TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT

MISSION 9050

15 - 17 DECEMBER 1962

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NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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PART I. MASTER PANORAMIC CAMERA

Mission No: 9050
Camera No: 102
Slit Width: 0.250"
Film Type: 7J23-7600 (SO 132)

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

1. Shutter Operation (Horizon Cameras): Operational.

2. Horizon Camera Exposure:
   a. Supply (Port): Imagery appears underexposed at the beginning of all passes, and varies from slightly overexposed to overexposed on passes which encounter very high sun angles (f/8.0, 1/100 second). Example: pass D38.
   b. Take-Up (Starboard): Imagery appears overexposed on all passes (f/8.0, 1/100 second).

3. Camera Number: Overexposed, with some center background flare.

4. Data Block: The data block record functions throughout the mission; however, lamps 4 and 12 are difficult to read because of underexposure, and lamps 8, 9, and 10 are wired incorrectly. Lamp number 8 is wired as number 10, number 9 as number 8, and number 10 as number 9. All lamps "bloom," including the index lamp, and lamps 16 to 29 "blossom" into the format intermittently throughout the film.

5. Film Metering:
   a. The average metering between the supply (port) horizon camera and the following panoramic frame is 0.26". Metering on pass D57, frame 07, is 3.3", probably because of film exhaustion. Otherwise, metering ranges from 0.26" to 0.28".
   b. The average metering between the take-up (starboard) horizon camera and the preceding panoramic frame is 0.23". Metering on pass D57, frame 17, is 3.9", probably because of film exhaustion. Otherwise, metering ranges from 0.22" to 0.25".

6. Film Tracking: Normal throughout the film.

7. Frequency Markers: Marks are underexposed and are recorded very close to the panoramic format. Toward the end of each pass, the marks become underexposed to the extent that they are difficult to read. The mark signifying an exposure of the index camera occurs every seventh frame and is recorded as a streaked mark 2.2" long.

8. Fiducials:
   a. Panoramic Camera: The fiducials are slightly ragged but are usable throughout the film.
   b. Horizon Cameras: The fiducials are well defined with little or no flare.

9. Light Leaks: Light leaks consisting of equipment image reflections, diagonal patterns, and fogged areas occur on 67 frames of the film. The light leaks are present within the first three or last three frames of a pass and within the

[redacted]

first three frames of split passes at the camera-on position.

10. Static Electricity: Edge static is recorded on 15 frames of the film. Fog and striations probably due to corona static discharges occur on frames 7 and 8 of pass D57.

11. Pinholes: Scattered intermittently throughout the film.

12. Abrasions and Scratches: Multiple, continuous, parallel scratches occur near the center of format on pass D40, frames 76 to 91. These scratches are also present on the leader, indicating that they occurred after processing. Numerous other minor scratches and abrasions are present throughout the film, also occurring after processing.

13. Tearing: None. Manufacturing splices are present on pass D21, frame 11; pass D40, frame 37; pass D52, frame 74. Transparent splices are present between the following frames on the passes indicated: pass D07, frames 141, 142; pass D21, frames 51, 52, 59, 60; pass D30, frames 13, 14; pass D53, frames 65, 66. Nine opaque heat splices, which did not originate at the processing site, obscure small portions of horizon and/or panoramic frame imagery adjacent to the metered space between frames. The following is a list of these occurrences: pass D07, frame 201; pass D22, frame 62; pass D37, frame 187; pass D38, frames 117, 118; pass D40, frames 91, 120; pass D54, frame 75. In two instances the splices were mounted on the emulsion side of the film.

14. Water Marks: None are evident on the film.

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

16. Processing Streaks: None are evident on the film.

17. Blistering and Crimping: Blistering occurs on 10 frames of the film. Crimps occurring after processing appear on approximately 15 frames. Edge crimping does not occur.

18. Contrast: 3% low, 87% medium, 10% high.

19. Apparent Resolution: Good. This is comparable to Mission 9032 as determined from those areas not degraded by sun angle and weather conditions. Acuteness and resolution appear slightly better than that obtained by the slave panoramic camera.

20. Apparent Granularity: Fine.

21. Photo Quality:
a. Panoramic Camera: Quality ranges from poor to good with degradation due to underexposure, overexposure, light leaks, scratches, abrasions, and lifted emulsion.
b. Horizon Cameras: Poor. The starboard horizon camera is overexposed and out-of-focus throughout the film. The port horizon camera is underexposed at the beginning of all passes and is overexposed at the end of a few passes; imagery appears slightly out-of-focus throughout.

22. Camera Operation:
a. Panoramic Camera: Good. A possible programming error occurs on pass D38, part III, frame 139, where there is a 37 second time-gap between exposures. On frames 139 to 146 the cycling rate of each frame is approximately 5 seconds, resulting in overexposure and gaps in the coverage. Frame 140 appears to be the most severely affected. This frame is black with the

[redacted]

frequency markers recorded as part of the format and the fiducials and edges of the format blurred because of flare.

b. Horizon Cameras: Poor. Degradation is due to overexposure, underexposure, and out-of-focus condition throughout the film. No mechanical malfunctions are present.

23. Suitability for PI: Good. Degradations are due to light leaks, sun angle, weather conditions, and film handling procedures after processing.

Remarks

1. Handling marks are present on approximately 15 frames throughout the film.

2. Foreign matter is present intermittently throughout the film; it consists principally of lacquer, bits of lifted emulsion, and wax residue. Examples: pass D07, frame 41; pass D08, frame 13; pass D36, frame 1; pass D38, frames 2, 118; pass D52, frames 34, 83, 122, 123; pass D54, frame 196; pass D56, frames 1-12, 20, 21, 24, 62, 83, 106.

3. Skiving is present intermittently throughout the film. Examples: pass D07, frame 65; pass D09, frames 86, 89; pass D21, frames 25, 28, 41; pass D37, frames 156, 157, 186; pass D40, frames 82, 86, 90, 108, 116-119, 121, 122, 125-127, 129, 135, 148, 150, 154, 156; pass D50, frames 5, 16, 36; pass D56, frames 1, 54.

4. Titling smear and transfer occur on pass D56, frames 4 to 75. In some instances the titling also extends slightly into the format. A smear of the opaquing material occurs on pass D37, frame 147. Frames 20 and 21 of pass D40 have a plus-density streak 0.05" wide parallel to the titled edge, possibly a stain occurring during the lacquering process.

5. A very ragged format edge extends 6" in from the port side of every frame along the titled edge of the film.

6. Minus-density spots and streaks are intermittent throughout the film. Examples: pass D05, frames 4, 9 (spot); pass D07, frames 1-15 (numerous streaks); pass D09, frames 20 (spot), 67-75 (numerous streaks); pass D20, frame 13; pass D21, frame 37; pass D39, frame 30. Plus-density streaking from high density areas to low density areas is noticeable on passes over water and on overexposed frames. Examples: pass D09, frames 69-75, pass D38, frames 114-146.

7. Overexposure due to high sun angle occurs on pass D09, frames 67-108; pass D38, frames 114-146; pass D40, frames 80-120; pass D56, frames 84-147. Most frames are slightly underexposed at the beginning of a pass.

8. Image streaking does not occur throughout the film.

9. Use of a Wratten 21 filter produced better results for this camera than the Wratten 12 filter achieved for the slave panoramic camera. Higher contrast, better apparent resolution and visual acuity are evident on a majority of the frames, regardless of sun angle.

10. The following descriptions of overlap for camera number 102 were determined from the fifth and last frames of every pass. Film transport was determined from the first and last frames when possible. Cloud cover, low sun angle, or lack of imagery may have precluded determination of these values in some passes.

Handle Via [redacted]
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Pass	Overlap (Percent)		Film Transport (From Take-Up Side in Inches)	
	Beginning	End	First Frame	Last Frame
D06	8	4	2.8	NM
D07	10	10	20.0	0.0
D08	5	NM	20.0	20.0
D09	NM	10	0.0	7.0
D20	7	9	18.5	18.0
D21	8	NM	17.1	0.0
D22	8	10	18.8	20.5
D25	6	NM	0.0	17.3
D30	8	10	20.0	19.7
D36	7	9	17.7	16.6
D37	6	10	16.7	20.0
D38	8	0	11.3	16.1
MD39	9	10	4.6	21.3
D40	8	9	20.0	19.7
D50	10	10	17.9	16.0
D51	10	12	15.9	16.1
D52	8	13	16.0	19.6
D53	6	12	17.7	21.0
D54	6	10	17.0	16.0
D55	5	NM	19.0	15.3
D56	7	NM	16.4	20.6
D57	7	NM	0.0	NM

NOTE: "NM" denotes Not Measurable.

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	D06	29	0.43	2.13	0.43	2.13	0.17	0.18	0.15
2		129	0.45	1.40	0.29	2.15	0.10	0.11	0.10
3		181	0.28	1.87	0.28	2.12	0.10	0.10	0.10
4	D07	24	0.30	1.47	0.27	1.69	0.11	0.11	0.11
5		107	0.20	1.80	0.20	1.80	0.07	0.08	0.08
6		176	0.60	1.86	0.58	2.16	0.18	0.18	0.18
7	D08	6	0.52	1.01	0.52	1.83	0.17	0.18	0.18
8	D09	51	0.66	1.58	0.66	2.16	0.18	0.18	0.16
9		97	0.78	1.92	0.78	1.96	0.18	0.18	0.19
10	D20	31	0.52	1.72	0.52	1.93	0.18	0.16	0.17
11		92	0.46	1.96	0.46	2.12	0.19	0.19	0.19
12	D21	46	0.70	2.00	0.70	2.02	0.18	0.16	0.18
13		101	0.63	1.70	0.63	1.70	0.18	0.17	0.18
14	D22	10	0.44	1.73	0.44	1.73	0.16	0.15	0.16
15		79	0.28	1.95	0.28	1.92	0.08	0.08	0.08
16		160	0.24	2.08	0.24	2.08	0.08	0.08	0.08
17	D24*								
18	*								
19	D25	40	0.70	1.89	0.70	2.00	0.11	0.10	0.10
20	D30	14	0.30	1.39	0.30	1.97	0.08	0.08	0.07
21	D36	4	0.58	1.34	0.58	1.76	0.17	0.17	0.16
22		102	0.43	1.59	0.43	1.88	0.17	0.16	0.16
23	D37	8	0.38	1.56	0.38	1.56	0.17	0.15	0.16
24		121	0.58	1.82	0.43	2.01	0.08	0.07	0.08
25		183	0.44	1.74	0.44	1.90	0.08	0.08	0.07

Handle Via [redacted]
Control System Only

[redacted]

Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D Min	D Max	D Min	D Max	Leading	Center	*Trailing
26	D38	33	0.40	1.70	0.40	1.70	0.08	0.08	0.08
27		107	0.33	1.59	0.33	2.08	0.16	0.16	0.15
28	MD39	14	0.32	1.40	0.32	1.40	0.14	0.13	0.13
29	D40	28	0.39	1.40	0.34	1.40	0.14	0.13	0.14
30		125	0.48	1.90	0.46	1.60	0.16	0.14	0.14
31	D50	7	0.38	1.74	0.38	1.74	0.15	0.13	0.14
32	D51	30	0.60	1.66	0.60	1.66	0.14	0.14	0.13
33	D52	7	0.48	1.82	0.48	1.82	0.14	0.13	0.14
34		36	0.52	1.30	0.52	1.69	0.15	0.13	0.14
35	D53	131	0.70	1.61	0.70	2.04	0.16	0.16	0.16
36	D54	70	0.58	2.06	0.58	2.06	0.09	0.09	0.09
37		64	0.58	2.10	0.58	2.10	0.06	0.06	0.06
38		153	0.46	2.14	0.46	2.14	0.06	0.06	0.06
39	D55	10	0.36	1.38	0.38	1.38	0.16	0.15	0.16
40	D56	4	0.44	1.50	0.44	1.60	0.18	0.17	0.17
41		78	0.59	1.06	0.59	1.93	0.18	0.15	0.16

*Monoscopic coverage, Slave Panoramic only. No Master Panoramic coverage this pass.

Terrain		Limiting	
D Max Range	1.01-2.14	D Max Range	1.38-2.16
D Min Range	0.20-0.89	D Min Range	0.20-0.89
Average D Max	1.67	Average D Max	1.68
Average D Min	0.48	Average D Min	0.47
		Gross Fog Range	0.08-0.19
		Average Gross Fog	0.13

PART II. SLAVE PANORAMIC CAMERA

Mission No: 9050
Camera No: 108
Slit Width: 0.850"
Film Type: 7J23-7800 (SO 132)

Filter, Panoramic: Wratten 12
Aperture, Panoramic: f/3.5
Filters, Horizon: Wratten 25
Evaluated By: [redacted]

1. Shutter Operation (Horizon Cameras): Operational.

2. Horizon Camera Exposure:

a. Take-Up (Port): Imagery appears underexposed at the beginning of all passes and varies from slightly overexposed to grossly overexposed on passes which encounter very high sun angles (f/6.8, 1/100 second).

b. Supply (Starboard): Imagery appears overexposed on all passes (f/6.8, 1/100 second).

3. Camera Number: The lamp exposing the camera number malfunctioned throughout the film.

4. Data Block: The index lamps malfunction

Handle Via [redacted]
Control System Only

throughout the film. All data block lamps "blossom," with lamp numbers 16 to 29 "blooming" intermittently into the format area.

5. Film Metering:

a. The average metering between the take-up (port) horizon camera and the preceding panoramic frame is 0.18". The range of metering is 0.16" to 0.24".

b. The average metering between supply (starboard) horizon camera and the following panoramic frame is 0.18". The range of the metering is 0.15" to 0.19".

6. Film Tracking: Normal throughout the film.

7. Frequency Markers: The marks are recorded outside the format as small thin dashed lines (partially obscured by the rail) on one-third of each frame. On two-thirds of the frame they appear as marks with reflected images. The marks are connected by a smear, throughout the film; which does not seriously impair readability.

8. Fiducials:

a. Panoramic Camera: The fiducials are slightly ragged but usable throughout the film.

b. Horizon Cameras: The fiducial adjacent to the panoramic frame of the port horizon camera "blooms" throughout the film. Other fiducials for the horizon cameras are well defined with little or no flare.

9. Light Leaks: Numerous light leaks are present throughout the film, consisting of equipment reflections, diagonal patterns, and fogged streaks. Light leaks do occur within the first [illegible] frames of a pass, and at split passes within the last four frames prior to [illegible]

[illegible]

on the following passes: pass D05, frames 42-100; pass D07, frames 147-176; pass D09, frames 66-107; pass D20, frames 79-102; pass D21, frames 64-173; pass D22, frames 15-150; pass D24, frames 66-190.

10. Static Electricity: Edge static is present on pass D54, frame 118. Corona static effects are not evident throughout the film.

11. Scratches and Abrasions: Scratches, possibly occurring after processing, are present on 40 frames of the film. Numerous small, very fine abrasions, probably occurring after processing, are present on pass D06, throughout; pass D08, frames 1-35; pass D40, throughout.

12. Pinholes: Numerous and scattered intermittently throughout the film. These are evident on approximately 100 frames of the film.

13. Tearing: None. A manufacturing splice is present on pass D25, frame 87. Transparent splices are present between the following frames on the passes indicated: pass D07, frames 160, 161; pass D21, frames 96, 97; pass D25, frames 25, 26; pass D38, frames 45, 46; pass D52, frames 64, 65; pass D55, frames 75, 76. Two opaque heat splices, which did not originate at the processing site, obscure small portions of horizon and/or panoramic frame imagery adjacent to the metered space between frames. Following is a list of their occurrences: pass D20, frame 75; pass D25, frame 75. The permanent splice on pass D20, frame 75, is mounted on the emulsion side of the film.

14. Water Marks: None are evident on the film.

15. Pressure Streaks: Small, shiny base rubs are [illegible]

[redacted]

film. Edge crimping does not occur.

18. Contrast: 8% low, 89% medium, 3% high.

19. Apparent Resolution: Good. This is comparable to Mission 9032 where not degraded by sun angle and weather conditions. Acuteness and resolution of the master panoramic camera appears slightly better than that obtained by the slave panoramic camera.

20. Apparent Granularity: Fine.

21. Photo Quality:

a. Panoramic Camera: Quality ranges from poor to good, with degradation due to underexposure, overexposure, light leaks, scratches, abrasions, and lifted emulsion.

b. Horizon Cameras: The starboard horizon camera imagery is overexposed and severely out-of-focus throughout the film. The port horizon camera is slightly out-of-focus, and imagery ranges from underexposed at the beginning of a pass to overexposed in some instances at the end of a pass.

22. Camera Operation:

a. Panoramic Camera: Good. A possible programming error occurs on pass D38, part III, frame 135, where there is a 37 second time-gap between exposures. On frames 135 to 144 the cycling rate is approximately 5 seconds, resulting in overexposure and gaps in the coverage. Frame 138 appears very dense and is the most severely affected. The frequency marks appear as a solid line and the edges of the panoramic frame and fiducials are blurred because of flare.

b. Horizon Cameras: Poor, due to overexposure, underexposure, and out-of-focus condition throughout the film. No mechanical malfunctions are present.

25. Suitability for Fit: Good. Degradation is due to light leaks, sun angle, and weather conditions.

Remarks:

1. Handling marks are present on approximately 5 frames throughout the film.

2. Foreign matter is present intermittently throughout the film, consisting principally of lacquer, bits of lifted emulsion, and wax residue. Examples: pass D09, frames 44, 47, 51; pass D22, frame 148; pass D30, frames 1, 17; pass D50, frame 35; pass D52, frame 46; pass D56, frame 1.

3. Skiving is present intermittently throughout the film. Examples: pass D07, frame 11; pass D09, frames 44, 78, 83; pass D21, frame 128; pass D25, frames 7, 47, 90; pass D36, frames 5, 14; pass D38, frames 25, 137; pass D40, frame 47; pass D51, frame 8; pass D52, frame 68; pass D54, frame 60.

4. Minus-density spots are present intermittently throughout the film. Examples: pass D06, frames 15, 63; pass D08, frame 44; pass D09, frame 15; pass D20, frames 15, 102; pass D24, frame 47; pass D25, frame 6; pass D36, frame 14; pass D37, frames 28, 31. A minus-density streak beginning 0.4" from the leading edge on the port side of the panoramic frame and ending 0.5" from the leading edge on the starboard side begins on pass D20 and continues throughout the film. Plus-density streaking from high density areas to low density areas is noticeable on passes over water and on overexposed frames. Examples: pass D09, frames 66-106; pass D38, frames 112-144.

5. Overexposure due to high sun angle is present on pass D09, frames 66-106; pass D38, frames 112-144; pass D40, frames 76-154; pass D56, frames 83-147. The beginning of most passes appears slightly underexposed.

6. Lifted Emulsion: This occurs on approximately 65 frames of the film.

[redacted]

7. Image streaking does not occur throughout the film.

8. Use of a Wratten 12 filter produced slightly degraded imagery on a majority of the frames, compared to that achieved by the master panoramic camera. Contrast, apparent resolution, and visual acuity appear lower, with overexposure becoming a problem at high sun angles.

9. The following descriptions of overlap for camera number 103 were determined from the fifth and last frame of every pass. Film transport was determined from the first and last frames of each pass. Cloud cover, low sun angle, or lack of imagery may have precluded determination of these values in some passes.

Pass	Overlap (Percent)		Film Transport (From Take-Up Side in Inches)	
	Beginning	End	First Frame	Last Frame
D06	4	5	3.4	28.0
D07	NM	8	15.2	27.0
D08	5	NM	15.0	0.0
D09	7	7	0.0	17.0
D20	5	8	15.0	16.0
D21	5	NM	12.1	6.0
D22	8	6	15.5	28.0
MD24	10	10	15.6	28.0
D25	8	NM	0.0	0.0
D30	5	4	15.5	14.1
D36	5	9	15.0	16.2
D37	9	7	14.1	28.0
D38	8	0	14.5	5.1
D40	6	5	5.9	29.5
D50	8	9	7.0	0.0
D51	7	9	13.6	0.0
D52	8	10	13.7	16.5
D53	6	9	14.7	26.8
D54	4	5	15.9	16.1
D55	5	NM	15.2	15.3
D56	6	NM	13.6	16.3
D57	8	NM	0.0	0.0

NOTE: "NM" denotes Not Measurable.

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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	D06	35	0.72	2.13	0.72	2.13	0.21	0.21	0.21
2		132	0.59	1.47	0.60	2.15	0.11	0.11	0.11
3		182	0.51	2.00	0.51	2.19	0.11	0.11	0.11
4	D07	30	0.46	1.55	0.31	1.81	0.12	0.11	0.12
5		113	0.26	1.92	0.26	1.99	0.06	0.06	0.06
6		179	0.82	1.77	0.74	2.19	0.11	0.11	0.11
7	D08	12	0.61	1.10	0.61	1.75	0.21	0.20	0.20
8	D09	56	0.65	1.46	0.65	2.15	0.11	0.11	0.11
9		101	0.97	2.04	0.97	2.06	0.22	0.21	0.21
10	D20	37	0.58	1.80	0.58	2.10	0.21	0.20	0.20
11		95	0.68	2.00	0.68	2.16	0.21	0.20	0.21
12	D21	52	0.66	2.10	0.66	2.10	0.20	0.19	0.20
13		108	0.82	1.86	0.82	1.86	0.20	0.19	0.20
14	D22	18	0.86	1.78	0.64	1.78	0.20	0.19	0.20
15		85	1.38	2.19	1.38	2.19	0.19	0.19	0.19
16		186	0.77	1.76	0.77	2.24	0.20	0.18	0.19
17	MD24	15	0.39	1.24	0.39	1.44	0.20	0.19	0.20
18		120	1.00	2.10	1.00	2.18	0.19	0.18	0.19
19	D25	46	1.06	1.77	1.06	2.14	0.19	0.18	0.19
20	D30	21	0.82	1.78	0.82	2.21	0.20	0.19	0.20
21	D36	10	0.67	1.70	0.67	1.70	0.19	0.19	0.20
22		109	0.70	1.76	0.70	1.76	0.19	0.19	0.19
23	D37	14	0.54	1.81	0.54	1.75	0.19	0.18	0.19
24		112	0.79	1.54	0.79	2.04	0.20	0.18	0.20
25		127	1.43	1.62	1.25	2.10	0.18	0.16	0.19
26	D38	89	1.10	1.97	1.10	1.97	0.20	0.19	0.20
27		118	1.36	1.88	1.36	2.22	0.20	0.19	0.20
28	*MD39								
29	D40	34	0.50	1.50	0.50	1.70	0.19	0.18	0.19
30		131	1.40	1.72	1.34	2.14	0.17	0.16	0.17
31	D50	18	0.46	1.61	0.46	1.81	0.18	0.16	0.16
32	D51	86	0.64	2.00	0.64	2.00	0.18	0.18	0.16
33	D59	13	0.56	1.90	0.56	1.90	0.20	0.19	0.20
34		62	0.60	1.36	0.60	2.06	0.18	0.18	0.18
35	D52	137	0.90	1.69	0.90	2.18	0.17	0.17	0.18
36	D54	75	1.10	2.15	1.10	2.15	0.17	0.16	0.17
37		90	1.40	2.20	1.40	2.20	0.19	0.17	0.19
38		139	0.94	2.16	0.94	2.16	0.19	0.17	0.19
39	D55	16	0.56	1.84	0.56	1.84	0.20	0.17	0.20
40	D56	10	0.20	1.06	0.20	1.52	0.06	0.07	0.06
41		75	0.76	1.86	0.76	1.84	0.09	0.09	0.08

*Monoscopic coverage, Master Panoramic only. No Slave Panoramic coverage this pass.

Terrain		Limiting	
D Max Range	1.06-2.20	D Max Range	1.44-2.24
D Min Range	0.20-1.43	D Min Range	0.20-1.60
Average D Max	1.77	Average D Max	1.98
Average D Min	0.78	Average D Min	0.76

Gross Fog Range 0.07-0.22
Average Gross Fog 0.17

[redacted]

[redacted]

PART III. STELLAR CAMERA

Mission No: 9050
Camera No: D4
Camera Setting: f/1.9, 1/2 second
Filter: None
Film Type: 7J3-135 (SO 130)
Evaluated By: [redacted]

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

2. Exposure: Although it appears to be adequate for stellar imagery, flare (associated with sun angle) degrades a majority of the frames.

3. Frame Correlation Fiducial Mark: Operational.

4. Camera Number: The number is present, but is poorly registered and flared.

5. Reseau Calibration Points: The lamps are operational but appear slightly flared throughout the film.

6. Reseau: The grid is visible, except where flare and vignetting are excessive.

7. Film Metering: Normal throughout the film.

8. Film Tracking: Normal.

9. Light Leaks: A crescent-shaped reflection from the edge of the reseau is noticeable at the beginning and end of all passes. A heavy, rectangular light leak is present on the third frame of most passes, and a bar-shaped leak occurs in the metered space between the third-from-last and next-to-last frames of the long passes. A total of 44 frames is affected.

10. Static Electricity: Small "spot" discharges occur associated with a heavy scratch from frames 366 to 370. Corona static discharges fog portions of 41 frames. Examples: frames 56, 57, 71, 72, 88, 96.

11. Scratches and Abrasions: A heavy scratch is present on frames 325 to 411 (end). A few minor abrasions occur intermittently throughout the film.

12. Pinholes: Few.

13. Water Marks: None.

14. Processing Streaks: None.

15. Pressure Streaks: None.

16. Tearing: None.

17. Blistering and Crimping: Very few blisters are evident throughout the film. No edge crimping is apparent, and film handling crimps are at a minimum.

18. Foreign Matter: None.

19. Contrast: Sufficient to establish stellar imagery on the least flared frames.

20. Apparent Granularity: Medium.

21. Photo Quality: Poor. Degradation is due to light leaks, flare, vignetting, and static effects.

22. Camera Operation: Fair. No malfunctions are present during this mission; however static discharges and light leaks degrade approximately 80 frames of the film.

Remarks

1. A few stellar images appear in the least flared frames of the mission.

2. Vignetting, possibly from the side of the vehicle, obscures approximately 25% of the format area of every frame.

3. On every frame a small desensitized spot occurs in the format area adjacent to the titling.

4. Density readings were taken as indicated by

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low, using the MacBeth Quantalog Densitometer, Model EP 1000, with an ET 20 attachment and an 0.5 mm aperture. D Max and D Min readings were taken on the first and last frames of all passes, except where these were totally fogged by light leaks, in which case the nearest unaffected frame of the pass was read. Gross Fog levels were read near the center of the film, between frames, in an area least affected by static or light leaks.

Reading	Pass	Frame	Beginning of Pass		End of Pass		Gross Fog
			D Min	D Max	D Min	D Max	
1	D06	1	0.30	0.59			0.20
2	D06	29			0.20	1.36	0.20
3	D07	30	0.20	0.34			0.20
4	D07	58			0.22	1.02	0.20
5	D08	59	0.22	0.28			0.19
6	D08	73			0.22	1.24	0.19
7	D09	76	0.24	0.74			0.22
8	D09	90			0.28	1.24	0.24
9	D20	91	0.23	0.36			0.23
10	D20	105			0.23	0.65	0.21
11	D21	106	0.19	0.35			0.19
12	D21	131			0.28	2.06	0.20
13	D22	132	0.20	0.54			0.20
14	D22	162			0.28	1.24	0.21
15	D25	164	0.24	0.70			0.22
16	D25	177			0.32	1.61	0.26
17	D30	178	0.25	1.54			0.22
18	D30	184			0.28	1.22	0.23
19	D36	185	0.25	0.43			0.23
20	D36	200			0.21	1.01	0.20
21	D37	201	0.24	0.46			0.21
22	D37	226			0.26	1.78	0.21
23	D38	227	0.21	0.55			0.20
24	D38	247			0.26	1.55	0.20
25	D39	248	0.20	0.22			0.20
26	D39	264			0.22	1.54	0.20
27	D40	265	0.21	0.28			0.21
28	D40	286			0.28	1.78	0.23
29	D50	287	0.24	0.32			0.24
30	D50	296			0.30	1.00	0.29
31	D51	297	0.30	0.88			0.30
32	D51	304			0.25	1.10	0.22
33	D52	305	0.22	0.48			0.21
34	D52	321			0.23	0.89	0.21
35	D53	322	0.21	0.89			0.21
36	D53	341			0.24	1.19	0.22
37	D54	342	0.21	0.69			0.21
38	D54	370			0.25	1.09	0.22
39	D55	371	0.21	0.27			0.21
40	D55	381			0.25	1.18	0.21
41	D56	382	0.21	0.31			0.21
42	D56	408			0.28	1.63	0.23
43	D57	406	0.26	0.98			0.24
44	D57	411			0.26	1.46	0.23

Beginning of Pass		End of Pass	
D Max Range	0.27-1.54	D Max Range	0.86-2.06
D Min Range	0.19-0.30	D Min Range	0.20-0.32
Average D Max	0.54	Average D Max	1.38
Average D Min	0.26	Average D Min	0.25
Gross Fog Range	0.19-0.26		
Average Gross Fog	0.22		

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PART IV. INDEX CAMERA

Mission No: 9050
Camera No: D4
Camera Setting: f/4.5, 1/125 second

Filter: Wratten 21
Film Type: SO 206
Evaluated By: [redacted]

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

2. Exposure: Good.

3. Camera Number: Clearly registered in all frames.

4. Film Metering: Normal, averaging 0.13".

5. Film Tracking: Normal.

6. Reseau: Well defined.

7. Light Leaks: A light reflection from approximately one-fourth of the reseau plate edge is present. This reflection extends from the edge of the film, on the untitled side, halfway into the format. It is usually evident in the second frame of a pass. However, in four instances the leak occurs in the first frame. A very faint reflection of the adjacent quarter of the grid plate edge is present in four frames and also extends from the untitled edge of the film. Examples: frames 2, 31, 60, 132, 164, 183..

8. Static Electricity: Static discharges are present intermittently along the untitled edge of the film. Examples: frames 123, 182, 251, 357, 380. "Spot" static discharges accumulating into a 0.1" streak are found within the format area of some frames. Examples: frames 159, 343-347, 373, 382, 391. Small linear static marks are present at the frame correlating lamp location throughout the majority of the film.

9. Pinholes: None.

10. Abrasions and Scratches: An almost continuous scratch is present from frames 1 to 367. It is located 0.09" from the format edge and through the camera number block.

11. Tearing: None.

12. Water Marks: None.

13. Pressure Streaks: None.

14. Processing Streaks: None.

15. Blistering and Crimping: None.

16. Contrast: 5% low, 55% medium, 40% high.

17. Apparent Resolution: A concavity of the format edge adjacent to the camera number is present and indicates that the film was not held against the reseau plate in this area. Degradation of the imagery is proportional to the concavity of the format edges. Along the leading and trailing edges the image is degraded for approximately 0.5" into the format from the untitled frame edge; this degradation almost disappears near the center of the frame, along the untitled edge of the format. A slight degradation of the format along the titled edge is also present and extends about 0.25" into the format and is attributable to the same condition. Image quality over most of the film is good. Image quality in the slightly out-of-focus areas is fair.

18. Apparent Granularity: Slightly grainy.

19. Photo Quality: Good. Degradation is due to

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the cyclical appearance of a desensitized spot near the center of the format and five emulsion lifts all spaced 2.38" apart. In addition, another desensitized spot appearing four grid spaces from the untitled edge of the format has a cyclical spacing of approximately 1.96" throughout the film.

20. Camera Operation: Good. No camera malfunctions are present during this mission. No overlap, however, is present between frames 246 and 247. This condition may be attributable to a corresponding gap present in the panoramic photography near the end of pass D38, indicating a programming discrepancy. Degradation of the rating is due to items 17 and 19.

21. PI Suitability: Good.

Remarks

1. Numerous small image obstructions, possibly lint and other foreign matter, are present on the grid plate causing the appearance of Newton Rings adjacent to each particle. Most of the obstructions disappear after the first few frames.

2. The opaque coating on the reseau plate is removed to some extent outside the format area, producing a spotted and scratched appearance from the camera number block to the trailing edge of the frame and about 0.5" into the metered space between frames.

3. The format edges are neither perpendicular nor parallel to the film edges, indicating a slight misalignment between the magazine and the camera body.

4. The frame correlating light is operational throughout the film.

5. The total number of exposed frames is 411.

6. 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	D06	4	0.25	1.74	0.25	1.75	0.17	0.16	0.17
2		28	0.51	1.65	0.35	2.44	0.16	0.16	0.17
3	D07	34	0.38	1.32	0.31	1.93	0.19	0.17	0.18
4		46	0.28	2.25	0.28	2.44	0.16	0.17	0.17
5	D08	59	0.28	0.60	0.25	1.78	0.16	0.17	0.17
6	D09	83	0.38	1.93	0.38	2.35	0.16	0.16	0.17
7		89	0.38	2.02	0.38	2.28	0.17	0.16	0.17
8	D20	103	0.25	1.72	0.25	1.96	0.15	0.16	0.16
9	D21	113	0.26	1.67	0.26	2.06	0.18	0.16	0.17
10		122	0.42	1.60	0.42	1.60	0.18	0.16	0.18
11	D22	135	0.26	1.76	0.26	1.78	0.17	0.16	0.17
12		156	0.22	2.47	0.22	2.47	0.16	0.17	0.16
13	D25	165	0.26	1.24	0.26	2.21	0.17	0.16	0.17
14	D30	180	0.23	1.70	0.23	2.22	0.19	0.16	0.19
15	D36	200	0.29	1.06	0.29	2.23	0.18	0.16	0.17
16	D37	208	0.26	2.09	0.26	2.09	0.19	0.17	0.18
17		215	0.31	2.01	0.31	2.23	0.17	0.15	0.16
18	D38	228	0.27	1.86	0.27	1.66	0.16	0.17	0.16
19		237	0.36	2.27	0.36	2.40	0.17	0.16	0.15
20		245	0.34	2.16	0.34	2.57	0.17	0.16	0.17
21	MD39	250	0.20	0.96	0.20	1.14	0.17	0.16	0.17
22	D40	270	0.24	1.40	0.20	1.72	0.17	0.15	0.16
23	D50	290	0.23	1.50	0.23	1.63	0.18	0.17	0.18
24	D51	302	0.35	2.10	0.35	2.10	0.18	0.16	0.17
25	D52	305	0.22	1.38	0.20	1.38	0.17	0.16	0.17

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Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D Min	D Max	D Min	D Max	Leading	Center	Trailing
26		321	0.26	1.79	0.26	2.20	0.17	0.17	0.17
27	D53	331	0.30	2.34	0.30	2.34	0.17	0.17	0.18
28	D54	364	0.32	2.14	0.32	2.26	0.16	0.16	0.16
29	D55	373	0.20	1.12	0.20	1.12	0.16	0.16	0.16
30	D56	365	0.20	1.10	0.20	1.10	0.16	0.16	0.16

Terrain		Limiting	
D Max Range	0.69-2.47	D Max Range	1.10-2.57
D Min Range	0.20-0.31	D Min Range	0.20-0.42
Average D Max	1.72	Average D Max	1.99
Average D Min	0.29	Average D Min	0.28
Gross Fog Range		0.15-0.19	
Average Gross Fog		0.17	

PART V. VEHICLE ATTITUDE

Pass	Pitch Variation		Pitch Range	Roll Variation		Roll Range	No. of Frames	Remarks
D06	13°58'	14°13'	15'	00°12'	00°25'	13'	25	No Data 1 thru 17
	14 15	13 56	17	-01 19	00 22	41	160	
D07	14 32	14 09	23	00 25	00 14	11	144	No Data 1 thru 57
D08	13 58	14 14	16	-00 07	00 38	45	51	No Data 1 thru 56
D09	14 41	13 49	52	-00 31	00 09	40	61	No Data 1 thru 5
	14 35	14 29	06	00 19	00 40	21	42	
D20	14 47	14 18	29	00 55	00 45	10	66	No Data 1 thru 17
D21	14 11	14 06	05	00 45	00 45	00	44	No Data 1 thru 20
	14 06	14 06	00	00 23	01 03	40	113	
D22	13 50	14 11	21	00 42	01 01	19	47	No Data 1 thru 14
	14 10	14 08	07	00 45	00 50	05	159	
MD24*	-14 55	-14 53	02	-00 45	-00 37	08	19	No Data 1 thru 42
	-15 10	-15 17	07	01 03	-00 30	1 33	66	
D25	14 49	15 03	14	00 53	00 50	03	92	
D30	16 32	16 25	07	-00 18	-00 19	01	41	
D26	14 18	14 06	12	00 46	00 50	04	105	No Data 1 thru 7
D27	13 54	14 00	06	00 39	00 27	12	47	No Data 1 thru 11
	14 22	14 40	18	-01 35	00 53	2 28	133	
D36	14 15	14 48	33	00 36	00 45	07	39	No Data 1 thru 20
	15 49	16 41	52	-00 41	01 05	1 46	54	
	15 25	15 07	18	-00 43	00 13	56	35	
MD39	14 15	14 19	04	00 43	00 45	02	18	No Data 1 thru 48
	14 37	16 23	1 46	00 00	00 46	46	52	
D40	15 22	15 34	12	00 36	00 49	13	51	No Data 1 thru 40
	15 53	16 12	19	-00 21	00 59	38	66	
D50	15 43	16 07	24	00 39	00 54	15	35	No Data 1 thru 28
D51	15 44	15 55	11	00 10	00 14	04	56	
D52	15 15	15 00	15	-00 37	00 02	39	36	
	15 11	15 49	38	00 17	01 00	43	89	
D53	15 34	16 45	51	00 50	00 58	08	140	
D54	15 00	14 40	20	00 00	01 08	1 08	200	
D55	15 43	15 56	13	00 42	00 48	06	45	No Data 1 thru 38
D56	15 20	15 28	08	00 31	00 54	23	52	No Data 1 thru 31
	15 24	15 06	18	00 28	00 50	15	66	
D57*	-15 02	-13 16	1 46	01 27	00 13	1 14	43	

*Data for Panoramic Slave; all other data computed for Panoramic Master.

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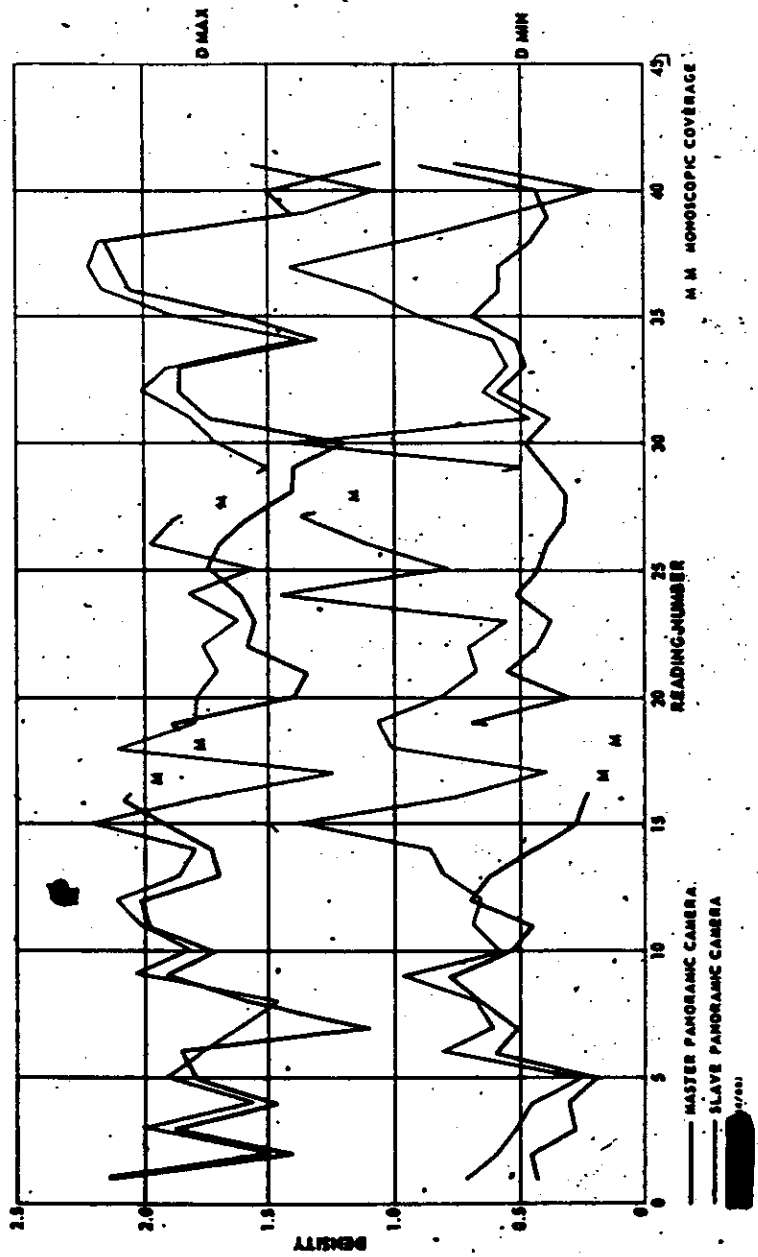
PART VI. DENSITY CHARTS



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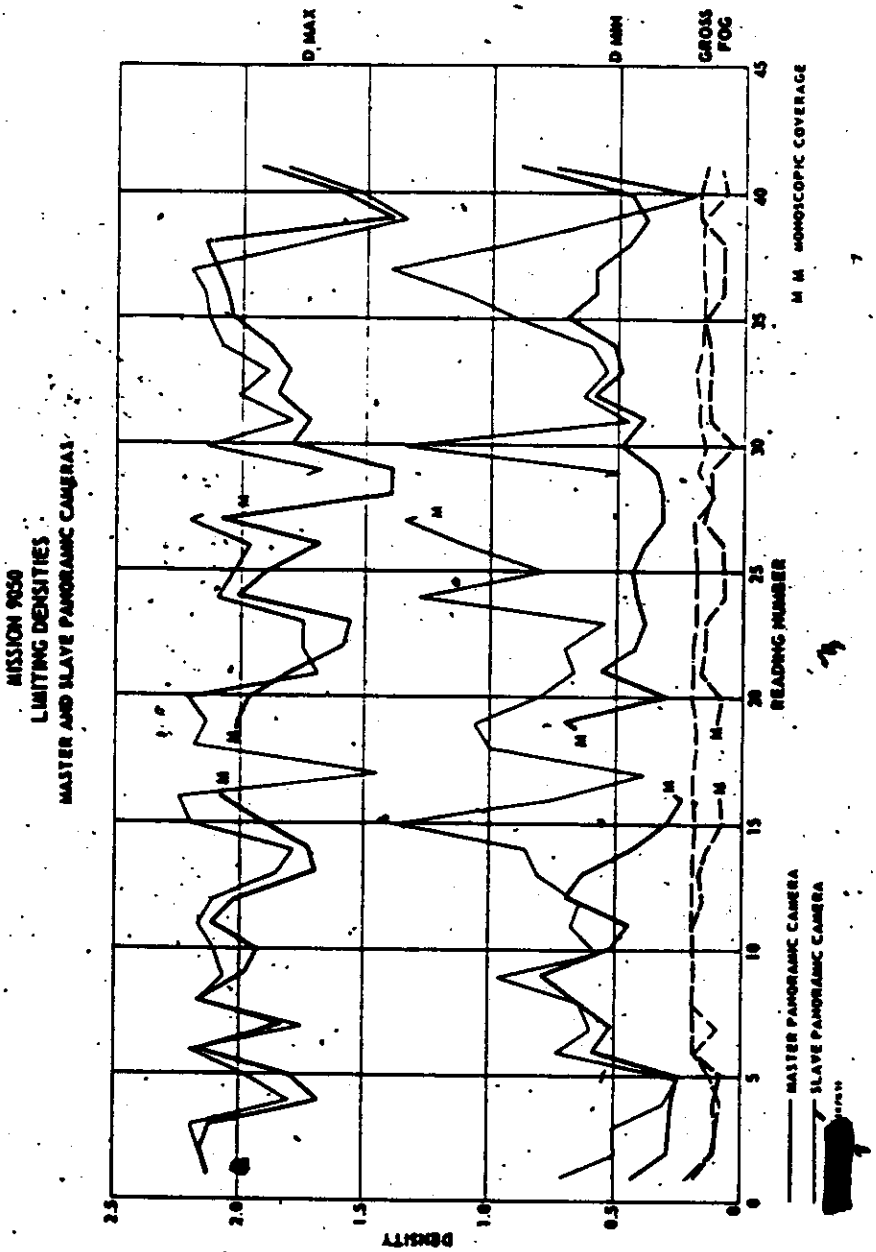

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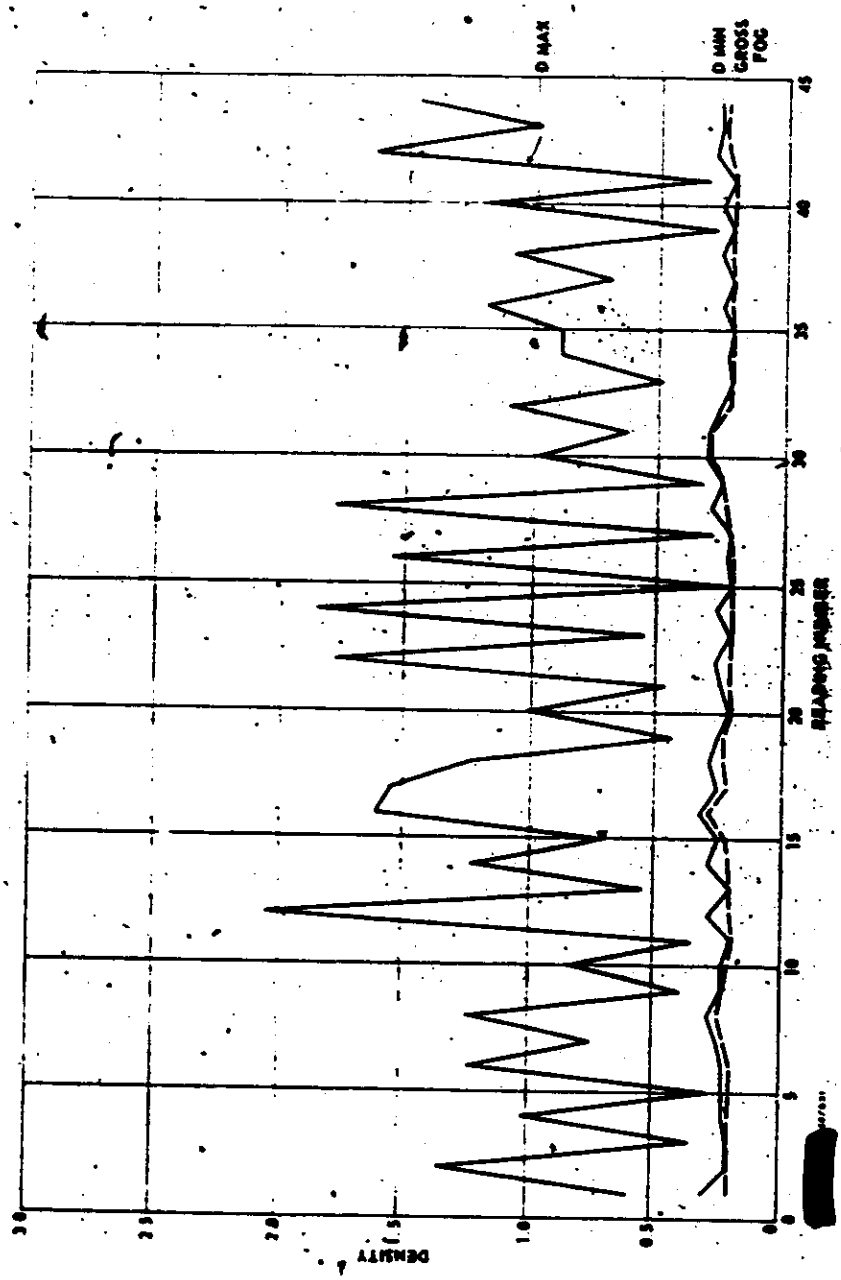

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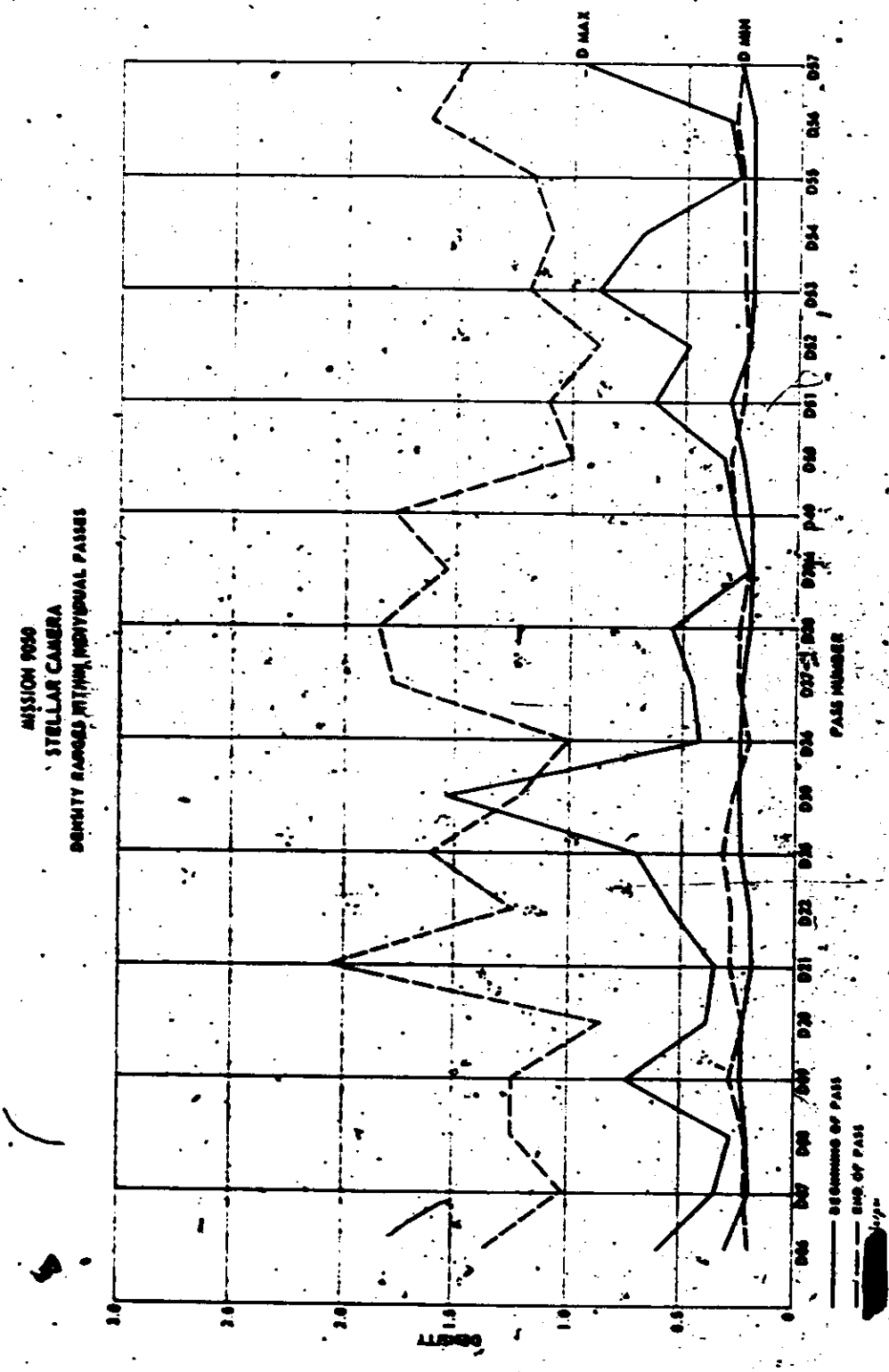

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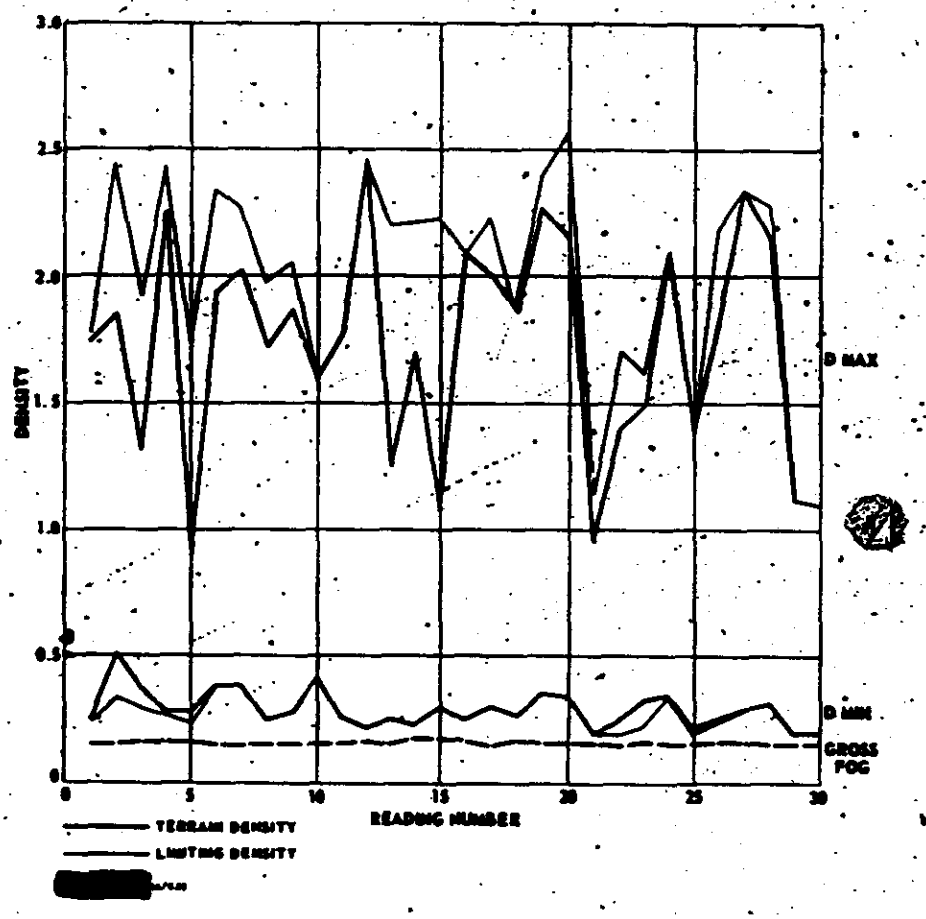
MISSION 9050
INDEX CAMERA DENSITIES



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