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March 1963

TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT

MISSION 9047

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5 - 9 NOVEMBER 1962

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Remarks

1. The heavy reflection occurring from an object outside the vehicle obscures as much as 12% of the imagery within a frame. The total loss of imagery because of this degradation is slightly under 5%.

2. A slight uniform fogging, possibly caused by radiation, is present on the first or last few frames of passes D17, D22, D24, D25, D36, D38, D39, D41, D49.

3. Handling marks occurring after processing are few and scattered. Examples: pass D06, frame 32; pass D07, frame 55 (fingerprints).

4. Foreign matter embedded in the film is scattered throughout. This consists of bits of wax, lint, and opaquing from titling material.

5. Minus-density streaks and spots are scattered throughout the film but are of minor consequence. Examples: pass D53, frame 128; pass D54, frames 3, 24.

6. Bits of emulsion have been pulled from the base in a few scattered instances. Examples: pass D25, frames 2, 63; pass D33, frame 32.

7. Leaders were not attached to the film on pass D37.

8. The following descriptions of overlap for panoramic camera number 98 were determined from the fifth and last frames of each pass. Film transport was determined from the first and last frames of each pass whenever possible.

Pass	Overlap (Percent)		Film Transport (From Take-Up Side in Inches)	
	Beginning	End	First Frame	Last Frame
D01*				
D02*				
D03*				
D04*				
D05*				
D06*				
D07*				
D08	NM	9	NM	14.0
D09	NM	9	NM	14.0
D15	9	10	14.0	13.5
D17	9	NM	14.9	16.9
D22	10	4	11.0	16.5
D23	NM	10	13.7	13.2
D24	9	3	15.0	13.8
D25	6	8	NM	16.3
D32	10	NM	14.0	13.5
D34	4	9	11.5	13.5
D36	4	9	12.2	16.5
D37	9	14	NM	14.4
D38	9	9	13.5	16.3
D39	9	NM	13.5	16.5
D40	4	10	NM	13.0
D41	NM	7	NM	16.0
D49	9	9	13.5	14.0
D50	NM	8	11.7	15.0
D51	5	NM	13.0	13.5
D52	NM	NM	13.1	NM
D53	5	NM	14.0	10.0
D54	NM	8	13.7	NM
D55	6	8	14.1	16.3
D56	NM	NM	NM	NM

*No imagery is present on passes D01 through D07 because of failure of panoramic camera door release mechanism.
NOTE: "NM" denotes Not Measurable.

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9. Density readings were taken on every pass, using 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 below.

Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D Min	D Max	D Min	D Max	Leading	Center	Trailing
1-10	D01-D07*								
11	D08	64	0.45	1.28	0.45	1.70	0.22	0.22	0.22
12		119	0.27	1.31	0.25	1.80	0.11	0.10	0.10
13	D09	54	0.44	1.44	0.44	1.44	0.22	0.21	0.23
14		95	0.48	1.53	0.48	1.91	0.24	0.24	0.25
15	D15	8	0.48	2.02	0.48	2.02	0.24	0.24	0.25
16	D17	26	0.68	1.95	0.68	1.95	0.24	0.24	0.26
17	D22	19	0.45	1.93	0.45	1.93	0.26	0.26	0.26
18		129	0.24	1.88	0.24	1.88	0.08	0.09	0.10
19		197	0.21	2.02	0.21	2.02	0.11	0.12	0.12
20	D23	38	0.20	1.48	0.20	1.80	0.11	0.11	0.11
21		91	0.18	1.72	0.18	1.72	0.10	0.11	0.11
22	D24	48	0.18	0.80	0.18	1.67	0.11	0.11	0.12
23			NR	NR	NR	NR	NR	NR	NR
24	D25	53	0.54	1.19	0.54	1.44	0.25	0.24	0.25
25	D33	9	0.54	1.81	0.54	1.81	0.25	0.24	0.26
26	D34	5	0.26	1.56	0.26	1.56	0.13	0.13	0.13
27	D36	4	0.17	1.68	0.17	1.68	0.12	0.12	0.13
28		29	0.53	1.62	0.53	1.72	0.26	0.25	0.25
29	D37	3	0.69	1.32	0.48	1.56	0.12	0.13	0.14
30		47	0.26	1.32	0.26	1.32	0.08	0.09	0.08
31	D38	7	0.24	1.46	0.24	1.48	0.11	0.11	0.12
32		31	0.71	1.51	0.68	1.70	0.11	0.11	0.11
33	D39	47	0.29	0.94	0.29	1.08	0.24	0.23	0.24
34		136	0.30	1.38	0.30	1.88	0.11	0.11	0.12
35		157	0.59	1.00	0.54	1.58	0.11	0.12	0.12
36	D40	44	0.45	1.06	0.45	1.65	0.24	0.23	0.23
37		85	0.42	1.55	0.42	1.58	0.25	0.24	0.25
38	D41	12	0.49	1.09	0.49	1.84	0.25	0.25	0.26
39	D48	13	0.28	1.71	0.28	1.71	0.11	0.12	0.12
40	D50	54	0.20	1.77	0.20	1.81	0.11	0.12	0.14
41	D51	11	0.34	1.84	0.30	1.84	0.11	0.11	0.11
42	D52		NR	NR	NR	NR	NR	NR	NR
43	D53	27	0.29	1.94	0.29	1.94	0.12	0.12	0.13
44		114	0.55	1.92	0.51	2.07	0.24	0.23	0.23
45		175	0.55	1.50	0.55	2.06	0.24	0.22	0.24
46	D54	61	0.57	1.63	0.57	1.63	0.23	0.23	0.24
47		149	0.58	1.12	0.48	1.94	0.10	0.10	0.11
48			NR	NR	NR	NR	NR	NR	NR
49	D55	21	0.32	1.74	0.32	1.74	0.21	0.20	0.21
50		67	0.36	1.61	0.36	1.78	0.21	0.20	0.21
51		154	0.56	1.65	0.56	1.68	0.21	0.20	0.21
52	D56	12	0.18	0.28	0.18	1.69	0.09	0.09	0.10

*No imagery is present on passes D01 through D07 because of failure of panoramic camera door release mechanism.

NOTE: "NR" denotes Not Readable.

Terrain		Limiting	
D Max Range	0.28-2.02	D Max Range	1.08-2.07
D Min Range	0.17-0.68	D Min Range	0.17-0.68
Average D Max	1.80	Average D Max	1.78
Average D Min	0.40	Average D Min	0.39

Gross Fog Range: 0.08-0.26
Average Gross Fog 0.17

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PART II. PANORAMIC CAMERA, SLAVE

Mission No: 9047
Camera No: 99
Slit Width: 0.200"
Film Type: 7J-23-7800 (SO 132)

Filter, Panoramic: Wratten 21
Aperture, Panoramic: 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. Take-up (Port): Approximately one-half of the imagery has good exposure. The majority of the remaining frames appear slightly overexposed (f/6.8, 1/100 second).
   b. Supply (Starboard): Approximately 60% of the imagery is overexposed. A majority of the remaining frames have good exposure (f/6.8, 1/100 second).

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

4. Data Block Operation: The data block lamps functioned with varying intensities throughout the mission; however, all lamps appear to have operated accurately. At the end of a pass, or at a camera-off position, a single or double data block is present. When two recordings are imaged, the end-of-pass marker falls in the area of the false reading. The camera number is always imaged with the true data block. Where two data blocks occur, the measurement between the two blocks is roughly equivalent to the film transport occurring between the camera-off and camera-on commands.

5. Film Metering:
   a. Take-up (Port): The average metering between the take-up horizon camera and the preceding panoramic frame is 0.20". The range of metering is 0.18" to 0.23".
   b. Supply (Starboard): The average metering between the supply horizon camera and the following frame is 0.23". The range of metering is 0.21" to 0.24".

6. Film Tracking: Normal throughout the mission.

7. Frequency Markers: Marks appear well defined and outside the format area but have reflected images and are slightly flared. Passes D05 and D06 have a 3" gap in the frequency mark continuity on every frame. Marks terminate approximately two inches from the end of all frames at the camera-off position of a pass.

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

9. Light Leaks: A thin diagonal light leak occurs on 17 frames, falling on the next to last or last frame of most passes. Occasionally, a slightly fogged area approximately 4" wide and parallel to the flight line is associated with this light leak. Equipment shadow images occur in 28 instances, usually on the first, second, third from last, or next to last frame of most passes. Examples: pass D03, frame 1; pass D08, frame 124; pass D38, frame 72. Heavy fogging occurs on that portion of the film positioned in the format area between passes, resulting in degradation of the first and last frames of some passes. Small miscellaneous fog patches occur on 20 other frames, usually at the beginning or end of a pass.

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10. Static Electricity: Small spot discharges occur on pass D55, frames 3 and 4, probably associated with a manufacturing splice. The last three frames of the mission (Pass D56) show some spot discharges, probably caused during recovery.

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

12. Abrasions and Scratches: Small miscellaneous scratches occur on approximately 36 frames throughout the film. Examples: pass D08, frame 1; pass D15, frames 1, 3; pass D37, frames 19, 20, 39. Severe scratches occur on pass D36, frame 24. None of the scratches appear to be camera induced.

13. Tearing: No film tearing is evident. Manufacturing splices are present on pass D24, frame 16, and pass D55, frame 3. Transparent splices are present on pass D05 between frames 69 and 70; pass D09 between frames 105 and 106 and pass D52 between frames 23 and 24. Opaque heat splices are present on pass D37, frames 1, 18, 19, 57; they obscure small portions of the panoramic format area and the horizon camera fiducials.

14. Water Marks: Water marks are few, scattered, and of little consequence. Examples: pass D01, frame 17; pass D40, frames 40,59, 60, 97.

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

16. Processing Streaks: No processing streaks are evident on the film.

17. Blistering and Crimping: Small blisters occur on pass D37, frames 22, 37, 38, 39, 42. Crimping is scarce, usually occurring on the first or last frame of a pass. No edge crimping is evident.

18. Contrast: high 10%, medium 82%, low 8%

19. Apparent Resolution: Imagery appears slightly degraded. It is comparable to Mission 9037 where not affected by low sun angle.

20. Apparent Granularity: Fine.

21. Photo Quality:

a. Panoramic Camera: A heavy reflection, presumably caused by a piece of metallic tape adhering to the vehicle and projecting in front of the lens, partially obscures varying portions of most frames. Image quality is fair. The principal degradations are haze, low sun angle, and a possible minor focus problem.

b. Horizon Cameras: When the port horizon imagery is not underexposed, the quality appears comparable to the best observed from horizon cameras to date. The starboard imagery appears overexposed and out of focus and therefore is rated poor.

22. Camera Operation:

a. Panoramic Camera: Fair. The factors degrading camera operation are the slightly out-of-focus condition, the varying intensities of the data block lamps, and the light leaks.

b. Horizon Cameras: The port horizon camera is rated very good, while the starboard camera is rated poor because of its focus problem. No shutter malfunctions occur in either camera.

23. Suitability for PI: A rating of fair to poor is assigned to this film because of the minor out-of-focus condition, the heavy reflection through the lens, low sun angle, cloud cover, and light leaks.

Remarks

1. The heavy reflection occurring from an object outside the vehicle obscures as much as 12% of the imagery within a frame. The total loss of imagery due to this degradation is approximately

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10%. More imagery is obscured on the slave camera film than on the master camera film.

2. A slight uniform fogging, possibly because of radiation, is present on the first or last several frames of passes D17, D22, D24, D25, D36, D38, D39, D41, and D49.

3. Handling marks occurring after processing are few and scattered. Fingerprints are present on pass D33, frame 34; pass D37, frame 19; pass D40, frame 60.

4. Foreign matter embedded in the film is scattered throughout. This consists of bits of wax, lint, and opaquing from titling material. Grease pencil markings or ink tracings are present on pass D24, frames 36, 37, 76; pass D40, frames 59, 60.

5. Minus-density streaks occur frequently throughout the film, usually attaining a width of approximately 1/16". Examples: passes D01, D05, D07, D24.

6. Bits of emulsion have been pulled from the base of approximately 25 frames. Examples: pass D02, frames 6, 15, 27, 33; pass D55, frames 99, 104.

7. The following descriptions of overlap for panoramic camera number 99 were determined from the fifth and last frames of each pass. Film transport was determined from the first and last frames of each pass whenever possible.

Pass	Overlap (Percent)		Film Transport (From Take-Up Side in Inches)	
	Beginning	End	First Frame	Last Frame
D01	NM	NM	NM	NM
D02	9	NM	12.5	NM
D03	NM	NM	12.5	NM
D04	9	NM	13.7	NM
D05	8	8	13.7	NM
D06	9	NM	14.7	NM
D07	NM	NM	12.2	NM
D08	NM	10	14.0	NM
D09	NM	10	NM	13.5
D15	4	4	14.0	16.2
D17	9	NM	13.5	13.7
D22	10	4	11.0	16.5
D23	NM	10	14.0	NM
D24	4	4	14.0	13.8
D25	NM	5	NM	16.5
D33	NM	9	14.0	NM
D34	NM	10	11.0	14.5
D36	9	NM	12.0	16.5
D37	8	10	NM	NM
D38	8	9	13.2	16.0
D39	10	9	11.5	NM
D40	8	6	NM	13.8
D41	NM	NM	NM	16.0
D49	9	NM	16.5	14.2
D50	NM	9	11.6	14.2
D61	7	NM	13.0	15.8
D62	NM	NM	13.1	NM
D63	5	5	14.0	16.0
D64	5	5	NM	NM
D65	7	8	12.3	14.1
D66	NM	NM	14.5	NM

NOTE: "NM" denotes Not Measurable.

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

Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D Min	D Max	D Min	D Max	Leading	Center	Trailing
1	D01	31	0.59	1.99	0.56	2.00	0.27	0.27	0.26
2	D02	13	0.68	2.02	0.65	2.02	0.27	0.27	0.27
3	D03	25	0.66	1.70	0.66	1.70	0.28	0.28	0.28
4		82	NR	NR	0.29	1.85	0.14	0.12	0.13
5	D04	36	0.19	1.91	0.19	1.91	0.12	0.12	0.11
6	D05	15	0.40	1.82	0.33	1.86	0.11	0.12	0.12
7		76	0.42	1.02	0.37	2.01	0.11	0.11	0.11
8	D06	46	0.21	1.81	0.21	1.83	0.12	0.11	0.11
9	D07	51	0.49	1.42	0.49	1.70	0.12	0.11	0.11
10		76	0.30	1.28	0.30	1.77	0.11	0.11	0.10
11	D08	88	0.44	1.18	0.44	1.61	0.26	0.27	0.26
12		124	0.61	1.71	0.71	1.83	0.26	0.26	0.26
13	D09	59	0.57	1.29	0.57	1.29	0.27	0.27	0.27
14			NR	NR	NR	NR	NR	NR	NR
15	D13	13	0.22	1.84	0.22	1.90	0.12	0.12	0.13
16	D17	32	0.30	1.83	0.30	1.83	0.17	0.16	0.17
17	D22	94	0.56	1.91	0.55	1.92	0.26	0.26	0.26
18		134	0.19	1.66	0.12	1.72	0.07	0.07	0.06
19		202	0.15	1.83	0.15	1.83	0.07	0.06	0.06
20	D23	45	0.47	1.53	0.47	1.96	0.23	0.22	0.22
21		97	0.36	1.82	0.36	1.83	0.20	0.20	0.20
22	D24	54	0.49	1.28	0.49	1.99	0.27	0.26	0.29
23		100	0.62	1.37	0.62	1.52	0.20	0.21	0.22
24	D25	44	0.65	1.34	0.55	1.84	0.21	0.21	0.22
25	D33	16	0.76	1.95	0.76	1.95	0.20	0.20	0.21
26	D34	11	0.37	1.83	0.37	1.76	0.20	0.19	0.20
27	D36	11	0.64	2.04	0.64	2.04	0.21	0.21	0.22
28		35	0.42	1.60	0.42	1.62	0.19	0.19	0.19
29	D37	8	0.29	1.04	0.29	1.55	0.20	0.10	0.11
30		54	0.80	1.74	0.80	1.74	0.14	0.14	0.13
31	D38	12	0.29	1.40	0.29	1.40	0.13	0.13	0.13
32		37	0.92	1.65	0.62	1.84	0.13	0.13	0.12
33	D39	52	0.36	0.82	0.36	1.52	0.23	0.23	0.24
34		143	0.26	1.15	0.26	1.99	0.20	0.10	0.10
35		168	0.57	1.36	0.57	1.86	0.13	0.13	0.13
36	D40	50	0.44	1.08	0.44	1.86	0.27	0.26	0.27
37		92	0.66	1.18	0.66	1.18	0.28	0.28	0.28
38	D41	18	0.68	1.28	0.68	1.34	0.28	0.27	0.28
39	D42	19	0.53	1.89	0.53	1.89	0.28	0.28	0.28
40	D50	60	0.70	1.95	0.70	1.95	0.29	0.28	0.29
41	D51	17	0.57	2.00	0.57	2.00	0.29	0.29	0.29
42	D52	62	0.58	1.52	0.58	1.57	0.28	0.28	0.28
43	D53	26	0.33	1.84	0.33	1.84	0.18	0.17	0.16
44		119	0.25	1.80	0.25	2.01	0.14	0.14	0.14
45		170	0.66	1.56	0.66	2.00	0.28	0.28	0.29
46	D54	97	0.61	1.52	0.61	1.52	0.27	0.27	0.28
47		154	0.36	0.64	0.22	1.75	0.09	0.08	0.09
48			NR	NR	NR	NR	NR	NR	NR
49	D55	26	0.39	1.56	0.26	1.56	0.25	0.24	0.25
50		72	0.42	1.57	0.40	1.84	0.22	0.22	0.22

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Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D Min	D Max	D Min	D Max	Leading	Center	Trailing
51		160	0.75	1.54	0.75	1.56	0.26	0.25	0.26
52	D56	16	0.48	1.02	0.48	1.75	0.26	0.26	0.26

NOTE: "NR" denotes Not Readable.

Terrain		Limiting	
D Max Range	0.64-2.04	D Max Range	1.18-2.04
D Min Range	0.15-0.92	D Min Range	0.12-0.80
Average D Max	1.55	Average D Max	1.76
Average D Min	0.49	Average D Min	0.47

Gross Fog Range 0.07-0.31
Average Gross Fog 0.20

PART III. STELLAR CAMERA

Mission No: 9047
Camera No: D5
Camera Setting: f/1.9, 1/2 second.
Filter: None
Film Type: 7J-3-135 (SO 130)
Evaluated by: [redacted]

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

2. Exposure: The exposure varies from slightly underexposed to overexposed, a majority of the frames appearing dense because of flare.

3. Frame Index Mark: Operational.

4. Camera Number: The camera number is difficult to identify at the beginning of the mission because of overexposure by the frame index lamp. Legibility improves as the mission progresses.

5. Reseau Calibration Points: Present throughout the film but flared, and in some cases distorted from the normal circular shape, because of variations in lamp intensities.

6. Reseau: The grid lines are clean and well defined except in the areas obscured by vignetting and corona fogging.

7. Film Metering: Normal throughout the mission.

8. Film Tracking: Normal throughout the mission.

9. Light Leaks: A severe light leak, originating at the tilted edge of the film, partially or completely degrades the stellar format area in approximately 40 frames. Analysis of the order of occurrence reveals that this light leak appears two frames beyond the first frame of each pass. Examples: frames 3, 9, 27, 34, 59, 74, 92. Rarely, as in frame 50, the sequence is reduced to one frame beyond the first frame of a pass. Another heavy light leak originating from the untilted edge of the film obscures portions of the stellar format area on frames 7, 13, 31, 38, 54. As the mission progresses this light leak appears to intensify and may degrade, simultaneously, portions of two or three adjoining frames. Examples: frames 199 to 201, 284 to 286. The sequence of appearance is usually four frames beyond the other previously mentioned light leak. Edge fog is apparent throughout the film.

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10. Static Electricity: Large, heavy, dendritic static discharges are evident along the untitled edge of the film, intruding into the format area on frames 1, 125 to 127, 176 to 180, and 282. Frame 238 shows dendritic static discharges which originate from the titled edge of the film. Corona static discharges are present adjacent to every frame, assuming the appearance of a 1/8" fogged bar emanating from the titled edge and perpendicular to the film travel. Probable corona static fogs approximately one-third of the film width, affects every frame, and gives a mottled, grainy cast to the film.

11. Scratches and Abrasions: Few.

12. Pinholes: Few.

13. Water Marks: None.

14. Processing Streaks: None.

15. Pressure Streaks: None.

16. Tearing: None.

17. Blistering and Crimping: None.

18. Foreign Matter: None.

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

20. Apparent Granularity: Medium.

21. Photo Quality: Poor, because of degradation by light leaks, flare, vignetting, and static effects.

22. Camera Operation: Fair, but degraded by light leaks and severe static problems.

Remarks

1. A few stellar images appear in the least flared frames of the mission. One group of three stars is seen repeatedly on the first several passes of the mission.

2. The Gross Fog level of the film is high, averaging 0.47, which indicates possible degradation by radiation.

3. Vignetting, possibly from the side of the vehicle, obscures approximately 20% of the format area on every frame.

4. Density readings were taken as indicated below, 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 frame of all passes except where these frames were totally fogged by light leaks, in which case the nearest unaffected frame of the pass was read. Gross Fog levels were read in the center of the film between frames, the area least affected by static or light fogging.

Reading	Pass	Frame	Beginning of Pass		End of Pass		Gross Fog
			D Min	D Max	D Min	D Max	
1	D01	1	0.41	0.80			0.32
2		6			0.37	1.04	0.32
3	D02	8	0.57	1.20			0.38
4		11			0.43	1.28	0.36
5	D03	14	0.60	0.68			0.42
6		24			0.47	1.88	0.46
7	D04	25	0.55	1.46			0.44
8		30			0.61	1.56	0.41
9	D05	35	0.49	1.75			0.36
10		48			0.42	1.84	0.37
11	D06	49	0.44	1.35			0.37
12		56			0.43	1.77	0.39
13	D07	57	0.47	1.67			0.40
14		71			0.42	2.89	0.43
15	D08	78	0.52	1.00			0.42
16		89			0.52	1.61	0.38
17	D09	93	0.56	1.57			0.41

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Reading	Pass	Frame	Beginning of Pass		End of Pass		Gross Fog
			D Min	D Max	D Min	D Max	
18		107			0.52	1.65	0.49
19	D15	108	0.52	2.01			0.43
20	D17	110	0.57	0.69			0.64
21		114			0.71	1.12	0.52
22	D22	119	0.61	0.97			0.50
23		146			0.77	2.18	0.52
24	D23	147	0.57	1.57			0.65
25		163			0.49	1.69	0.44
26	D24	164	0.51	1.37			0.43
27		178			0.65	1.93	0.44
28	D25	182	0.58	1.66			0.53
29		189			0.66	2.11	0.51
30	D33	190	0.47	0.68			0.52
31		194			0.79	1.29	0.51
32	D34	195	NM	NM			0.65
33		197			NM	NM	0.51
34	D36	198	0.53	1.67			0.50
35		209			0.60	2.26	0.64
36	D37	210	0.78	1.47			0.61
37		217			0.64	1.99	0.61
38	D38	218	0.64	1.51			0.62
39		228			0.61	2.23	0.47
40	D39	229	0.51	0.79			0.51
41		252			0.52	2.45	0.64
42	D40	253	0.77	1.58			0.63
43		266			0.65	1.69	0.41
44	D41	268	0.66	1.93			0.39
45		275			0.65	2.23	0.51
46	D49	276	1.67	1.78			0.51
47		279			1.12	1.74	0.53
48	D50	286	0.66	1.95			0.44
49		294			0.76	1.96	0.64
50	D51	295	0.75	1.61			0.44
51		298			0.68	2.27	0.42
52	D52	300	0.79	1.94			0.41
53		316			0.79	2.01	0.36
54	D53	317	0.83	1.52			0.35
55		346			0.99	3.04	0.40
56	D54	347	0.56	0.89			0.39
57		373			0.66	2.59	0.49
58	D55	374	0.56	0.71			0.40
59		399			0.76	2.22	0.41
60	D56	400	0.50	1.70			0.39
61		416			0.62	1.61	0.37
62	"	417	0.41	0.50			0.37
63	"	423			0.53	1.31	0.37
64	"	424	0.67	1.12			0.39
65	"	438			0.56	1.64	0.33

NOTE: Density readings were taken at the beginning and end of each pass to establish changes in density due to sun angle.
"NM" denotes Not Measurable.
*Pass number not assigned.

D Max Range	0.60-3.04
D Min Range	0.37-1.67
Gross Fog Range	0.33-0.81
Average Gross Fog	0.47

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PART IV. INDEX CAMERA

Mission No: 9047
Camera No: D5
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 throughout the mission.

2. Exposure: Good.

3. Camera Number: Good.

4. Film Metering: Metering ranged from 0.13" to 0.16" except for a 0.1" overlap between frames 1, 2 and a 14.25" gap between frames 429, 430 (the last two frames of the mission).

5. Film Tracking: Normal.

6. Reseau: Lines tend to disappear in extremely dense areas but are well defined on the majority of frames. An edge reflection of the circular reseau plate is present, surrounding the first and/or last frame of every pass. Small, opaque particles are scattered throughout the grid squares.

7. Light Leaks: The circular grid outline mentioned above occurs as a reflection and is present on approximately 75 frames. Examples: frames 1, 7, 25, 48. Vertical light leaks originating at the camera number edge of the film and obscuring portions of the format area occur on 13 frames. Examples: frames 108, 109, 117, 118. A faint vertical light leak is present, crossing the titled edge (the edge opposite the camera number) of the film on nine intermittent occasions. Examples: frames 11, 15, 36, 76.

8. Static Electricity: Edge static occurs intermittently throughout the film. Possible corona static fogging is scarce and intermittent. Examples: frames 191, 192, 276, 277.

9. Pinholes: Few.

10. Abrasions and Scratches: A few fine abrasions are scattered throughout the film.

11. Tearing: None.

12. Water Marks: None.

13. Pressure Streaks: None.

14. Processing Streaks: None.

15. Blistering and Crimping: Infrequent.

16. Contrast: Medium to high.

17. Apparent Resolution: Good, comparable to the expected system capability.

18. Apparent Granularity: Slightly grainy.

19. Photo Quality: Good.

20. Camera Operation: Good. The only degrading factor is the presence of light leaks.

21. PI-Suitability: Good, limited only by the small scale and light leaks.

Remarks

1. An object, presumed to be a piece of metallic tape adhering to the outside skin of the vehicle, is present in most frames. The image always appears on the take-up side of the film, never changing position in respect to the film edges, but slowly changing in length and shape throughout the mission. The position of the object lies between 0.70" and 0.80" below the titled edge of the film, and moves slowly in and out of the for-

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mat area. Kinks and twists in the tape may be observed in many frames.

2. The frame index lights used to correlate stellar-index pairs is operational throughout the mission.

3. Overlap is normal, ranging from 60% to 65%.

4. The presence of fragmentary terrain images in the metering areas indicates worn spots on the supply side of the mask surrounding the format area.

5. Density readings were taken on representative frames of all passes, using the MacBeth Quantalog Densitometer Model EP 1000 with an ET 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	Terrain		Limiting		Gross Fog		
			D Min	D Max	D Min	D Max	Tiled	Center	Opposite
1	D01	5	0.30	2.06	0.30	2.06	0.19	0.20	0.15
2	D02	11	0.35	2.34	0.35	2.34	0.13	0.12	0.15
3	D03	24	0.32	1.33	0.32	2.37	0.14	0.13	0.16
4	D04	29	0.31	2.48	0.31	2.48	0.13	0.12	0.15
5	D05	45	0.31	1.32	0.31	2.58	0.14	0.13	0.16
6	D06	54	0.43	1.41	0.43	2.45	0.14	0.13	0.15
7	D07	65	0.61	1.67	0.61	2.39	0.16	0.15	0.17
8	D08	82	0.41	1.02	0.41	2.09	0.15	0.14	0.16
9	D09	104	0.33	1.62	0.33	2.46	0.16	0.16	0.16
10	D15	108	0.34	1.79	0.34	2.54	0.16	0.16	0.16
11	D17	114	0.32	2.17	0.32	2.17	0.13	0.12	0.14
12	D22	117	0.26	1.64	0.26	1.84	0.12	0.15	0.14
13	D23	153	0.41	1.59	0.41	2.44	0.12	0.11	0.12
14	D24	170	0.61	1.11	0.54	2.20	0.14	0.13	0.14
15	D25	184	0.34	1.62	0.34	2.48	0.13	0.11	0.13
16	D33	192	0.44	1.46	0.36	2.27	0.20	0.14	0.17
17	D34	197	0.42	2.20	0.42	2.30	0.13	0.12	0.13
18	D36	201	0.44	1.54	0.44	1.96	0.12	0.10	0.12
19	D37	210	0.53	1.29	0.53	2.24	0.11	0.11	0.12
20	D38	220	0.32	2.19	0.32	2.19	0.11	0.10	0.11
21	D39	235	0.35	1.63	0.35	1.91	0.10	0.09	0.11
22	D40	260	0.38	1.46	0.38	2.25	0.11	0.10	0.11
23	D41	269	0.46	1.19	0.46	2.46	0.13	0.10	0.12
24	D49	276	0.73	1.58	0.73	1.96	0.17	0.20	0.12
25	D50	289	0.59	2.40	0.56	2.40	0.10	0.10	0.11
26	D51	295	0.50	1.46	0.50	2.39	0.13	0.11	0.14
27	D52	316	0.44	2.00	0.44	2.47	0.11	0.10	0.11
28	D53	324	0.49	2.39	0.49	2.42	0.10	0.10	0.11
29	D54	336	0.33	2.22	0.33	2.22	0.12	0.10	0.12
30	D55	353	0.22	1.00	0.22	2.09	0.11	0.11	0.12
31	D56	414	0.26	1.79	0.26	2.47	0.12	0.11	0.12
32	*	423	0.24	1.32	0.24	1.97	0.11	0.10	0.12
33	**	429	0.28	2.30	0.28	2.34	0.11	0.10	0.11

*Pass number not assigned, Frames 417-423
**Pass number not assigned, Frames 424-430

Terrain		Limiting	
D Max Range	1.00-2.48	D Max Range	1.84-2.58
D Min Range	0.22-0.61	D Min Range	0.22-0.61
Average D Max	1.71	Average D Max	2.27
Average D Min	0.40	Average D Min	0.39

Gross Fog Range 0.09-0.20
Average Gross Fog 0.13

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PART V. VEHICLE ATTITUDE DATA

Pass	Pitch Variation		Pitch Range	Roll Variation		Roll Range	No. of Frames	Remarks
D01	-17°26'	-17°49'	0°23'	00°21'	-00°22'	0°43'	17	No Data 1 thru 25
D02	-16 16	-16 58	0 42	00 23	-01 24	1 47	84	Approx. Values 1 thru 16
D03	-15 46	-17 10	1 24	00 23	-00 52	1 15	27	Approx. Values 1 thru 27
	-16 19	-16 19	0 00	-01 34	00 14	1 48	66	
D04	-16 12	-16 48	0 36	-00 56	-00 02	0 56	52	
D05	-16 10	-16 28	0 18	-00 47	-01 50	1 03	56	
	-16 37	-16 19	0 18	-01 44	00 18	2 02	57	
D06	-16 23	-16 33	0 10	-01 26	-00 18	1 08	60	
D07	-16 38	-16 37	0 01	-01 05	00 20	1 25	51	
	-16 31	-16 34	0 03	-00 22	-02 28	2 06	53	
D08	-16 46	-16 26	0 20	-00 04	-01 20	1 16	126	Approx. Values 1 thru 16
D09	-17 13	-16 21	0 52	-00 22	-01 24	1 02	112	
D15	-16 44	-16 43	0 01	-00 44	-00 15	0 29	17	
D17	-16 16	-16 45	0 29	00 13	-00 19	0 32	42	All Values Approx.
D22	-15 56	-17 07	1 09	00 15	-00 36	0 51	48	Approx. Values 1 thru 48
	-16 17	-16 21	0 04	01 09	-00 28	0 41	69	
	-16 26	-16 07	0 19	00 16	-00 01	0 15	103	
D23	-17 07	-16 02	1 05	-00 44	-00 13	0 31	56	
	-16 04	-17 06	1 02	-00 36	-01 11	0 35	57	
D24	-16 43	-16 26	0 17	-00 48	00 04	0 52	110	
D25	-15 58	-17 06	1 08	-00 31	-01 07	0 36	67	
D33	-16 12	-17 06	0 56	-00 11	-00 28	0 17	35	All Values Approx.
D34	-16 54	-16 30	0 24	-00 33	-00 40	0 07	20	
D36	-15 59	-16 47	0 48	-01 23	00 20	1 43	84	
D37	-16 09	-16 18	0 09	-01 49	-01 23	0 26	57	
D38	-16 23	-16 17	0 06	-01 20	-00 51	0 29	74	
D39	-15 49	-16 43	0 54	-00 12	-01 04	0 52	52	Approx. Values 1 thru 52
	-16 16	-16 11	0 05	-01 45	-01 21	0 24	61	
	-16 25	-15 41	0 16	-01 06	-00 36	0 30	54	
D40	-16 55	-16 33	0 22	-01 02	-01 00	0 02	99	
D41	-16 17	-16 56	0 21	-01 15	-00 52	0 23	51	
D49	-17 10	-17 03	0 07	-00 26	-01 07	0 41	35	All Values Approx.
D50	-17 56	-15 52	2 04	-00 32	-00 27	0 05	36	Approx. Values 1 thru 36
	-16 42	-16 09	0 33	-01 19	-00 36	0 41	61	
D51	-16 35	-15 53	0 42	-01 11	-01 00	0 11	40	
D52	-16 13	-16 33	0 20	-01 06	00 10	1 16	113	
D53	-16 47	-15 58	0 49	-00 36	-00 29	0 07	67	
	-16 24	-16 22	0 02	-01 53	-01 43	0 10	146	
D64	-16 18	-16 06	0 12	-00 29	-00 23	0 06	189	Approx. Values 1 thru 39
D65	-15 35	-16 34	0 01	-01 33	00 16	0 43	182	No Data 1 thru 46
D66	-16 55	-16 08	0 47	-01 19	00 16	1 35	50	

Handle Via
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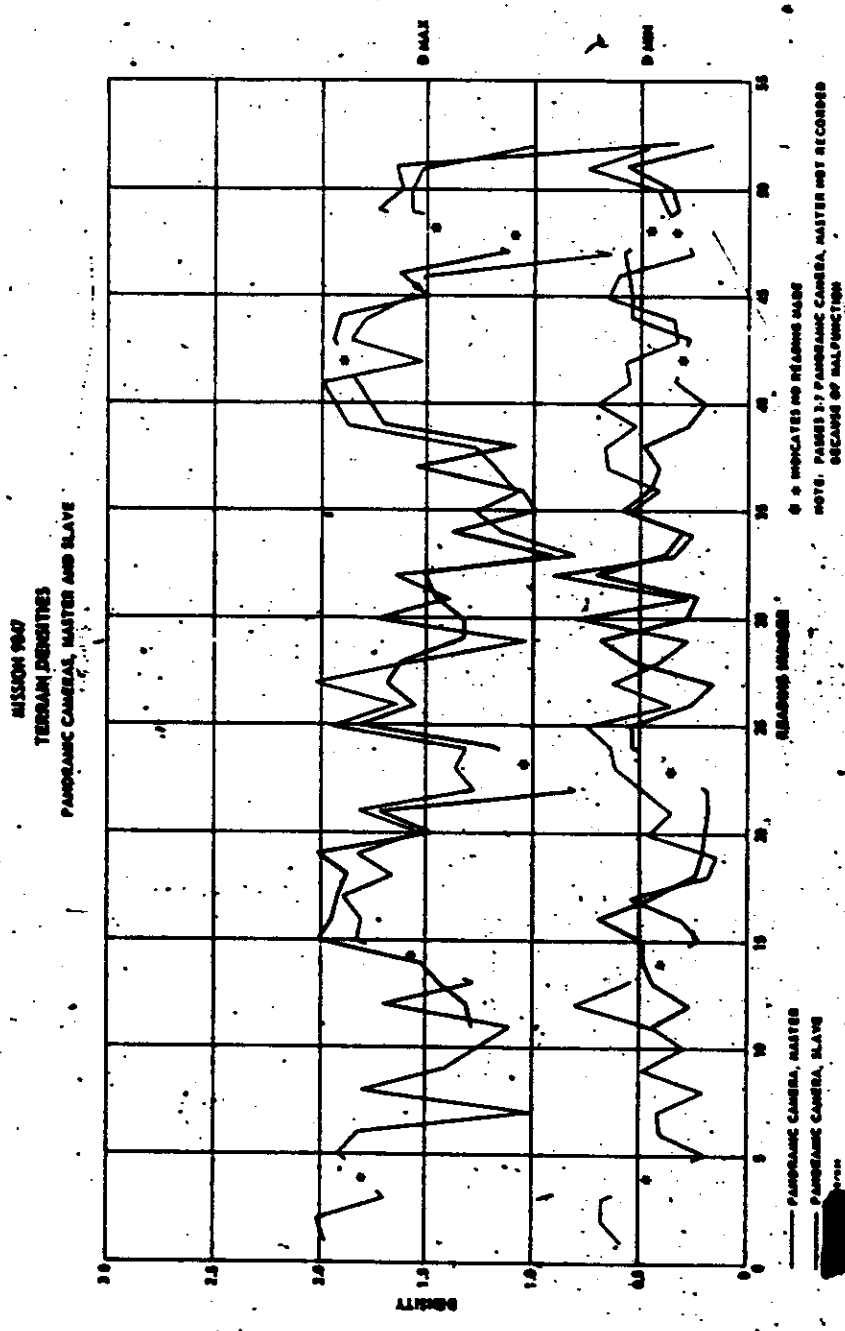
PART VI. DENSITY CHARTS



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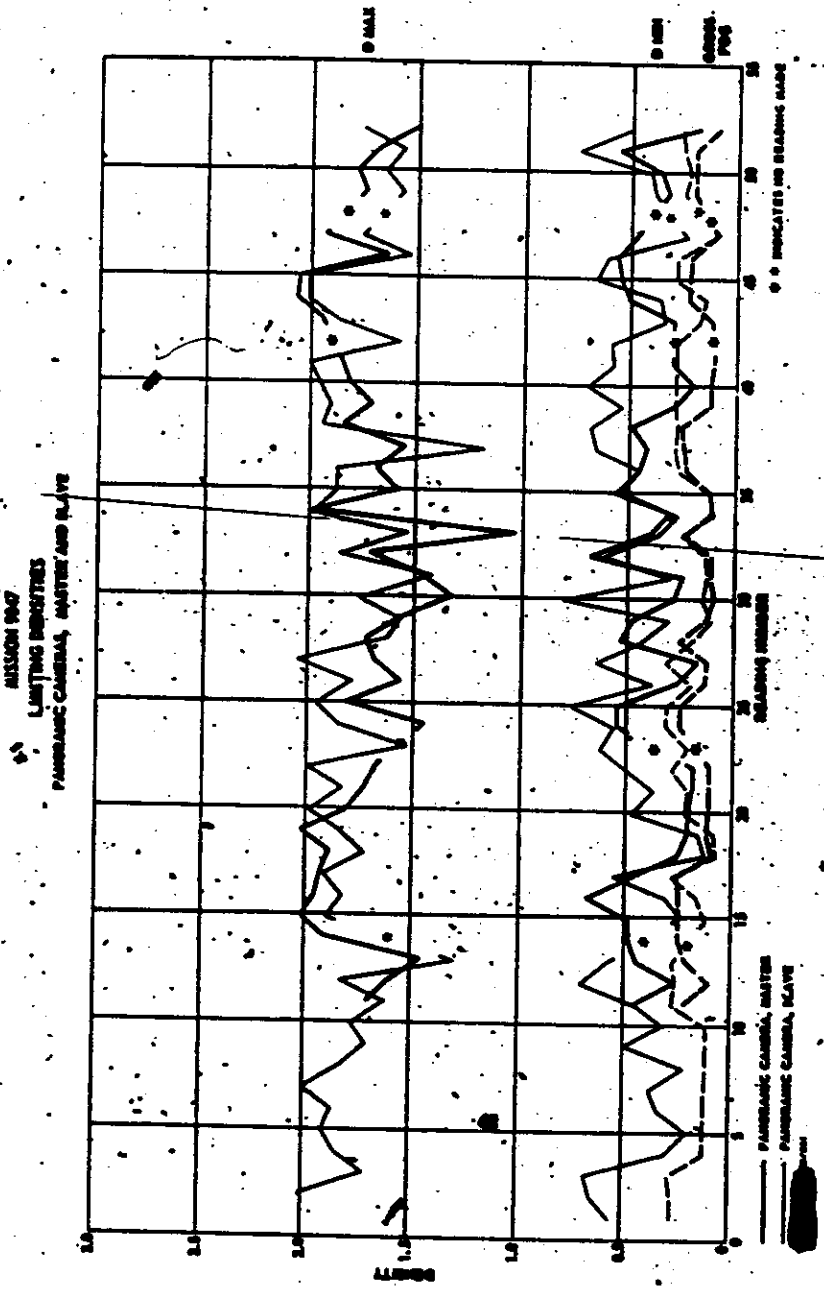

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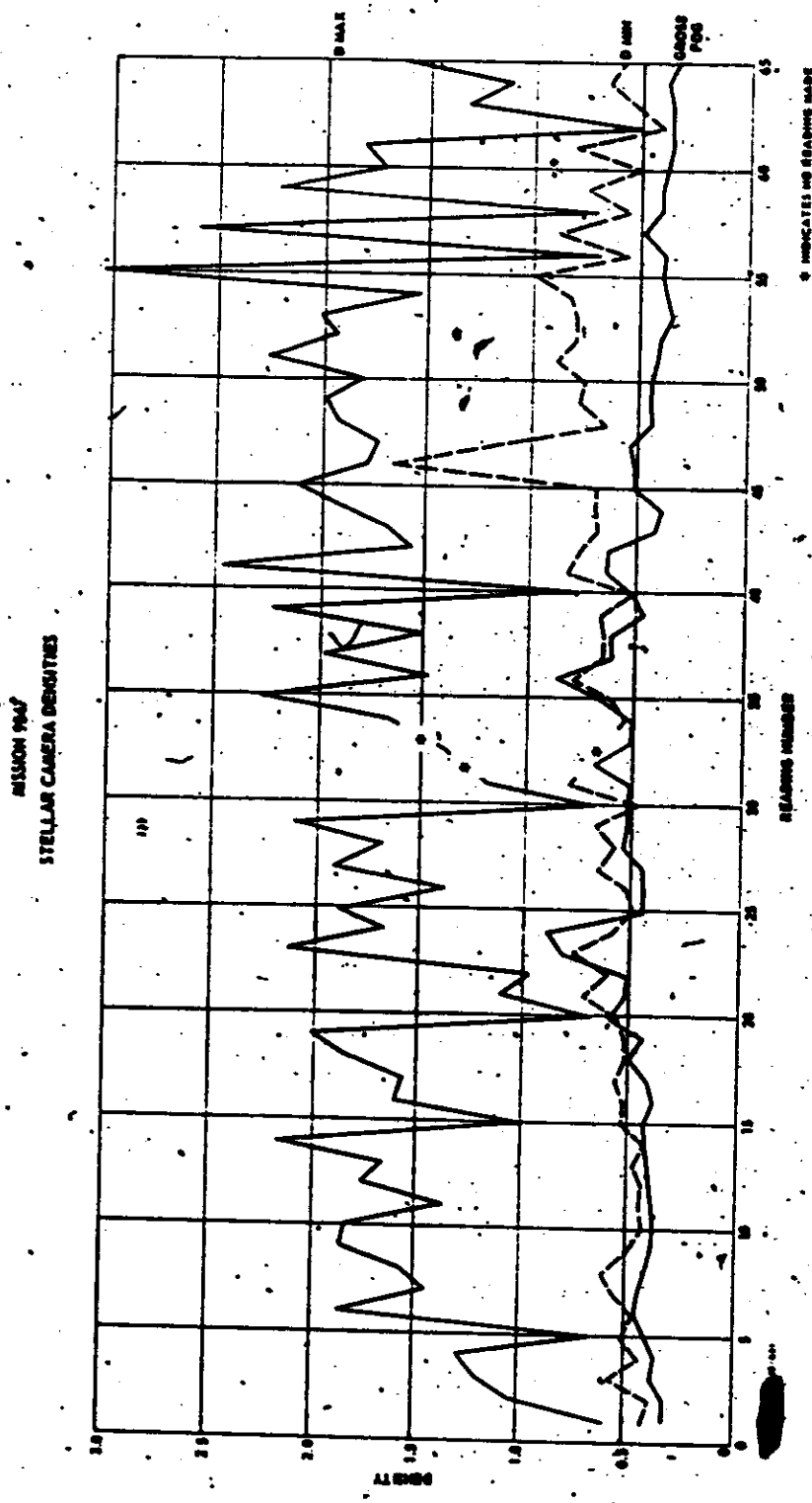

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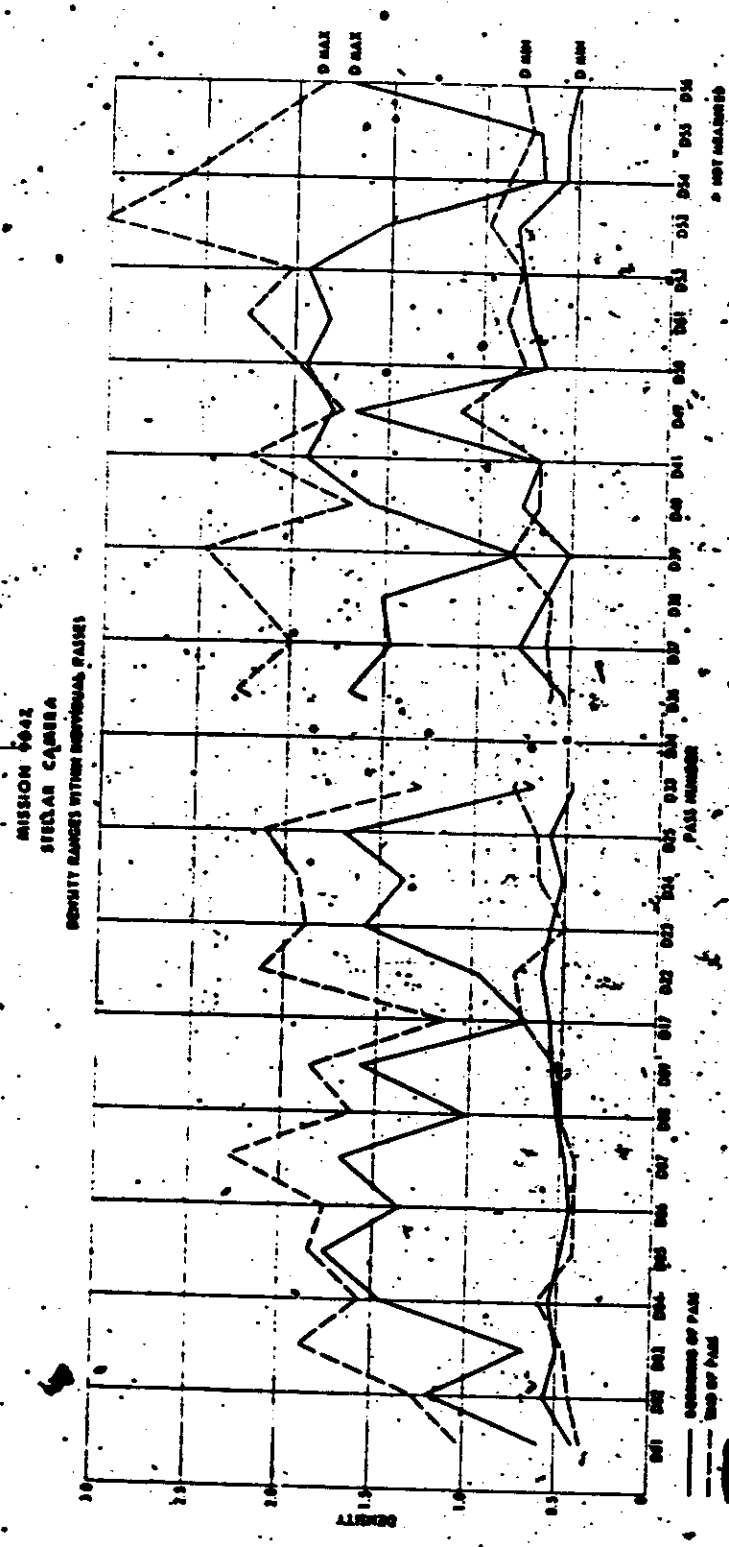

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MISSION 9047
INDEX CAMERA DENSITIES