TECHNICAL PUB ATION

PHOTOGRAPHIC EVALUATION REPORT

MISSION 1026-1

28 OCTOBER - 2 NOVEMBER 1965

MISSION 1026-2

3-7 NOVEMBER 1965

[redacted]

FEBRUARY 1966

COPY [redacted]

105 PAGES

FORM NO. 238 REPLACES FORM 38-1 WHICH IS OBSOLETE
1 MAY 56

DOCUMENT CONTROL

HC (13-40) (MFG. 3-67)

SEC. CL.	ORIGIN	CONTROL NO.
~~S~~	NPIC	[redacted]

DATE OF DOC	DATE REC'D	DATE OUT	SUSPENSE DATE	CROSS REFERENCE OR POINT OF FILING
Feb 68	27 Mar	68		

TO OSP
FROM PHOTOGRAPHIC EVALUATION RE
SUBJ. 1020-1, MISSION 1016-2

cy [redacted] C/OSP

ROUTING	SENT

COURIER NO.	ANSWERED	NO REPLY		6

Notice of Missing Page(s)

Pages 2, 56, 66, and 68 of the original document were blank.

TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT
MISSION 1026-1
28 OCTOBER - 2 NOVEMBER 1965
MISSION 1026-2
3-7 NOVEMBER 1965

FEBRUARY 1966

NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF ILLUSTRATIONS

SYNOPSIS

Mission 1026 (J-25) was launched at 2116Z on 28 October 1965. Both portions of the mission (1026-1 and 1026-2) were recovered dry, in good condition, by air catch. The mission consisted of 67 operational, 11 domestic, and 4 engineering passes. All cameras operated properly throughout the mission.

Three minor malfunctions occurred in potentially dangerous areas. First, the sticking of a manufacturer's splice to a successive film wrap caused 4 frames of the forward-looking panoramic material, on the second portion of the mission, to be creased. This condition could have easily resulted in the jamming of the forward camera. Second, a shutter malfunction on 4 frames of stellar photography in Mission 1026-1 indicates that its operation was not positive. If it had failed completely, more than half of the stellar frames on the first portion of the mission would not have been recorded. Third, the least serious of the 3 anomalies was the intermittent failure of the center of format switch on the aft panoramic camera. This switch controls the recording of the binary word, camera number, and horizons on the aft record. It failed numerous times on the first portion of the mission but operated properly on the second part (1026-2).

The interpretation of the material is limited by cloud cover which degrades or obscures approximately 45 percent of the mission photography. Low solar elevations and cloud shadow also hamper its useability.

The quality of the photography is considered to be good, and an MIP of 85 was assigned.

The Trenton vs Yardleigh processor evaluation planned for the second half of the mission was inconclusive because of the high percentage of full-level processing used.

Due to a command error, the V/h programmer was not started on pass 87D of Mission 1026-2. Therefore, the photography was taken at the bottom of the V/h ramp and the imagery is affected by overexposure and displays excessive image motion. This pass consists of 37 forward and 37 aft frames.

GENERAL FLIGHT DATA

1. Launch and Recovery Dates

Launch Date, Mission 1026-1	28 October 1965, 2116Z
Recovery Date, Mission 1026-1	3 November 1965, 0012Z
Reactivation Date, Mission 1026-2	3 November 1965
Recovery Date, Mission 1026-2	7 November 1965, 2119Z

2. Orbital Parameters

	Mission 1026-1 (Rev 40)	Mission 1026-2 (Rev 150)
Period	90.615 min	90.254 min
Perigee	82.951 nm	85.[illegible] nm
Apogee	336.970 nm	335.[illegible] nm
Eccentricity	0.01996	0.01[illegible]
Inclination Angle	74.97°	74.98°
Perigee Latitude	16.97°N	28.11°N

3. Photographic Operations

	Mission 1026-1	Mission 1026-2
Operational Passes	32	32
Domestic Passes	6	5
Operational-Domestic Passes	3	3
Engineering Passes	2	2

4. Recovery Revolution

a. Mission 1026-1: 81
b. Mission 1026-2: 150

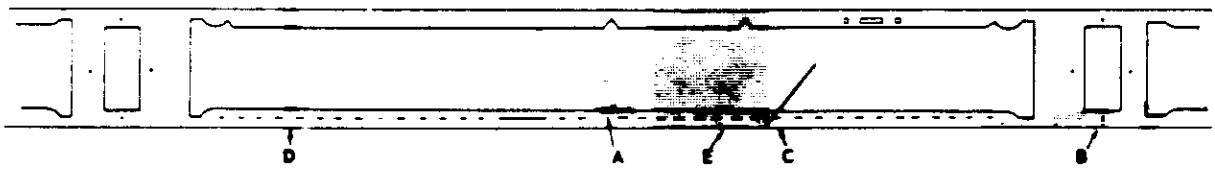
PART I. CAMERA OPERATIONS

1. Forward-Looking (Master) Panoramic Camera No 174

The forward-looking panoramic camera functioned properly throughout the mission. The photography is not affected by any major degradations. However, a few of minor severity are present.

a. The location of fog patterns caused by light leaks is illustrated below. These areas of fog are present throughout the mission, their density level being proportionate to the time span between camera operations. Although none are considered to be of a serious nature, action is being taken to eliminate them on future flights.

Approximate Location of Fog Patterns



A. 1st frame from start of pass.
B. 2nd frame from start of pass.
C. 3rd frame from start of pass.
D. 5th frame from start of pass.
E. 6th frame from end of pass.

b. Fine emulsion scratches are present under the camera number just inside the format at the binary edge. A series of extremely fine, short, emulsion scratches parallel to the major axis of the film is located under the camera number and in the bonus area at the take-up end of each frame. This raking is present across the width of the format at these locations.

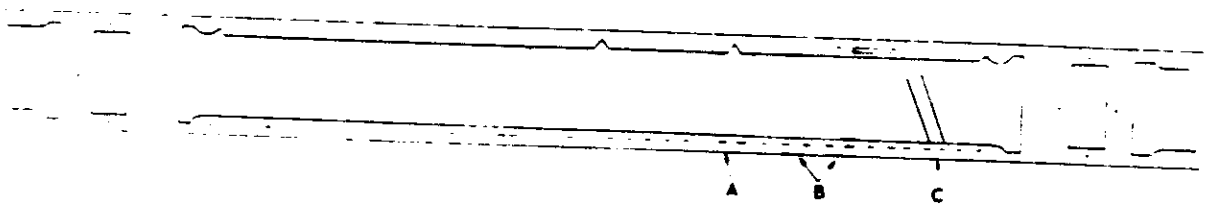
c. Traces of dendritic static discharges are present along the binary edge of the film in passes 5D, frames 35 thru 38; 51D, frames 25 thru 43; 52D, frames 1 thru 7; and 86D, frames 28 and 86. Static traces are present along the frequency mark edge of the film in pass 116D, frames 95 thru 96, and at both film edges in pass 8-D, frames 58 thru 112.

2. Aft-Looking (Slave) Panoramic Camera No 175

The aft-looking panoramic camera operated properly throughout the mission. The photography is not affected by any serious degradations. However, a few minor ones were noted.

a. The configuration of the fog patterns on the material is illustrated below. Elimination of the light leaks which cause these patterns is in progress. The fogged areas were present throughout the mission, and their density level is commensurate with the duration of the sit time between camera operations.

Approximate Location of Fog Patterns



A. [illegible] frame from start of pass.
B. [illegible] frame from end of pass.
C. [illegible] frame from end of pass.

- - -

b. Fine emulsion scratches are present just inside the format area under the camera number at both the binary and frequency mark edges. A series of extremely fine emulsion scratches, parallel to the major axis of the film, is located under the camera number and in the bonus area. These scratches form a raking pattern which is present across the width of the format at these locations.

c. Traces of dendritic static are present along the binary edge of the film in passes 7D, frame 3; 55D, frames 96 thru 111; and 56D, frames 9 thru 21. Both film edges contain static traces in pass -1D, frames - thru 16.

d. Streaks of minus density appear intermittently throughout the first half of the mission. In some instances, these streaks appear to follow the path of the field flatten. Others are parallel to the major axis of the film, and a few are randomly oriented. Examples can be found in passes 3D, frame 1, and 12D, frame 5.

3. Forward-Looking (Master) Horizon Cameras

Both master horizon cameras were operational throughout the mission. In the first pass (1D), the starboard horizon imagery is normal. From the second operational pass (3D) through pass 14D the imagery of this camera appears to be out-of-focus. When studied under magnification, the photography was discovered to display a sharp (in-focus) but veiled condition. The cause of this phenomenon, which has occurred on previous missions, is unknown. Most starboard horizons in part 2 of the mission are slightly to grossly overexposed. This heavy exposure is believed to be a combination of look angle and high reflectivity due to considerable cloud cover. An area of fog enters each starboard horizon format at the frequency-mark/supply corner. The level of fog is commensurate with the density of the horizon imagery. This area may result from a reflection on an external surface. The port horizon imagery is of good quality and the exposure is normal. Both horizons contain small traces of dendritic static. These occur intermittently along the frequency-mark edge of the format and affect neither the imagery nor the horizon area.

4. Aft-Looking (Slave) Horizon Cameras

Both slave horizon cameras were operational throughout the mission. The starboard horizon displayed a veiled condition on all passes from 1D through 116D. Veiling was so severe on the first half of the mission that it could not be determined whether the imagery was veiled or out-of-focus. This condition continued into the second half of the mission, where veiling gradually became less severe and cleared up by pass 117D.

Although this phenomenon has been experienced on previous missions, it is generally not present on the first pass and has always dissipated by the 25th pass. The condition experienced here is unusual in that it is present on the first pass and continues more than half way through the second bucket operation. The cause of this apparent veiling has not been determined but is being studied. Due to an intermittent malfunction of the center of format switch, several pairs of horizons were missing (see part 9 of this section for additional information). Both horizon formats contain small dendritic static traces. These occur intermittently along both the binary and frequency-mark edges of the format but affect neither the horizon imagery nor the arcs.

5. Stellar Camera No D75 Reseau No 93 (Mission 1026-1)

The stellar camera operated properly on all but 4 frames. The shutter did not open on frames 182 and 183. Frame 184 is slightly over-exposed. However, star images are detectable. Frame 185 is grossly overexposed. The area between frames 184 and 185 is fogged, indicating that the stellar shutter failed while in an open position on frame 184, remained open during film transport, and closed only after frame 185 had received an extremely long exposure. The stellar frame correlation with the forward-looking (master) camera for these frames is:

Mission 1026-1

Stellar Frame No.	Pass	Forward-Looking Camera Frame	Total Frames
177	30D	6	
178	30D	13	
179	30D	20	
180	30D	27	
181	30D	34	
182	30D	41	41
183	31D	7	
184	31D	14	20
185	34M	1	
186	34M	8	

The density level of the flare is low, and stellar images are detectable throughout the format area. The stars generally appear doubled or elongated, indicating slight vehicle instability. This vacillating is minor and within system specifications. Handling marks degrade frames 378 through 381, and a plus density streak with associated emulsion cracking is located between the correlation mark and the stellar format on frames 357 through 384. Film supply was depleted prior to mission completion, the last titled frame being 404. Approximately the last 2 feet of film were fogged and abraded due to runout. The quality of the stellar imagery is considered to be good, and no major problems were encountered in the stellar reduction. Streaked images, believed to be particles of crystallized jettisoned fuel, are present on the first 18 frames. A few isolated particles appear at random thereafter through the first half of the mission.

6. Stellar Camera No D72 Reseau No 85 (Mission 1026-2)

The stellar camera functioned properly through film exhaustion, the last titled frame being 388. The star images are of good quality although most are elongated or doubled. The last 30 frames are abraded due to runout, the last half of these being severely abraded. Emulsion cracks parallel to the minor axis are present throughout the material. A row of plus density dots with associated emulsion cracking is located 0.1 inch from the correlation mark edge of the film. These dots are spaced 1.58 inches apart and occur throughout the material. An irregular area of minus density located near the center of the format is imaged on every frame. It is believed to be caused by an obstruction on the reseau plate.

7. Index Camera No D75 Reseau No 92 (Mission 1026-1)

The index camera operated well throughout the mission, and the photographic quality is good. Some frames contain an image of a portion of the edge of the reseau. These images are caused by internal light scatter within the glass being refracted by the edge of the reseau to form an outline of its edge.

8. Index Camera No D72 Reseau No 89 (Mission 1026-2)

The index camera functioned properly throughout the mission, providing 434 titled frames. Two small minus density dots, caused by specks of foreign matter on the grid throughout the mission, and runout-induced fog on the final 2 frames are the only degradations. The quality of the imagery is considered to be good.

9. Associated Equipment

This equipment records part of the information required for correlation and mensuration of the panoramic cameras.

a. No binary word was recorded on the following forward-looking frames.

Pass	Frame
1D	3
37D	97
100D	35
130D	3
148D	21

b. An intermittent malfunction of the center of format switch on the aft-looking camera resulted in the camera number, binary word and index marks, and horizon exposures and fiducials (when required) not being recorded on the following frames. No pulse was skipped in the frequency-mark track on these frames, indicating that the clock was not interrogated.

Pass	Frames
3D	11, 12
6D	108, 139
7D	50
8D	16
19D	42
24D	51-56
37D	5, 6
38D	10-19 and 63-66
39D	58, 59 and 63-68
40D	37-43 and 63
52D	52, 53 and 62-72
53D	105
54D	1, 48
68D	26-29, 92, and 93
70D	21
82D	1
88D	12
111D	21
150D	75 and 76 present but smeared due to runout

FIGURE 1. DESCRIPTION OF PHOTOGRAPHIC DATA

The data pertaining to photographs contained in this publication are defined as follows:

PASS: A pass is the operational portion of an orbital revolution. A suffix D indicates that the photography was acquired during the descending portion, a suffix A indicates that the photography was acquired during the ascending portion, and a suffix M indicates that the photography was acquired during a pass that includes both ascending and descending portions. An additional suffix E indicates that the pass was an engineering operation or that a portion of the pass has been edited.

DATE OF PHOTOGRAPHY: The date of photography indicates the day, month, and year (GMT) that the photography was acquired.

UNIVERSAL GRID COORDINATES: These coordinates are included to locate the illustrated photography within the panoramic format.

ENLARGEMENT FACTOR: The enlargement factor is included to indicate the number of diameters the original material has been enlarged in the photographic illustration.

GEOGRAPHIC COORDINATES: These coordinates are included to indicate the latitude and longitude of the center of the panoramic format.

ALTITUDE: This measurement is the vertical distance from the vehicle to the Hough Ellipsoid at the time of the acquisition of the photography.

PITCH: Rotation of the camera about its transverse axis. Using appropriate aeronautical terminology, positive readings indicate nose-up attitude and negative readings indicate nose-down attitude.

ROLL: Rotation of the camera about its longitudinal axis. Using appropriate aeronautical terminology, positive readings indicate left wing-up attitude and negative readings indicate right wing-up attitude.

YAW: Rotation of the camera about its vertical axis. Positive readings indicate counterclockwise rotation when viewing the ground nadir from the vehicle-mounted camera in flight.

LOCAL SUN TIME: This time is included to present to the viewer a realistic time of acquisition of the photography illustrated.

SOLAR ELEVATION: The solar elevation is the angular elevation of the sun above a plane tangent to the surface of the earth at the center of the panoramic format. A negative solar elevation indicates that the sun is below the plane.

SOLAR AZIMUTH: The solar azimuth is the angular measurement of the rays of the sun measured from true north in a clockwise direction.

EXPOSURE: The exposure is the duration of the photographic exposure expressed in a fraction of a second and is computed from the scan rate and slit width.

PROCESSING LEVEL: The particular degree of development given to the film to attain negatives of the highest possible quality. Three levels of processing, Primary, Intermediate, and Full, are currently employed.

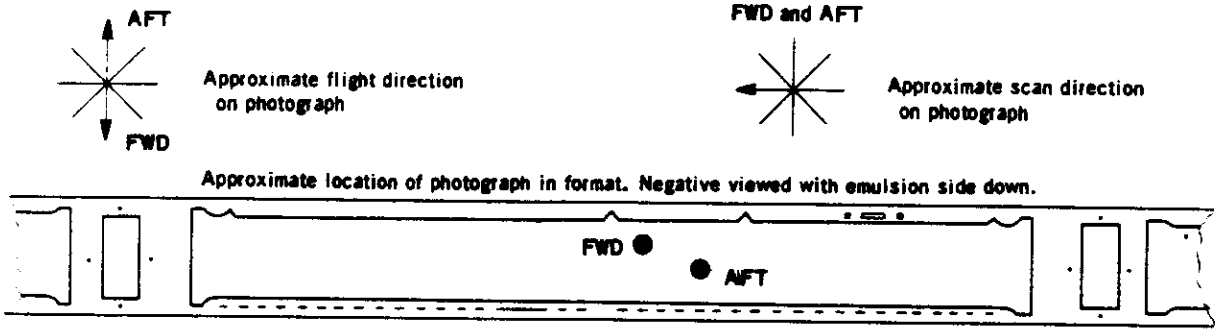
VEHICLE AZIMUTH: The clockwise measurement from true north to the longitudinal axis of the vehicle heading.

FIGURES 2 AND 3. EXAMPLE OF GOOD QUALITY PHOTOGRAPHY

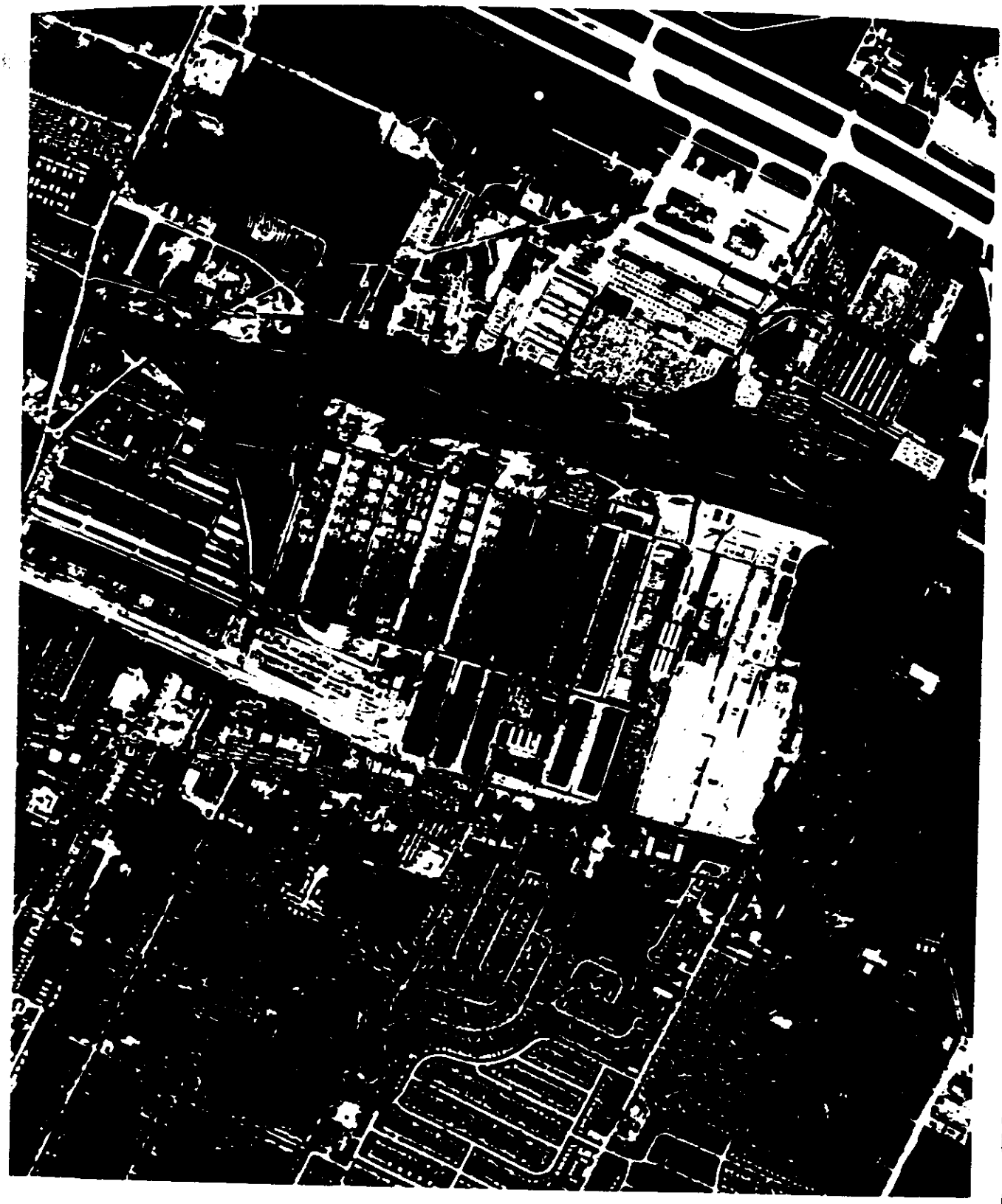
The industrial complexes illustrated here indicate the good quality of the photography throughout the mission. The acuity of the aft-looking material is slightly better than that of the forward-looking.

NPIC K-6170 (2/66) NPIC K-6171 (2/66)

	FIGURE 2	FIGURE 3
Camera	Fwd-Looking	Aft-Looking
Pass	14D	46D
Frame	5	11
Date of Photography	29 Oct 65	31 Oct 65
Universal Grid Coordinates	48.5 - 13.5	56 - 10.1
Enlargement Factor	20X	20X
Geographic Coordinates	39-53N 82-59W	39-09N 94-14W
Altitude (feet)	645,120	616,220
Camera:		
Pitch	14°29'	-15°12'
Roll	0°18'	0°7'
Yaw	0°2'	0°9'
Local Sun Time	1241	1217
Solar Elevation	33°43'	35°13'
Solar Azimuth	192°	186°
Exposure (fractions of second)	1/111	1/177
Processing Level	Full	Full
Vehicle Azimuth	159°50'	160°36'



[redacted]



[redacted]

[redacted]

~~TOP SECRET RUFF~~

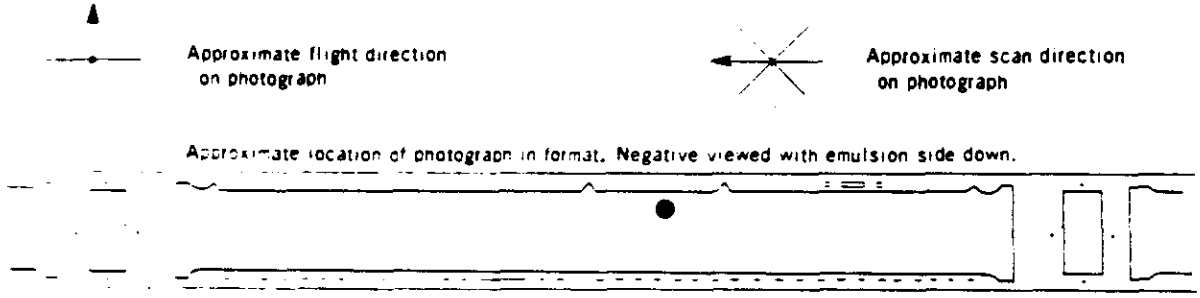
~~NO FOREIGN DISSEM~~

[redacted]

FIGURE 4. EXAMPLE OF IMPROPER IMC

The image smear, which is easily detectable on the accompanying photography, is the result of improper IMC. Due to a command error, the V/h programmer was not started for this pass. Therefore, the photography was accomplished at the bottom of the V/h ramp.

Camera	Aft-Looking
Pass	87D
Frame	34
Date of Photography	3 Nov 65
Universal Grid Coordinates	55 - 14
Enlargement Factor	20X
Geographic Coordinates	39-19N 49-28E
Altitude (feet)	597,158
Camera:	
Pitch	-15°10'
Roll	-0°9'
Yaw	Not Available
Local Sun Time	1216
Solar Elevation	31°52'
Solar Azimuth	138°
Exposure (fractions of second)	1/79
Processing Level	Full
Vehicle Azimuth	160°23'



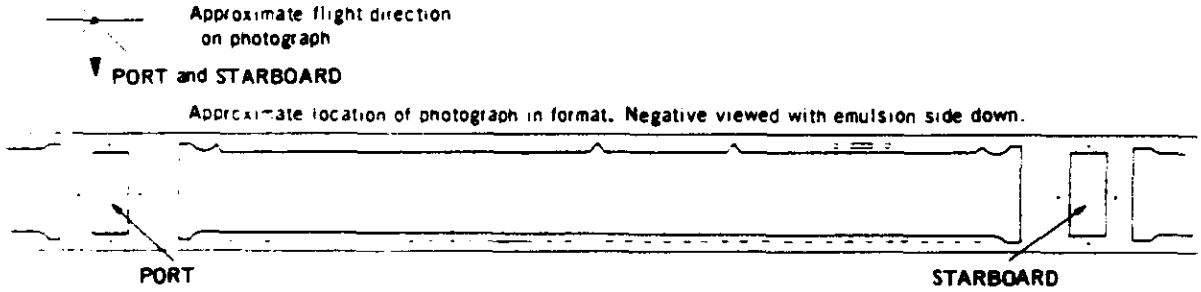
[redacted]

FIGURES 5 AND 6. EXAMPLE OF NORMAL AND VEILED HORIZON IMAGERY OF THE FORWARD HORIZON CAMERAS

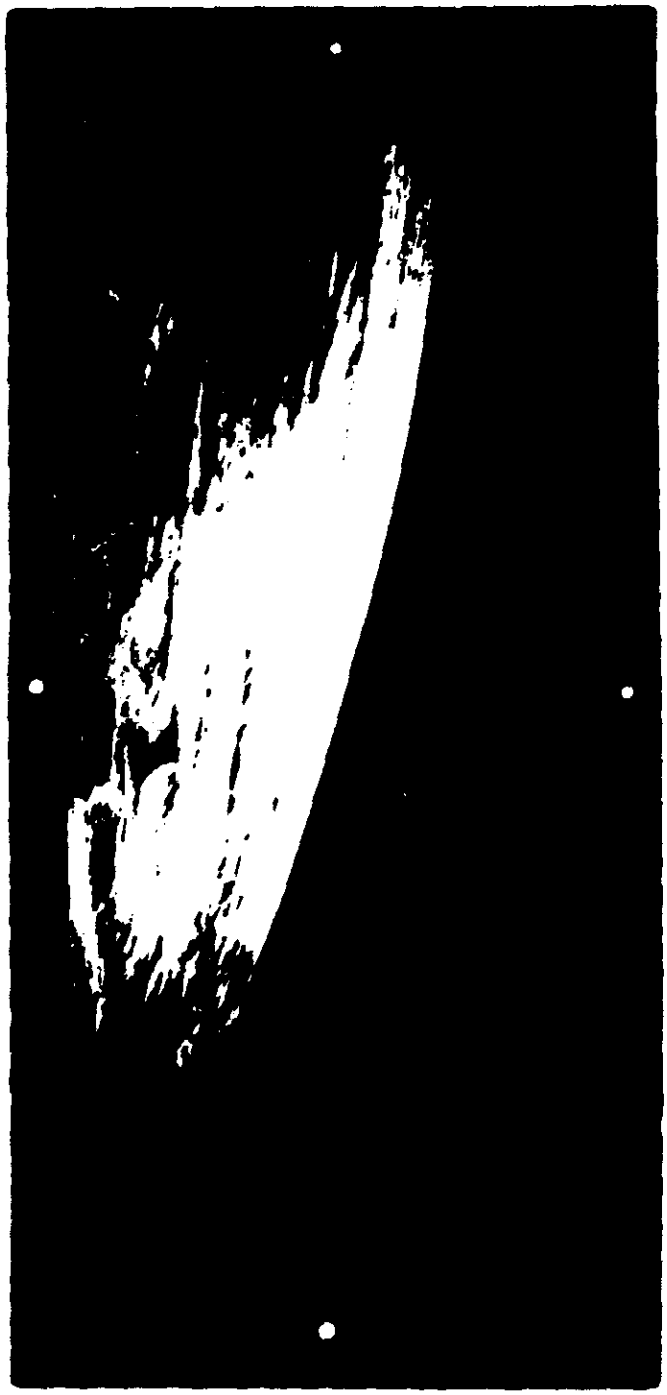
The port horizon appears normal while the starboard horizon of the same panoramic frame displays a veiled condition. This veiling is present on passes 3D through 14D on the material of the forward starboard horizon camera.

NPIC K-6173 (2/66) NPIC K-6174 (2/66)

	FIGURE 5	FIGURE 6
Camera	Fwd Port Horizon	Fwd Starboard Horizon
Pass	6D	6D
Frame	152	152
Date of Photography	29 Oct 65	29 Oct 65
Universal Grid Coordinates	5.5 - 12	87 - 12
Enlargement Factor	3X	3X
Geographic Coordinates of Vehicle Nadir	31-59S 117-52E	31-59S 117-52E
Altitude (feet)	721,528	721,528
Camera:		
Pitch	14°41'	14°41'
Roll	0°3'	0°3'
Yaw	-1°9'	-1°9'
Local Sun Time	1449	1449
Solar Elevation	46°21'	46°21'
Solar Azimuth	154°	154°
Exposure (fractions of second)	1/100	1/100
Processing Level	Intermediate	Intermediate
Vehicle Azimuth	162°15'	162°15'



[redacted]



[redacted]

Handle Via
~~TALENT-KEYHOLE~~
Control System Only

[redacted]

Handle Via
~~TALENT-KEYHOLE~~
Control System Only

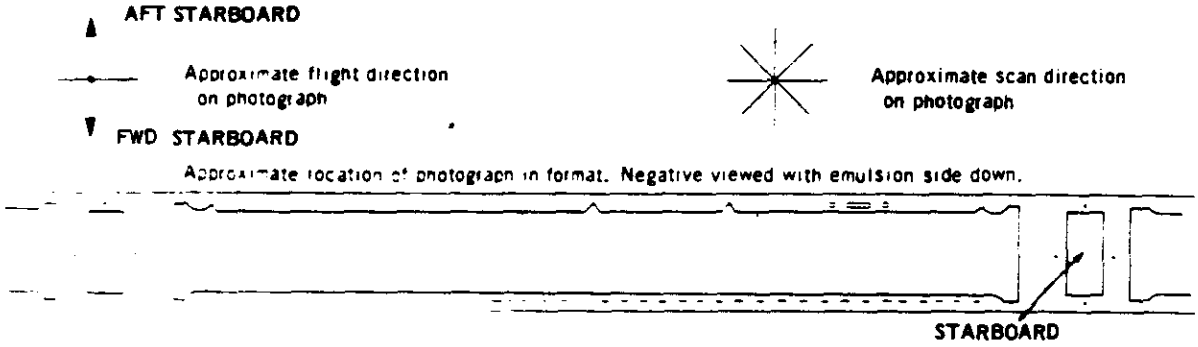
[redacted]

FIGURES 7 AND 8. EXAMPLE OF NORMAL AND VEILED HORIZON IMAGERY OF THE FWD AND AFT STARBOARD HORIZON CAMERAS

The veiled condition of the aft starboard horizon can be compared with the normal condition of the fwd starboard horizon. These photographs were taken at approximately the same time. It is felt that the difference in look angle (fwd vs aft) of the horizon cameras accounts for the variance in the quality.

NPIC K-6178 (2/66) NPIC K-6178 (2/66)

	FIGURE 7	FIGURE 8
Camera	Fwd Starboard Horizon	Aft Starboard Horizon
Pass	84D	84D
Frame	13	13
Date of Photography	3 Nov 65	3 Nov 65
Universal Grid Coordinates	87 - 12	5.5 - 12
Enlargement Factor	3X	3X
Geographic Coordinates of Vehicle Nadir	41-39N 116-59E	41-39N 116-59E
Altitude (feet)	601,654	601,793
Camera:		
Pitch	14°30'	-15°30'
Roll	-0°4'	-0°4'
Yaw	Not Available	Not Available
Local Sun Time	1214	1214
Solar Elevation	34°43'	33°52'
Solar Azimuth	184°	184°
Exposure (fractions of second)	1/100	1/100
Processing Level	Full	Full
Vehicle Azimuth	159°46'	159°46'



[redacted]

[redacted]

Handle Via
~~TALENT KEYHOLE~~
Control System Only

[redacted]

Handle Via
~~TALENT KEYHOLE~~
Control System Only

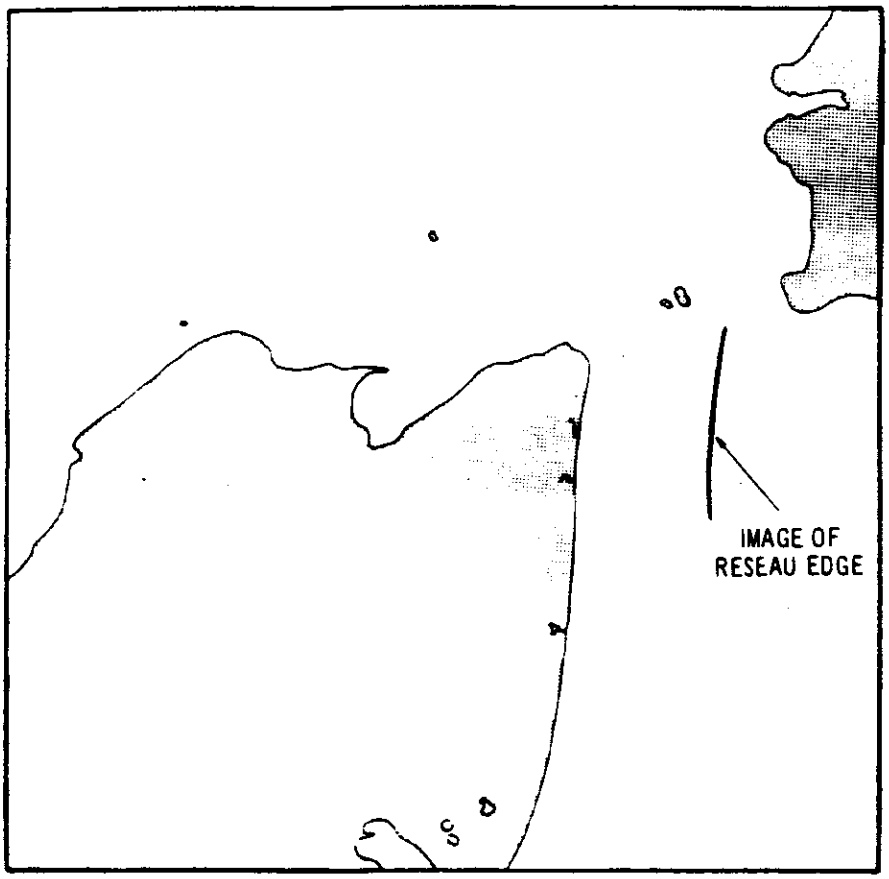
[redacted]

FIGURE 9. QUALITY OF INDEX PHOTOGRAPHY ON MISSION 1026-1

The quality of the index photography of Mission 1026-1 is shown here. The location of the image of the reseau edge is indicated in the drawing on page 10 1.

NPIC K-6177 (2/66)

Camera	Index (1026-1)
Pass	64D
Frame	351
Date of Photography	1 Nov 65
Enlargement Factor	2X
Geographic Coordinates	65-28N 166-48W
Altitude (feet)	662,898
Camera:	
Pitch	15°7'
Roll	0°5'
Yaw	-0°2'
Local Sun Time	1030
Solar Elevation	9°24'
Vehicle Azimuth	141°32'



[redacted]

[redacted]

FIGURE 10. EXAMPLE OF MALFUNCTION OF THE STELLAR UNIT ON MISSION 1021-1

Those frames involved with the slight malfunction of the stellar camera are illustrated. This anomaly is described in Part I, section 5, of this report. The frames on which the malfunction occurred are 182, 183, 184, and 185.

NPIC K-6178 (2/66)

Camera	Stellar (1026-1)
Pass	30D & 31D
Frame	180 - 185
Date of Photography	30 Oct 65
Enlargement Factor	Contact
Exposure (second)	2

[redacted]

[redacted]

PART II. FILM

1. Film Processing

This section provides an evaluation of exposure, processing, and densities of the original negatives from Mission 1026.

a. The following slit width and filter combination were employed on the panoramic cameras in this mission.

	Slit Width	Filter
Forward-Looking Camera	0.225"	25
Aft-Looking Camera	0.150"	21

Solar elevations ranged from -4°48' to 72°57' on operational photography. About 35 percent of the photography was accomplished with solar elevations of 20 degrees or less. The processing contractor reported that densities read on the original negatives of this mission ranged lower than normally observed on previous missions even though most of this mission received the full level of processing. Although the same slit width and filter combinations were utilized on missions 1023 and 1024, it is felt that this mission received less exposure because of the difference in solar elevation. Also, due to the high percentage of cloud cover, a larger amount of photography than usual was accomplished of areas in cloud shadow. It is felt that additional exposure would have helped those areas affected by low solar elevation and/or cloud shadow. An increase in exposure would not have hindered the photography in areas of relatively high solar elevation and good weather conditions, and would have enabled more processing to be carried out at a lower level, reserving the full processing level for special areas. The exposure level of the index photography appeared slightly less than usual, indicating a lower level of illumination throughout the mission. The exposure of stellar photography is considered to be good.

SOLAR ELEVATION OF FORWARD-LOOKING FRAMES

Pass	Solar Elevation Less than 10°	Solar Elevation 10° to 20°	Solar Elevation Greater than 20°
1D	1-27	28-45	
3D	1-28	29-39	40-58
5D	1-5	6-49	50-87
6D			1-169
7D		1-14	15-79
8D	1	2-67	68-72
9D		1-9	10-90
14D			1-95
16D			1-11
19D	1-29	30-51	
20D	1-10	11-74	
21D			1-108
23D		1-19	20-72
24D		1-12	12-101
25D			1-31
26D			1-79
30D			1-41
31D			1-20
34M	1-84	85-93	
35M	1-76	77-85	
37D		1-13	14-164
38D			1-153
39D	1-19		20-109
40D		1-19	20-98
41D			1-61
46D			1-21
47DE			1-19
51D		1-45	
52D			1-72
53D		1-34	35-105
54D	1-32	33-65	66-91
61D			1-17
63D			1-16
64D	1-19		
66D			1-20
68D	1-51	52-69	70-125
69D	1-29	30-86	87-114
70D			1-42
72D		1-31	32-129
76D			1-16
79D			1-11
82D		1-6	7-40
83D			1-34

SOLAR ELEVATION OF FORWARD-LOOKING FRAMES
(cont'd)

Pass	Solar Elevation Less than 10°	Solar Elevation 10° to 20°	Solar Elevation Greater than 20°
84D			1-123
85D	1-6	7-68	69-121
86D	1-6	7-68	69-135
87D			1-37
88D		1-22	23-131
89D			1-82
94D	1-21		22-62
95D	1-35		
98D	1-2	3-41	
99D	1-23	24-62	63-90
100D	1-2	3-65	66-104
101D	1-54	55-78	
102D		1-39	40-82
103D		1-52	53-159
104D		1-26	27-91
105D			1-48
110D			1-20
116D	1-37	38-84	85-158
117D	1-2	3-65	66-105
118D		1-42	43-91
119D			1-62
120D		1-2	3-42
126D			1-21
130D		1-27	28-57
131D	1-55	56-75	76-131
132D	1-30	30-94	95-122
133D		1-48	49-126
134D		1-42	43-105
135D		1-49	50-78
142D			1-11
144D			1-18
148D		1-38	39-159
149D		1-54	55-71
150D		1-40	41-78
151D		1-42	

b. The entire footage from both the forward and aft panoramic cameras on the first half of the mission (1026-1) was processed in the Trenton processor. This machine employs infrared detection densitometry to determine the optimum level of development. Seventeen processing changes were required for the forward and 12 for the aft material. The percentages of Mission 1026-1 processed at the various levels are as follows:

Development Level	Forward	Aft
Primary	0	0
Intermediate	20.8	4.2
Full	79.2	95.8

c. Approximately half of the material from both panoramic cameras on the second portion of the mission (1026-2) was processed in the Yardleigh processor in order to determine the advantages or disadvantages of this machine. The Yardleigh is a frame-by-frame processor capable of changing the processing level for each frame according to the Dmin value as read by infrared densitometry. It utilizes the same 3 levels of processing as the older Trenton machine but provides an immediate, rather than gradual, change in development level. The Trenton requires up to 40 feet of film in which to complete an entire processing level change. Through the primary level of development, the operation of the Yardleigh is the same as that of the Trenton; both employ the spray technique. The full and intermediate levels of development in the Yardleigh, however, are accomplished by utilizing the developing agent suspended in a viscose medium. The application of the viscose developer is automatically controlled according to the density of the negative as read by an infrared densitometer. Changes in processing levels are almost instantaneous, affording frame-by-frame control of the processing level. The forward and aft panoramic material from the first half of Mission 1026-2 was processed in the Trenton. The second half of each panoramic camera was processed in the Yardleigh. The percentages processed at the various levels for each machine are as follows:

First Half	Mission 1026-2	Trenton Processor
Development Level	Forward	Aft
Primary	0%	0%
Intermediate	5%	4%
Full	95%	96%
Number of Processing Level Changes	4	4

Second Half	Mission 1026-2	Yardleigh Processor
Development Level	Forward	Aft
Primary	3%	4%
Intermediate	5%	6%
Full	92%	90%
Number of Processing Level Changes	109	93

Because of the high percentage of full processing, an evaluation of the advantages or disadvantages of the Yardleigh processor is impossible. No difference in the quality of the material processed in either machine was detected. It was necessary to cut the panoramic film to enable the processing to be accomplished on the 2 machines. A night engineering pass was programmed to provide approximately 25 feet of blank footage in which to perform this cut. Since there is no accurate way of determining film footage prior to processing without jeopardizing the safety of the material, only a rough judgement regarding the location of this blank footage could be made. The cut in the forward-looking panoramic film was accomplished in frame 53 of pass 102D. This is 30 frames, or approximately 75 feet, before the blank footage. The aft-looking film was cut in frame 130 of pass 103D. This cut came 103 frames, or about 260 feet, after the blank material. Considering the method employed to determine the correct location for the cut, the areas chosen were suprisingly close. Although the cuts did fall in an area of imagery, the amount of film degraded is less than that normally covered by a manufacturer's splice.

2. Physical Film Degradations

Emulsion digs, scratches, pinholes, and handling marks are minor and considered nominal on the panoramic and index material. Handling marks degrade frames 378 thru 381 of the stellar material from Mission 1026-1. A biased crease, indented from the base side of the film, begins 0.8 inch from the frequency-mark edge of forward panoramic frame 43 of pass 100D. It continues and runs off the film at the frequency-mark edge in frame 46. Compressive forces caused the adhesive of a manufacturer's splice in frame 51 to cold flow and adhere to a successive film wrap. This caused a momentary hesitation in the film supply which created a tension transient and allowed the film to crease during transport. An adhesive transfer is present in frame 52, 4 feet 4.5 inches from the splice. Other manufacturer's splices on the forward material are located in passes 21D, frame 9; 38D, frame 150; 72D, frame 30, 126D, frame 8; and on the aft material in passes 30D, frame 35; 70D, frame 3; 104D, frame 12. The last frame of the aft and the last 2 frames of the forward panoramic material were severly abraded due to runout.

3. Film Footage

Camera	Footage	Frames
Forward-Looking Panoramic Camera No 174 Mission 1026-1	8030	2923
Aft-Looking Panoramic Camera No 175 Mission 1026-1	8103	2954
Stellar Camera No 75 Mission 1026-1	45	404
Index Camera No 75 Mission 1026-1	91	416
Forward-Looking Panoramic Camera No 174 Mission 1026-2	*	3023
Aft-Looking Panoramic Camera No 175 Mission 1026-2	*	2993
Stellar Camera No 72 Mission 1026-2	40	388
Index Camera No 72 Mission 1026-2	91	434

*Because the Trenton and Yardleigh processors were used for both the forward and aft panoramic material, only the total of all panoramic footage is available. Forward plus aft footage is 15,908 feet.

PART III. IMAGE QUALITY

1. Definition of Photographic Interpretation (PI) Suitability

PI suitability is an assessment of the information content of photographic reconnaissance material and its interpretability. A number of interrelated factors are involved, such as the quality of the photography, the extent of target coverage, scale, and weather limitations. However, the fundamental criteria for assigning a PI suitability rating may be reduced to (a) the scope of the photographic coverage and (b) the degree to which a photographic interpreter may extract useful and reliable information from the material.

PI suitability ratings are: Excellent, Good, Fair, Poor, and Unuseable. These ratings refer to the overall interpretive value of the photography obtained from a particular reconnaissance mission. Individual targets may also be assigned PI suitability ratings. The standards that determine assignment of the various ratings are:

Excellent: The photography is free of degradations by camera malfunctions or processing faults, and weather conditions are favorable throughout. The imagery contains sharp, well-defined edges and corners with no unusual distortions. Contrast is optimum and shadow details, as well as details in the highlight areas, are readily detectable. Observation of small objects and a high order of mensuration are made possible by the consistently good quality of the photography.

Good: The photography is relatively free of degradation or limiting atmospheric conditions. Edges and corners are well defined. No unusual distortions are present. Detection and accurate mensuration of small objects are feasible, but to a lesser degree than in material rated as Excellent.

Fair: Degradation is present, and the acuity of the photography is less than optimum. Edges and corners are not crisply defined, and there is loss of detail in shadow or highlight areas. Detection and identification of small objects are possible but accuracy of mensuration is limited by the fall-off in image quality and the less-than-optimum contrast.

Poor: Camera-induced degradations or weather limitations severely reduce the effectiveness of the photography. Edges and corners are not well defined. Only gross terrain features and culture may be detected or identified and distortion of form may exist. Accurate mensuration of even large objects is doubtful.

Unuseable: Degradation of photography completely precludes detection, identification, and mensuration of cultural details.

2. PI Suitability, Missions 1026-1 and 1026-2

The PI suitability of Missions 1026-1 and 1026-2 is considered to be fair to poor due to adverse weather conditions which greatly limited the informational content of both portions of the mission. Cloud cover degraded or obscured approximately 40 percent of the photography on Mission 1026-1 and about 47 percent on 1026-2. Only 246 targets were reported in the preliminary readout. The interpretability of most of these targets was reduced by scattered clouds, cloud shadow, haze, and other atmospheric influences. Photography in the extreme northern latitudes was restricted in informational content by the low solar elevations at this time of the year. Photography in areas of low solar elevation and in cloud shadow was reported to appear grainy. Such an appearance is directly attributed to the low level of illumination and, hence, the lack of sufficient exposure. Industrial haze, obliquities of greater than 25 degrees, and reduced scale of the photography, or a combination thereof, also hampered the interpretation of some targets.

The photographic interpreters reported that, for the most part, the quality of the photography in the domestic areas was good, withstanding enlargement of 40 times. However, due to the aforementioned degrading influences, the greater portion of the operational photography was considered to be of fair to poor quality. With this type of weather conditions, such a rating is to be expected.

3. Definition of Mission Information Potential (MIP)

The MIP is an arbitrary number, not limited by terminal values, which is subjectively assigned to the panoramic photography of a mission and which compares it to the other missions. It is meant to be a measure of the camera's maximum capability for recording information, discounting adverse atmospheric conditions, minimum solar elevations, camera malfunctions, or other factors which reduce the quality of the photography.

The MIP is based on the best photography found in a mission, even though the photography may be limited to a few frames. Since these frames are considered to be the best in the mission, they do not indicate the overall success, average quality, or general interpretability of the photography.

Criteria for selection of the MIP frame:

a. Eliminate all portions of the mission affected by system malfunctions.

b. Select frames which are free of clouds or atmospheric attenuation.

c. Eliminate the first 10 frames and last frame of a pass because these may be affected by incorrect scan speed.

d. Select frames that are in a continuous strip of approximately 10 cloud-free frames because cloud shadows from weather fronts are cast for great distances.

e. Determine from the horizon cameras that the panoramic photography is not affected by apparent vehicle perturbations.

f. Select targets that are near the center of the format and on frames as close as possible to perigee for scale purposes and to eliminate obliquity.

g. Select frames having near optimum solar elevation.

h. Select a high-contrast target (preferably an airfield) and compare the target to a previous mission which has been given an MIP rating.