0 | NM | NM |
| A16 | 0 | 2 | NM | 9.5 |
| A18 | 4 | 10 | 7.5 | 11.0 |
| D18 | 10 | 10 | NM | 16.5 |
| A19 | 4 | 6 | NM | NM |
| A20 | NM | NM | NM | 10.0 |
| D20 | 0 | 1 | NM | 17.8 |
| A21 | NM | NM | 15.5 | 12.3 |
| D21 | 1 | NM | NM | NM |
| D22 | NM | 1 | NM | 23 |
| A30 | 10 | 10 | 18.5 | NM |
| A31 | 1 | 20 | NM | 13.2 |
| A32 | 4 | 10 | NM | 10.0 |
| A33 | 4 | 10 | NM | 10.5 |
| D39 | 12 | 6 | NM | NM |
| D40 | 10 | 1 | NM | 17.5 |
| A46 | NM | 13 | 16.0 | 10.0 |
| A47 | 5 | 8 | NM | 8.0 |
| A48 | 2 | 9 | NM | 9.5 |
| A49 | 0 | 11 | NM | 11.0 |
| A50 | 6 | 8 | NM | 11.0 |
| D50 | NM | NM | NM | NM |
| A51 | 0 | 15 | NM | NM |
| D51 | 10 | NM | 9.5 | 10.75 |
| A52 | 15 | NM | NM | NM |
| A53 | NM | NM | NM | 13.0 |
| D53 | 11 | 0 | NM | 19.5 |
| D54 | 13 | 12 | 17.5 | NM |
| D55 | 10 | 7 | 16.7 | 18.7 |
| D56 | 9 | 12 | NM | 18.0 |
| A62 | 10 | 10 | NM | NM |
| A63 | 4 | 12 | 9.1 | 10.6 |
| A65 | 4 | 10 | NM | NM |

9. Density readings were taken on every pass using the MacBeth Quantalog Densitometer Model EP 1000 with an EP 20 attachment and a 0.5 mm aperture. Terrain and Limiting density value readings for D Max, D Min and Gross Fog are correlated below.

| | | | Terrain | | Limiting | | | |
|---|---|---|---|---|---|---|---|---|
| Reading | Pass | Frame | D Min | D Max | D Min | D Max | Gross Fog | Sun Angle* |
| 1 | A01 | 14 | 0.92 | 1.64 | 0.72 | 1.90 | 0.28 | |
| 2 | A02 | 32 | 0.60 | 1.48 | 0.58 | 1.82 | 0.18 | |
| 3 | A03 | 7 | 0.51 | 1.71 | 0.32 | 1.71 | 0.15 | |
| 4 | A04 | 3 | 0.68 | 1.58 | 0.68 | 2.11 | 0.14 | |
| 5 | D04 | 4 | 0.40 | 1.22 | 0.38 | 1.88 | 0.14 | |
| 6 | D05 | 10 | 0.40 | 1.21 | 0.36 | 2.01 | 0.14 | |
| 7 | D06 | 52 | 0.58 | 1.41 | 0.44 | 2.10 | 0.13 | |
| 8 | | 78 | 0.27 | 1.42 | 0.27 | 1.99 | 0.12 | |
| 9 | D07 | 61 | 0.28 | 1.90 | 0.27 | 2.10 | 0.12 | |

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| | | | Terrain | | Limiting | | | |
|---|---|---|---|---|---|---|---|---|
| Reading | Pass | Frame | D Min | D Max | D Min | D Max | Gross Fog | Sun Angle* |
| 10 | A09 | 6 | 0.68 | 1.52 | 0.68 | 2.18 | 0.12 | |
| 11 | D09 | 4 | 0.39 | 1.21 | 0.27 | 2.06 | 0.12 | |
| 12 | A14 | 11 | 0.48 | 1.79 | 0.48 | 2.03 | 0.14 | |
| 13 | D15 | 4 | 0.46 | 1.60 | 0.28 | 2.14 | 0.16 | |
| 14 | A16 | 7 | 0.62 | 1.71 | 0.82 | 1.71 | 0.12 | |
| 15 | A18 | 6 | 0.57 | 1.82 | 0.44 | 1.82 | 0.12 | |
| 16 | | 81 | 0.62 | 1.50 | 0.62 | 2.09 | 0.12 | |
| 17 | D18 | 15 | 0.57 | 1.12 | 0.42 | 2.06 | 0.12 | |
| 18 | A19 | 18 | 0.62 | 1.56 | 0.62 | 2.00 | 0.12 | |
| 19 | A20 | 6 | 0.78 | 1.40 | 0.78 | 1.94 | 0.14 | |
| 20 | D20 | 20 | 0.26 | 0.86 | 0.24 | 2.08 | 0.12 | |
| 21 | A21 | 11 | 0.70 | 1.68 | 0.52 | 2.10 | 0.12 | |
| 22 | D21 | 31 | 0.32 | 1.34 | 0.32 | 2.10 | 0.14 | |
| 23 | | 79 | Clouds | Clouds | 0.42 | 1.89 | 0.14 | |
| 24 | D24 | 24 | 0.79 | 1.64 | 0.67 | 2.06 | 0.14 | |
| 25 | | 70 | 0.32 | 1.20 | 0.26 | 1.92 | 0.14 | |
| 26 | A30 | 38 | 0.52 | 1.38 | 0.48 | 2.01 | 0.14 | |
| 27 | A31 | 19 | 0.28 | 1.32 | 0.28 | 1.88 | 0.14 | |
| 28 | | 75 | 0.56 | 1.22 | 0.56 | 2.06 | 0.18 | |
| 29 | A32 | 15 | 0.50 | 1.56 | 0.48 | 2.10 | 0.18 | |
| 30 | A33 | 12 | 0.54 | 1.56 | 0.54 | 2.04 | 0.12 | |
| 31 | D39 | 52 | 0.68 | 1.18 | 0.58 | 1.90 | 0.14 | |
| 32 | | 98 | 0.49 | 1.70 | 0.49 | 1.70 | 0.14 | |
| 33 | D40 | 17 | 0.54 | 1.52 | 0.48 | 1.99 | 0.14 | |
| 34 | | 91 | 0.28 | 1.34 | 0.28 | 1.98 | 0.14 | |
| 35 | A46 | 25 | 0.52 | 2.00 | 0.38 | 2.00 | 0.14 | |
| 36 | A47 | 10 | 0.51 | 1.39 | 0.51 | 2.12 | 0.24 | |
| 37 | A48 | 15 | 0.32 | 2.00 | 0.32 | 2.00 | 0.18 | |
| 38 | A49 | 15 | 0.54 | 1.36 | 0.54 | 1.82 | 0.18 | |
| 39 | A50 | 28 | 0.69 | 1.64 | 0.69 | 1.94 | 0.22 | |
| 40 | D50 | 2 | 0.52 | 1.60 | 0.52 | 1.60 | 0.22 | |
| 41 | A51 | 2 | 0.48 | 1.36 | 0.48 | 2.01 | 0.16 | |
| 42 | | 88 | 0.68 | 1.42 | 0.68 | 2.08 | 0.17 | |
| 43 | D51 | 2 | 0.68 | 1.01 | 0.62 | 2.09 | 0.18 | |
| 44 | A52 | 25 | 0.62 | 1.32 | 0.53 | 2.00 | 0.27 | |
| 45 | | 82 | Clouds | Clouds | 0.74 | 2.00 | 0.14 | |
| 46 | A53 | 2 | Clouds | Clouds | 0.98 | 2.04 | 0.15 | |
| 47 | D53 | 26 | 0.61 | 1.28 | 0.49 | 2.04 | 0.14 | |
| 48 | | 81 | 0.32 | 1.02 | 0.22 | 1.70 | 0.14 | |
| 49 | D54 | 56 | 0.78 | 1.34 | 0.60 | 2.04 | 0.14 | |
| 50 | | 119 | 0.52 | 1.26 | 0.52 | 2.02 | 0.14 | |
| 51 | D55 | 24 | 0.74 | 1.62 | 0.67 | 2.08 | 0.14 | |
| 52 | | 96 | 0.42 | 1.80 | 0.42 | 1.86 | 0.15 | |
| 53 | D56 | 14 | 0.51 | 1.52 | 0.51 | 1.92 | 0.16 | |
| 54 | | 79 | 0.48 | 1.26 | 0.48 | 1.88 | 0.14 | |
| 55 | A62 | 27 | 0.58 | 2.00 | 0.47 | 2.00 | 0.22 | |
| 56 | A63 | 27 | 0.68 | 1.18 | 0.68 | 1.76 | 0.18 | |
| 57 | A65 | 32 | 0.71 | 1.54 | 0.71 | 1.81 | 0.20 | |

| Terrain | | Limiting | |
|---|---|---|---|
| D Max Range | 2.00 - 0.86 | D Max Range | 2.18 - 1.60 |
| D Min Range | 0.92 - 0.26 | D Min Range | 0.98 - 0.22 |
| Gross Fog Range | 0.28 - 0.12 | Average D Max | 1.98 |
| Average D Max | 1.47 | Average D Min | 0.50 |
| Average D Min | 0.54 | | |
| Average Gross Fog | 0.15 | | |

*These Sun Angle data were not available for enclosure in the Photographic Evaluation Report at the time of publication, however, upon compilation of these data, they will be published as an addendum to this report.

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PART II - AFT CAMERA

| | | | |
|---|---|---|---|
| Mission No: | 9044 | Filter, Main: | Wratten 21 |
| Camera No: | 93 | Aperture, Main: | f/3.5 |
| Slit Width: | 0.200" | Filter, Horizon: | Wratten 25 |
| Film Type: | 7J23-7800 (SO 132) | Evaluated By: | IH, TK, CL, ES |

1. Shutter Operation (Horizon Cameras): Operational.

2. Horizon Camera Exposure:
   a. Take-Up (Port): Slightly underexposed throughout most of the film. (f/6.8, 1/200 second).
   b. Supply (Starboard): Slightly underexposed throughout most of the film. (f/6.8, 1/200 second).

3. Camera Number: Operational throughout, however, a double binary occurs at the camera-off position the second binary recording does not have a camera number exposed. Camera number is overexposed on most of the photography.

4. Binary Operation: Operational. A double binary recording usually appears at the camera-off position. The second binary recording does not show the index lights.

5. Film Metering:
   a. Metering on the take-up side (port horizon camera) ranges from 0.11" to 0.17", with an average of 0.13".
   b. Metering on the supply side (starboard horizon camera) ranges from 0.11" to 0.16", with an average of 0.14".

6. Film Tracking: Normal.

7. Timing Pulses: Functional throughout. Images appear outside of the format area but on most of the film they appear double exposed.

8. Fiducials: Well defined and clean.
   a. Main Camera - Well defined and clean.
   b. Horizon Camera - Well defined with no flare.

9. Light Leaks: An equipment image similar to that found in mission 9041 is found intermittently. Examples: pass A03, between frames 62 and 63; pass D05, frame 58; pass D07, frame 61; pass D22, frame 104. A bar-shaped light leak is present. Examples: pass D04, frame 39; pass D06, frame 101; pass D09, frame 56; pass A21, frame 78. Another light leak in the form of a diagonal line, similar to crease pattern in some previous missions, is found in pass D09, frame 57; pass D22, frame 105; pass A33, frame 66. Other light leaks are present in a general fogging pattern in pass D09, frames 54, 57; pass A14, frame 27; pass A33, frames 64, 65. In general, the equipment image and the bar-shaped light leak, possibly a portion of the equipment image, appears in the third-from-last frame of a camera-off position or at the end of a pass.

10. Static Electricity: Possible corona-type static is first evident on pass A14, from frame 3 through frame 6 and then disappears for the remainder of the pass. This pattern exists at the beginning of a pass, and in the corresponding frames at the camera-on position of a split pass, through pass D40. Slight variations may occur where as many frames as the twelfth from the start of the pass may contain the static pattern. During pass A46, however, heavy possible corona-type static patterns are present in frame 3, sometimes covering up to one half of the frame. After approximately 10 heavily fogged frames, this pattern becomes less intense as the pass progresses,

finally dissipating toward the end of the pass. The static pattern differs in some passes such as pass A49 and pass D56, from the usual static pattern to a pattern resembling a "sine-wave" curve. Pass D54 is the only pass after A46 in which there is no static pattern present. As the possible static pattern dissipates it moves out of the terrain area and is evident as an arc of approximately 0.375" in length within the leading edge rail area at intervals of 6.3". Associated with these "arcs" is a light fogged area.

11. Pinholes: Few are present in this photography.

12. Abrasions and Scratches: A camera-induced scratch is present under the binary in the terrain format area throughout most of the film. Another is found approximately 5" from the supply edge of the terrain format and is present intermittently throughout. In addition, other scratches are present. Examples: pass A02, frames 1, 4, 37-45, 67; pass D06, frames 1, 2, 12; pass A21, frames 9, 14, 28, 34, 38, 39, 41; pass D39, frames 95-99; pass D40, frames 61, 110. Few abrasions are present. Examples: pass A18, frame 42; pass A21, frame 10.

13. Tearing: No tearing is present.

14. Water Marks: None are present.

15. Pressure Streaks: Small shiny base rubs are present intermittently on all passes.

16. Processing Streaks: None are present.

17. Blistering and Crimping: Few blisters are present on the film. Examples: pass A01, frames 2, 4; pass A02, frames 13, 44; pass D39, frames 4, 50. Crimps induced after processing are present intermittently throughout the photography. Examples: pass A02, frames 12, 67; pass A04, frames 1, 2; pass A16, frames 41, 42; pass A19, frames 3,9. Few creases are present. Examples: pass A04, frame 2; pass D55, frame 141.

18. Contrast: 60% low, 40% medium, 0% high.

19. Apparent Resolution: Good. Acuity is comparable to mission 9041. Quality of the aft camera appears slightly better than that of the forward camera.

20. Apparent Granularity: Fine.

21. Photo Quality:
    a. Main Camera - Fair. Degradation is due to the presence of light leaks, possible corona static, scratches and low contrast.
    b. Horizon Cameras - Fair. Degradation is due to presence of possible corona static, roll motion of vehicle which negates starboard horizon camera images after pass A48, and scratches.

22. Camera Operation:
    a. Main Camera - Fair. Degradation is due to possible corona static fogging present from pass A14 to end of mission with the exception of pass D54.
    b. Horizon Cameras - Poor. Degradation is due to out-of-focus appearance of imagery and to underexposure of the majority of the horizon formats. The out-of-focus condition of the starboard horizon camera image is more severe than that of the port horizon.

23. Suitability for PI: Fair. Degrading factors are possible corona static patterns, approximately 45% cloud cover, and roll motion present in the vehicle after pass A48 to the end of the mission.

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Remarks:

1. No density gradient is present, where the gross fog is heavier at the leading edge of the film than on the trailing edge.

2. Handling marks are evident in pass D39, frames 10, 11, 33, 34, 35; pass A50, frames 4, 6, 7; pass D55, frame 99.

3. The use of a new heat sealing type of mylar splice eliminates the occurrence of foreign matter clinging to the transferred adhesive. This is an improvement over the type of splice previously used. Other foreign matter however, is present. Examples: pass A30, frames 29, 33; pass A33, frames 12, 13, 14, 15 (grease pencil), 59, 61; pass D39, frames 13, 41, 58; pass A52, frames 3-8, 10, 21-30, 36-39, 76, 81, 82, 84, 86-90. Opaquing material is also present. Examples: pass A02, intermittent throughout; pass D04, frames 20, 21; pass A14, frames 1, 28.

4. Lifted emulsion occurs on a few frames. Examples: pass A01, frames 8, 23; pass A02, frames 5, 6; pass A21, frames 10, 13, 18, 21, 39; pass D21, frames 3, 4, 9.

5. The end-of-pass marker is operational throughout the mission.

6. Uniform fogging, due to possible radiation, is not present in this film.

7. Roll motion prevents the recording of the horizon image by the starboard horizon camera after pass A48.

8. A negative density streak is present throughout some passes located 0.1" to 0.3" from the leading edge of the terrain format. Examples: passes A18, D18, A19, D21, A30, D50.

9. The following descriptions of overlap and film transport for camera number 93 were determined for approximately the fifth and last frames of each pass where possible. Cloud cover, low sun angle and no imagery may have precluded determination of these values in some passes.

| | Overlap (Percent) | | Film Transport (From Take-Up Side in Inches) | |
|---|---|---|---|---|
| Pass | Beginning Percent | End Percent | First Frame | Last Frame |
| A01 | 1 | 26 | NM | 9.0 |
| A02 | 22 | 23 | NM | 9.5 |
| A03 | 30 | 25 | NM | 9.0 |
| A04 | 30 | NM | NM | 10.0 |
| D04 | NM | 11 | NM | 14.3 |
| D05 | 15 | 15 | NM | 17.0 |
| D06 | 13 | 5 | NM | 14.0 |
| D07 | 15 | 15 | NM | 13.0 |
| A09 | 0 | 0 | 23.5 | NM |
| D09 | 2 | 3 | NM | 12.3 |
| A14 | 5 | 5 | 10.5 | 6.5 |
| D15 | 0 | 0 | NM | 12.5 |
| A16 | 0 | NM | NM | 23.0 |
| A18 | 4 | 13 | NM | 8.0 |
| D18 | 10 | 10 | NM | NM |
| A19 | 5 | 10 | NM | 7.5 |
| A20 | 4 | NM | NM | 7.5 |
| D20 | 3 | 3 | NM | 13.0 |

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| Pass | Overlap Beginning Percent | Overlap End Percent | Film Transport First Frame | Film Transport Last Frame |
|---|---|---|---|---|
| A21 | 0 | 0 | NM | 8.7 |
| D21 | 4 | 1 | NM | 11.8 |
| D22 | 6 | 4 | NM | 14.5 |
| A30 | NM | 1 | 17.0 | NM |
| A31 | 1 | 19 | 6.0 | 10.0 |
| A32 | 4 | NM | NM | 7.0 |
| A33 | 1 | 5 | 6.0 | 7.1 |
| D39 | 10 | 6 | 3.4 | 12.9 |
| D40 | 6 | 1 | 13.0 | 13.5 |
| A46 | NM | 10 | 18.0 | 7.5 |
| A47 | NM | 10 | NM | 24.0 |
| A48 | 1 | 10 | 5.5 | 7.0 |
| A49 | 4 | NM | NM | NM |
| A50 | 3 | 8 | 6.0 | 7.5 |
| D50 | NM | NM | NM | 12.5 |
| A51 | 0 | 16 | None | None |
| D51 | 12 | NM | None | 12.5 |
| A52 | 1 | NM | NM | None |
| A53 | 11 | 10 | None | 10.0 |
| D53 | NM | 2 | NM | 14.5 |
| D54 | 10 | NM | 17.5 | NM |
| D55 | 11 | 5 | 11.3 | None |
| D56 | 10 | 7 | None | 16.0 |
| A62 | 4 | 10 | NM | 8.0 |
| A63 | 10 | 12 | NM | 7.0 |
| A65 | NM | NM | NM | NM |

Note: NM denotes "Not Measurable"

10. Density readings were taken on every pass using the MacBeth Quantalog Densitometer, Model EP 1000, with an EP 20 attachment and an 0.5 mm aperture. Terrain and Limiting density value readings for D Max and D Min as well as Gross Fog are correlated below.

| Reading | Pass | Frame | Terrain D Min | Terrain D Max | Limiting D Min | Limiting D Max | Gross Fog | Sun Angle* |
|---|---|---|---|---|---|---|---|---|
| 1 | A01 | 21 | 0.86 | 1.47 | 0.77 | 1.83 | 0.22 | |
| 2 | A02 | 38 | 0.90 | 1.68 | 0.87 | 2.00 | 0.10 | |
| 3 | A03 | 4 | 0.67 | 1.52 | 0.67 | 1.52 | 0.08 | |
| 4 | A04 | 9 | 0.24 | Clouds | 0.24 | 1.88 | 0.08 | |
| 5 | D04 | 10 | 0.24 | 0.92 | 0.24 | 1.72 | 0.08 | |
| 6 | D05 | 18 | 0.33 | 0.80 | 0.27 | 1.77 | 0.09 | |
| 7 | D06 | 58 | 0.28 | 0.92 | 0.28 | 1.91 | 0.09 | |
| 8 | | 86 | 0.14 | 1.72 | 0.14 | 1.72 | 0.08 | |
| 9 | D07 | 59 | 0.18 | 1.12 | 0.18 | 1.12 | 0.08 | |
| 10 | A09 | 8 | 0.48 | 1.01 | 0.38 | 1.82 | 0.08 | |
| 11 | D09 | 33 | 0.24 | 0.74 | 0.24 | 1.80 | 0.08 | |
| 12 | A14 | 17 | 0.32 | 1.81 | 0.32 | 2.02 | 0.09 | |
| 13 | D15 | 12 | 0.20 | 0.82 | 0.11 | 1.98 | 0.08 | |
| 14 | A16 | 13 | 0.60 | 1.42 | 0.60 | 1.42 | 0.08 | |
| 15 | A18 | NR | NR | NR | NR | NR | NR | |
| 16 | | 77 | 0.21 | 0.88 | 0.21 | 1.64 | 0.08 | |
| 17 | D18 | 24 | 0.42 | 0.82 | 0.34 | 1.92 | 0.08 | |
| 18 | A19 | 24 | 0.43 | 1.18 | 0.43 | 1.72 | 0.08 | |
| 19 | A20 | 10 | 0.50 | 0.98 | 0.50 | 1.84 | 0.08 | |

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| Reading | Pass | Frame | Terrain D Min | Terrain D Max | Limiting D Min | Limiting D Max | Gross Fog | Sun Angle* |
|---|---|---|---|---|---|---|---|---|
| 20 | D20 | 26 | 0.16 | 1.30 | 0.16 | 2.09 | 0.09 | |
| 21 | A21 | 17 | 0.48 | 1.26 | 0.38 | 1.86 | 0.09 | |
| 22 | D21 | 36 | 0.19 | 0.95 | 0.18 | 1.91 | 0.09 | |
| 23 | | 76 | 0.24 | 0.76 | 0.20 | 1.27 | 0.09 | |
| 24 | D22 | 30 | 0.35 | 1.51 | 0.27 | 1.87 | 0.08 | |
| 25 | | 88 | 0.10 | 1.62 | 0.10 | 1.62 | 0.08 | |
| 26 | A30 | 38 | 0.30 | 0.92 | 0.30 | 1.82 | 0.08 | |
| 27 | A31 | 25 | 0.17 | 0.96 | 0.17 | 1.22 | 0.08 | |
| 28 | | 81 | 0.18 | 0.88 | 0.18 | 1.82 | 0.08 | |
| 29 | A32 | 22 | 0.28 | 1.22 | 0.28 | 1.22 | 0.08 | |
| 30 | A33 | 17 | 0.34 | 1.30 | 0.34 | 1.82 | 0.08 | |
| 31 | D39 | 57 | 0.76 | 1.17 | 0.76 | 2.08 | 0.12 | |
| 32 | | 91 | 0.27 | 1.77 | 0.27 | 1.77 | 0.14 | |
| 33 | D40 | 23 | 0.40 | 1.31 | 0.42 | 2.06 | 0.13 | |
| 34 | | 98 | 0.28 | 1.26 | 0.28 | 1.92 | 0.12 | |
| 35 | A46 | 30 | 0.59 | 1.89 | 0.59 | 1.89 | 0.16 | |
| 36 | A47 | 15 | 0.42 | 1.27 | 0.42 | 2.00 | 0.17 | |
| 37 | A48 | 20 | 0.48 | 1.80 | 0.44 | 1.84 | 0.16 | |
| 38 | A49 | 21 | 0.74 | 1.68 | 0.74 | 1.68 | 0.18 | |
| 39 | A50 | 35 | 0.65 | 1.61 | 0.65 | 2.04 | 0.18 | |
| 40 | D50 | 36 | 0.49 | 1.12 | 0.38 | 2.00 | 0.14 | |
| 41 | A51 | 24 | 0.52 | 1.50 | 0.52 | 1.86 | 0.13 | |
| 42 | | 87 | Clouds | Clouds | Clouds | 1.97 | 0.13 | |
| 43 | D51 | 2 | 0.48 | 1.28 | 0.48 | 1.99 | 0.13 | |
| 44 | A52 | 30 | 0.66 | 1.40 | 0.66 | 1.97 | 0.16 | |
| 45 | | 87 | Clouds | Clouds | 1.01 | 2.00 | 0.15 | |
| 46 | A53 | 2 | Clouds | Clouds | 0.89 | 2.01 | 0.16 | |
| 47 | D53 | NR | NR | NR | NR | NR | NR | |
| 48 | | 76 | 0.21 | 1.24 | 0.21 | 1.92 | 0.14 | |
| 49 | D54 | 64 | 0.88 | 1.32 | 0.82 | 2.00 | 0.14 | |
| 50 | | 124 | 0.55 | 1.28 | 0.55 | 1.98 | 0.13 | |
| 51 | D55 | 31 | 0.60 | 1.22 | 0.60 | 1.90 | 0.14 | |
| 52 | | 102 | 0.62 | 1.82 | 0.62 | 1.94 | 0.14 | |
| 53 | D56 | 21 | 0.26 | 1.39 | 0.36 | 1.92 | 0.16 | |
| 54 | | 85 | 0.44 | 1.32 | 0.44 | 2.04 | 0.15 | |
| 55 | A62 | 32 | 0.42 | 1.94 | 0.42 | 1.94 | 0.14 | |
| 56 | A63 | 27 | 0.56 | 0.88 | 0.56 | 2.04 | 0.18 | |
| 57 | A65 | 38 | 0.52 | 1.74 | 0.52 | 1.76 | 0.14 | |

Note: NR denotes "No Readings" were taken.

| Terrain | | Limiting | |
|---|---|---|---|
| D Max Range | 1.94 - 0.74 | D Max Range | 2.09 - 1.22 |
| D Min Range | 0.90 - 0.14 | D Min Range | 1.01 - 0.10 |
| Gross Fog Range | 0.22 - 0.08 | Average D Max | 1.88 |
| Average D Max | 1.28 | Average D Min | 0.41 |
| Average D Min | 0.42 | | |
| Average Gross Fog | 0.12, .09 to pass D39<br>0.15 to end of mission | 76% medium contrast<br>24% high contrast | |
| 60% low contrast<br>40% medium contrast | | | |

* These Sun Angle data were not available for enclosure in the Photographic Evaluation Report at the time of publication, however, upon compilation of these data, they will be published as an addendum to this report.

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PART III - FRAMING CAMERA

Mission No: 9044
Camera No: 84
Camera Setting: f/6.3, 1/250 second
Filter: Wratten 21
Film Type: 7J-30-135 (SO 130)
Evaluated By: IH, TK, CL, ES

1. Shutter Operation: Operational for 24 frames, thereafter a possible film jam and shutter malfunction occurred.

2. Exposure: Good when not degraded by uniform fogging.

3. Camera Number: Clearly registered on all frames.

4. Film Metering: Slightly erratic, ranging from 0.12" to 0.31" and averaging approximately 0.17".

5. Film Tracking: Normal.

6. Reseau Grid: Clean and well defined.

7. Light Leaks: A bar-shaped light leak 0.1" wide is present on frames 4, 23 and 24. A bar-shaped light leak 0.4" wide occurs on frames 7, 16, 17, 20 and 21. Miscellaneous heavy light leaks occur on frames 1 and 3. Edge fog is present along the film edge at 6.3" intervals.

8. Static Electricity: None present.

9. Pinholes: Few.

10. Abrasions and Scratches: A small scratch is present on frame 1.

11. Tearing: None.

12. Water Marks: None.

13. Pressure Streaks: None.

14. Processing Streaks: None.

15. Blistering and Crimping: Several blisters are present on frame 21.

16. Contrast: Low to medium

17. Apparent Resolution: Good for the system employed.

18. Apparent Granularity: Slightly grainy.

19. Photo Quality: Good when not degraded by uniform fog or light leaks.

20. Uniform fogging is present on frames 17-22, possibly due to cumulative radiation as this portion of the film remained in the "chute," between the camera and the supply spool, for several passes.

21. Camera Operation: Poor. Degradation is due to a shutter malfunction after frame 24.

22. PI Suitability: Poor. Degradation is due to uniform fogging, shutter malfunction and light leaks.

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Remarks:

1. Overlap is normal; approximately 65% on all frames.

2. Numerous small desensitized spots occur randomly throughout the film.

3. Bits of skiving or dust obstruct small portions of numerous frames.

4. Density readings were taken on all frames using the MacBeth Quantalog Densitometer Model EP 1000, with an EP 20 attachment and an 0.5 mm aperture. Terrain and Limiting density values for D Max and D Min as well as Gross Fog are given below:

| | | Terrain | | Limiting | | |
|---|---|---|---|---|---|---|
| Pass | Frame | D Min | D Max | D Min | D Max | Gross Fog |
| A01 | 1 | 0.77 | 2.07 | 0.71 | 2.51 | 0.14 |
| | 2 | 0.62 | 1.87 | 0.52 | 2.88 | 0.12 |
| | 3 | 0.61 | 1.29 | 0.61 | 2.70 | 0.12 |
| | 4 | 0.62 | 1.37 | 0.62 | 2.52 | 0.12 |
| A02 | 5 | 0.36 | 2.62 | 0.36 | 2.62 | 0.10 |
| | 6 | 0.38 | 3.04 | 0.38 | 3.04 | 0.12 |
| | 7 | 0.82 | 2.66 | 0.82 | 2.66 | 0.11 |
| | 8 | 0.72 | 2.09 | 0.72 | 2.09 | 0.13 |
| | 9 | 0.91 | 1.84 | 0.91 | 2.52 | 0.12 |
| | 10 | 0.74 | 1.77 | 0.72 | 3.22 | 0.12 |
| | 11 | 0.56 | 1.78 | 0.52 | 3.20 | 0.13 |
| | 12 | 0.84 | 1.29 | 0.69 | 3.06 | 0.12 |
| | 13 | 0.92 | 1.54 | 0.72 | 3.19 | 0.18 |
| | 14 | 0.66 | 1.09 | 0.66 | 3.19 | 0.22 |
| A03 | 15 | 0.77 | 1.92 | 0.77 | 1.92 | 0.39 |
| | 16 | 0.83 | 2.10 | 0.83 | 2.20 | 0.46 |
| | 17 | 0.93 | 2.29 | 0.93 | 2.29 | 0.62 |
| | 18 | 1.27 | 1.97 | 1.27 | 2.21 | 1.01 |
| | 19 | 1.83 | 2.04 | 1.83 | 2.71 | 1.33 |
| | 20 | 1.82 | 2.21 | 1.82 | 3.01 | 1.49 |
| | 21 | 1.48 | 2.08 | 1.48 | 3.00 | 1.07 |
| | 22 | 1.29 | 1.92 | 1.29 | 3.07 | 0.52 |
| | 23 | 1.02 | 1.53 | 1.02 | 3.26 | 0.24 |
| A04 | 24 | 0.52 | 1.74 | 0.52 | 2.90 | 0.26 |

| | | |
|---|---|---|
| Average Terrain D Max | 1.92 | Range 1.82 - 0.36 |
| Average Terrain D Min | 0.89 | Range 3.04 - 1.29 |
| Average Limiting D Max | 2.75 | Range 1.83 - 0.36 |
| Average Limiting D Min | 0.86 | Range 3.26 - 1.92 |
| Average Gross Fog | 0.39 | Range 1.49 - 0.10 |

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PART IV - VEHICLE ATTITUDE DATA

| Pass | Pitch Variation | Pitch Range | Roll Variation | Roll Range | No. of Frames | Remarks |
|---|---|---|---|---|---|---|
| A01 | -19° 15' -17° 04' | 2° 11' | 1° 33' 0° 57' | 0° 36' | 39 | |
| A02 | -18 10 -17 17 | 0 53 | -1 08 -0 05 | 1 03 | 33 | |
| | -18 47 -17 03 | 1 44 | -0 39 0 21 | 1 00 | 34 | |
| A03 | -16 46 -15 25 | 1 21 | 0 23 0 10 | 0 13 | 28 | |
| | -17 13 -16 55 | 0 18 | -0 23 0 0 | 0 23 | 37 | |
| A04 | -17 12 -16 54 | 0 18 | -0 27 0 14 | 0 41 | 60 | |
| D04 | -17 05 -16 19 | 0 46 | -0 50 -0 18 | 0 32 | 41 | |
| D05 | -17 11 -16 13 | 0 58 | -0 47 -0 31 | 0 16 | 60 | |
| D06 | -16 56 -16 40 | 0 16 | -0 39 0 0 | 0 39 | 60 | |
| | -16 54 -16 08 | 0 46 | -0 33 -0 22 | 0 11 | 43 | |
| D07 | -16 20 -16 01 | 0 19 | -0 15 0 07 | 0 22 | 63 | |
| A09 | -17 33 -16 49 | 0 44 | 0 17 0 02 | 0 15 | 9 | |
| D09 | -16 21 -16 04 | 0 17 | -0 08 0 31 | 0 39 | 58 | |
| A14 | -16 05 -15 54 | 0 11 | -0 09 0 24 | 0 33 | 31 | |
| D15 | -16 07 -15 36 | 0 31 | 0 34 0 0 | 0 34 | 16 | |
| A16 | -16 47 -16 17 | 0 30 | -0 07 0 06 | 0 13 | 25 | |
| | -16 09 -15 41 | 0 30 | -0 05 0 26 | 0 31 | 32 | |
| A18 | -15 45 -14 33 | 1 12 | -0 05 0 19 | 0 24 | 46 | |
| | -17 11 -16 05 | 1 06 | -0 27 0 04 | 0 31 | 35 | |
| D18 | -16 32 -15 43 | 0 49 | -0 46 -0 27 | 0 19 | 40 | |
| A19 | -16 38 -16 31 | 0 07 | -0 54 -0 41 | 0 13 | 28 | No data 1-11 |
| | -16 32 -16 05 | 0 27 | -0 57 0 19 | 1 16 | 42 | |
| A20 | -16 59 -16 38 | 0 21 | -0 37 0 02 | 0 35 | 50 | |
| D20 | -17 29 -16 25 | 1 04 | -0 26 -0 01 | 0 25 | 45 | |
| A21 | -16 24 -16 09 | 0 15 | -0 13 -0 02 | 0 11 | 41 | |
| D21 | -16 03 -15 47 | 0 16 | -0 05 0 29 | 0 34 | 37 | |
| | -19 03 -16 16 | 2 47 | -1 13 0 00 | 1 13 | 43 | |
| D22 | -16 36 -15 32 | 1 04 | -0 28 0 28 | 0 56 | 61 | |
| | -18 23 -15 42 | 2 41 | -1 41 0 02 | 1 43 | 45 | |
| A30 | -16 58 -16 26 | 0 32 | -0 06 1 05 | 1 11 | 38 | |
| A31 | -15 46 -13 18 | 2 28 | 1 44 1 10 | 0 34 | 35 | No data 1-13 |
| | -17 03 -16 41 | 0 22 | 0 51 0 17 | 0 34 | 32 | |
| | -15 25 -14 56 | 0 29 | -0 19 0 07 | 0 26 | 28 | |
| A32 | -16 41 -15 38 | 1 03 | 0 41 0 27 | 0 14 | 31 | |
| | -15 56 -15 41 | 0 16 | -1 15 -0 20 | 0 55 | 27 | |
| A33 | -15 33 -14 57 | 0 36 | 0 17 0 03 | 0 14 | 38 | |
| | -16 51 -16 10 | 0 41 | -1 37 -0 18 | 1 19 | 30 | |
| D39 | -15 16 -15 07 | 0 09 | -0 47 -0 13 | 0 34 | 58 | |
| | -15 40 -14 47 | 0 53 | -0 39 -0 18 | 0 21 | 41 | |
| D40 | -14 23 -13 56 | 0 27 | -0 03 0 33 | 0 36 | 77 | |
| | -15 35 -14 39 | 1 16 | -1 47 -0 41 | 1 06 | 33 | |
| A46 | -16 19 -15 53 | 0 26 | 0 56 0 17 | 0 39 | 31 | |
| A47 | -16 10 -15 56 | 0 14 | -0 11 0 09 | 0 20 | 24 | |
| A48 | -16 28 -16 05 | 0 23 | -2 37 -1 53 | 0 44 | 22 | |
| | -17 07 -16 26 | 0 41 | -3 45 -2 47 | 0 58 | 32 | |
| A49 | -17 04 -14 35 | 2 29 | -5 31 -3 22 | 2 19 | 73 | |
| A50 | -16 31 -14 44 | 1 47 | -4 21 -3 46 | 0 35 | 18 | |
| | -16 39 -15 52 | 0 47 | -6 22 -5 34 | 0 48 | 41 | |
| D50 | -13 59 -13 04 | 0 55 | -7 26 -6 42 | 0 44 | 44 | |
| A51 | -16 50 - 8 34 | 8 16 | -9 20 -5 25 | 3 55 | 87 | |
| D51 | -15 33 -14 44 | 0 49 | -9 49 -8 50 | 0 59 | 28 | |
| A52 | -16 24 - 8 32 | 7 52 | -10 37 -8 43 | 1 54 | 94 | |
| A53 | -17 46 -17 03 | 0 43 | -11 54 -10 59 | 0 55 | 33 | |
| D53 | -14 32 -14 00 | 0 32 | -10 59 -10 02 | 0 57 | 50 | |
| | -18 59 -16 32 | 2 27 | -9 43 -8 14 | 1 29 | 34 | |

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| Pass | Pitch Variation | | Pitch Range | Roll Variation | | Roll Range | No. of Frames | Remarks |
|---|---|---|---|---|---|---|---|---|
| D54 | -15° 00' | -13° 41' | 1° 19 | -12° 22' | -10° 51' | 1° 31' | 138 | |
| D55 | -16 04 | -13 50 | 2 14 | -11 37 | -8 57 | 2 40 | 145 | |
| D56 | -14 41 | -13 05 | 1 36 | -10 05 | -8 15 | 1 50 | 91 | |
| A62 | -16 41 | -16 22 | 0 19 | -7 55 | -7 21 | 0 34 | 39 | |
| A63 | -15 41 | -9 53 | 5 48 | -9 04 | -8 40 | 0 24 | 28 | |
| A65 | -18 07 | -14 54 | 3 13 | -10 29 | -8 33 | 1 56 | 17 | |
| | -18 02 | -9 22 | 8 40 | -11 47 | -10 09 | 1 38 | 66 | |

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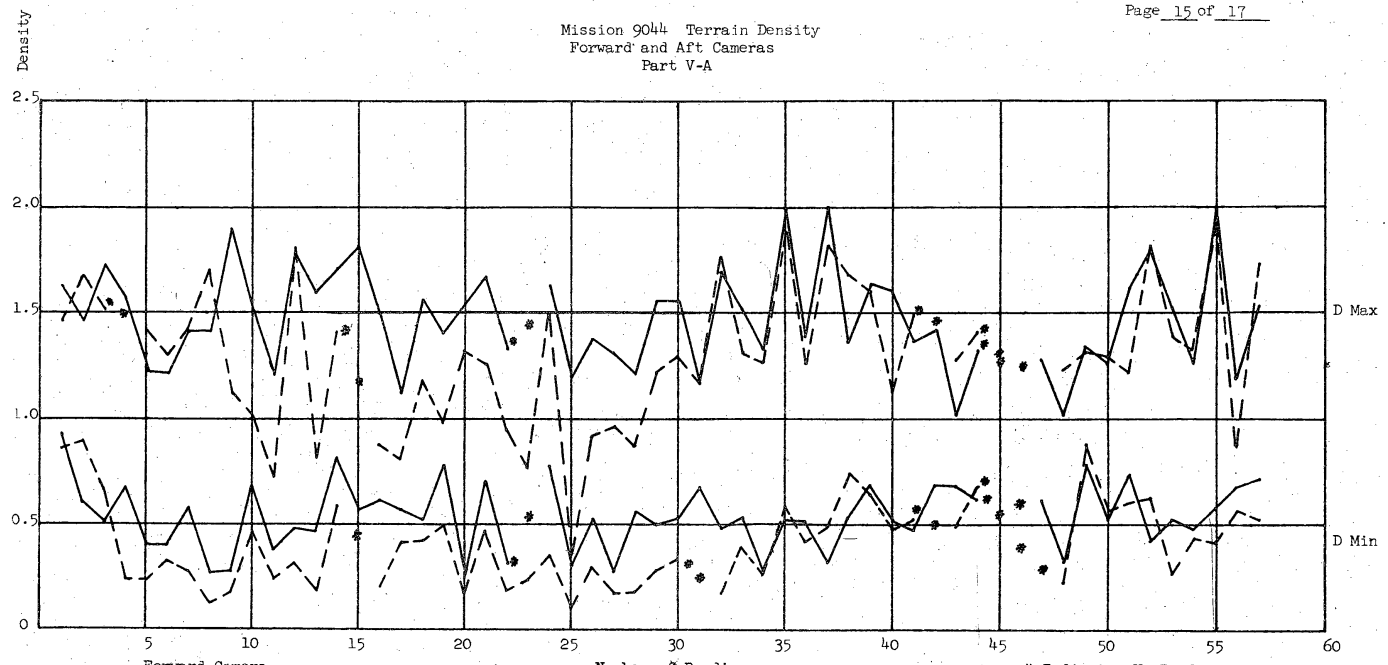
Mission 9044 Terrain Density
Forward and Aft Cameras
Part V-A




_____Forward Camera
------Aft Camera

* Indicates No Readings Made

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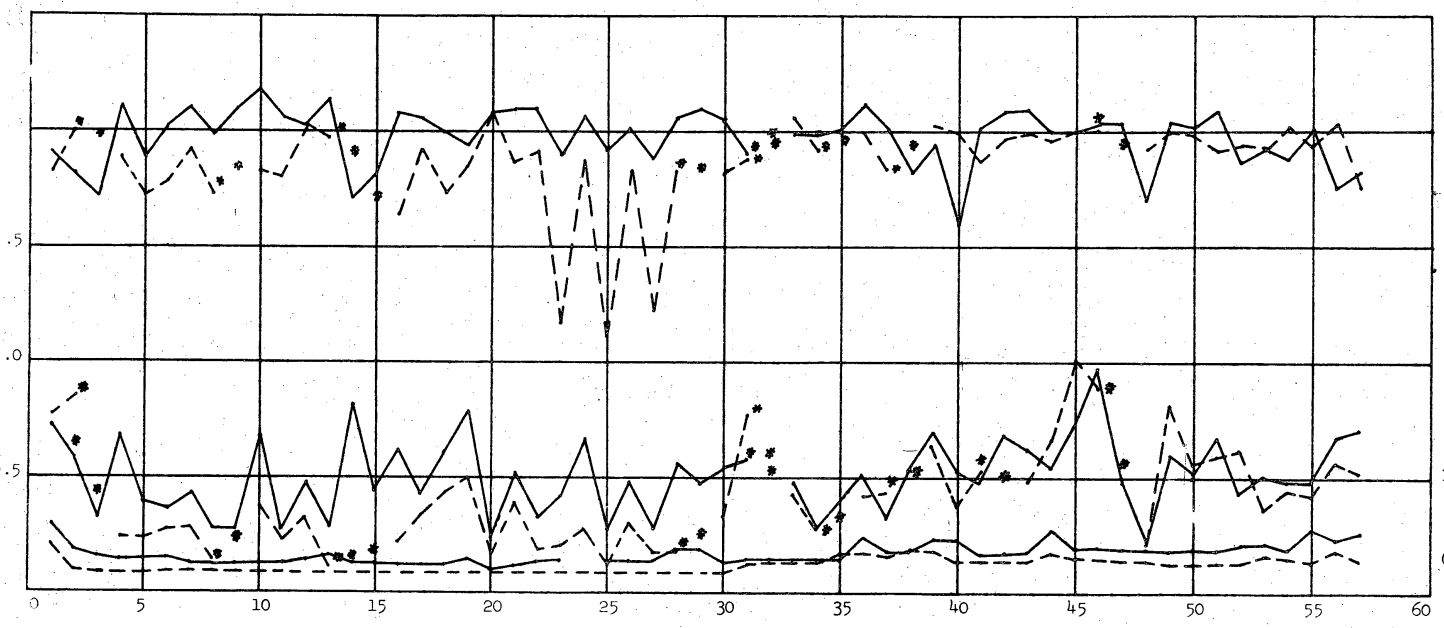
Mission 9044 Limiting Density
Forward and Aft Cameras
Part V-B



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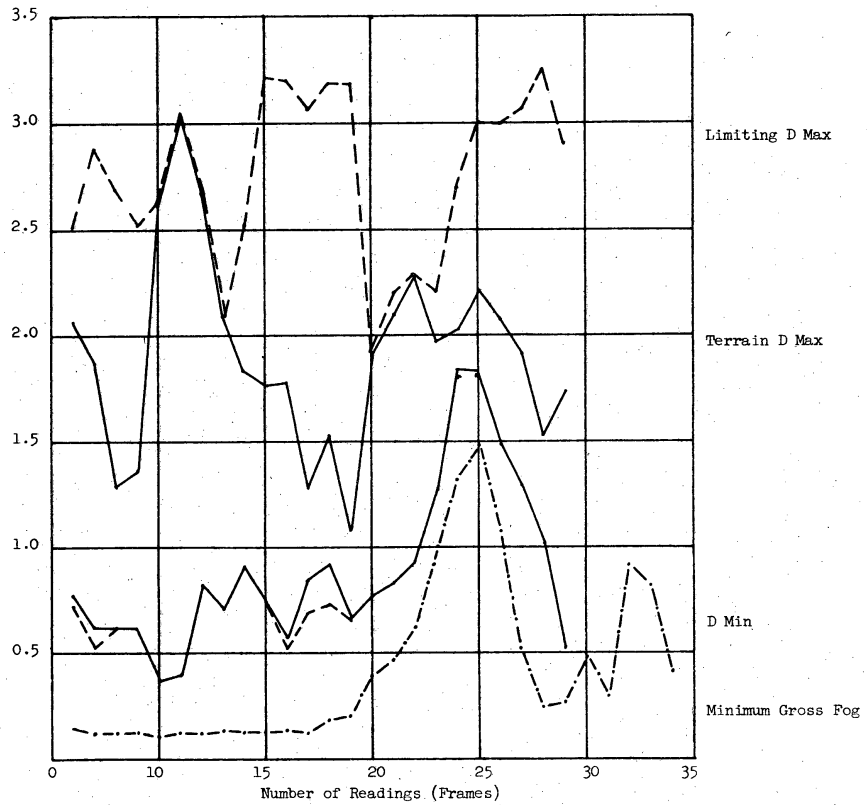
Mission 9044
Framing Camera
Part V-C

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TOP SECRET

TOP SECRET