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February 1964
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TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT

MISSION 1002-1

23-26 OCTOBER 1963

This document contains information referring to

Project Corona

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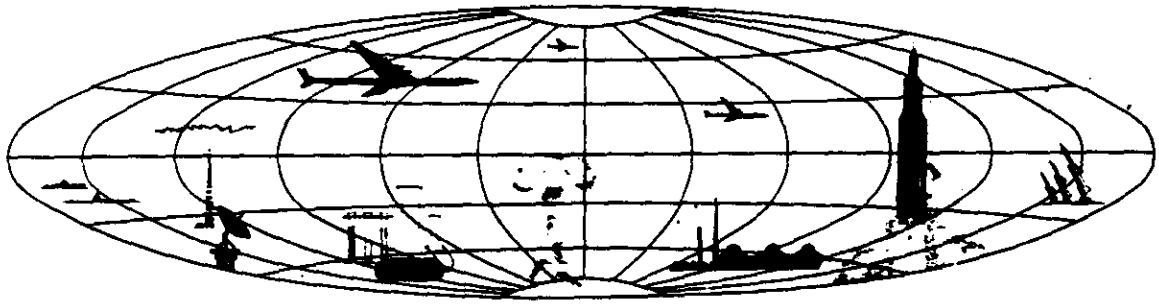
NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER



TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT
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NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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PART I. MASTER PANORAMIC CAMERA

Mission No: 1002-1
Camera No: 116
Slit Width: 0.250"
Film Type: 31-7-5-3 (4404)

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

1. Shutter Operation (Horizon Cameras): The starboard horizon camera shutter operated only four times. The shutter partially opened at the start of pass D00 giving an incomplete and under-exposed image on the first four frames and then remained closed for the duration of the mission. The port horizon shutter operated satisfactorily throughout the mission.

2. Horizon Camera Exposure:
   a. Supply (Port): The exposure is adequate (f/6.8, 1/100 second).
   b. Take-Up (Starboard): No imagery due to the shutter malfunction noted in Item 1 (f/6.8, 1/100 second).

3. Camera Number: The camera number recorded satisfactorily where visible. A light leak in the vehicle caused extensive fogging of the film, obscuring the camera number.

4. Data Block: The data block record operated erratically at the beginning and end of each pass. Eighty percent of the data block is obliterated by the light leak that fogged the film in the master panoramic camera (see item 9).

5. Film Metering: The film metering is normal.

6. Film Tracking: The film tracking is normal.

7. Frequency Markers: The marks are adequately exposed and are recorded outside the format, but reflected images extend into the format of the panoramic frames. The clock interrogate mark and the framing camera mark operated properly throughout the mission.

8. Fiducials:
   a. Panoramic Camera: The fiducials are well defined where visible.
   b. Horizon Cameras: The fiducials for both horizon cameras recorded satisfactorily but are slightly flared.

9. Light Leaks: The photography from the master panoramic camera was seriously degraded by a light leak in the vehicle located in the vicinity of the camera. Every frame is affected to some degree. The most serious fogging occurred when the camera was at rest between passes and at the camera off/on points. Five frames at the beginning and three frames at the end of each pass are completely fogged except for a few small areas which were protected by equipment. The light leak affected the data block edge more than the frequency mark edge. Severity of the fogging is directly related to sun angle. In a few cases the gross fog level is near normal, as in pass D18. On these passes a well defined triangle-shaped fog patch similar to one observed on Mission 9056 is present on the starboard end of every frame. Approximately 80 percent of the photography from the master camera is severely degraded by the light leak. Gross fog density readings range from 0.20 to 0.50.

10. Static Electricity: No indications of static electricity observed.

[redacted]

[redacted]

11. Pinholes: Present intermittently throughout the film. Examples: passes D00, D02, D04, D08, D18, D20, D21, D36, D39, D42.

12. Abrasions and Scratches: Rail scratches are present on the titled edge of the film throughout the mission. Fine emulsion and base scratches occur intermittently but do not seriously degrade the photography except in a few instances where they are numerous. Examples: passes D20, D35, and D38 where they terminate at an ultrasonic splice. There are occasional serious emulsion scratches which follow no particular pattern. Examples: pass D38, frame 15; pass D41, frame 42; pass D42, frame 25. Every frame is affected by repetitive emulsion digs. These digs are located 9.50" from the take-up edges of the frames. There are usually three on the frequency mark edge and one on the data block edge. The number varies but never exceeds four. Associated elongated minus-density dots are present approximately 0.20" from the digs and are located in the respective margins.

13. Tearing: None. A manufacturer's splice is present on pass D07, frame 76 and pass D20, frame 20. Heat splices are present between frames 35 and 36 of pass D18, frames 103 and 104 of pass D20, frames 117 and 118 of pass D40, and frames 123 and 124 of pass D42.

14. Watermarks: None observed.

15. Pressure Streaks: None observed.

16. Processing Streaks: None observed.

17. Blistering and Crimping: Scattered, minor blisters are noted throughout the mission. Crimps, occurring after processing, are few and intermittent.

18. Contrast: Low, due to the camera system light leak noted in Item 9.

19. Apparent Resolution: Good, comparable to Mission 9054.

20. Apparent Graininess: Fine.

21. Photo Quality:
a. Panoramic Camera: The quality ranges from fair to good. Fogging due to a camera system light leak, emulsion digs, and numerous, possibly camera-induced, scratches are the major degrading factors.
b. Horizon Cameras: The starboard horizon was not imaged throughout the mission. The image quality of the port horizon is good.

22. Camera Operation:
a. Panoramic Camera: Good. The only notable anomalies which can be attributed to the camera are rail scratches which are present to some extent on every frame, occasional fine base and emulsion scratches, and periodic emulsion digs.
b. Horizon Cameras: The starboard camera shutter failed to operate throughout the mission. The port horizon camera operated properly.

23. Suitability for PI: Good, where not degraded by fogging.

Remarks

1. The photography obtained from the master panoramic camera is inferior to that produced by the slave. Degradation is attributed to the light leak previously noted (see item 9).

2. Film transport indications are present at all camera off/on positions.

[redacted]

3. Overlap could not be determined from Camera 116 due to the excessive fogging caused by the light leak in the system.

4. Density readings were not taken on negatives from the master panoramic camera. Gross fog density readings range from 0.20 to 0.50 throughout the mission.

5. The negatives from the master panoramic camera were considered too dense for normal titling on the data block edge because of the fog caused by the light leak in the camera system. The problem was evaluated by the NPIC team leader who authorized the titling information for the master negatives on this mission to be relocated to the frequency mark edge. Production procedures were adjusted to accomodate the change. On some passes the titling and lacquer operation was erroneously performed according to standard procedures. These parts were subsequently corrected, but embossing of the information is still visible although it does not degrade the photography.

PART II. SLAVE PANORAMIC CAMERA

Mission No: 1002-1
Camera No: 117
Slit Width: 0.250"
Film Type: 31-7-5-3 (4404)

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

1. Shutter Operation (Horizon Cameras): Both shutters operated properly throughout the mission.

2. Horizon Camera Exposure:
   a. Take-Up (Port): The film is adequately exposed on all passes (f/6.8, 1/100 second).
   b. Supply (Starboard): The film is slightly overexposed on all passes (f/6.8, 1/100 second).

3. Camera Number: The camera number is slightly flared but readable through pass D23. It is not recorded on pass D24 and subsequent passes.

4. Data Block: The data block record operated erratically at the beginning and end of each pass and drifted into the edge of the format or off the edge of the film in some passes.

5. Film Metering: The film metering is normal.

6. Film Tracking: The film tracking is normal.

7. Frequency Markers: The marks are recorded on all frames but are slightly flared and the reflected images occasionally track into the formats.

8. Fiducials:
   a. Panoramic Camera: The fiducials are well defined.
   b. Horizon Cameras: The fiducials for both cameras recorded properly but are slightly flared.

9. Light Leaks: The light leak that degraded the take from the master panoramic camera also affected the slave camera take, but to a lesser degree. Approximately seven frames of photography are fogged at each camera off/on position. The first frame and half of the second frame were protected from the light leak by the equipment. The other half of the second frame, all of

[redacted]

[redacted]

the third, and half of the fourth are totally fogged. The last two frames of each pass were also protected by equipment. The third and fourth from last frame and portions of the fifth and sixth from last are totally fogged. This fogging was caused by the same light leak which degraded the master panoramic photography, but unlike the master, the photography between the fogged areas is not noticeably affected.

10. Static Electricity: No indications of static electricity observed.

11. Pinholes: Present intermittently throughout the film. Examples: passes D00, D17, D20, D21, D25, D41.

12. Abrasions and Scratches: Fine emulsion and base scratches occur intermittently throughout the film. They do not seriously degrade the photography except in the few instances where they are numerous. Examples: pass D06, frame 1; pass D22, frame 67; pass D08, frame 57. Every frame is affected by repetitive emulsion digs. These digs occur 8.0" from the take-up edge of the frame. There are usually three on the frequency mark edge and one on the data block edge. Their number varies but never exceeds four. Associated, elongated minus-density dots are present occasionally and are located 0.20" from the digs and are located in the respective margins.

13. Tearing: None noted. A manufacturer's splice (ultrasonic) is present on pass D23, frame 141. Heat splices are present between frames 136 and 137 of pass D20; 146 and 147 of pass D37; and frames 102 and 103 of pass D40.

14. Watermarks: None observed.

15. Pressure Streaks: None observed.

16. Processing Streaks: None observed.

17. Blistering and Crimping: Minor blisters are scattered throughout the mission. Crimps, occuring after processing, are few and intermittent.

18. Contrast: 0% low, 82% medium, 18% high.

19. Apparent Resolution: Good, comparable to Mission 9054.

20. Apparent Graininess: Fine.

21. Photo Quality:
a. Panoramic Camera: Good, where not degraded by light leaks.
b. Horizon Cameras: The port horizon camera was slightly out of focus and the imagery is poor. The starboard horizon camera was good where the exposure was adequate.

22. Camera Operation:
a. Panoramic Camera: Good. However, the emulsion and base scratches and emulsion digs may have been camera-induced.
b. Horizon Cameras: The starboard camera operated properly, but the port camera produced negatives of inferior quality (probably because of vehicle vibration).

23. Suitability for PI: Good, despite the presence of fogged areas caused by light leaks, minor scratches, and abrasions.

Remarks

1. The photography produced by the slave camera is superior to that obtained from the

[redacted]

master camera. The light leak that degraded the master camera photography also depreciated, but to a lesser degree, that of the slave camera.

2. Film transport indications are present at all camera off/on positions.

3. The following descriptions of overlap from camera No 117 were determined from the fifth and last frame of each pass, where possible. Cloud cover, low sun angle, or lack of imagery may have precluded these determinations. When such is the case the omission is denoted by "NM" for "Not Measurable."

Pass	Overlap (Percent)		Pass	Overlap (Percent)	
	Beginning	End		Beginning	End
D02	NM	5	D23	08	NM
D04	10	10	D24	NM	09
D05	10	10	D25	04	07
D06	NM	09	A31	NM	09
D07	10	09	D36	09	09
D08	09	NM	D37	09	08
D09	10	NM	D38	02	09
D17	07	07	D39	NM	NM
D18	05	06	D40	NM	07
D20	NM	NM	D41	NM	09
D21	05	05	D42	00	07
D22	05	NM			

4. Density readings were taken on each pass using a Macbeth QuantaLog Densitometer, Model EP 1000, with an ET 20 attachment and an 0.5 mm aperture. The values are correlated below:

Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D-Min	D-Max	D-Min	D-Max	Leading	Center	Trailing
1	D00	09	NR	NR	1.53	2.27	0.22	0.23	0.21
2	D02	45	1.15	1.74	1.15	2.08	0.40	0.45	0.50
3	D04	32	0.64	1.39	0.79	2.10	0.45	0.45	0.43
4	D05	14	NR	NR	0.92	2.06	0.32	0.34	0.37
5	D05	34	0.73	1.72	0.73	2.12	0.24	0.27	0.32
6	D05	90	0.91	1.37	0.91	2.15	0.27	0.27	0.27
7	D06	14	NR	NR	1.10	2.03	0.25	0.25	0.24
8	D06	31	0.97	1.56	0.94	2.15	0.44	0.44	0.42
9	D06	99	0.62	2.16	0.62	2.16	0.46	0.46	0.47
10	D07	06	0.64	1.26	0.84	2.24	0.27	0.27	0.27
11	D07	93	0.99	1.56	0.99	2.14	0.23	0.25	0.23
12	D08	16	0.62	1.40	0.62	2.20	0.46	0.53	0.67
13	D08	62	0.67	1.76	0.67	1.76	0.43	0.43	0.43

[redacted]

[redacted]

Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D-Min	D-Max	D-Min	D-Max	Leading	Center	Trailing
14	A09E		NR	NR	NR	NR	NR	NR	NR
15	D09	1	0.75	0.95	0.70	2.08	0.27	0.29	0.29
16	A11E	1	NR	NR	NR	NR	0.27	0.25	0.27
17	D17	29	NR	NR	0.84	2.03	0.21	0.23	0.26
18	D18	42	0.94	1.76	0.60	1.95	0.16	0.16	0.16
19	D20	71	0.66	0.91	0.56	2.03	0.22	0.22	0.24
20	D20	76	0.59	1.63	0.52	1.95	0.22	0.22	0.24
21	D20	167	0.65	1.32	0.65	2.09	0.24	0.25	0.23
22	D21	21	0.63	1.94	0.36	2.08	0.19	0.19	0.17
23	D21	52	0.50	0.99	0.41	2.02	0.19	0.19	0.19
24	D21	74	0.82	2.24	0.85	2.24	0.37	0.34	0.35
25	D21	150	0.96	2.02	0.99	2.12	0.39	0.39	0.40
26	D22	6	0.71	1.19	0.71	2.19	0.24	0.24	0.24
27	D22	46	0.44	0.65	0.44	2.02	0.17	0.16	0.17
28	D22	87	0.60	2.15	0.60	2.15	0.22	0.25	0.23
29	D23	12	0.69	1.56	0.69	2.16	0.37	0.37	0.36
30	D23	80	NR	NR	1.60	2.14	0.37	0.39	0.36
31	D23	89	0.59	1.60	0.89	2.12	0.27	0.29	0.26
32	D23	177	NR	NR	1.12	2.16	0.46	0.46	0.46
33	D24	18	0.80	0.54	0.60	2.24	0.39	0.41	0.41
34	D24	87	0.79	1.55	0.79	2.04	0.25	0.25	0.25
35	D24	154	0.60	1.76	0.60	2.16	0.30	0.26	0.26
36	A25E	2	NR	NR	NR	NR	0.14	0.15	0.14
37	D25	16	0.46	1.39	0.46	2.14	0.24	0.25	0.24
38	A27E	2	NR	NR	NR	NR	0.27	0.26	0.24
39	A31	7	NR	NR	NR	NR	0.22	0.24	0.23
40	D36	36	1.35	1.53	1.14	2.19	0.37	0.40	0.38
41	D36	56	0.59	1.25	0.46	2.13	0.20	0.21	0.20
42	D37	6	0.59	0.82	0.59	2.16	0.21	0.22	0.21
43	D37	89	0.44	1.89	0.44	1.89	0.17	0.17	0.17
44	D37	178	0.37	0.68	0.37	1.82	0.12	0.12	0.12
45	D38	10	NR	NR	0.45	1.83	0.16	0.16	0.15
46	D38	81	0.92	1.41	0.76	2.17	0.20	0.22	0.20
47	D38	155	0.76	1.87	0.45	2.15	0.20	0.20	0.20
48	D39	33	0.70	0.75	0.62	1.90	0.17	0.18	0.18
49	D39	160	0.96	1.62	0.96	1.62	0.19	0.21	0.20
50	D40	20	0.85	0.92	0.85	1.42	0.37	0.37	0.37
51	D40	83	0.66	1.01	0.66	2.11	0.22	0.23	0.23
52	D40	152	0.61	1.87	0.61	2.15	0.17	0.19	0.19
53	A41E	2	NR	NR	NR	NR	0.22	0.22	0.22
54	D41	32	0.66	1.34	0.66	2.15	0.22	0.22	0.22
55	D42	7	0.67	1.87	0.67	2.02	0.19	0.19	0.19
56	A43E	2	NR	NR	NR	NR	0.19	0.19	0.19
57	A47E	2	NR	NR	NR	NR	0.19	0.20	0.20
58	D47	19	0.76	2.04	0.76	2.04	0.28	0.27	0.27

NR denotes no reading made.

Terrain

D-Max Range 0.65-2.15
D-Min Range 0.37-1.37
Average D-Max 1.48
Average D-Min 0.76

Limiting

D-Max Range 1.42-2.24
D-Min Range 0.37-1.60
Average D-Max 2.07
Average D-Min 0.77

Gross Fog Range 0.12-0.67
Average Gross Fog 0.27

[redacted]

PART III. STELLAR CAMERA

Mission No: 1002-1
Camera No: D18
Exposure Setting: f/1.9, 2 to 5 seconds
Filter: None
Film Type: 4401
Evaluated By: [redacted]

1. Shutter Operation: The shutter rewind mechanism of the index camera operated out of proper sequence, causing the stellar camera shutter to remain closed in 32 frames and to open but overexpose or multiple expose 35 frames. In addition, mismetering occurred seven times.

2. Exposure: The exposure was adequate. As many as 50 stars through the seventh magnitude are recorded.

3. Frame Correlation Fiducial Mark: Operational, but slightly overexposed and flared.

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

5. Reseau Calibration Points: Operational, but overexposed and flared.

6. Reseau: The grid is visible and well-defined except in frames that contain multiple exposures.

7. Film Metering: The film metering is normal.

8. Film Tracking: The film tracking is normal.

9. Light Leaks: Light leaks did not affect the stellar photography.

10. Static Electricity: There are dendritic static traces and corona discharges on all frames. Their high density obliterated the fiducial marks on one side of the frame and obscured the reseau to some extent. This static discharge and the subsequent loss of fiducials negates the use of stellar take for attitude determination.

11. Abrasions and Scratches: Intermittent and minor in nature.

12. Pinholes: None.

13. Watermarks: 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 determine star fields and stars to the seventh magnitude.

20. Apparent Graininess: Fine.

21. Photo Quality: Good.

22. Camera Operation: The stellar unit operated correctly through the first 172 cycles. Starting with pass D21, frame 130, the ratio between the stellar and the master panoramic camera deviated from the designated ratio of 1:7. Between passes D21 and D37 the ratio varied on 73 different occasions, with a maximum ratio of 1:38 occurring in pass D23 between frames 176 and 214. In the middle of pass D37 the ratio reverted to normal and with the exception of

three minor deviations in the first 51 panoramic frames of pass D38 the ratio remained normal throughout the balance of the mission.

Remarks

1. Flare degraded 10 percent of each format throughout the mission.

2. 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. The values are correlated below:

Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D-Min	D-Max	D-Min	D-Max	Leading	Center	Trailing
1	D00	1			NR	NR		NR	
2	D02	2			0.76	2.24		0.70	
3	D02	6			1.20	2.58		1.12	
4	D04	9			1.15	2.90		1.00	
5	D04	17			0.47	2.90		0.23	
6	D05	16			0.39	2.45		0.23	
7	D05	30			0.59	3.05		0.23	
8	D06	31			0.63	3.12		0.23	
9	D06	46			0.49	3.15		0.21	
10	D07	47			0.53	3.13		0.21	
11	D07	65			0.47	3.01		0.22	
12	D08	66			0.43	2.97		0.22	
13	D08	82			0.46	2.88		0.23	
14	A09E	86			NR	NR		0.23	
15	A09E	89			NR	NR		0.23	
16	D09	90			0.55	3.06		0.23	
17	D09	106			0.60	2.72		0.42	
18	A11E	109			NR	NR		0.41	
19	D17	110			0.71	3.00		0.46	
20	D17	115			0.88	2.93		0.57	
21	D16	116			0.66	2.56		0.50	
22	D18	123			0.40	2.82		0.22	
23	D20	124			0.39	2.51		0.23	
24	D20	153			0.60	3.09		0.25	
25	D21	154			0.50	2.58		0.25	
26	D21	176			0.51	2.71		0.22	
27	D22	177			1.11	3.38		0.26	
28	D22	190			0.48	2.87		0.25	
29	D23	191			0.54	2.81		0.27	
30	D23	214			0.72	2.93		0.28	
31	D24	216			NR	NR		0.24	
32	D24	224			0.51	1.76		0.48	
33	A25E	225			NR	NR		0.60	
34	D25	226			1.04	3.25		0.60	
35	D25	229			1.19	3.05		1.01	
36	A31	232			NR	NR		0.79	
37	A31	235			0.64	2.16		0.56	
38	D36	236			0.95	3.72		0.46	
39	D36	242			0.56	3.14		0.24	
40	D37	243			0.56	2.92		0.23	
41	D37	263			0.62	3.02		0.22	
42	D38	264			0.36	2.42		0.26	
43	D38	292			0.62	2.96		0.25	
44	D39	293			0.46	2.76		0.24	
45	D39	320			0.72	3.19		0.25	

[redacted]

Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D-Min		D-Min	D-Max	Leading	Center	Trailing
46	D40	321			0.49	2.75		0.25	
47	D40	344			0.67	2.91		0.33	
48	A41E	345			NR	NR		0.33	
49	A41E	346			NR	NR		0.36	
50	D41	347			0.73	3.06		0.41	
51	D41	352			0.81	3.01		0.37	
52	D42	353			0.66	3.06		0.35	
53	D42	357			0.72	3.07		0.36	
54	A43E	358			NR	NR		0.34	
55	A47E	359			NR	NR		0.27	
56		363			NR	NR		0.23	

NR denotes no reading made.

Limiting

D-Max Range 1.76-3.72
D-Min Range 0.39-1.20
Average D-Max 2.86
Average D-Min 0.66

Gross Fog Range
Average Gross Fog 0.37

PART IV. INDEX CAMERA

Mission No: 1002-1
Camera No: D15
Exposure Setting: f/4.5, 1/500 second

Filter: Wratten 21
Film Type: 9-3-63 (4404)
Evaluated By: [redacted]

1. Shutter Operation: The shutter rewind mechanism of the index camera operated out of proper sequence, causing the shutter to remain closed in 32 frames and to open but overexpose or multiple expose 35 frames. In addition, mis-metering occurred seven times.

2. Exposure: Adequate.

3. Camera Number: Well defined.

4. Film Metering: The film metering is normal.

5. Film Tracking: The film tracking is normal.

6. Reseau: Well defined on all frames which are not degraded by multiple exposures.

7. Light Leaks: None noted.

8. Static Electricity: Corona discharge marks occur in approximately 50 percent of the frames causing considerable degradation of imagery.

9. Pinholes: Few, scattered.

10. Abrasions and Scratches: None.

11. Tearing: None.

12. Watermarks: None.

13. Pressure Streaks: None.

14. Processing Streaks: None.

15. Blistering and Crimping: None.

16. Contrast: 6% low, 89% medium, 5% high.

17. Apparent Resolution: Good.

18. Apparent Graininess: Medium.

19. Photo Quality: Good.

20. Camera Operation: The index camera operated through the first 172 cycles. Starting with pass D21, frame 130, the ratio between the index and the master panoramic camera deviated from the nominal ratio of 1:7. Between pass D21 and pass D37 the ratio varied on 73 different occasions, with a maximum ratio of 1:38 in pass D23 between frames 176 and 214. In the middle of pass D37 the ratio reverted to normal and with the exception of three minor deviations in the first 51 panoramic frames of pass D38 the ratio remained normal for the balance of the mission. When the shutter rewind mechanism operated out of its proper sequence the platen was not in its proper position and consequently the reseau and terrain images are out of focus in approximately 75 frames.

21. PI Suitability: Good for the scale achieved except where quality of the photography is reduced by multiple exposure.

Remarks

1. The correlation lamps operated satisfactorily throughout the mission.

2. Density readings were taken on each pass, using a Macbeth QuantaLog Densitometer, Model EP 1000, with an ET attachment and an 0.5 mm aperture. The values are correlated below:

Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D-Min	D-Max	D-Min	D-Max	Titled	Center	Non-Titled
1	D00	1	NR	NR	0.55	2.27	0.17	0.17	0.17
2	D02	2	NR	NR	0.61	1.73	0.17	0.17	0.17
3	D02	8	0.91	1.70	0.56	1.76	0.13	0.13	0.14
4	D04	9	NR	NR	0.70	1.83	0.16	0.16	0.18
5	D04	17	0.58	1.05	0.36	2.24	0.09	0.20	0.09
6	D05	18	NR	NR	0.67	1.72	0.10	0.17	0.10
7	D05	30	0.75	1.00	0.65	2.10	0.10	0.23	0.10
8	D06	31	NR	NR	0.70	1.71	0.10	0.13	0.11
9	D06	46	0.75	1.47	0.46	2.03	0.10	0.29	0.10
10	D07	47	0.65	0.86	0.65	1.79	0.12	0.13	0.11
11	D07	65	0.66	1.36	0.66	1.38	0.12	0.14	0.12
12	D08	66	NR	NR	0.40	1.51	0.13	0.12	0.12
13	D08	82	1.10	1.37	0.64	1.68	0.10	0.10	0.10
14	A09E	88	NR	NR	NR	NR	0.14	0.13	0.12
15	A09E	89	NR	NR	NR	NR	0.17	0.13	0.14
16	D09	90	0.53	0.60	0.50	1.89	0.15	0.12	0.12
17	D09	106	NR	NR	0.63	1.86	0.12	0.13	0.12
18	A11E	109	NR	NR	NR	NR	0.14	0.13	0.12
19	D17	110	NR	NR	0.40	1.55	0.14	0.12	0.13
20	D17	115	NR	NR	0.79	1.68	0.11	0.11	0.11
21	D18	116	NR	NR	0.49	1.37	0.11	0.12	0.11
22	D18	123	0.47	1.16	0.39	1.49	0.11	0.10	0.11

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Reading	Pass	Frame	Terrain		Limiting		Gross Fog		
			D-Min	D-Max	D-Min	D-Max	Titled	Center	Non-titled
23	D20	124	0.52	1.30	0.50	1.66	0.13	0.09	0.11
24	D20	153	0.60	1.12	0.60	2.12	0.10	0.14	0.11
25	D21	154	NR	NR	0.26	1.48	0.11	0.06	0.08
26	D21	176	0.69	1.19	0.69	2.01	0.07	0.10	0.08
27	D22	177	NR	NR	0.60	1.65	0.09	0.06	0.05
28	D22	190	0.65	1.32	0.65	1.32	0.09	0.13	0.10
29	D23	191	0.42	0.63	0.42	1.90	0.16	0.14	0.10
30	D23	214	NR	NR	0.69	1.96	0.09	0.09	0.09
31	D24	216	0.74	0.86	0.60	1.89	0.12	0.09	0.08
32	D24	224	0.62	1.21	0.62	2.00	0.10	0.10	0.09
33	A25E	225	NR	NR	NR	NR	0.06	0.10	0.09
34	D25	226	0.59	1.18	0.59	1.96	0.10	0.10	0.10
35	D25	229	0.36	1.18	0.36	1.65	0.12	0.20	0.11
36	A31	234	NR	NR	0.21	1.24	0.13	0.20	0.17
37	A31	235	NR	NR	0.42	1.28	0.13	0.17	0.14
38	D36	236	0.59	0.64	0.59	1.90	0.16	0.16	0.19
39	D36	242	NR	NR	0.47	2.21	0.12	0.10	0.10
40	D37	243	0.54	0.62	0.54	1.68	0.11	0.09	0.10
41	D37	263	NR	NR	0.42	2.03	0.11	0.10	0.10
42	D38	264	NR	NR	0.42	1.51	0.13	0.12	0.11
43	D38	292	0.54	0.74	0.54	1.81	0.12	0.12	0.12
44	D39	293	NR	NR	0.60	1.52	0.12	0.10	0.13
45	D39	320	0.99	1.60	0.99	1.60	0.11	0.11	0.12
46	D40	321	0.41	0.64	0.41	1.01	0.11	0.09	0.11
47	D40	344	0.74	1.21	0.74	2.15	0.10	0.09	0.10
48	A41E	345	NR	NR	NR	NR	0.10	0.10	0.10
49	A41E	346	NR	NR	NR	NR	0.10	0.10	0.10
50	D41	347	NR	NR	0.55	1.93	0.10	0.10	0.11
51	D41	352	0.30	0.52	0.30	1.85	0.10	0.11	0.10
52	D42	353	1.14	1.62	1.14	1.62	0.12	0.14	0.13
53	D42	357	0.69	1.36	0.89	2.01	0.11	0.10	0.12
54	A43E	356	NR	NR	NR	NR	0.10	0.11	0.10
55	A47E	359	NR	NR	NR	NR	0.11	0.12	0.12
56	A47E	363	NR	NR	NR	NR	0.09	0.09	0.09

NR denotes no reading made.

Terrain

D-Max Range 0.60-1.70
D-Min Range 0.41-1.14
Average D-Max 1.11
Average D-Min 0.66

Limiting

D-Max Range 1.01-2.27
D-Min Range 0.21-1.14
Average D-Max 1.76
Average D-Min 0.58

Gross Fog Range 0.08-0.29
Average Gross Fog 0.12

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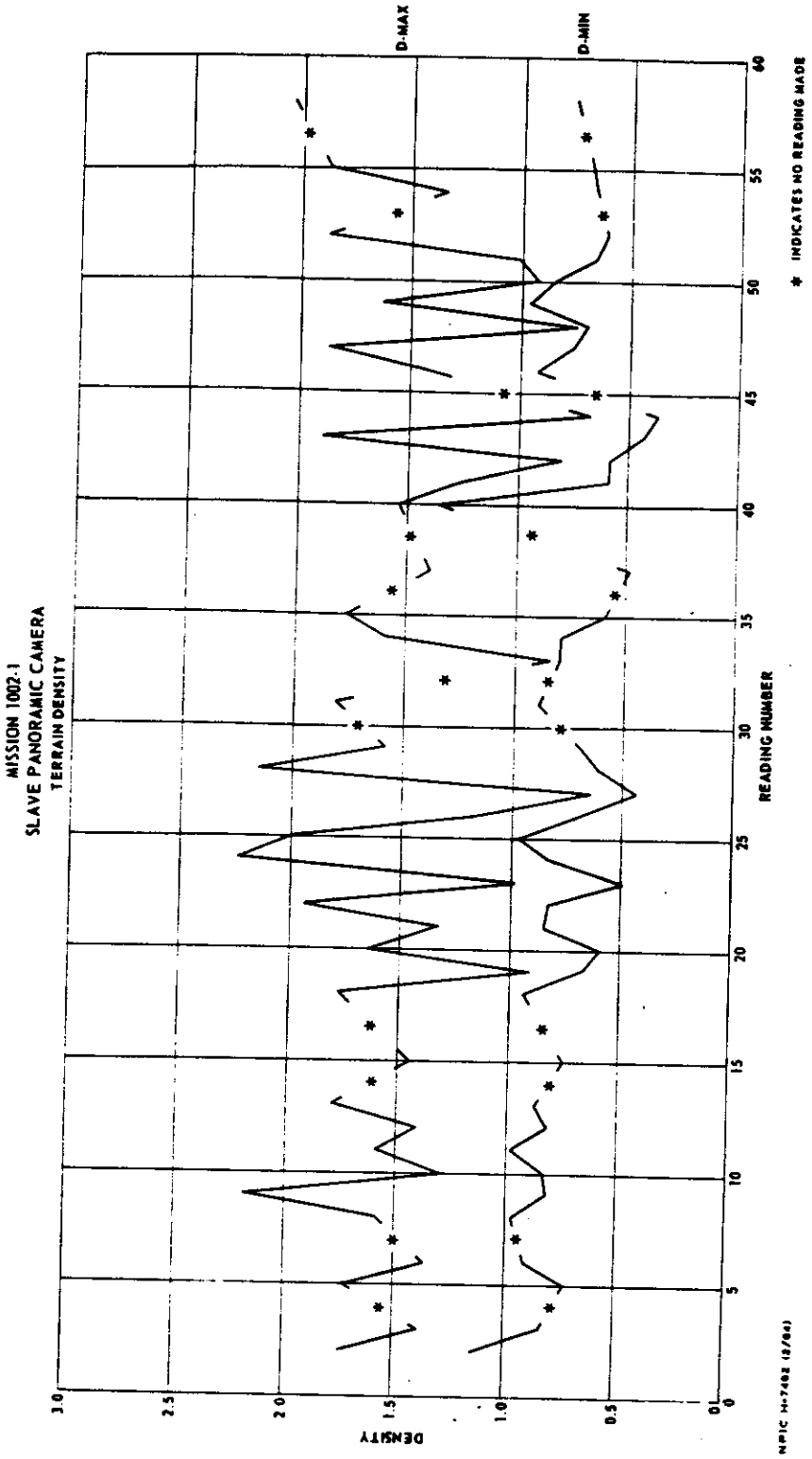
PART V. VEHICLE ATTITUDE

Pass	Pitch Range (All Minus Readings)	Pitch Variation	Roll Range	Roll Variation	Cumulative Frames
D00	11°31' 15°33'	4°02'	-0°55' -1°11'	0°16'	9
D02	15 26 15 45	0 19	-0 19 -0 36	0 17	49
D04	15 32 15 44	0 12	-0 26 -0 34	0 08	65
D05	15 34 15 46	0 12	-0°47' -0°55'	0 08	49
D05	15 39 15 54	0 15	-0 54 -1 09	0 15	94
D06	15 07 15 18	0 11	-1 16 -1 24	0 08	58
D06	15 10 15 44	0 34	-1 19 -1 35	0 16	111
D07	15 23 15 37	0 14	-0 55 -1 22	0 27	51
D07	14 53 15 55	1 02	-0 38 -1 22	0 44	131
D08	15 06 16 02	0 56	-0 03 -1 18	1 15	153
A09	NO DATA				
D09	15 06 15 46	0 40	-0 03 -1 37	1 34	132
A11E	NO DATA				
D17	15 23 15 38	0 10	-1 08 -1 21	0 13	44
D18	14 31 15 26	0 55	-0 29 -0 39	0 10	53
D20	13 49 15 57	2 06	-0 36 -1 20	0 44	206
D21	15 47 16 00	0 13	-0 50 -1 57	1 07	34
D21	14 37 16 01	1 24	-0 25 -0 32	0 07	73
D21	13 19 14 36	1 17	-0 33 -0 43	0 10	121
D21	12 53 13 17	0 24	-0 44 -0 55	0 11	165
D22	15 04 15 35	0 31	-1 03 -1 35	0 32	46
D22	14 17 15 05	0 48	-0 06 -0 27	0 21	99
D23	15 13 15 32	0 19	-0 25 -1 04	0 39	164
D23	12 41 14 06	1 27	-0 44 -1 10	0 26	226
D24	12 52 14 22	1 30	-0 05 -1 35	1 30	178
A25E	NO DATA				
D25	15 04 15 34	0 30	-0 24 -0 49	0 25	76
A27E	NO DATA				
A31	NO DATA				
D36	14 55 15 16	0 21	-0 45 -1 35	0 50	87
D36	14 44 14 54	0 10	-0 22 -0 47	0 25	74
D37	12 30 13 15	0 25	-0 52 -1 18	0 26	57
D37	13 19 13 50	0 31	-0 31 -0 51	0 20	204
D38	15 25 15 57	0 32	-0 09 -0 28	0 10	36
D38	14 51 15 26	0 16	-0 54 -1 23	0 29	92
D38	15 18 15 57	0 39	+0 27 -1 19	1 46	205
D39	15 05 15 30	0 25	+0 07 -0 32	0 39	39
D39	15 19 15 47	0 28	+0 16 -0 59	1 15	199
D40	12 56 14 36	1 40	-0 10 -1 04	0 54	166
A41E	NO DATA				
D41	15 01 15 09	0 08	-0 37 -0 56	0 19	44
D42	13 19 13 40	0 21	-0 56 -1 05	0 09	36
A43E	NO DATA				
A47E	NO DATA				
D47E	NO DATA				

[redacted]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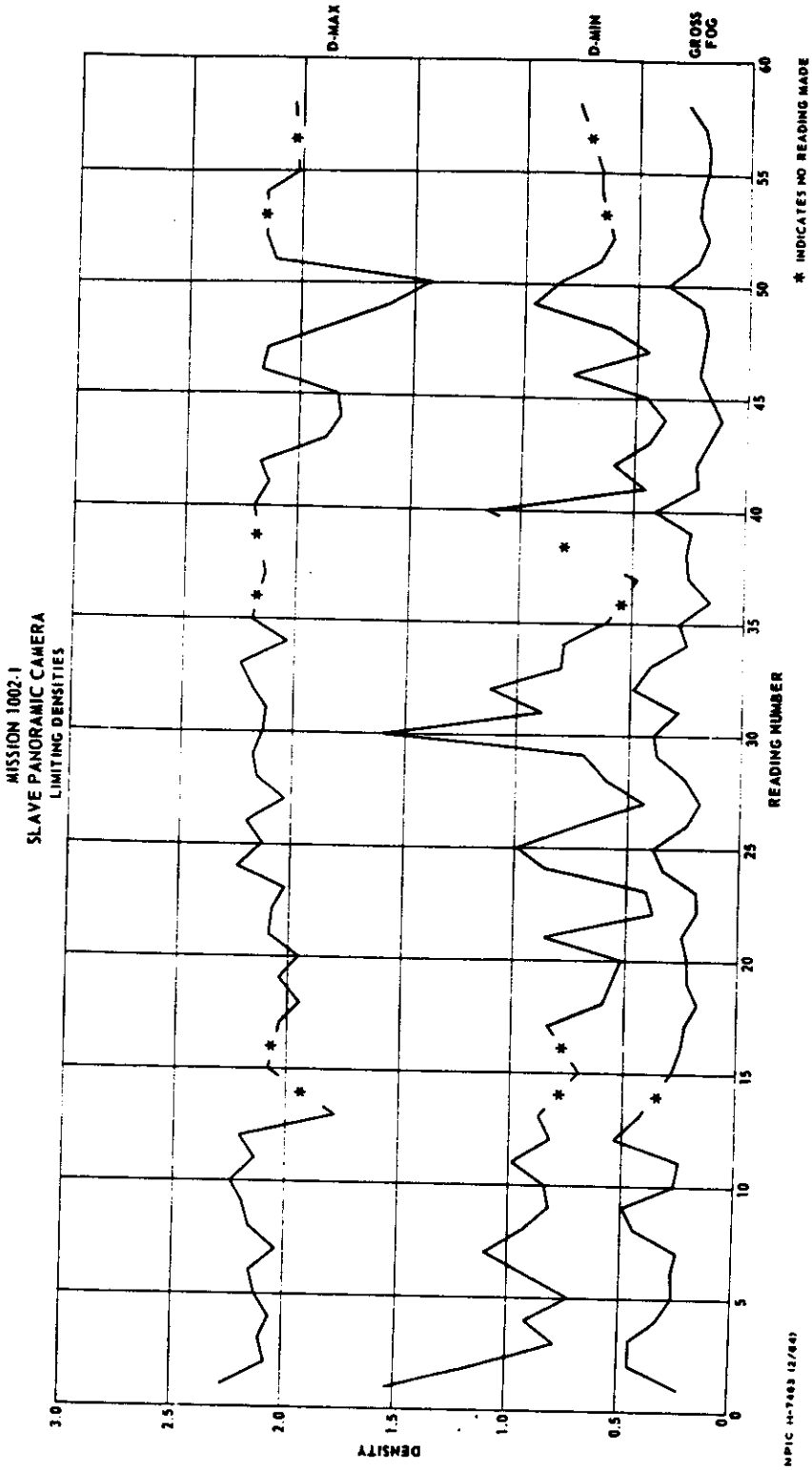
D-MIN
* INDICATES NO READING MADE
MISSION 1002-1
SLAVE PANORAMIC CAMERA
TERRAIN DENSITY
READING NUMBER
DENSITY
3.0
2.5
2.0
1.5
1.0
0.5
0.1
0
5
10
15
20
25
30
35
40
45
50
55
60


D-MAX
D-MIN
GROSS FOG
* INDICATES NO READING MADE
MISSION 1002-1
SLAVE PANORAMIC CAMERA
LIMITING DENSITIES
DENSITY
READING NUMBER
3.0
2.5
2.0
1.5
1.0
0.5
0
60
55
50
45
40
35
30
25
20
15
10
5
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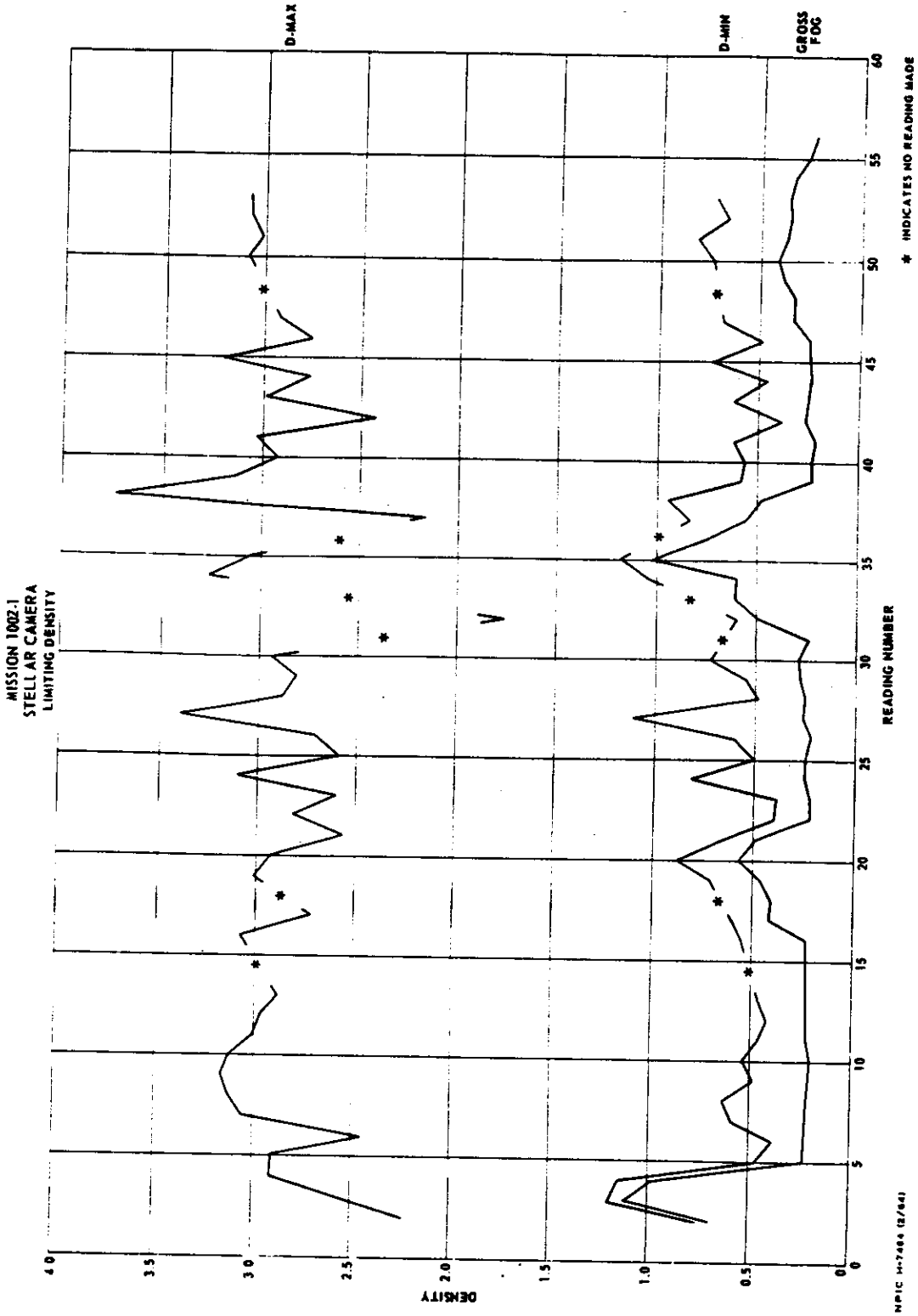
D-MAX
D-MIN
GROSS FOG
* INDICATES NO READING MADE
MISSION 1002-1
STELLAR CAMERA
LIMITING DENSITY
READING NUMBER
DENSITY
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
60
55
50
45
40
35
30
25
20
15
10
5
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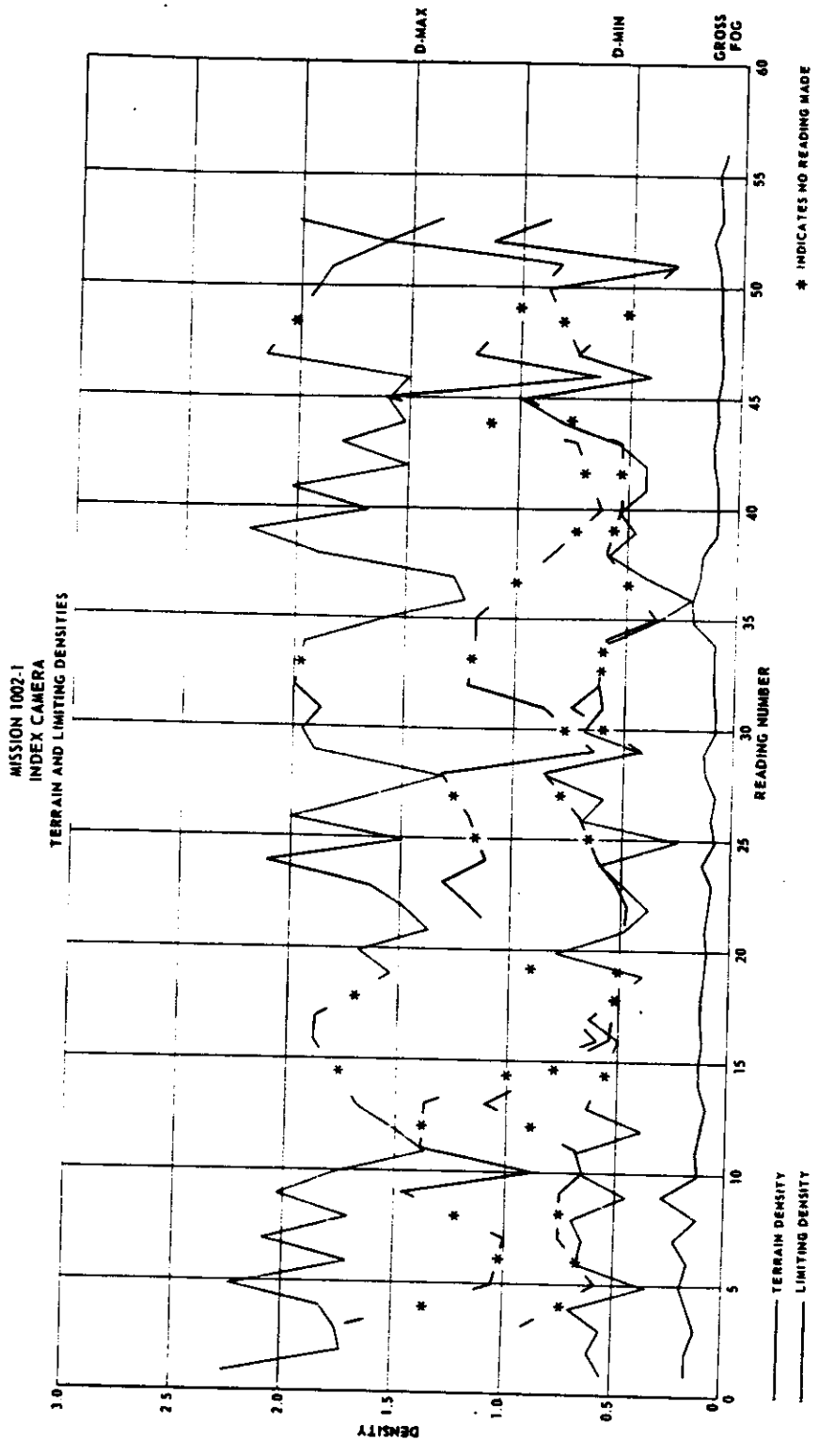
NPIC 1-7464 (2/64)


MISSION 1002-1
INDEX CAMERA
TERRAIN AND LIMITING DENSITIES
D-MAX
D-MIN
GROSS FOG
* INDICATES NO READING MADE
READING NUMBER
DENSITY
TERRAIN DENSITY
LIMITING DENSITY
NPIC H-7488 (2/64)