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May 1963

TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT

MISSION 9053

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This document contains information referring to

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NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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PART I. MASTER PANORAMIC CAMERA

Mission No: 9053
Camera No: 106
Slit Width: 0.200"
Film Type: 7J23-7800 (SO 132)

Filter, Panoramic: Wratten 21
Aperture, Panoramic: f/3.5
Filters, Horizon: Wratten 25
Evaluated By: [redacted]

1. Shutter Operation (Horizon Cameras): The port horizon camera shutter failed to open in pass D08, frame 99; pass D22, frames 63, 85; pass D39, frames 164, 166; pass D40M, frames 8, 10, 12, 14. The starboard horizon camera shutter operated satisfactorily.

2. Horizon Camera Exposure:
   a. Supply (Port): The exposure is adequate on all descending passes. Very little horizon imagery is present on ascending passes because of low sun angle (f/6.8, 1/100 second).
   b. Take-Up (Starboard): The exposure is adequate (f/6.8, 1/100 second).

3. Camera Number: The center background is flared but the number is readable.

4. Data Block: The data block record functions throughout the mission, but the lamps are bloomed noticeably. Single data blocks are recorded at the termination of 50% of the passes, with end-of-pass markers present and displaced from the data blocks by a distance approximately equal to film transport. Double or triple data blocks are recorded at the termination of the remaining passes. In such cases the lamps are elliptical and grossly enlarged. Example: pass D09. Despite the presence of multiple data block records, no camera-off position contains more than one end-of-pass marker.

5. Film Metering:
   a. The average metering between the supply (port) horizon camera and the following panoramic frame is 0.24" and ranges from 0.17" to 0.27".
   b. The average metering between the take-up (starboard) horizon camera and the preceding panoramic frame is 0.19" and ranges from 0.18" to 0.23".

6. Film Tracking: Normal throughout the mission.

7. Frequency Markers: The marks are underexposed and are flared, with reflected images. There are no markers on the first eight frames of pass D05. In a majority of the passes, the first two frames did not contain frequency markers.

8. Fiducials:
   a. Panoramic Camera: The fiducials are slightly ragged but usable.
   b. Horizon Cameras: The fiducials are well defined but flare occasionally. Examples: passes D01, A02.

9. Light Leaks: Light leaks, consisting of equipment image reflections and/or diagonal patterns, occur on 28 frames. When present at pass beginnings these light leaks affect some or all of the first three panoramic frames. However, the majority of the light leaks occur at camera-off positions and at pass endings, where they affect the last two panoramic frames. Examples: pass D03, frames 88, 89; pass D05, frames 103, 104; pass D21, frames 1, 3, 257, 258; pass A35, frames 1, 2; pass D39, frames 1-3, 201, 202.

10. Static Electricity: Edge static is present on the trailing (titled) edge of pass D22, frame 1. A possible corona static discharge is present in the port horizon format of pass D35, frame 4.

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11. Pinholes: Present intermittently throughout the film. Examples: pass D02, frames 1-3, 4, 6, 7, 10, 76, 80, 89; pass D05, frames 3, 37, 51; pass D22, frames 2, 11, 71, 84, 90, 98, 99, 113, 120, 138, 151, 152, 168, 181.

12. Abrasions and Scratches: Heavy scratches are present on pass D01, frames 28-31. Emulsion is scraped from the titled edge of the film throughout pass D02. Severe abrasions and/or scratches affect most frames in pass D07. Continuous, parallel scratches located 0.50" from the trailing (titled) edge are noted in pass D22, frames 120-131. Long scratches occur in pass D39, frames 72, 87-90. In addition, random scratches and/or abrasions, ranging from minor to severe, are present throughout the film. Examples: pass D01, frames 1-4, 9, 12-14, 21; pass D03, frames 48, 60; pass D21, frames 62; 93; 128; pass D23, frames 42, 106, 133, 174, 175, 181, 182, 193, 222; pass D40M, frames 97, 154.

13. Tearing: None noted. Manufacturer's splices are present on pass D08, frame 11; pass D21, frame 214. Opaque splices are present on pass D03 in the port horizon format of frame 116, and pass D22, frame 257. In both cases some of the horizon fiducials and horizon imagery are obscured by the placement of these splices. Transparent splices are present between the following frames on the passes indicated: pass D23, frames 95, 96; pass D40M, frames 21, 22.

14. Water Marks: None observed.

15. Pressure Streaks: Continuous, multiple streaks of a near-abrasive degree are present throughout, on the base of the film, pass D04. In addition, small base rubs are found intermittently throughout the mission.

16. Processing Streaks: None observed, but a small chemical stain is present on pass D06, on the leading (untitled) edge of frame 187.

17. Blistering and Crimping: A blister is present on pass D03, frame 23. Emulsion skiving is noted on pass D02, frame 4; pass D03, frames 23, 64; pass D07, frames 130, 134, 173, 191; pass D08, frames 28, 35, 139, 151, 158. Crimps are found on pass D03, frames 51, 52, 72; pass D07, frames 1, 192. A crease is present on pass D40M, frame 153.

18. Contrast: 20% low, 78% medium, 2% high.

19. Apparent Resolution: Good, comparable to the best obtained in previous missions.

20. Apparent Graininess: Fine.

21. Photo Quality:

a. Panoramic Camera: Quality ranges from fair to good. Part 3 of pass D06, and parts 4 and 5 of pass D22 appear to be excessively underexposed despite a relatively high sun angle. Minus-density streaks, present on 12 passes, are the major source of degradation throughout the mission. Refer to item 1, Remarks, for detailed description.

b. Horizon Cameras: Fair to poor. The port and starboard horizon images are consistently out of focus, imparting a "fuzzy" quality to the photography. Port horizon imagery was totally underexposed on ascending passes.

22. Camera Operation:

a. Panoramic Camera: Good, except for the possibility that the minus-density streaks mentioned in item 21 may be camera-induced.

b. Horizon Cameras: A rating of no more than "fair" is assigned. The shutter malfunctions previously noted in item 1 and the out-of-focus condition of the photography preclude assignment of a more favorable rating.

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23. Suitability for PI: Good, despite some degradation by overexposure or underexposure (attributable to variations in sun angle), cloud cover, and the minus-density streaks previously mentioned.

Remarks

1. The majority of panoramic frames on passes D01-D22 are affected by minus-density streaks believed to be camera-induced. A brief tabulation of frequency of appearance and pattern description follows:

Pass D01: Most panoramic frames contain 1/8" minus-density streaks of irregular appearance and location, except for the last frame which exhibits a linear streak located 0.60" inboard and parallel to the leading (untitled) edge.

Pass A02: Frames 1-12 and the last frame contain linear 1/8" minus-density streaks similar to that noted in the last frame of pass D01. Irregular streaks appear in the remaining frames.

Pass D02: The majority of panoramic frames contain irregular minus-density streaks of unstable location.

Pass D03: Frames 1-89 contain linear 1/8" minus-density streaks located approximately 1" inboard and nearly parallel to the trailing (titled) edge.

Pass D04: Same as noted in pass D03. All frames are affected. The streaks are stable and measure 0.70" inboard from the trailing edges (titled) on the take-up ends of the frames and 1" inboard at the supply ends.

Pass D05: Same as noted in passes D03 and D04. Frames 1-104 affected.

Pass D06: Same, all frames affected.

Pass D07: Same, frames 1-192.

Pass D08: Same, frames 1-123.

Pass D09: Same, all frames affected.

Pass D21: Same, frames 1-162, 164-174, 176-191, 193, 198-200, 202-206, 211-213, 224. Frames 163, 175, 194 and 238 contain fragmentary minus-density streaks. Frame 197 exhibits the linear streak previously noted, paralleled by another streak spaced 0.50" away (on the leading edge side of the original streak) and extending from supply to frame-center. Frames 208 and 234 contain minus-density smears approximately 0.50" in width. The majority of the remaining frames are free of streaks and/or smears.

Pass D22: This is the last pass in which the streaks appear. They are intermittently linear and irregular and affect approximately 100 frames.

2. Heavy processing fog is noted on passes A01, D01, A02.

3. A total of 12 parts were spooled tails out. Part 2 of D40M was spooled emulsion out. In addition, a number of leaders and trailers were too short (less than 4' long) for expeditious instrument handling of the film.

4. An opaque heat splice parted in pass D39. On pass D08, frame 76, an opaque heat splice masks off approximately 0.10" of the photography.

5. Handling marks are evident on pass D02, frame 75; pass D03, frame 75; pass D05, frames 101, 102; pass D07, frame 174.

6. Foreign matter is present on pass D02, frames 2, 19; pass D03, frames 31, 51; pass D05, frames 101, 102; pass D07, frames 109, 110; pass D08, frame 39; pass D09, frame 100; pass D22, frames 21, 42, 56, 68. These consist principally of opaque material transfers. In addition, a number of film fragments are embedded in the emulsion along the trailing (titled) edge on pass D22, frame 9.

7. Emulsion lifts and digs occur on approximately 60 frames throughout the film. Examples:

[redacted]

pass D02, frames 1, 4, 6, 7, 10, 38, 56, 68, 76; pass D07, frames 33, 34, 36, 38, 46, 101, 104, 118, 138, 146.

8. Approximately 5" of the trailing (titled) edge on each panoramic frame format is ragged (measured from take-up toward frame-center).

9. Image acuity appears slightly higher than that obtained from the slave panoramic camera.

10. The following descriptions of overlap from camera Number 106 were determined from the fifth and last frames of each pass, where possible. Film transport was determined from the first and last frames on each pass. Cloud cover, low sun angle, or lack of imagery may have precluded determination of these values in some passes. When such is the case, the omission is denoted by "NM" for "Not Measurable."

Pass	Overlap (Percent)		Film Transport (From Take-Up Side in Inches)	
	Beginning	End	First Frame	Last Frame
A01	14	NM	NM	NM
D01	14	14	12.8	16.5
A02	14	14	14.5	14.3
D02	NM	8	NM	17.4
D03	NM	NM	15.4	18.1
D04	NM	11	16.0	NM
D05	9	9	19.0	20.0
D06	6	15	17.8	NM
D07	9	8	19.4	20.0
D08	9	NM	18.4	18.0
D09	6	9	NM	21.0
D21	NM	15	18.5	18.8
D22	9	15	18.8	21.0
D23	13	9	19.0	21.0
A35	13	13	18.0	18.5
D35	NM	11	11.8	18.0
D39	9	13	16.0	20.0
D40M	11	10	17.5	20.0

11. Density readings were taken on each pass, using the MacBeth Quantalog Densitometer, Model EP 1000, with an ET 20 attachment and an 0.5 mm aperture. Terrain and limiting density readings for D-Max, D-Min and Gross Fog values are correlated below.

Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D-Min	D-Max	D-Min	D-Max	Leading	Center	Trailing
1	A01	12	1.09	1.56	1.09	1.56	0.23	0.23	0.23
2	D01	13	0.82	1.94	0.82	2.01	0.23	0.24	0.23
3	A02	6	0.75	1.18	0.69	1.22	0.26	0.26	0.26
4	D02	75	1.41	1.93	1.41	1.93	0.10	0.10	0.10
5		91	0.69	1.79	0.69	1.86	0.10	0.10	0.10
6	D03	38	1.58	1.98	1.58	1.98	0.11	0.11	0.11
7	D04	37	0.61	1.96	0.61	1.96	0.11	0.11	0.11
8		79	0.68	1.91	0.30	1.91	0.11	0.11	0.11
9	D05	28	0.46	1.66	0.42	1.79	0.10	0.10	0.10
10		76	0.45	1.70	0.37	1.48	0.10	0.10	0.10
11	D06	13	0.54	1.79	0.54	1.88	0.12	0.12	0.12
12		91	0.51	1.68	0.51	1.92	0.12	0.12	0.12

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Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D-Min	D-Max	D-Min	D-Max	Leading	Center	Trailing
13		191	0.57	1.02	0.57	1.88	0.12	0.12	0.12
14		277	0.28	1.00	0.28	1.91	0.12	0.13	0.12
15		314	NR	NR	0.27	1.91	0.12	0.12	0.12
16	D07	46	0.56	1.82	0.55	1.92	0.10	0.10	0.10
17		84	0.39	1.92	0.34	1.92	0.11	0.11	0.11
18		114	0.56	1.70	0.56	1.78	0.11	0.11	0.11
19		186	0.42	1.32	0.42	1.98	0.11	0.11	0.11
20	D08	19	0.55	1.93	0.36	1.98	0.11	0.11	0.11
21		103	0.90	2.02	0.90	2.02	0.11	0.12	0.11
22	D09	36	0.47	1.90	0.47	1.90	0.13	0.15	0.13
23		100	0.49	1.70	0.41	2.01	0.13	0.12	0.12
24	D21	34	0.66	2.04	0.58	2.04	0.11	0.12	0.12
25		118	0.64	1.21	0.64	1.46	0.12	0.12	0.12
26		181	0.49	0.71	0.38	1.84	0.12	0.12	0.12
27		241	0.45	0.98	0.37	1.94	0.12	0.12	0.12
28	D22	23	0.77	1.89	0.62	1.89	0.11	0.11	0.11
29		129	0.71	1.80	0.69	1.94	0.12	0.12	0.12
30		156	0.53	1.97	0.53	1.97	0.11	0.11	0.11
31		204	0.35	0.83	0.30	1.92	0.12	0.12	0.12
32		260	0.34	0.80	0.29	2.01	0.12	0.12	0.12
33	D23	31	0.82	1.78	0.72	1.92	0.11	0.11	0.12
34		77	0.41	1.87	0.41	1.87	0.10	0.11	0.11
35		139	0.56	1.77	0.56	1.77	0.11	0.11	0.11
36		175	0.51	1.53	0.33	1.78	0.11	0.11	0.11
37	D24	SLAVE PANORAMIC COVERAGE ONLY							
38		SLAVE PANORAMIC COVERAGE ONLY							
39		SLAVE PANORAMIC COVERAGE ONLY							
40	A35	20	0.62	1.58	0.38	1.58	0.27	0.28	0.27
41	D35	27	1.09	1.89	1.09	1.98	0.13	0.13	0.12
42	D39	32	0.66	1.61	0.54	2.01	0.13	0.13	0.13
43		146	1.19	1.96	1.19	1.98	0.11	0.11	0.11
44		201	0.36	1.45	0.36	1.67	0.12	0.12	0.12
45	D40M	16	0.48	1.85	0.48	1.91	0.12	0.11	0.12
46		135	0.68	1.61	0.57	2.01	0.12	0.11	0.12

NOTE: "NR" denotes "Not Readable."

Terrain

D-Max Range 0.71-2.04
D-Min Range 0.28-1.41
Average D-Max 1.62
Average D-Min 0.63

Limiting

D-Max Range 1.28-2.04
D-Min Range 0.28-1.41
Average D-Max 1.86
Average D-Min 0.57

Gross Fog Range 0.10-0.28
Average Gross Fog 0.12

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PART II. SLAVE PANORAMIC CAMERA

Mission No: 9053
Camera No: 107
Slit Width: 0.900"
Film Type: 7J23-7800 (SO 132)

Filter, Panoramic: Wratten 21
Aperture, Panoramic: f/3.5
Filters, Horizon: Wratten 25
Evaluated By: [redacted]

1. Shutter Operation (Horizon Cameras): The port and starboard horizon camera shutters malfunctioned simultaneously, in an intermittent fashion, from pass A02 to end-of-mission. The shutters failed to open on more than 500 frames. Examples: pass A02, frames 3, 7, 13; pass D02, frames 3, 5, 7, 9, 11, 15, 31, 33, 35, 37, 39, 45, 47, 49, 55, 57, 63, 73, 79, 83, 89, 97; pass D22, frames 1, 5, 7, 17, 27, 29, 31, 51, 53, 65, 69, 71, 73, 77, 79, 81, 83, 85, 87, 89, 99, 101. A cursory examination of the failure frequency does not reveal a definable sequence or pattern.

2. Horizon Camera Exposure:
   a. Take-Up (Port): The exposure is adequate on all descending passes. Very little imagery is present on ascending passes because of low sun angle (f/6.8, 1/100 second).
   b. Supply (Starboard): The exposure is adequate (f/6.8, 1/100 second).

3. Camera Number: The background is flared but the number is readable.

4. Data Block: The data block record functions throughout the mission but the lamps are bloomed noticeably. Single data blocks are recorded at the termination of 33% of the passes, with end-of-pass markers present and displaced from the data blocks by a distance approximately equal to film transport. Double or triple data blocks are recorded at the termination of the remaining two-thirds of the passes. In such cases the lamps are elliptical and occasionally grossly enlarged. Example: pass D09. Despite the presence of multiple data block records, no pass contains more than one end-of-pass marker at the camera-off positions.

5. Film Metering:
   a. The average metering between the take-up (port) horizon camera and the preceding panoramic frame is 0.24" and ranges from 0.18" to 0.27".
   b. The average metering between the supply (starboard) horizon camera and the following panoramic frame is 0.19" and ranges from 0.18" to 0.24".

6. Film Tracking: Normal throughout the mission.

7. Frequency Markers: The marks are flared, with reflected images that occasionally track into the panoramic format. They terminate an average of 2" from the supply end of frames at the camera-off positions and at pass endings.

8. Fiducials:
   a. Panoramic Camera: The fiducials are well defined.
   b. Horizon Cameras: The fiducials fail to record where imagery is present on nearly 100 frames. Examination of the failure frequency does not reveal a definable sequence or pattern. Examples: pass A02, frame 9; pass D03, frames 9, 17, 31, 39, 67, 77; pass D04, frames 39, 49, 67, 75, 83, 85; pass D23, frames 63, 65, 67, 85, 115, 199; pass D89, frames 23, 67, 117, 185, 191.

9. Light Leaks: Light leaks, consisting of equipment image reflections and/or diagonal

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patterns, occur on 48 frames. When present at pass beginnings, these light leaks affect the first two or three frames. The majority of the light leaks occur at camera-off positions and at pass endings, where they affect the last two or three panoramic frames. Examples: pass D01, frames 28, 29; pass D04, frames 34, 85, 86; pass D08, frames 119, 120; pass A39, frames 1, 3, 199, 200, 201.

10. Static Electricity: Edge static is present on pass D21, frames 151, 180 and on pass D23, frame 137 on the leading (titled) edges of the frames.

11. Pinholes: Present intermittently throughout the film. Examples: pass D01, frames 2, 5, 11, 14, 17, 20, 22, 26; pass D03, frames 1, 3, 6, 32, 34, 37, 41; pass D22, frames 44, 62, 64, 71, 72, 80, 125, 146, 151, 157, 158, 159, 205, 239, 243, 257.

12. Abrasions and Scratches: Severe scratches are present on pass A01, frames 37, 38. Pass A02 contains multiple, continuous base scratches, spaced approximately 0.75" apart and parallel to each other. A heavy scratch is noted on pass D04, frame 2. Pass D05, frames 100-103 exhibit multiple, continuous base abrasions. On pass D21, frames 1-75, small scratches are present, spaced approximately 3.10" apart in a cross-track direction. These scratches first appear on the trailing (untitled) edges of the panoramic frames and gradually shift toward the leading edges. Pass D24, frames 1-34 contain continuous scratches through the frame centers. Frames 76-91 of the same pass have numerous small scratches and abrasions. Minor random scratches and/or abrasions are present intermittently throughout the film. Examples: pass A01, frames 1, 2, 9, 35; pass D03, frames 27, 47; pass D05, frames 41, 48; pass D21, frames 76-81; pass D22, frames 177, 179, 251.

13. Tearing: None noted. Transparent splices are present between the following frames on the passes indicated: pass D05, frames 12, 13; pass D07, frames 31, 32; pass D21, frames 74, 75; pass D23, frames 27, 28; pass A35, frames 33, 34. An opaque heat splice is present on pass D21, frame 181.

14. Water Marks: Present on pass D02, frames 70, 71, 81, 89, 92.

15. Pressure Streaks: Small base rubs are present intermittently throughout the film.

16. Processing Streaks: None noted.

17. Blistering and Crimping: Blisters are noted on pass D03, frames 44, 64; pass D08, frame 51; pass D22, frames 92, 123, 178. Crimps occur on pass D01, frame 1; pass D03, frames 5, 28, 76, 78; pass D07, frames 76, 99; pass D08, frame 121; pass D22, frames 70, 87, 180.

18. Contrast: 20% low, 75% medium, 5% high.

19. Apparent Resolution: Good, comparable to the best obtained in previous missions.

20. Apparent Graininess: Fine.

21. Photo Quality:

a. Panoramic Camera: Quality ranges from fair to good. Passes A01, D01, and A02 suffer some degradation because of the presence of minus-density streaks in many frames. Refer to Item 1, Remarks, for details. Part 3 of pass D06 and parts 4 and 5 of pass D22 appear to be excessively underexposed despite a relatively high sun angle.

b. Horizon Cameras: Poor to fair. The port and starboard horizon images are consistently out of focus, imparting a "fuzzy" quality to the photography.

22. Camera Operation:

a. Panoramic Camera: Good, except for the possibility that the minus-density streaks mentioned in Item 21, above, may be camera-induced.

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b. Horizon Cameras: Poor, because of the intermittent simultaneous malfunctions noted in item 1 and the out-of-focus condition of the photography.

23. Suitability for PI: Good, despite some degradation by overexposure or underexposure (attributable to variation in sun angle), cloud cover, and the minus-density streaks previously mentioned.

Remarks

1. Numerous panoramic frames of passes A01, D01, A02 and D02 are affected by minus-density streaks, probably camera-induced. Frame 11 of pass A01 is the first frame in which a streak appears. Consecutive appearance of these streaks does not commence until frame 30, same pass. Streaks are present on pass D01, frames 3, 9, 10, 13, 14, 19, 23, 25, 26, 27. Most frames of pass A02 are affected. Streaks are observed on pass D02, frames 16, 23, 29, 31, 34, 35, 36-39, 42-45, 56, 62, 64, 65. The streaks appear as linear traces or are of irregular configuration, intermittently. On pass D07 a minus-density streak is present on frame 130 only. Frame 91 of pass D09 contains a slightly curved streak through the format-center, which extends from the supply end through three-fourths of the frame. Fragmentary minus-density streaks of unstable location appear on pass D23, frames 143, 149, 150, 152-154, 172, 173; pass A35, frames 4-10; pass D35, frames 4-6; pass D39, frames 4-6, 10, 11, 36, 37, 38, 191.

2. Heavy processing fog is noted on passes A01, D01, and A02.

3. A total of 13 parts were spooled tails out. In addition, a number of leaders and trailers were too short for expeditious instrument handling of the film.

4. Foreign matter is present on pass D02, frames 2, 73, 97; pass D05, frame 72; pass D22, frames 134, 177, 179, 180. These consist principally of opaque material transfers and/or lacquer.

5. Emulsion lifts and digs occur on approximately 50 frames throughout the film. Examples: pass D01, frames 6, 16, 27, 30; pass D05, frames 1, 2, 34, 41, 51, 52, 59, 71. Emulsion skiving occurs on pass D22, frame 59.

6. A portion of the letter "D" in the pass identification of pass D02 did not print in frames 1-23.

7. High-to-low density streaks are present on some of the over-water photography of pass D08.

8. Image acuity appears slightly lower than that obtained from the master panoramic camera.

9. The following descriptions of overlap for camera number 107 were determined from the fifth and last frames of each pass, where possible. Film transport was determined from the first and last frames in each pass. Cloud cover, low sun angle, or lack of imagery may have precluded determination of these values in some passes. When such is the case, the omission is denoted by "NM" for "Not Measurable."

Pass	Overlap (Percent)		Film Transport (From Take-Up Side in Inches)	
	Beginning	End	First Frame	Last Frame
A01	[illegible]	NM	NM	NM
D01	NM	[illegible]	NM	[illegible]
A02	14	14	[illegible]	NM
D02	NM	[illegible]	NM	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[redacted]

Pass	Overlap (Percent)		Film Transport (From Take-Up Side in Inches)	
	Beginning	End	First Frame	Last Frame
D07	7	9	16.9	17.5
D06	7	NM	15.4	15.0
D08	6	9	NM	18.3
D21	6	18	15.8	17.5
D22	5	NM	16.3	18.3
D23	9	9	16.5	NM
D24M	9	6	15.0	18.0
A25	NM	10	15.5	NM
D25	NM	12	NM	16.0
D29	9	9	11.0	17.0

10. Density readings were taken on each pass, using the MacBeth Quantalog Densitometer, Model EP 1000, with an ET 20 attachment and an 0.5 mm aperture. Terrain and limiting density readings for D-Max, D-Min, and Gross Fog values are correlated below.

Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D-Min	D-Max	D-Min	D-Max	Leading	Center	Trailing
1	A01	20	1.12	1.70	1.12	1.77	0.23	0.23	0.23
2	D01	20	1.79	2.04	1.36	2.09	0.23	0.20	0.27
3	A02	12	0.79	1.36	0.79	1.36	0.23	0.23	0.23
4	D02	72	1.68	2.01	1.68	2.01	0.13	0.13	0.13
5		95	0.74	2.04	0.74	2.04	0.13	0.13	0.13
6	D03	40	1.60	2.11	1.60	2.11	0.12	0.12	0.12
7	D04	37	1.14	2.08	1.14	2.08	0.10	0.10	0.10
8		85	0.86	2.08	0.29	2.08	0.11	0.11	0.11
9	D05	33	0.67	1.70	0.66	1.91	0.10	0.10	0.10
10		81	0.46	1.36	0.30	1.36	0.10	0.10	0.10
11	D06	34	0.80	1.95	0.79	1.96	0.13	0.13	0.13
12		101	0.62	1.73	0.53	2.13	0.11	0.11	0.11
13		179	0.49	1.06	0.49	1.94	0.11	0.12	0.11
14		260	0.30	1.12	0.30	1.97	0.11	0.12	0.11
15		321	NR	NR	0.28	2.09	0.12	0.12	0.12
16	D07	51	0.92	1.94	0.92	2.07	0.10	0.11	0.11
17		90	0.83	1.88	0.78	2.09	0.11	0.12	0.12
18		119	0.86	1.60	0.86	2.10	0.12	0.12	0.12
19		180	0.65	1.44	0.65	2.08	0.11	0.12	0.12
20	D08	22	0.48	1.96	0.40	1.96	0.11	0.12	0.11
21		107	1.15	2.08	1.15	2.08	0.10	0.11	0.11
22	D09	41	0.66	1.88	0.45	1.96	0.11	0.11	0.11
23		105	0.64	1.56	0.46	1.96	0.12	0.12	0.12
24	D21	41	0.88	2.08	0.96	2.07	0.10	0.11	0.10
25		114	1.08	1.41	1.08	1.78	0.10	0.11	0.11
26		158	0.48	0.92	0.47	2.08	0.11	0.11	0.11
27		240	0.88	0.92	0.80	1.94	0.11	0.12	0.12
28	D22	36	1.12	1.94	1.12	2.00	0.11	0.11	0.11
29		125	1.15	2.01	1.15	2.01	0.11	0.11	0.11
30		161	0.74	2.01	0.74	2.01	0.12	0.12	0.12
31		200	0.48	1.01	0.48	1.98	0.11	0.11	0.11
32		260	0.41	1.01	0.94	1.98	0.12	0.12	0.12
33	D23	20	1.12	1.98	1.12	1.97	0.10	0.11	0.10
34		60	0.67	1.99	0.67	1.97	0.10	0.10	0.10
35		144	0.66	1.98	0.66	1.98	0.10	0.10	0.10
36		180	0.75	1.46	0.67	1.99	0.10	0.11	0.10

[redacted]

Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D-Min	D-Max	D-Min	D-Max	Leading	Center	Trailing
37	D24M	16	0.65	1.95	0.65	2.01	0.11	0.11	0.11
38		91	0.98	1.60	0.98	1.95	0.11	0.11	0.11
39		116	0.65	1.47	0.65	1.95	0.11	0.11	0.11
40	A35	26	NR	1.08	0.22	1.12	0.11	0.11	0.11
41	D35	33	1.08	1.91	1.08	1.96	0.11	0.11	0.11
42	D39	37	0.75	1.82	0.73	1.98	0.11	0.11	0.11
43		136	1.18	1.92	1.18	2.00	0.11	0.11	0.11
44		195	0.59	1.84	0.59	1.84	0.11	0.11	0.11
45	D40M	MASTER PANORAMIC COVERAGE ONLY							

NOTE: "NR" denotes "Not Readable."

Terrain

D-Max Range 0.92-2.11
D-Min Range 0.30-1.79
Average D-Max 1.69
Average D-Min 0.85

Limiting

D-Max Range 1.36-2.13
D-Min Range 0.22-1.68
Average D-Max 1.94
Average D-Min 0.77

Gross Fog Range 0.10-0.30
Average Gross Fog 0.12

PART III. STELLAR CAMERA

Mission No: 9053
Camera No: 10
Camera Setting: f/1.9, 1/5 second

Filter: None
Film Type: 7J3 and SO 102
Evaluated By: [redacted]

NOTE: The original negative from this camera was not available, so an evaluation was performed from a duplicate positive. Apparent camera-induced degradations and other pertinent information gathered during the preliminary evaluation of the original negative at the processing site are included in this report.

1. Shutter Operation: No shutter malfunctions are evident on the film.

2. Exposure: Adequate to produce some stellar imagery. Flare, associated with sun angle, degrades approximately 35% of every frame.

3. Frame Correlation Fiducial Mark: Operational. The mark is slightly flared, though in some instances appears underexposed. Examples: frames 142-144; 311-313; 321-323; 326-328. The mark occasionally glows faintly on consecutive frames. Examples: frames 335-337; 345-347.

4. Camera Number: The number is well defined and adequately registered.

5. Reseau Calibration Points: The lamps are operational but in most cases are slightly flared.

6. Reseau: The grid is visible only in the flared area.

7. Film Metering: Normal throughout the film.

8. Film Tracking: Normal.

9. Light Leaks: A small light leak occurs on frames 181 and 289.

10. Static Electricity: Intermittent edge static

occurs throughout the film. Dendritic static extending into the format area is present on frames 280, 281, 298. Intense dendritic static emanating from the titled edge of the film occurs on frames 308-332. Frames 333-352 (end of mission) have intense dendritic static that originates from either edge of the film.

11. Abrasions and Scratches: Very few abrasions or scratches are present on the film.

12. Pinholes: Few.

13. Watermarks: None.

14. Processing Streaks: None.

15. Pressure Streaks: None.

16. Tearing: None.

17. Blistering and Crimping: Very little blistering or crimping occurs throughout the film.

18. Foreign Matter: None.

19. Contrast: Sufficient to establish some stellar imagery on some frames.

20. Apparent Graininess: Medium.

21. Photo Quality: Fair. Degradation is due to flare and static problems.

22. Camera Operation: Good. Static and flare are the only degrading factors.

Remarks

1. A few (possibly 4) stellar images appear on some frames.

2. Lunar imagery occurs on frames 293-352.

3. A small, elongated plus-density spot, possibly an image, occurs on frames 9 and 19.

4. The mission terminated before any of the SO 102 emulsion had been exposed.

5. Density readings were not recorded as the original negative was not available.

PART IV. INDEX CAMERA

Mission No: 9058
Camera No: D10
Camera Setting: f/4.5, 1/125 second
Filter: Wratten 21
Film Type: SO 208
Evaluated By: [redacted]

1. Shutter Operation: No shutter malfunctions are evident on the film.

2. Exposure: Good to slightly overexposed.

3. Camera Number: Clearly registered in all frames.

4. Film Metering: Normal, averaging 0.15".

5. Film Tracking: Normal.

6. Reseau: Well defined, but containing a small obstruction in the third grid square from the supply edge of the frame, adjacent to the format edge containing the correlation lamp.

7. Light Leaks: Very few. A small crescent-shaped reflection from the edge of the reseau plate occurs on 14 frames, usually at the beginning or end of a pass. Examples: frames 11, 41, 53, 68, 142.

8. Static Electricity: No dendritic or corona static discharges are present.

9. Pinholes: Few.

10. Abrasions and Scratches: Numerous fine abrasions and scratches are present throughout the film. A heavy scratch is present on frame 58.

11. Tearing: None.

12. Water Marks: Few. Examples: 180, 184, 187.

13. Pressure Streaks: None.

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[redacted]

14. Processing Streaks: None.

15. Blistering and Crimping: Small crimps are present on frames 31 and 215.

16. Contrast: 15% low, 65% medium, 20% high.

17. Apparent Resolution: Good. Close to optimum system capability.

18. Apparent Graininess: Medium.

19. Photo Quality: Very good, the only degradation being the crescent-shaped light leak previously mentioned.

20. Camera Operation: Very good. No camera malfunctions are evident during the mission.

21. P1 Suitability: Good for the scale achieved.

Remarks

1. The frame correlation light is operational throughout the mission, but occasionally glows faintly for several frames. However, no problems were encountered in determining the true reading.

2. Small minus-density spots occur every 2" on frames 1-14.

3. The total number of exposed frames is 352.

4. Density readings were taken on each pass, using the MacBeth Quantalog Densitometer, Model EP 1000 with an ET 20 attachment and an 0.5 mm aperture. Terrain and limiting density readings for D-Max, D-Min, and Gross Fog values are correlated below.

Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D-Min	D-Max	D-Min	D-Max	Leading	Center	Trailing
1	A01	1	1.38	1.89	0.77	1.89	0.16	0.14	0.16
2	D01	8	1.20	2.04	1.20	2.14	0.14	0.13	0.14
3	A02	12	0.60	1.12	0.34	1.73	0.13	0.13	0.14
4	D02	14	NR	NR	1.13	2.42	0.14	0.13	0.14
5		27	NR	NR	0.84	2.54	0.14	0.13	0.14
6	D03	32	1.76	2.08	1.76	2.42	0.14	0.13	0.14
7	D04	49	0.84	2.37	0.49	2.37	0.14	0.13	0.13
8	D05	57	0.76	2.10	0.76	2.38	0.13	0.12	0.13
9		66	0.59	1.86	0.52	1.86	0.13	0.12	0.13
10	D06	75	0.59	2.48	0.59	2.48	0.13	0.12	0.13
11		90	1.22	2.04	0.87	2.54	0.13	0.12	0.13
12		110	0.81	1.27	0.44	2.49	0.14	0.13	0.14
13	D07	121	1.08	2.09	1.08	2.42	0.13	0.12	0.13
14	D08	144	0.70	2.08	0.70	2.08	0.11	0.10	0.11
15		153	0.73	2.07	0.73	2.30	0.11	0.10	0.11
16	D09	164	0.85	2.28	0.44	2.28	0.11	0.10	0.11
17		177	0.90	2.17	0.90	2.17	0.11	0.10	0.11
18	D21	188	0.88	2.42	0.88	2.42	0.11	0.10	0.11
19		196	1.16	1.96	0.89	2.12	0.11	0.10	0.11
20	D22	217	1.32	2.35	1.32	2.36	0.11	0.10	0.11
21		242	0.86	1.65	0.57	2.14	0.11	0.11	0.11
22	D23	265	1.01	2.20	0.88	2.27	0.11	0.10	0.11
23		274	1.44	2.09	0.88	2.48	0.11	0.10	0.11
24	A25	292	0.48	1.60	0.22	1.60	0.12	0.11	0.12
25	D25	300	1.22	NR	1.13	2.42	0.11	0.10	0.11

[redacted]

Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D Min	D Max	D Min	D Max	Leading	Center	Trailing
26	D39	308	1.00	2.30	1.00	2.30	0.11	0.10	0.11
27		323	1.33	2.08	1.00	2.08	0.11	0.10	0.11
28	D40	338	1.55	2.40	1.20	2.40	0.11	0.10	0.11
29		345	1.17	2.00	1.17	2.38	0.12	0.11	0.12

NOTE: "NR" denotes "Not Readable."

Terrain
D-Max Range 1.12-2.48
D-Min Range 0.38-1.76
Average D-Max 2.04
Average D-Min 1.01

Limiting
D-Max Range 1.60-2.54
D-Min Range 0.22-1.76
Average D-Max 2.27
Average D-Min 0.80

Gross Fog Range 0.10-0.16
Average Gross Fog 0.11

PART V. VEHICLE ATTITUDE

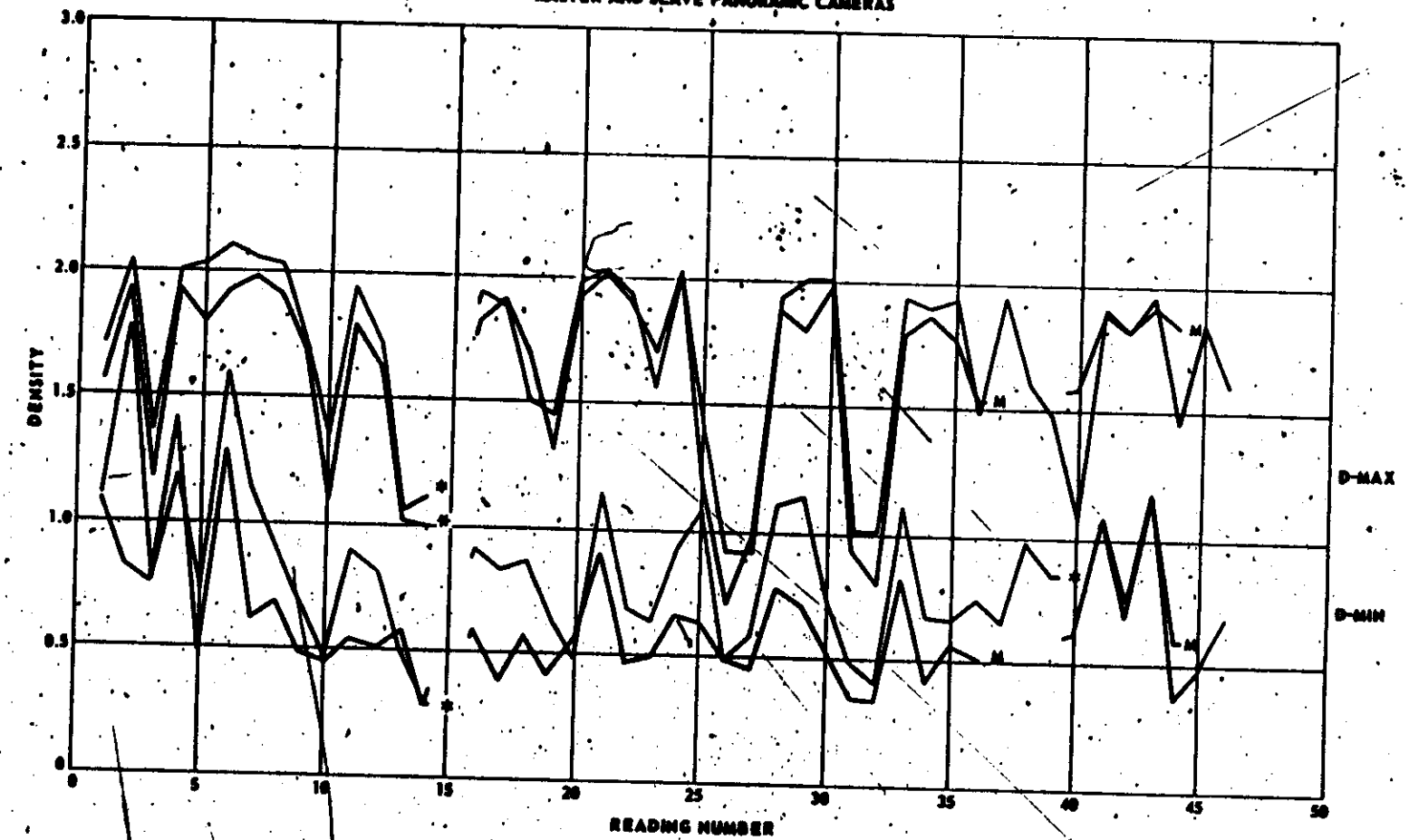
Pass	Pitch Variation	Pitch Range	Roll Variation	Roll Range	No of Frames
A01	13° 36' 13° 18'	0° 18'	-1° 26' -0° 32'	0° 54'	39
D01	13 39 13 29	0 10	-1 25 -1 14	0 11	31
A02	13 52 13 40	0 12	-1 14 -0 43	0 31	22
D02	13 52 13 25	0 27	-1 10 -0 51	0 19	90
D03	13 36 13 28	0 08	0 04 -0 08	0 12	41
	14 00 13 23	0 33	-0 42 -0 23	0 19	48
D04	13 47 13 36	0 11	0 39 0 10	0 29	35
	13 50 13 40	0 10	0 05 -0 21	0 26	53
D05	13 54 13 38	0 16	-0 38 -0 18	0 20	52
	13 47 13 42	0 05	-1 08 -0 12	0 54	52
D06	13 45 13 23	0 22	0 40 0 00	0 40	78
	14 35 13 53	0 42	0 47 -1 22	2 09	122
	14 01 13 13	0 48	-0 36 -0 15	0 21	125
D07	14 08 13 46	0 17	0 57 0 09	0 48	80
	14 00 13 09	0 51	0 10 -0 55	1 05	132
D08	13 59 13 21	0 38	0 49 -0 29	1 18	123
D09	14 53 13 06	1 37	0 43 0 09	0 34	66
	13 46 13 25	0 13	-0 53 -0 37	0 16	59
D21	14 51 14 16	0 35	0 20 -0 34	0 54	61
	15 53 15 25	0 28	0 50 -0 48	1 38	92
	15 34 14 01	1 33	-0 29 -0 03	0 27	105
D22	16 45 16 18	0 27	0 09 -0 26	0 35	72
	16 36 15 50	0 46	0 25 -1 13	1 38	109
	14 49 13 43	1 06	0 16 0 08	0 13	86
D23	16 41 16 07	0 34	0 52 -0 06	0 58	137
	16 09 14 30	1 39	0 49 -0 28	1 17	85
D24M	13 50 13 17	0 33	0 53 -1 00	1 53	147
A35	16 23 16 04	0 19	-1 40 -0 49	0 51	43
D35	16 48 16 27	0 21	0 15 -0 31	0 46	54
D39	16 57 15 22	1 35	0 43 -0 25	1 08	202
D40M	16 32 16 01	0 31	0 46 -0 43	1 29	96
	16 00 15 22	0 38	0 36 -0 34	1 10	60

PART VI. DENSITY CHARTS

MISSION 9853

TERRAIN DENSITIES

MASTER AND SLAVE PANORAMIC CAMERAS



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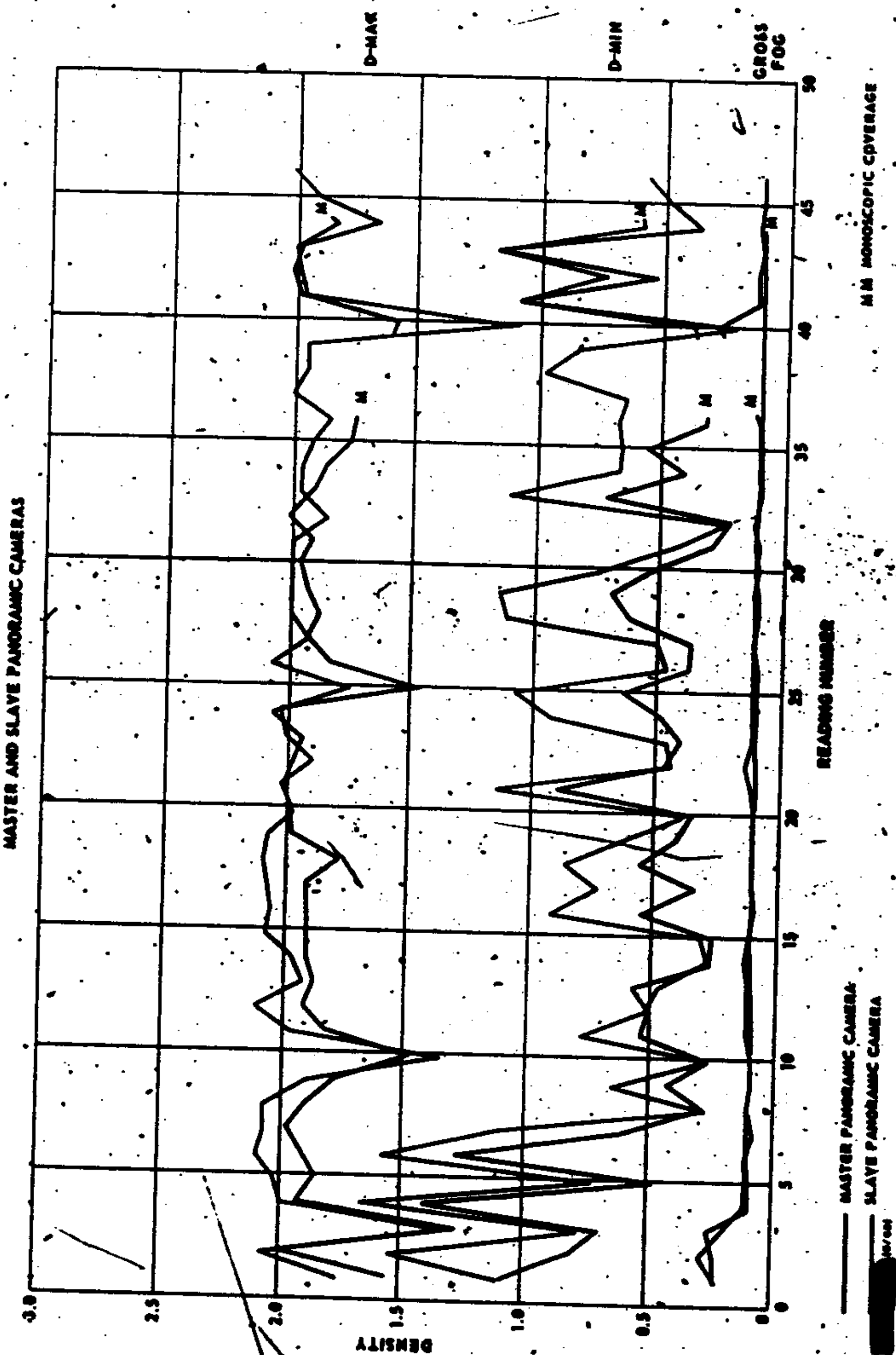
MISSION 9053
LIMITING DENSITIES
MASTER AND SLAVE PANORAMIC CAMERAS



Handle Via
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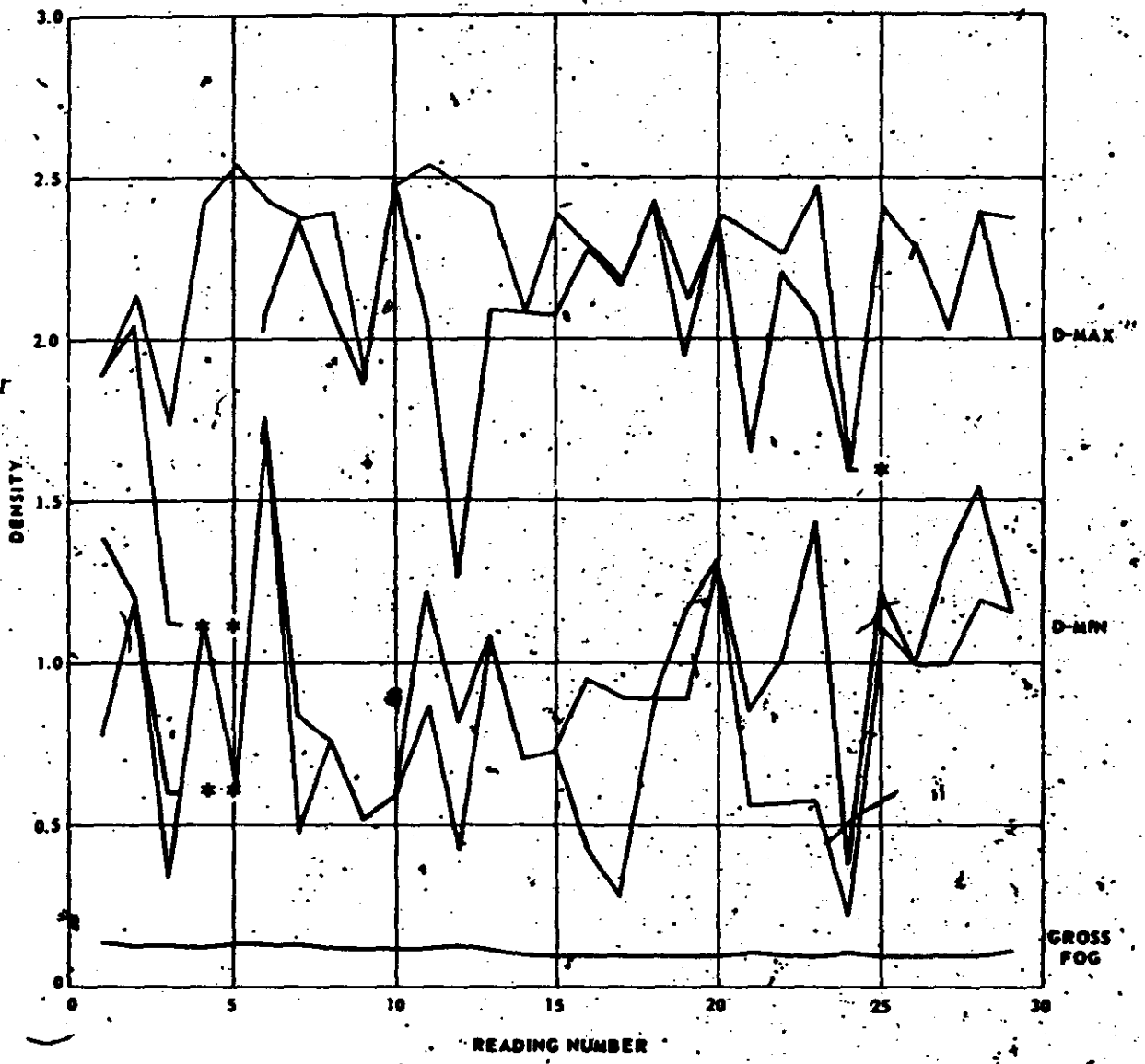
MISSION 9053

INDEX CAMERA DENSITIES



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