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March 1963

TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT

MISSION 9048

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This document contains information referring to Project Corona

WARNING

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TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT

MISSION 9048'

24-29 NOVEMBER 1962 Z

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March 1963

NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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PART I. FORWARD CAMERA

Mission No: 9048
Camera No: 100
Slit Width: 0.200"
Film Type: 7J-23-7800 (SO 132)

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

1. Shutter Operation (Horizon Cameras): Both the port and starboard horizon camera shutters functioned normally throughout the mission.

2. Horizon Camera Exposure:
   a. Supply (Port): Approximately one-half of the imagery has good exposure, one-quarter is slightly underexposed, and the remaining one-quarter is overexposed (f/6.8, 1/100 second).
   b. Take-Up (Starboard): Four-fifths of the imagery is overexposed. Of the remaining one-fifth, half has good exposure and half is underexposed (f/6.8, 1/100 second).

3. Camera Number: Operational throughout the film. A slight background flare is present; however, the camera number is legible.

4. Binary Operation: The binary functions throughout the film. The index light adjacent to the camera number flares and varying intensities of binary light images are present throughout the film. At the end of a pass, or at the camera-off position, a single binary is usually present and the end-of-pass marker is imaged by itself, being displaced from the binary recording by an amount equal to the film transport which is present on most passes.

5. Film Metering:
   a. Supply (Port): The average metering between the supply horizon camera and the following terrain frame is 0.21". The range of the metering is 0.19" to 0.22".
   b. Take-Up (Starboard): The average metering between the take-up horizon camera and the preceding terrain format is 0.19". The range of the metering is 0.16" to 0.22".

6. Film Tracking: Normal throughout the film.

7. Timing Pulses: These appear well defined, being outside the format area, with good exposure. However, the pips are double imaged and have a three to four inch gap present on each frame. The elongated pip, indicating an index camera exposure, was erratic in its operation after the first part of split pass D06. In addition to the first elongated pip, other index camera exposure pips are present on as many as one to 25 successive large-scale frames. The pips extend to the end of all terrain frames at the camera-off position.

8. Fiducials:
   a. Main Camera: Well defined.
   b. Horizon Cameras: Well defined with no flare.

9. Light Leaks: A diagonal line across the format width is present at the beginning or end of most passes. In addition, an equipment shadow image is present intermittently on the first, second, next to the last or last frame of most passes. Other light leaks, appearing as a fogging of a small portion of a terrain frame, can usually be found in the second and third frames from the beginning of a pass and the second or third frames from the end of a pass.

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10. Static Electricity: Edge static appears on a few passes. Examples: pass D18, frame 49; pass D38, frame 68; pass D55, frames 114, 115. Other small static discharges (spot discharges) are found on pass D36, frame 85; pass D66, frame 50; pass D72, frames 68, 70, 76.

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

12. Abrasions and Scratches: Fine scratches, possibly occurring before processing, are present on pass D01. Other scratches occurring after processing are present intermittently on the film. Examples: pass D02, frames 1, 3, 5, 8; pass D06, frames 8-10; pass D68, intermittent throughout; pass D69, frames 29, 42, 43, 62, 148; pass D72, frames 71, 74. Few abrasions are present. Examples: pass D30, along the trailing edge throughout; pass D72, frames 59-67.

13. Tearing: Transparent splices are present between the following frames on the passes indicated: pass D06, frames 157/158; pass D23, frames 213/214; pass D38, frames 15/16; pass D55, frames 72/73; pass D69, frames 191/192; pass D71, frames 23/24. A manufacturing splice is present on pass D38, frame 66. No film tearing is evident.

14. Water Marks: Few present on this film. Examples: pass D07, frames 141, 142, 150; pass D18, frames 42-51; pass D37, frame 192.

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

16. Processing Streaks: None evident on the film.

17. Blistering and Crimping: Few blisters are present on this film. Examples: pass D02, frames 3, 4, 16, 37, 43; pass D06, frame 62, 84; pass D07, frames 118, 119; pass D72, frames 34, 65, 66. No edge crimping is present.

18. Contrast: Low 35%, medium 60%, high 5%.

19. Apparent Resolution: Image quality of forward camera is comparable to that of Mission 9037, and is rated from fair to good in those areas not affected by low sun angle.

20. Apparent Granularity: Fine.

21. Photo Quality:

a. Main Camera: Quality ranges from fair to good, depending upon the degradation by low sun angle, light leaks, scratches, abrasions, and water marks.

b. Horizon Cameras: Although at least one-half of the imagery taken by the port horizon camera shows good exposure, a rating of poor is give to both cameras due to the out of focus condition of the imagery.

22. Camera Operation:

a. Main Camera: Fair to good throughout the mission except for multiple elongated pip recordings of the index camera exposure after the second part of split pass D06. In addition, the imagery of the forward camera seems slightly out of focus throughout most of the film; however, imagery on pass D07, frame 136 does not appear out of focus.

b. Horizon Cameras: Fair. Both port and starboard horizon cameras are out of focus. No malfunctions are present.

23. Suitability for PI: A rating of fair is assigned, due to degradation by the slightly out of focus condition of the camera, low sun angle and cloud cover.

Remarks

1. Handling marks occurring after processing are present intermittently on the film. Examples: pass D07, frame 151; pass D68, frame 74 (grease pencil); pass D69, frame 256; pass D70, frame 281. Crimps are also present intermittently throughout.

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2. Foreign matter embedded in the base or emulsion is found in some passes. Examples: pass D02, scattered throughout; pass D03, frames 1-3, 7, 27; pass D06, frames 75, 151; pass D07, frames 1, 10, 120, 128, 147, 161; pass D38, frames 24, 45, 83, 102, 127, 164.

3. Lifted emulsion is present on pass D02, frames 3, 6, 20; pass D06, frames 11, 27, 95; pass D46, frames 1, 4; pass D70, frames 312, 350; pass D72, frames 66, 70.

4. Minus density streaks are present intermittently throughout the film. Examples: pass D01, frames 12, 14, 17-19; pass D02, throughout; pass D04, frame 13; pass D05, throughout; pass D06, frames 157-170.

5. Approximately one-half of the film was wound either tails-out or emulsion-out on the film spools.

6. The following descriptions of overlap for camera number 100 were determined from the fifth and last frames of each pass. Film transport was determined from the first and last frames of each pass, wherever possible. Cloud cover, or lack of imagery, precluded determination of these values in some passes.

Pass	Overlap (Percent)		Film Transportation (From Take-Up Side in Inches)	
	Beginning	End	First Frame	Last Frame
D01	6	9	NM	13.6
D02	NM	7	NM	NM
D03	NM	10	NM	19.1
D04	5	8	15.1	17.0
D05	3	9	NM	13.2
D06	NM	6	NM	NM
D07	NM	8	17.8	18.0
D18	1	8	16.0	18.7
D23	5	11	14.2	15.9
D30	5	10	16.8	11.5
D34	4	10	16.3	15.7
D36	4	6	13.6	17.0
D37	NM	15	14.9	18.6
D38	4	22	NM	19.1
D39	4	8	17.2	16.7
D46	9	11	8.5	19.0
D55	1	9	16.7	13.0
D66	NM	9	5.4	14.0
D67	2	9	13.5	16.5
D68	3	8	13.9	16.8
D69	5	NM	14.7	18.4
D70	NM	15	NM	19.3
D71	4	5	16.6	16.4
D72	NM	7	NM	NM

END OF MISSION

Note: "NM" denotes Not Measurable

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

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Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D Min	D Max	D Min	D Max	Leading	Center	Trailing
1	D01	21	0.39	1.76	0.39	1.78	0.29	0.29	0.29
2	D02	42	0.51	1.93	0.51	1.93	0.29	0.29	0.29
3	D03	38	0.61	0.88	0.61	1.90	0.31	0.31	0.31
4	D04	19	0.60	1.51	0.60	1.81	0.30	0.30	0.30
5	D05	12	0.47	1.50	0.47	1.90	0.30	0.30	0.30
6	D06	52	0.56	1.86	0.56	1.68	0.30	0.30	0.30
7	D06	147	1.10	1.45	1.10	1.96	0.30	0.30	0.30
8	D06	160	0.64	1.72	0.60	2.12	0.30	0.30	0.30
9	D07	33	0.43	0.48	0.43	1.71	0.30	0.30	0.30
10	D07	68	1.12	1.64	1.12	1.64	0.29	0.29	0.29
11	D18	14	0.54	1.62	0.48	1.62	0.26	0.26	0.26
12	D23	12	0.50	1.91	0.50	1.91	0.27	0.27	0.27
13	D23	106	0.70	1.74	0.70	1.56	0.26	0.26	0.26
14	D23	194	1.03	2.06	1.03	2.08	0.28	0.28	0.26
15	D23	207	0.24	2.05	0.24	2.05	0.14	0.12	0.14
16	D30	6	0.26	1.26	0.23	2.00	0.11	0.11	0.11
17	D34	11	0.38	1.66	0.38	1.68	0.25	0.25	0.25
18	D36	33	0.56	1.68	0.56	1.56	0.27	0.27	0.27
19	D36	60	0.52	0.94	1.52	2.02	0.27	0.27	0.27
20	D37	56	0.93	1.66	0.93	1.56	0.24	0.24	0.24
21	D37	153	1.17	1.35	1.09	2.06	0.25	0.25	0.25
22	D37	163	0.64	1.77	0.84	2.10	0.26	0.26	0.26
23	D38	7	0.39	1.13	0.39	1.71	0.26	0.26	0.26
24	D38	108	0.60	2.00	0.60	2.00	0.13	0.13	0.13
25	D38	121	0.30	1.20	0.30	2.04	0.12	0.12	0.12
26	D39	5	0.38	0.56	0.36	1.69	0.32	0.32	0.32
27	D39	96	0.52	0.54	0.52	1.68	0.32	0.32	0.32
28	D46	20	0.53	1.64	0.53	1.78	0.33	0.33	0.33
29	D55	61	0.55	1.26	0.55	1.86	0.32	0.32	0.32
30	D55	101	0.54	1.78	0.54	1.78	0.32	0.32	0.32
31	D66	33	0.65	2.07	0.65	2.07	0.34	0.34	0.34
32	D67	7	0.63	1.54	0.63	1.84	0.32	0.32	0.32
33	D68	50	0.65	1.61	0.55	1.72	0.31	0.31	0.31
34	D68	63	0.64	1.89	0.64	2.00	0.31	0.31	0.31
35	D69	39	0.68	1.64	0.68	1.64	0.31	0.31	0.31
36	D69	115	0.71	1.64	0.71	1.90	0.31	0.31	0.31
37	D69	161	0.67	1.65	0.67	1.86	0.28	0.28	0.28
38	D69	269	0.29	0.60	0.29	2.00	0.10	0.10	0.10
39	D69	274	0.58	0.97	0.48	2.00	0.12	0.12	0.12
40	D70	29	0.46	0.50	0.42	1.48	0.30	0.30	0.30
41	D70	53	0.40	0.80	0.40	1.58	0.28	0.28	0.28
42	D70	157	0.40	1.96	0.40	1.96	0.29	0.29	0.29
43	D70	176	0.80	2.10	0.71	2.10	0.30	0.30	0.30
44	D70	217	0.52	0.97	0.52	0.97	0.30	0.30	0.30
45	D70	346	1.18	1.46	1.18	2.06	0.27	0.27	0.27
46	D70	366	1.12	1.56	1.12	1.86	0.28	0.28	0.28
47	D71	31	0.50	1.13	0.50	1.62	0.28	0.28	0.28
48	D71	77	0.60	0.82	0.60	1.60	0.27	0.27	0.27
49	D72	26	0.88	0.96	0.88	1.82	0.28	0.28	0.28

Terrain		Limiting	
D Max Range	2.10 - 0.48	D Max Range	2.12 - 0.97
D Min Range	1.18 - 0.24	D Min Range	1.18 - 0.23
Gross Fog Range	0.34 - 0.10	Average D Max	1.80
Average D Max	1.48	Average D Min	0.61
Average D Min	0.65		
Average Gross Fog	0.27		

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PART II. AFT CAMERA

Mission No: 9048
Camera No: 101
Slit Width: 0.200"
Film Type: 7J-23-7800 (SO 132)

Filter, Main: Wratten 21
Aperture, Main: f/5.6
Filters, Horizon: Wratten 25
Evaluated By: [redacted]

1. Shutter Operation (Horizon Cameras): The port and starboard horizon camera shutters functioned normally throughout the mission.

2. Horizon Camera Exposure:
   a. Take-Up (Port): The majority of the exposures are underexposed (f/6.8, 1/100 second).
   b. Supply (Starboard): The majority of the frames indicate good exposure. Slight overexposure is evident on seven passes and underexposure is noted on only two passes (f/6.8, 1/100 second).

3. Camera Number: The camera number is present throughout the film but is difficult to read due to heavy background flare.

4. Binary Operation: The binary functions throughout the photography but the lower left index lamp consistently "bloomed" and a variation in the light intensity is present. Single binaries and the camera number are recorded at the camera-off positions on most of the passes, but the end-of-pass markers are displaced by film transport and appear as separate, individual images.

5. Film Metering:
   a. Take-Up (Port): The metering averages 0.21", with a range of 0.19" to 0.23".
   b. Supply (Starboard): The metering averages 0.21", with a range of 0.20" to 0.24".

6. Film Tracking: Normal throughout the film.

7. Timing Pulses: The timing pulses are recorded outside of the terrain format area but are underexposed in the majority of passes and appear as double images with flare present between the true and reflected images. The pips extend to the end of all terrain frames at the camera-off position.

8. Fiducials:
   a. Main Camera: Well defined.
   b. Horizon Cameras: Well defined with no flare present.

9. Light Leaks: Bar-shaped, vertical light leaks and diagonal light leaks are present in the majority of passes, appearing at the beginning and/or end of a pass. Examples: pass D01, frame 20; pass D02, frames 2, 3, 42; pass D03, frames 41, 46; pass D04, frame 36; pass D30, frame 46; pass D34, frame 52; pass D38, frames 101, 167, 168; pass D55, frames 3, 118; pass D68, frames 3, 102, 103; pass D70, frame 103. Random light leaks of no particularly definable pattern also appear in some passes but are few in number. Equipment shadow images are present in pass D05, frame 46; pass D18, frame 48; pass D30, frame 45; pass D39, frame 148; pass D46, frame 46; pass D55, frame 117; pass D66, frame 57; pass D67, frame 36; pass D70, frames 216, 361; pass D72, frame 109. The horizon camera format is imaged within the main format area in pass D18, frame 50; pass D39, frame 150; pass D46, frame 48; pass D55, frame 119. Fogged areas within individual frames are

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noted in pass D05, frame 46; pass D18, frame 46; pass D30, frame 45; pass D55, frame 117; pass D66, frames 56, 57.

10. Static Electricity: Corona discharges occur on pass D03, frame 3; pass D06, frame 3; pass D30, frame 3. Dendritic static traces are present within the format areas and/or the film edges intermittently throughout the film. Examples: pass D01, frame 7; pass D02, frames 1, 14; pass D03, frames 6, 16, 22, 29; pass D06, frames 3, 4, 79, 97, 134, 168; pass D18, frames 28, 48, 49; pass D37, frames 11, 47, 49, 50, 60; pass D39, frames 14, 96, 107, 126, 130, 138, 150; pass D68, frames 70-71 (edge static); pass D69, frames 1, 3, 5, 6, 9, 79, 82, 84, 195 and frames 234, 236, 240, 250, 258 (edge static); pass D70, frames 80, 85-89 (edge static), 104, 194, 291.

11. Pinholes: Few in number and scattered intermittently throughout the film.

12. Abrasions and Scratches: Small, fine scratches, apparently camera-induced, are present throughout several passes. Examples: passes D03, D04, D06, D07, D18, D30, D37. Severe scratches are present on pass D05, frames 1, 48; pass D34, frames 19-27 (continuous, 1.1" inboard from the trailing edge). A few minor scratches are present at random throughout. A few abrasions are found intermittently throughout.

13. Tearing: None. Transparent splices are present between the following frames on the passes indicated: pass D06, 158/159; pass D23, frames 192/193; pass D37, frames 183/184; pass D55, frames 83/84; pass D69, frames 179/180. An opaque leader splice in pass D70, frame 1, masks a portion of the horizon camera imagery and fiducials.

14. Water Marks: Water marks are present on pass D23, frame 264; pass D37, frames 141-150; pass D69, frames 64-75; pass D70, frame 197.

15. Pressure Marks: Small base rubs are present at random throughout the film.

16. Processing Streaks: Noted only in pass D72, frame 20.

17. Blistering and Crimping: Blisters and crimps are few. Examples: pass D04, frame 38 (crimps); pass D06, frames 48 (blisters), 129 (crimps); pass D07, frames 73 (blisters), 94 (crimps); pass D36, frames 50, 75 (crimps).

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

19. Apparent Resolution: Resolution is not as good as that obtained by the forward camera. This is due in part to the fact that the aft camera imagery was photographed through the base of the film, and to an out of focus condition of the camera.

20. Apparent Granularity: Fine.

21. Photo Quality:

a. Main Camera: Quality ranges from poor to good. The principal causes of image degradation are low sun angle and inadequate exposure which virtually precludes terrain imagery on some passes; other degradation is due to light leaks, static discharges, scratches and water marks.

b. Horizon Cameras: Despite underexposure, the port horizon imagery is good. The starboard horizon imagery is visibly out of focus throughout and can be rated no more than "fair."

22. Camera Operation:

a. Main Camera: Operation is rated "good" in spite of the light leaks and static discharges previously noted.

b. Horizon Cameras: Operation is rated "good" notwithstanding the out of focus condition noted in the starboard horizon camera.

23. Suitability for PI: An over-all rating of not

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more than "fair" is assigned, due to image degradation by low sun angle, out of focus condition, intermittent light leaks and similar factors.

Remarks

1. The aft camera imagery was exposed through the base of the film.

2. After processing, much of the aft camera film footage was spooled emulsion and/or tails out. In addition, the leaders and trailers of several passes were attached inverted with relation to the "right-reading" side of the film.

3. Post-processing handling marks, including fingerprints, are found intermittently throughout the film. Examples: pass D09, frame 48; pass D30, frame 44; pass D55, frame 5 (fingerprints as in all previous frames noted) and miscellaneous handling marks in pass D69, frames 177, 234.

4. Foreign matter, consisting mostly of lacquer spots and opaquing, is present intermittently throughout. Examples: pass D05, frames 5, 38; pass D07, frames 29, 30; 63, 64, 164, 183; pass D23, frames 65, 166, 192, 193.

5. Examples of lifted emulsion are present in pass D06, frames 14, 72, 84, 88, 108; pass D39, frame 148; pass D72, frame 5.

6. Minus density streaks are present intermittently, as are minus density spots. Examples are found on most of the passes.

7. The following descriptions of overlap for camera number 101 were determined from the fifth and last frames of each pass; film transport was determined from the first and last frames of each pass, wherever possible. Cloud cover, or lack of imagery, 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
D01	4	9	NM	16.3
D02	NM	5	NM	17.5
D03	NM	10	NM	NM
D04	5	9	13.9	17.6
D05	3	6	NM	NM
D06	NM	10	NM	NM
D07	NM	9	19.1	19.3
D18	2	7	17.4	NM
D23	2	9	14.9	20.6
D30	5	10	18.8	NM
D34	4	8	17.6	NM
D36	4	9	14.6	NM
D37	NM	15	NM	NM
D38	4	20	17.8	21.0
D39	5	6	NM	16.0
D46	7	11	NM	NM
D55	NM	8	18.4	16.4
D66	4	8	NM	16.7
D67	8	8	NM	NM
D68	8	8	15.0	19.6
D69	1	16	17.6	20.6
D70	NM	NM	NM	18.4
D71	4	4	19.1	17.6
D72	NM	NM	NM	18.8
D80	NM	NM	16.8	END OF MISSION

Note: "NM" denotes Not Measurable

8. Density readings were taken on each pass with the MacBeth Quantalog Densitometer, Model EP 1000, with an ET 20 attachment and a 0.5 mm aperture. Terrain and Limiting density value readings for D Max and D Min, as well as Gross Fog, are correlated on the following page.

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Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D Min	D Max	D Min	D Max	Leading	Center	Trailing
1	D01	22	0.36	1.40	0.28	1.40	0.20	0.20	0.20
2	D02	5	0.26	0.72	0.28	1.24	0.20	0.20	0.20
3	D03	35	0.22	1.38	0.23	1.66	0.19	0.19	0.19
4	D04	26	0.26	1.70	0.26	1.70	0.21	0.20	0.20
5	D05	19	0.22	1.50	0.22	1.50	0.20	0.20	0.20
6	D06	59	0.30	1.70	0.30	1.70	0.20	0.20	0.20
7	D06	154	0.84	1.66	0.72	2.04	0.33	0.32	0.32
8	D06	165	0.26	0.80	0.26	1.78	0.20	0.20	0.20
9	D07	40	0.24	NM	0.24	1.09	0.20	0.20	0.20
10	D07	182	0.26	1.70	0.26	1.70	0.14	0.14	0.14
11	D18	21	0.50	1.59	0.50	1.76	0.32	0.32	0.32
12	D23	19	0.24	NM	0.24	0.97	0.22	0.22	0.22
13	D23	113	0.30	0.58	0.30	1.10	0.23	0.22	0.22
14	D23	201	0.14	1.65	0.14	1.65	0.12	0.12	0.12
15	D23	226	0.13	1.66	0.12	1.66	0.11	0.11	0.11
16	D30	14	0.28	1.00	0.28	1.70	0.25	0.23	0.23
17	D34	18	0.34	NM	0.34	1.55	0.16	0.15	0.16
18	D36	40	0.26	1.14	0.26	1.14	0.22	0.21	0.21
19	D36	86	0.31	NM	0.31	1.52	0.22	0.23	0.22
20	D37	63	0.35	1.41	0.35	1.41	0.24	0.23	0.23
21	D37	150	NM	NM	0.72	1.66	0.23	0.24	0.23
22	D37	190	0.35	0.65	0.35	1.73	0.22	0.22	0.22
23	D38	14	0.26	0.40	0.26	0.70	0.22	0.22	0.22
24	D38	76	0.50	1.18	0.50	1.44	0.25	0.24	0.24
25	D38	128	0.42	0.79	0.42	1.78	0.30	0.28	0.30
26	D38	12	0.27	NM	0.27	1.00	0.26	0.25	0.27
27	D39	103	0.40	0.74	0.40	1.49	0.29	0.28	0.29
28	D46	25	0.30	0.83	0.30	1.50	0.27	0.27	0.28
29	D55	66	0.30	0.80	0.30	1.28	0.27	0.25	0.27
30	D55	108	0.32	1.10	0.32	1.10	0.27	0.26	0.28
31	D66	40	0.31	1.71	0.31	1.71	0.28	0.26	0.28
32	D67	14	0.34	1.32	0.34	1.32	0.28	0.27	0.28
33	D68	58	0.50	1.31	0.50	1.31	0.26	0.24	0.26
34	D68	90	0.34	1.24	0.34	1.61	0.30	0.28	0.30
35	D69	46	0.35	0.90	0.35	1.44	0.26	0.25	0.27
36	D69	110	0.47	1.64	0.47	1.64	0.25	0.24	0.26
37	D69	168	0.40	0.79	0.40	1.82	0.26	0.26	0.26
38	D69	195	0.30	0.92	0.30	1.46	0.25	0.23	0.24
39	D69	271	0.34	NM	0.34	1.85	0.26	0.25	0.27
40	D70	68	0.29	0.36	0.29	1.09	0.25	0.25	0.26
41	D70	87	0.50	0.50	0.50	1.25	0.25	0.24	0.25
42	D70	164	0.42	1.38	0.42	1.68	0.23	0.23	0.25
43	D70	208	0.40	1.54	0.40	1.54	0.25	0.24	0.25
44	D70	249	0.30	1.70	0.30	1.77	0.23	0.21	0.22
45	D70	333	0.62	0.90	0.40	1.72	0.24	0.23	0.24
46	D71	41	0.27	0.36	0.27	1.06	0.24	0.22	0.24
47	D71	84	0.28	NM	0.28	1.49	0.24	0.22	0.24
48	D72	29	0.26	0.39	0.28	1.20	0.20	0.20	0.21
49	D72	104	0.33	0.50	0.30	1.62	0.24	0.22	0.24

Note: "NM" denotes Not Measurable

Terrain

D Max Range	1.71 - 0.36
D Min Range	0.84 - 0.13
Gross Fog Range	0.33 - 0.11
Average D Max	1.11
Average D Min	0.33
Average Gross Fog	0.22

Limiting

D Max Range	2.04 - 0.70
D Min Range	0.72 - 0.12
Average D Max	1.46
Average D Min	0.33

[redacted]

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PART III. STELLAR CAMERA

Mission No: 9048
Camera No: 7
Camera Setting: f/1.9, ½-second

Filter: None
Film Type: 7J-3-135 (SO 130)
Evaluated By: [redacted]

1. Shutter Operation: Probable shutter malfunction is indicated by light leaks and plus density streaking between frames, severely degrading the imagery in frames 51 through 90. This condition appears to be caused by the shutter remaining partially open throughout that portion of the mission.

2. Exposure: The exposure varies from slightly underexposed (frames 1-4) to overexposed (frames 37-44) with adequate exposure in the intervening frames. The exposures in frames 45-50 grade progressively from underexposed to overexposed. Subsequent exposures are difficult to assess due to the probable shutter malfunction noted in Item 1., above.

3. Frame Correlation Fiducial Mark: Operational.

4. Camera Number: The camera number is present where the frame correlation fiducial mark functions. However, the latter is consistently underexposed.

5. Reseau Calibration Points: Present throughout the film but exposures are not constant in density, possibly due to a variation in light intensities. In addition, flaring of the calibration point image is noted in each location, but not to an objectionable degree.

6. Reseau Grid: The grid is definable in all frames except those few where lack of density or excessive density precludes detection.

7. Film Metering: Normal throughout the film although exposures are not obtained in consecutive frames beyond frame 44 due to shutter failures of the index camera. As measured in frames 1-44, the metering is constant at 1.20".

8. Film Tracking: Normal.

9. Light Leaks: Intermittent and few in frames 1 through 50. An abrupt increase in frequency and severity of light leaks is noted in frames 51-90. This condition is apparently derived from the probable shutter malfunction previously noted.

10. Static Electricity: Probable corona static discharges in vertical, bar-shaped patterns, are present in the format in each frame. These discharges appear to originate at the leading (titling) edge of the film and dissipate toward the trailing edge. Where imagery is present, the discharge touches upon and passes through the extreme left (supply) edge of the photography. Spot static traces are found intermittently throughout the film. Dendritic and linear static discharges are intense from frame 51 to frame 90, while the upper (leading) portion of the film throughout the mission is affected by static, possibly corona-associated, rendering the film a mottled, grainy appearance.

11. Scratches and Abrasions: Few.

12. Pinholes: Few.

13. Water Marks: None.

14. Processing Streaks: None.

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15. Pressure Streaks: None.

16. Tearing: None.

17. Blistering and Crimping: None.

18. Foreign Matter: None.

19. Contrast: Generally low.

20. Apparent Resolution: Poor, due to degradation by light leaks and static effects.

21. Apparent Granularity: Medium.

22. Photo Quality: Poor, due to degradation by light leaks, static effects, and suspected shutter malfunction in the latter portion of the mission.

23. Camera Operation: Poor, due to severe static throughout the mission and the suspected shutter malfunction previously mentioned.

Remarks

1. No stellar imagery is discernible in this photography.

2. Density readings were taken with the MacBeth Quantalog Densitometer, Model EP 1000, with an ET 20 attachment and a 0.5 mm aperture. D-Max and D-Min readings were taken wherever a gradation of densities existed within the images. Gross Fog levels were determined from the trailing (non-titled) edge of the film, that area being relatively free of the static effects that degrade the leading portion of the film throughout the mission.

Reading	Pass	Frame	D Max	D Min	Gross Fog
1	D01	3	0.80	0.24	0.19
2	D02	7	1.40	0.26	0.19
3	D03	13	1.70	0.29	0.19
4	D04	17	1.58	0.29	0.18
5	D05	23	1.56	0.32	0.18
6	D05	29	1.57	0.80	0.18
7	D06	35	1.93	0.46	0.18
8	D06	41	2.70	0.41	0.18
9	D07	47	0.98	0.26	0.20
10	D18	53	1.69	NM	0.20
11	D23	59	2.28	NM	0.23
----------Remaining frames not evaluated due to severe degradation by light leaks and static discharge effects.					

Notes: 1. "NM" denotes Not Measurable.
2. D Min readings should not be considered "pure," due to presence of static discharge from film center to the leading edge. Gross Fog readings, however, were taken in relatively unaffected areas.

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PART IV. INDEX CAMERA

Mission No: 9048
Camera No: D7
Camera Setting: f/4.5, 1/125 second

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

1. Shutter Operation: The shutter functioned satisfactorily through frame 44; thereafter, the shutter intermittently failed to open. Approximately 218 frames were lost due to this malfunction.

2. Exposure: Good.

3. Camera Number: Good. Number is not readable when the frame is very dense due to clouds or terrain.

4. Film Metering: Metering, where measurable, ranged from 0.13" to 0.17". Double exposures occurred on frames 84 and 91 (last frame).

5. Film Tracking: Normal.

6. Reseau Grid: Grid lines disappear in dense frames. Lines are broadened perpendicular to the film path on nine frames having concave edges.

7. Light Leaks: Curved light reflections from the edge of the reseau grid occur on the first, next to the last, or last frames of all passes. Examples may be seen on frames 1, 4, 17, 22 and 29.

8. Static Electricity: Small "spot" discharges occur continuously throughout the film. Probable corona static fogging occurs at infrequent intervals with no specific pattern. Dendritic edge static occurs between frames 74 and 75; 77 and 78.

9. Pinholes: Few.

10. Abrasions and Scratches: Numerous dark, fine scratches and abrasions, associated at times with spot static discharges, are visible throughout the film. A heavy scratch occurs on every frame in the format area immediately below the index dot. Another is present 1.2" from the leading edge of the film and 0.25" into the format from the titled edge.

11. Tearing: None.

12. Water Marks: None.

13. Pressure Streaks: None.

14. Processing Streaks: None.

15. Blistering and Crimping: Very little observed.

16. Contrast: Medium to high.

17. Apparent Resolution: Good to and including frame 44, then poor to the end of the film.

18. Apparent Granularity: Slightly grainy.

19. Photo Quality: Good through frame 44, then poor to the end of the film.

20. Camera Operation: Poor. Degradation is due to focus problems and shutter failures.

21. PI Suitability: Poor. Degradation is due to small scale, focus problems, shutter failures and light leaks.

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Remarks

1. An out of focus band 0.5" wide along the camera number edge of the film occurs continuously after frame 44, suggesting the possibility that the film was out of its guides during exposure.

2. Format edges perpendicular to film transport are concave on 20 frames throughout the film, indicating the possibility that the film was not being held tightly against the platen on these frames during exposure.

3. The indexing dot functioned correctly.

4. Overlap on the first 44 frames is normal at approximately 65%.

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

Reading	Pass	Frame	D Max	D Min	D Max	D Min	Leading	Center	Trailing
1	D01	4	1.72	0.42	2.25	0.29	0.15	0.14	0.15
2	D02	9	NM	NM	2.45	0.28	0.15	0.14	0.15
3	D03	16	0.64	0.34	2.57	0.27	0.15	0.14	0.15
4	D04	15	2.26	0.45	2.26	0.45	0.17	0.16	0.17
5	D05	25	2.24	0.29	2.24	0.29	0.14	0.13	0.14
6	D06	44	1.84	0.44	2.48	0.33	0.15	0.14	0.15
7	D07	49	1.40	0.80	2.13	0.73	0.15	0.14	0.15
8	D18	53	2.14	0.32	2.30	0.22	0.15	0.15	0.15
9	D23	57	2.65	0.40	2.65	0.40	0.16	0.16	0.16
10	D34	60	2.21	0.32	2.21	0.32	0.16	0.16	0.16
11	D36	61	1.74	0.33	2.01	0.33	0.16	0.16	0.16
12	D37	63	2.34	0.34	2.34	0.34	0.17	0.15	0.15
13	D38	66	1.50	0.64	2.58	0.36	0.17	0.15	0.15
14	D39	68	2.21	0.40	2.21	0.40	0.17	0.15	0.17
15	D46	70	1.00	0.30	2.30	0.30	0.18	0.18	0.30
16	D55	71	1.44	0.43	2.37	0.43	0.15	0.15	0.16
17	D66	72	2.32	0.51	2.32	0.34	0.18	0.20	0.30
18	D65	74	2.54	0.47	2.54	0.47	0.18	0.16	0.16
19	D69	77	1.69	0.65	2.49	0.65	0.15	0.15	0.20
20	D70	85	1.85	0.33	2.58	0.33	0.16	0.16	0.25
21	D71	85	1.55	0.31	2.22	0.28	0.14	0.13	0.14
22	D72	89	NM	NM	2.06	0.41	0.14	0.12	0.18

Note: "NM" denotes Not Measurable

Range, D Max, Terrain:	2.65 - 0.64	Range, D Max, Limiting:	2.65 - 2.01
Range, D Min, Terrain:	0.99 - 0.29	Range, D Min, Limiting:	0.73 - 0.22
Average D Max, Terrain:	1.87	Average D Max, Limiting:	2.34
Average D Min, Terrain:	0.48	Average D Min, Limiting:	0.37
Range, Gross Fog:	0.30 - 0.12		
Average Gross Fog:	0.16		

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PART V. VEHICLE ATTITUDE DATA

Pass	Pitch	Variation	Pitch Range	Roll	Variation	Roll Range	No. of Frames	Remarks
D01	14°57'	13°34'	1°23'	00°21'	00°22'	0°01'	23	All values approximate
D02	12 45	13 59	1 14	00 01	00 47	0 46	45	Frames 1 thru 18 approximate
D03	13 40	13 58	0 18	00 09	01 00	0 13	43	
D04	14 00	13 43	0 17	01 06	00 35	0 31	39	
D05	13 54	13 51	0 03	00 11	00 51	0 40	49	
D06	13 25	13 58	0 23	-00 21	00 26	0 49	62	
	14 06	13 44	0 24	00 53	-00 05	0 58	108	
D07	13 35	14 24	0 49	-00 46	01 03	1 17	53	No data frames 1 thru 69
	14 20	13 29	0 51	00 49	-00 56	1 47	66	
D16	14 35	14 33	0 02	00 36	00 11	0 25	21	No data frames 1 thru 30
D23	13 43	14 11	0 28	-00 31	00 14	0 45	36	No data frames 1 thru 70
	14 09	13 59	0 10	00 06	-00 30	0 36	170	
D30	14 12	13 38	0 34	00 31	-00 12	0 43	48	
D34	13 48	13 57	0 09	00 19	00 28	0 09	38	No data frames 1 thru 37
D36	14 12	13 58	0 14	01 03	-00 14	1 17	57	
D37	14 13	14 03	0 10	-00 09	00 06	0 15	74	
	13 59	13 50	0 09	-00 28	-00 35	0 07	61	
	14 10	14 05	0 05	00 57	-00 12	1 09	37	
D38	13 27	14 02	0 35	-00 17	00 11	0 28	104	
	14 07	13 55	0 12	00 11	00 29	0 18	67	
D39	14 18	14 03	0 15	-00 12	00 41	0 53	75	No data frames 1 thru 24
	14 27	13 48	0 39	-00 01	-00 18	0 17	53	
D46	14 16	14 01	0 15	00 40	00 07	0 33	49	
D55	13 47	13 31	0 16	-00 11	-00 35	0 24	67	
	13 50	14 09	0 19	00 07	00 34	0 27	53	
D66	14 17	14 00	0 17	00 19	00 31	0 12	60	
D67	14 10	14 11	0 01	00 46	-00 22	0 26	39	
D66	13 46	14 22	0 36	00 36	00 52	0 16	56	
	14 20	14 03	0 17	-00 49	00 06	0 57	46	
D69	14 31	14 22	0 09	00 19	00 26	0 07	64	
	14 02	13 55	0 07	00 45	-00 10	0 55	142	
	13 54	14 26	0 32	-00 46	00 49	1 35	69	
D70	14 25	14 01	0 24	-01 51	00 27	1 18	161	No data frames 1 thru 40
	14 01	13 56	0 05	00 05	-00 19	0 24	60	
	13 53	13 53	0 00	02 07	-00 22	2 29	66	
D71	15 00	14 06	0 55	-00 32	00 50	1 22	79	No data frames 1 thru 29
D72	14 26	13 46	0 40	-00 26	-00 19	0 07	76	

Handle Via [redacted] Control System Only

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TOP SECRET
CORONA
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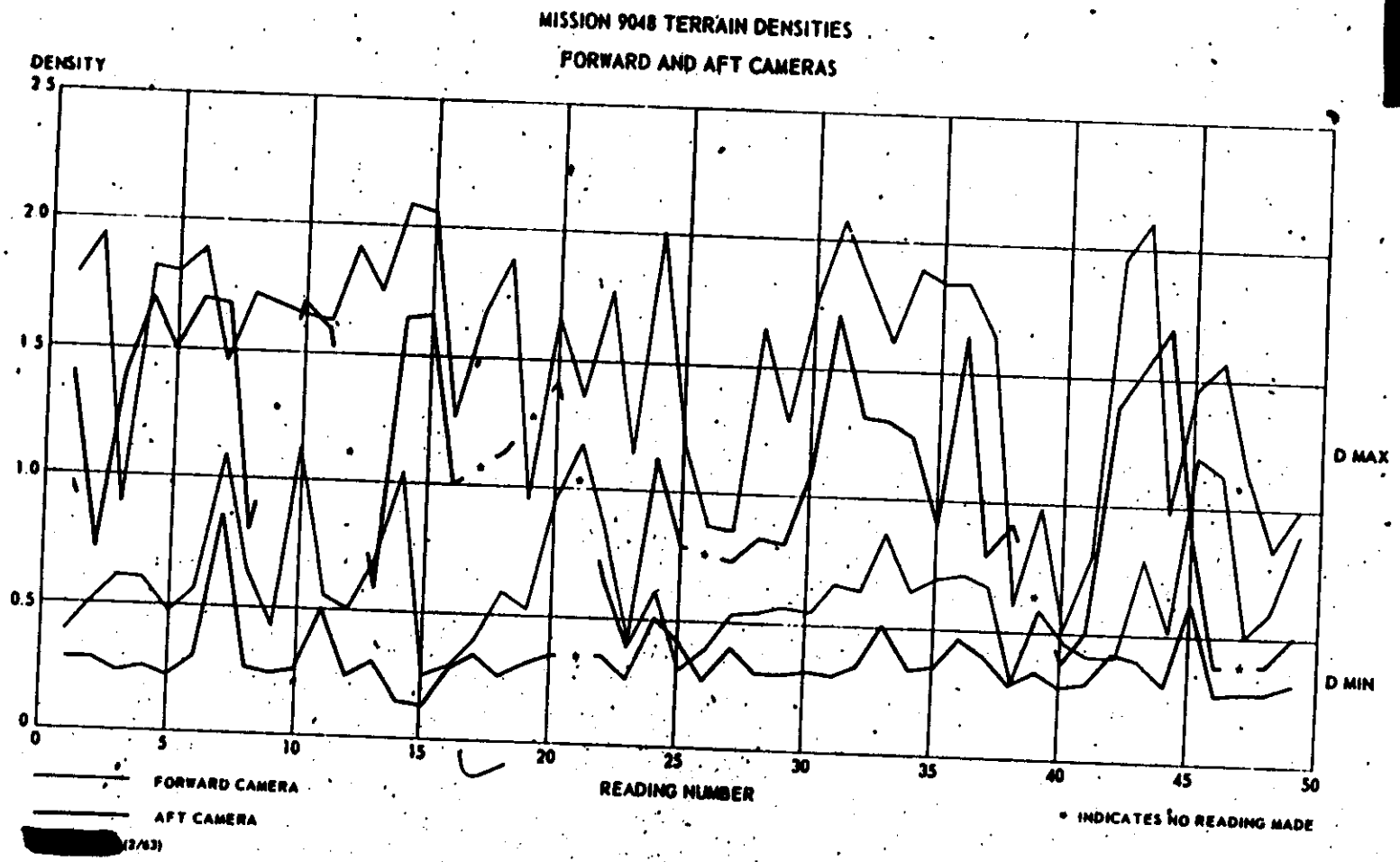
PART VI. DENSITY CHARTS



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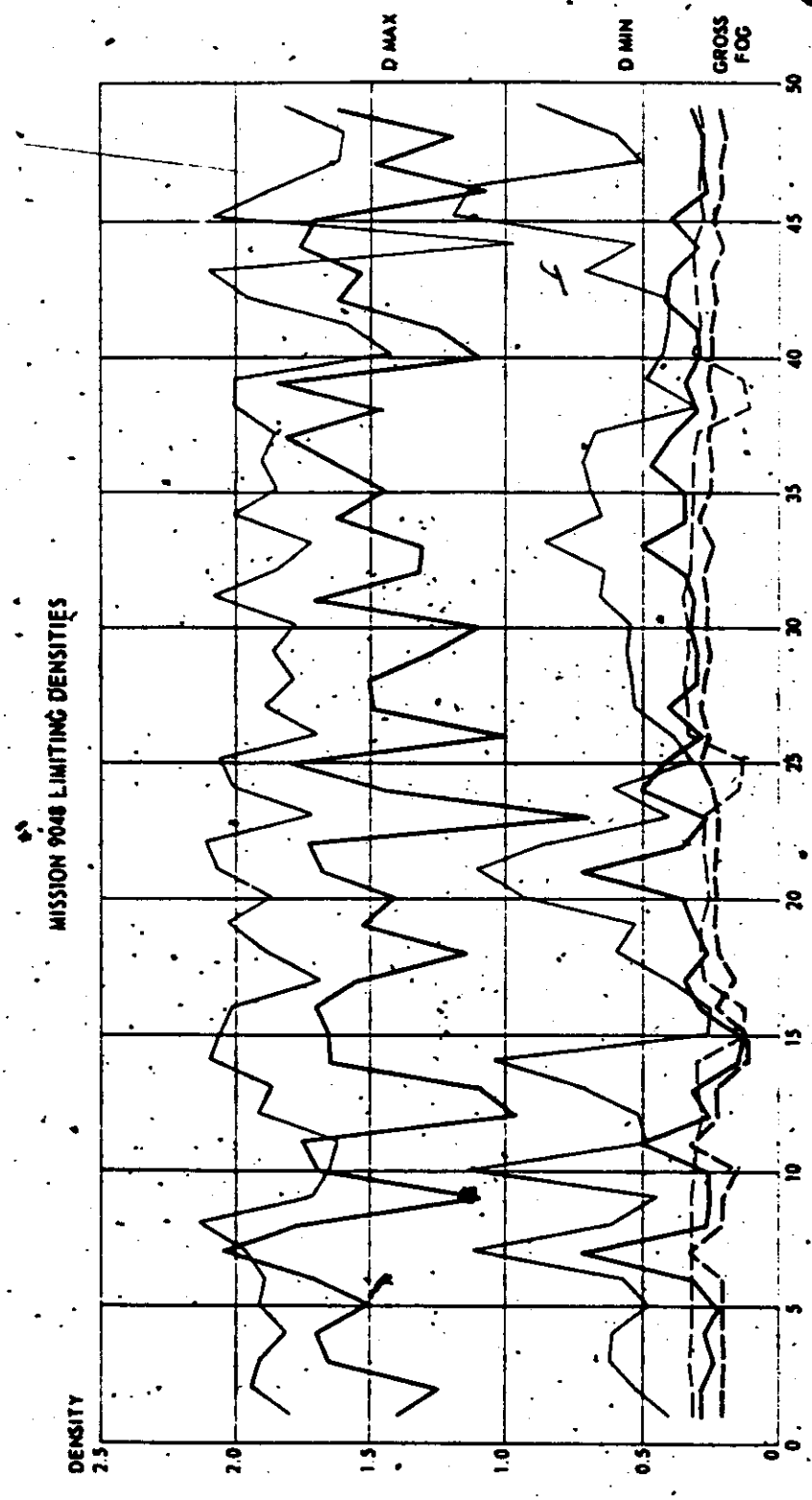

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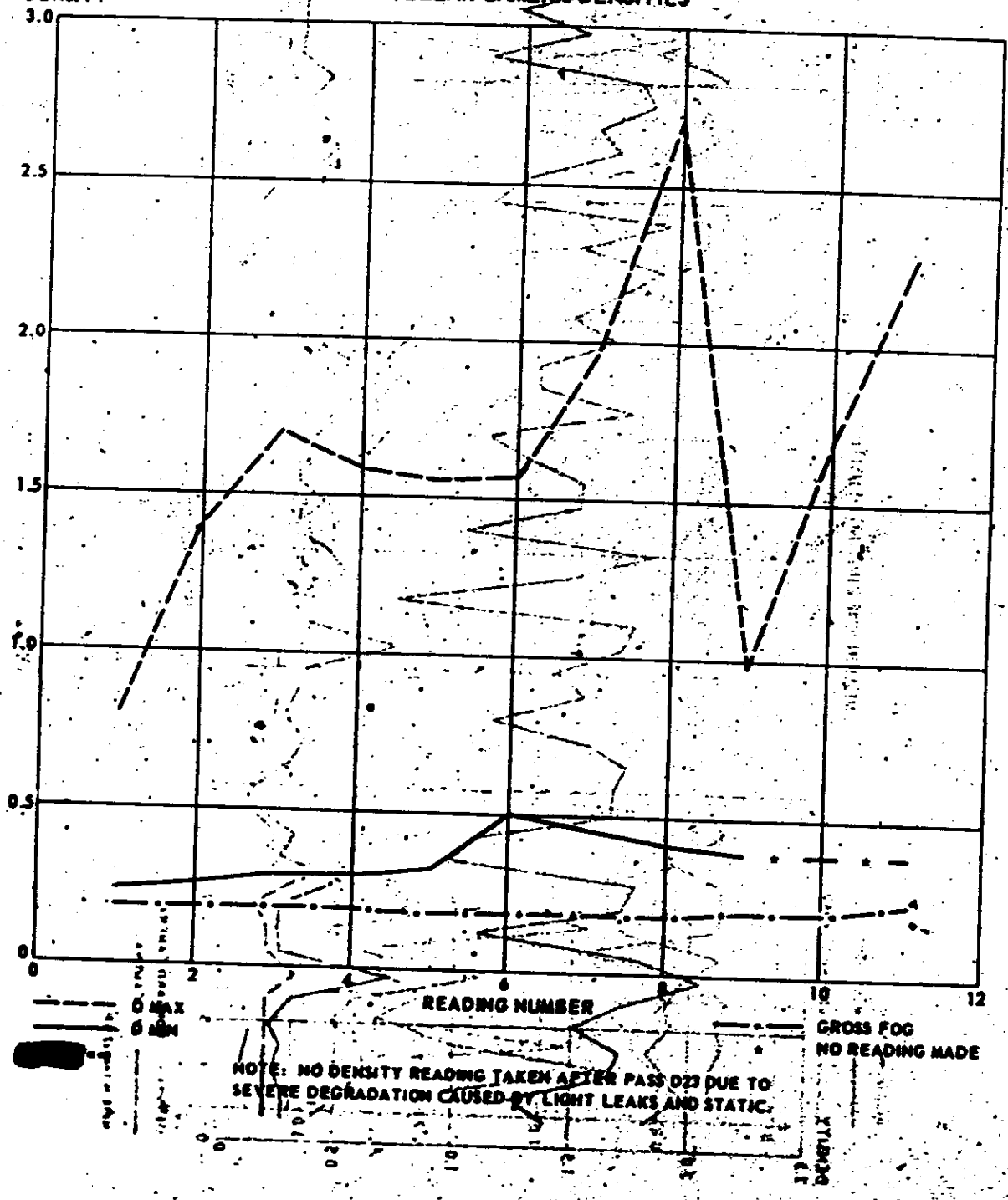
STELLAR CAMERA DENSITIES



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INDEX CAMERA DENSITIES