PHOTOGRAPHIC EVALUATION REPORT

MISSION 1030-1

9-14 MARCH 1966

MISSION 1030-2

15-19 MARCH 1966

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TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT
MISSION 1030-1
9-14 MARCH 1966
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15-19 MARCH 1966

AUGUST 1966

NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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SYNOPSIS

Mission 1030 (J-29), a 2-part photographic satellite reconnaissance mission, was launched at 2202Z on 9 March 1966. The first part (Mission 1030-1) was recovered dry during revolution 81 at 0102Z on 15 March 1966. The second part (Mission 1030-2) was recovered dry during revolution 159 at 2235Z on 19 March 1966. Photography was obtained during 78 orbital revolutions, consisting of 65 operational passes, 10 domestic passes, and 3 engineering passes.

All cameras operated satisfactorily throughout the mission. The panoramic photography was acquired at solar elevations ranging from 3 to 78 degrees.

The quality of the panoramic photography is rated as poor to good, with only a small portion of the mission considered good. A large percentage of the mission is rated as poor due to heavier-than-normal densities.

The last 63 feet of forward record from Mission 1030-1 was removed before processing for a low gamma processing experiment.

GENERAL FLIGHT DATA

1. Launch and Recovery Dates

Launch Date, Mission 1030	9 March 1966/2202Z
Recovery Date, Mission 1030-1	15 March 1966/0102Z
Reactivation Date, Mission 1030-2	15 March 1966
Recovery Date, Mission 1030-2	19 March 1966/2235Z

2. Orbital Parameters (actual)

	Mission 1030-1 (Rev 42)	Mission 1030-2 (Rev 120)
Period	90.621 min	90.470 min
Perigee	97.568 nm	98.784 nm
Apogee	234.610 nm	230.040 nm
Eccentricity	0.01899	0.01821
Inclination Angle	75.034°	75.034°
Perigee Latitude	24.254°	37.555°

3. Photographic Operations

a. Pass Information

	Mission 1030-1	Mission 1030-2
Operational Passes	31*	35
Domestic Passes	5**	2
Domestic/Operational Passes	1	1
Engineering Passes	1	2

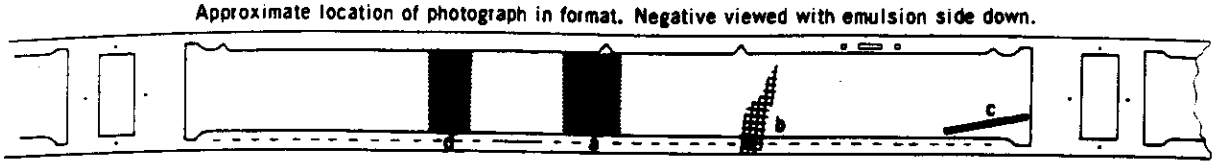
*Includes one mono pass.
**Includes cut-and-wrap pass and one mono pass.
Recovery orbits 81 and 159.

PART I. CAMERA OPERATIONS

1. Fwd-Looking (Master) Panoramic Camera No 182

The master panoramic camera operated normally throughout the mission. Camera-induced degradations are minor. The fogged areas caused by light leaks are less dense than any previous mission. Most of the fogged areas are detectable only on engineering (night) passes or after long camera sit periods. Location of the fogged areas within those passes affected are as follows:

Approximate location of photograph in format. Negative viewed with emulsion side down.



a. First frame: Two inch area near the center of the format, cut off near the edges of the film by the guide rails.

b. Sixth frame from the end: Minor streak near format center that strikes across the timing track edge.

c. Next to last frame: A narrow streak, approximately 2 inches long and almost parallel to the major axis, is located near the take-up end.

d. Last frame: An area near format center called film transport.

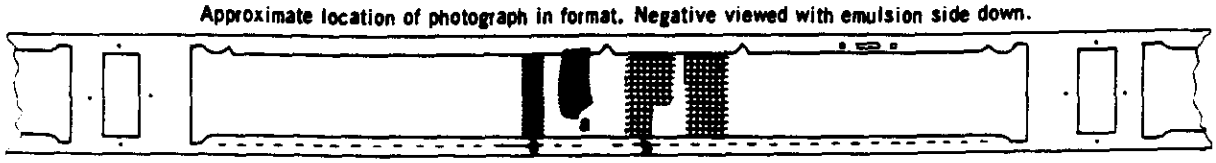
Minor banding is present intermittently during the mission. It is only detectable over areas of extreme low contrast and medium density.

2. Aft-Looking (Slave) Panoramic Camera No 183

The slave panoramic camera operated normally during both parts of the mission. Camera-induced degradations are minor.

Location of the fogged areas on the affected passes are as follows:

Approximate location of photograph in format. Negative viewed with emulsion side down.



a. First frame: A small area of fog near the center of format is cut off near the film edge by the guide rails.

b. Third frame from end: A very minor equipment shadowgraph is present near the center of format after long camera sit periods.

c. Last frame: The fogged area called film transport is present near the center of format.

All the fogged areas on the slave film are minor and are detected on only a few passes.

3. Fwd-Looking (Master) Horizon Cameras

a. The port horizon camera functioned properly throughout the mission.

b. The starboard horizon camera was operational throughout the mission. However, the images are veiled through pass 115D. The poor imagery gradually recedes toward the center of the format in passes 116D through 131D. Thereafter, the imagery appears normal.

4. Aft-Looking (Slave) Horizon Cameras

a. The port horizon camera functioned properly throughout the mission.

b. The starboard horizon camera functioned properly but, similar to the master horizon camera, the photography contains veiled imagery. However, in the last 2 passes the veiling appears to be slightly reduced near the format edge.

5. Stellar Camera No D107 (1030-1)

The stellar camera operated normally throughout the mission, producing 422 frames containing imagery. More than 30 stellar images are visible in each frame but some of these have odd configurations instead of the regular point images. Flare affected approximately 30 percent of each format. However, the density level of this flare is less than on recent missions, and stellar images are detectable within the flared areas.

The first 25 frames contain multidirectional plus density streaks. Static was noted intermittently along the edge opposite the camera number, just outside the format area. Edge fog was present along both edges. A continuous plus density streak, between the correlation fiducial lamp and format edge, appears from frame 361 to a point 5.7 inches past the last frame.

6. Stellar Camera D102 (1030-2)

The stellar camera operated normally throughout the mission, producing 444 frames of photography. There are at least 30 stellar images detectable in each frame but most of them have odd configurations. Flare affected approximately 30 percent of each format. The density level of the flare is less than recent missions, and stellar images are detectable within the flared areas. Frames 416 through 422 contain 2 small, dense patterns at the format edge resembling some previously observed flares.

Degradations include:

a. Edge fog occurs intermittently along the camera number edge of the film.

b. A plus density streak, with fine emulsion cracks extending from it, occurs between the correlation fiducial lamp and the format edge. It is first noticed adjacent to frame 378 and continues to the end cut.

7. Index Camera D100 (1030-1)

The index camera operated normally and produced 422 frames containing imagery. Intermittent processing scratches, 0.6 inch from the camera number edge, were noted throughout the film. These scratches vary in length from 0.1 inch to 2.6 inches and caused minor degradation to the photography.

8. Index Camera D195 (1030-2)

The index camera operated normally throughout the mission, producing 444 frames of photography. However, edge fog occurred intermittently along the camera number edge of the film. A small emulsion dig was noted in frames 422 and 424. A faint plus density streak is present between the camera number and the format edge. It is first noticed adjacent to frame 401 and continues to the end cut, approximately 50 inches past the last frame.

9. Associated Equipment

This equipment records technical information for the correlation and mensuration of the primary camera.

a. The camera number and binary index lamp adjacent to the camera number are bloomed but readable on both cameras.

b. The end-of-pass marker is missing throughout the record on the master camera. A review of the pre-flight material shows that it was present prior to lift off. The marker loss was probably caused by vibration during assent.

c. The end-of-pass marker on the slave camera intermittently appears on the first frame of the subsequent camera operation.

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 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.

VEHICLE AZIMUTH: The vehicle azimuth is the angle of ground track with respect to geodetic coordinates.

PROCESSING LEVEL: The processing level is pertinent to the referenced frame and is extracted from the contractor's processing report.

FIGURE 2. EXAMPLE OF PLUS DENSITY STREAK ON THE STELLAR FILM

This streak appears to have been caused by a foreign object in the stellar camera field of view. From the size of the plus density area, the object must have passed close to the vehicle. The appearance of this streak near the end of a mission is unusual.

[redacted]

Stellar Frame Number	396
Correlates With:	
Pan Camera Number	182
Pass	68D
Frame	133F
Date of Photography	14 Mar 66
Enlargement Factor	4X
Exposure Time	2 sec

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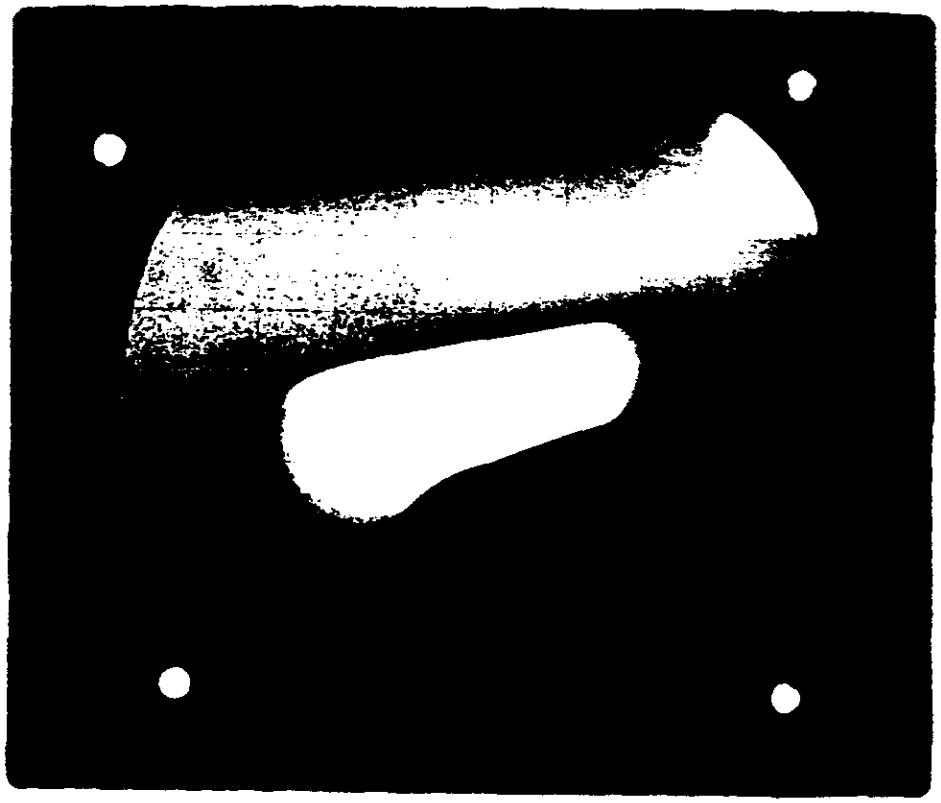

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FIGURE 3. EXAMPLE OF INDEX CAMERA PHOTOGRAPHY

The photography from the index cameras compares favorably with past missions.

[redacted]

Index Frame Number	341
Correlates With:	
Pan Camera Number	182
Pass	61D
Frame	13F
Date of Photography	13 Mar 1966
Enlargement Factor	3X
Exposure	1/500 sec

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PART II. FILM

1. Film Processing

This section provides an evaluation of processing, density, contrast, and physical conditions of the original negatives. Infrared detection densitometry was employed to determine the optimum level of development for various portions of the mission. Seventy-three processing changes were required for the photography processed from the master camera and 65 processing changes were used for the photography obtained from the aft camera. The percentage of processing changes for the various levels are as follows:

	Mission 1030-1		Mission 1030-2	
Development Level	Master	Slave	Master	Slave
Primary	3	0.2	0.1	0.2
Intermediate	31.7	45.6	52.5	28.3
Full	65.3	54.2	47.4	71.5

Much of the photography was very dense due to the exposure and/or processing. This can be attributed to the snow, which covered a significant portion of the terrain, overexposure, processing, or a combination of any or all of these factors. The slit widths used for this mission were 0.275 inch for the master and 0.175 inch for the slave. A check of the processing summary indicates that full processing was used approximately 60 percent of the time. Although the percentage of heavy density in Mission 1030-2 is less than that of Mission 1030-1 the average density is comparable. Most of the photography in both missions contains medium contrast imagery.

2. Physical Film Degradations

The degradations to the original negative of this mission are similar to those on previous missions. Rail scratches are present along both edges of the film throughout the mission. Scratches just inside the time track and under the camera number continued throughout both missions. The format edge nearest the camera number is ragged from the take-up end of each frame to slightly past format center. In Mission 1030-2, many faint plus and minus density streaks were observed parallel to the major axis of the film. These also extend through the horizon formats and are most detectable over areas of low contrast. They are first observed in pass 87D, frame 50 and continue to the end of the mission. Also, in Mission 1030-2 a minus density streak is present on frames 2, 3, and 4 of pass 116D. This streak is approximately 0.1 inch wide and appears to follow the path of the field flattener. Fog caused by dendritic static discharges was noted in both missions but was

of a minor nature and did not degrade the imagery. Emulsion digs, scratches, pinholes, handling marks, abrasions, and dirt are minor but present at random throughout. There are manufacturing splices on pass 20D, frame 66; 63D, frame 15; 110D, frame 34; and 132D, frame 12 of the master camera film. The slave material has manufacturing splices on pass 16D, frame 9; 52D, frame 99; 98D, frame 55; and 133D, frame 53.

3. Film Footage/Frame Totals

	Master	Slave
Footage Available	16,000 approx.	16,000 approx.
Pre-Flight Footage	269.8	291
Process Footage (1030-1)	8,045	8,115
Process Footage (1030-2)	7,922	7,913
Titled Frames (1030-1)	2,928	2,939
Titled Frames (1030-2)	2,991	2,995

4. Low Gamma Processing Experiment

a. The last 63 feet of film from the forward camera on Mission 1030-1 was removed before processing for a low gamma processing experiment. The Performance Evaluation Team supplied the requirement for the removal of the film.

b. The film was placed in cold storage by the processing contractor to await processing instructions. The coverage included the last part of pass 78D (domestic) and all but the last 5 frames of pass 79D (all water). The purpose of the experiment was to compare low gamma processing with Trenton processing to determine if better image detail could be gained by low gamma processing.

c. A conference was held on 5 and 6 April 1966 at the processing site to analyze and evaluate the processing of the 63 feet of film. At the direction of PET, the film was slit along the major axis, providing 2 strands of film, 35mm by 63 feet. One strand was processed in the Trenton processor at the intermediate level and the other strand in an EH-6A processor using low gamma processing chemistry. Film positives were printed at various density levels from each of the 35mm strips.

d. Since photography is interpreted from positive transparencies, emphasis was on the image quality of the positive rather than the original negative. After a comparison of the 2 strips, the following facts were observed:

(1) The low gamma processing produced slightly more detail in the highlight areas.

(2) The low gamma developing produced lower contrast images. The extraction of information is more difficult from low contrast images.

e. The group discussed the possibility of processing the original negative conventionally and processing the positive to a low gamma or processing the original to a low gamma and the positives to a higher gamma. While no decision was arrived at the ideas were left open for consideration at a later date.

f. The following items are significant in an appraisal of the low gamma processing technique:

(1) Low gamma processing chemistry is not compatible with the spray processing technique (Trenton type) because of rapid oxidation.

(2) A low gamma developer in viscose form has not been developed for the Yardleigh processor. However, the processing contractor is confident a suitable viscose could be formulated.

(3) If a deep tank processor is used (EH-6A variety) the machine confidence level would be reduced.

(4) If the processing contractor's low gamma developer is used, an increase in exposure or a higher speed film would probably be necessary. Both of these could cause image degradation.

(5) The camera contractor has a low gamma developer which provides increased speed in the toe of the curve, allowing the present exposure/film combination to be used successfully. However, the chemicals in this formula deteriorate faster than the other low gamma developer.

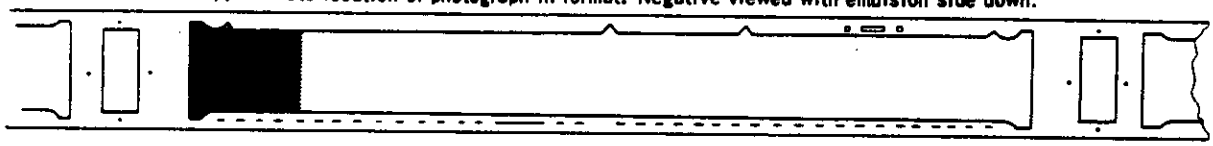
FIGURE 4. PHOTOGRAPHY SHOWING PLUS AND MINUS DENSITY STREAKS ON THE AFT PANORAMIC FILM FROM MISSION 1030-2

These density streaks could have been caused during the manufacturing of the film.

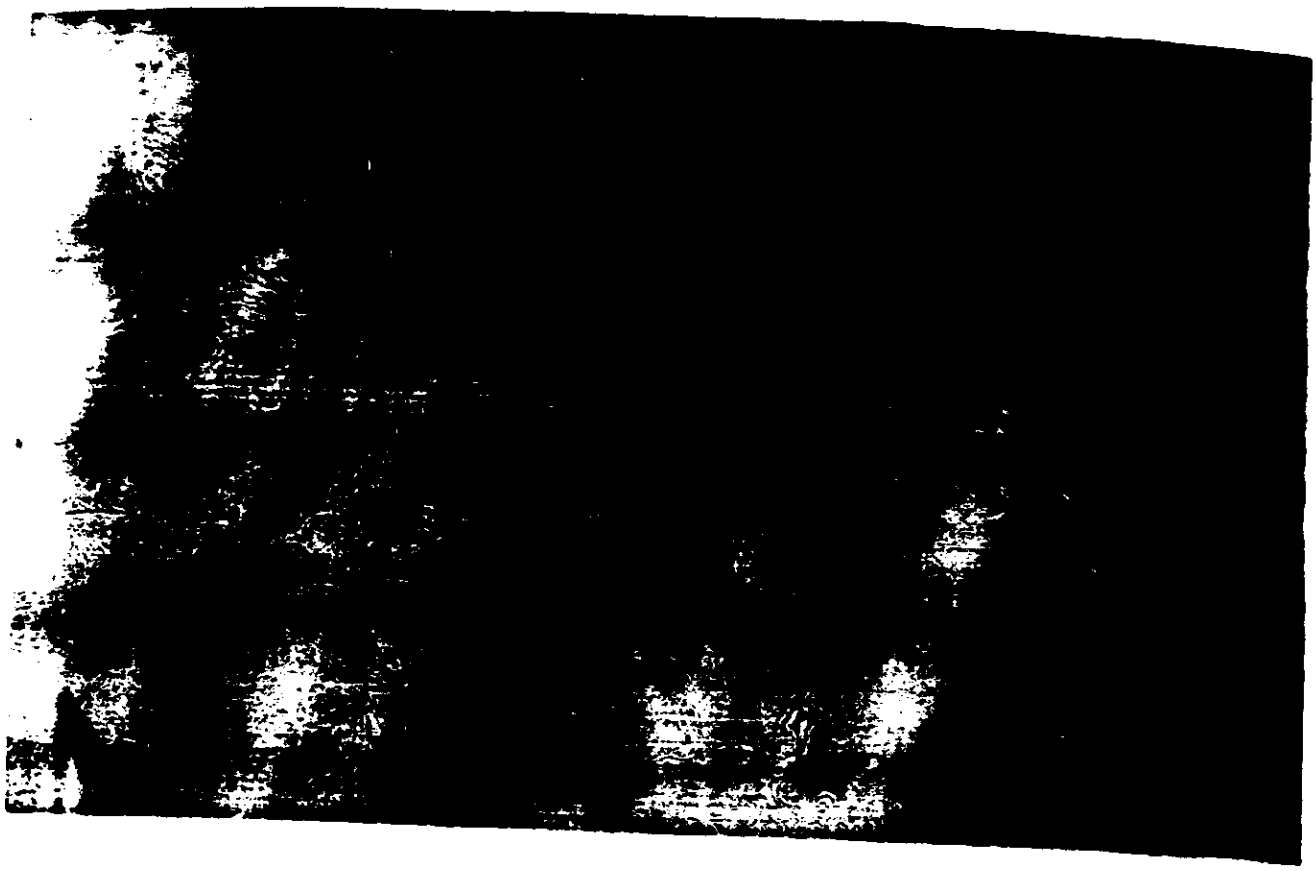
NPIC K-9011 (7/66)

Camera	Aft
Pass	129D
Frame	16
Date of Photography	18 Mar 66
Universal Grid Coordinates	8.19 - 9.15
Enlargement Factor	2X
Geographic Coordinates	72-30N 128-15E
Altitude (feet)	720,241
Camera:	
Pitch	-14°26'
Roll	3°24'
Yaw	0°11'
Local Sun Time	909
Solar Elevation	11°26'
Solar Azimuth	NA
Exposure (fractions of second)	1/314
Processing Level	Full
Vehicle Azimuth	123°24'

Approximate location of photograph in format. Negative viewed with emulsion side down.



[redacted]



PART III. IMAGE QUALITY

1. 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 degradations, 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. Definition of 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 1030-1 and 1030-2

A total of 455 targets was observed during the initial scan of Mission 1030. The majority of these targets was rated as poor. In many instances, although the frame is clear of atmospherics, the poor ratings may be attributed to snow cover or light industrial smog. Both PET and the photographic interpreters agree that the overall quality of this mission was distinctly poorer than any recent mission. They attributed the quality loss to severe atmospheric conditions and a high percentage of dense original negatives. In the mission, the measured dmin values were higher than on previous missions, even with the lower percentage of full processing. PET feels it is not easy to define optimum exposure due to the lack of correlation between measured density values and mission performance. Variables such as atmospherics, slit width, solar altitude, launch time, and so forth affect both density and performance in different ways. They feel that until more information on optimum exposure levels is available, this question will remain unanswerable.

There was a severe haze layer which drastically reduced contrast and image quality in many target areas. In trying to prove the affects of atmospherics, PET conducted an analysis of the index camera material. All the clear frames were noted and then broken down into snow, ice, and terrain categories. The frames with a high percentage of clouds or obvious haze were not further analyzed. The data presented below illustrates the low percentage of clear index frames noted and the even lower percentage of clear frames containing terrain.

Mission 1030-1 (Total index frames - 422)

Clear frames with snow and ice	58 or 13 percent of the record
Clear frames of terrain	7 or 2 percent of the record
Total clear frames (10 percent or less cloud cover)	65 or 15 percent of the record

Mission 1030-2 (Total index frames - 444)

Clear frames with snow and ice	23 or 6 percent of the record
Clear frames of terrain	52 or 11 percent of the record
Total clear frames (10 percent or less cloud cover)	75 or 17 percent of the record

From the analysis, it is obvious that a very small percentage of the targets was in clear areas.

Only one resolution target display was imaged on the panoramic film. The high contrast target, covered under poor weather conditions, indicated along track and cross track resolution values of about 12 feet for both cameras.

3. 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.

4. MIP Rating, Mission 1030

Although the overall quality of the mission is poor, a small portion of the panoramic photography is considered to be as good as any observed in recent missions; hence, an MIP rating of 85.

The quality of material from the 2 panoramic cameras appears to be comparable.

The MIP frame of Mission 1030-1 is frame 74 aft, pass 39D. The MIP selection of Mission 1030-2 is frame 17 aft, pass 126D.

5. Highlights of the Mission

a. A newly identified facility consisting of several buildings.

b. A newly identified launch complex.

c. Several new launch areas.

d. Area of former unidentified activity now identified as a probable site under construction

e. Several newly identified launch sites.

FIGURE 5. MIP FRAME OF MISSION 1030-1

NPIC K-9012 (7/66)

Camera	Aft
Pass	39D
Frame	74
Date of Photography	12 Mar 66
Universal Grid Coordinates	37.2 - 14.0
Enlargement Factor	20X
Geographic Coordinates	45-37N 062-55E
Altitude (feet)	646,475
Camera:	
Pitch	-14°23'
Roll	03°00'
Yaw	0°27'
Local Sun Time	1128
Solar Elevation	39°01'
Solar Azimuth	167°
Exposure (fractions of second)	1/370
Processing Level	Full
Vehicle Azimuth	160°56'

Approximate location of photograph in format. Negative viewed with emulsion side down.

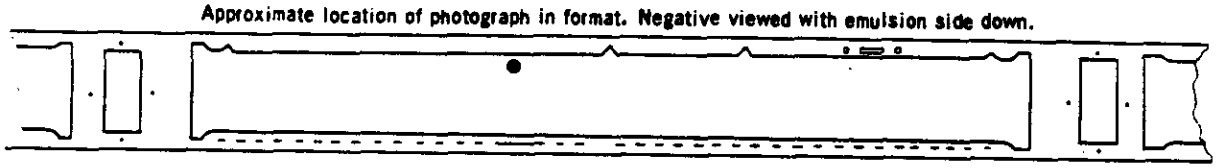


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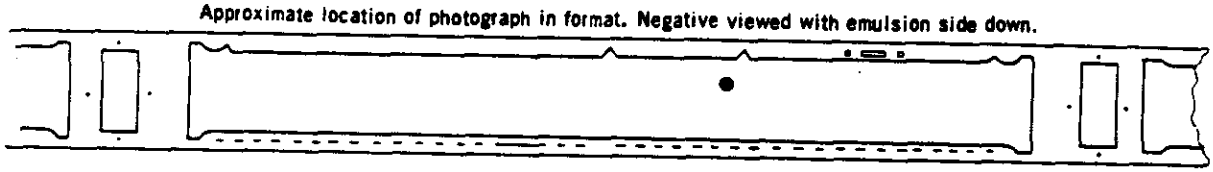
FIGURE 6. MIP FRAME OF MISSION 1030-2

NPIC K-9013 (7/66)

[redacted]

Camera	Aft
Pass	126D
Frame	17
Date of Photography	17 Mar 66
Universal Grid Coordinates	60.0 - 13.4
Enlargement Factor	20X
Geographic Coordinates	33-35N 119-15W
Altitude (feet)	598,478
Camera:	
Pitch	-14°31'
Roll	2°48'
Yaw	0°40'
Local Sun Time	1222
Solar Elevation	53°58'
Solar Azimuth	189°
Exposure (fractions of second)	1/387
Processing Level	Full
Vehicle Azimuth	164°40'

Approximate location of photograph in format. Negative viewed with emulsion side down.



[redacted]

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

[redacted]

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

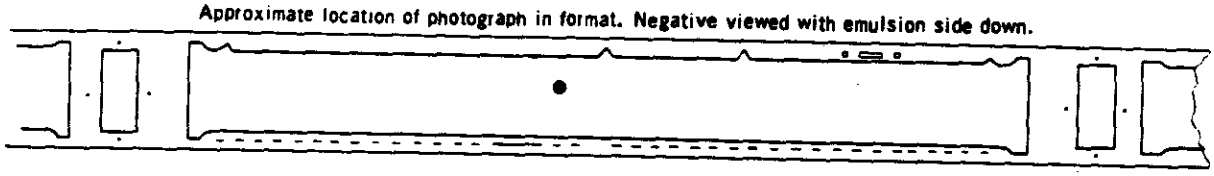
FIGURE 7. GOOD QUALITY PHOTOGRAPHY FROM THE FWD CAMERA

NPIC K-8014 (7/66)

[redacted]

Camera	Fwd
Pass	126D
Frame	14
Date of Photography	17 Mar 66
Universal Grid Coordinates	43.7 - 12.8
Enlargement Factor	20X
Geographic Coordinates	34-7N 119-03W
Altitude (feet)	598,633
Camera:	
Pitch	15°08'
Roll	-0°12'
Yaw	0°44'
Local Sun Time	1222
Solar Elevation	54°25'
Solar Azimuth	189°
Exposure (fractions of second)	1/244
Processing Level	Full
Vehicle Azimuth	164°33'

Approximate location of photograph in format. Negative viewed with emulsion side down.



[redacted]

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Handle Via
TALENT-KEYHOLE
Control System Only

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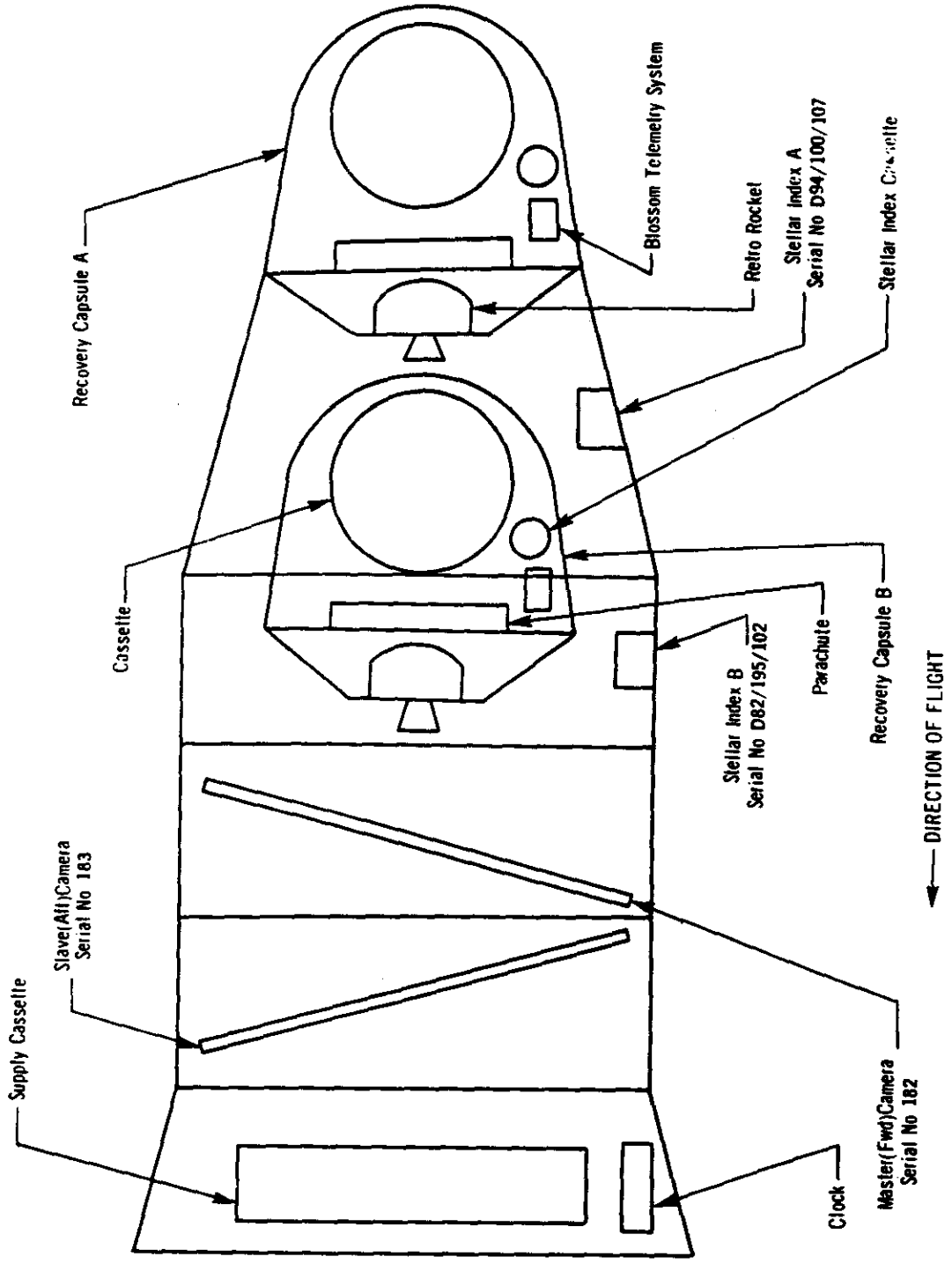
APPENDIX A. SYSTEM SPECIFICATIONS

1. Cameras

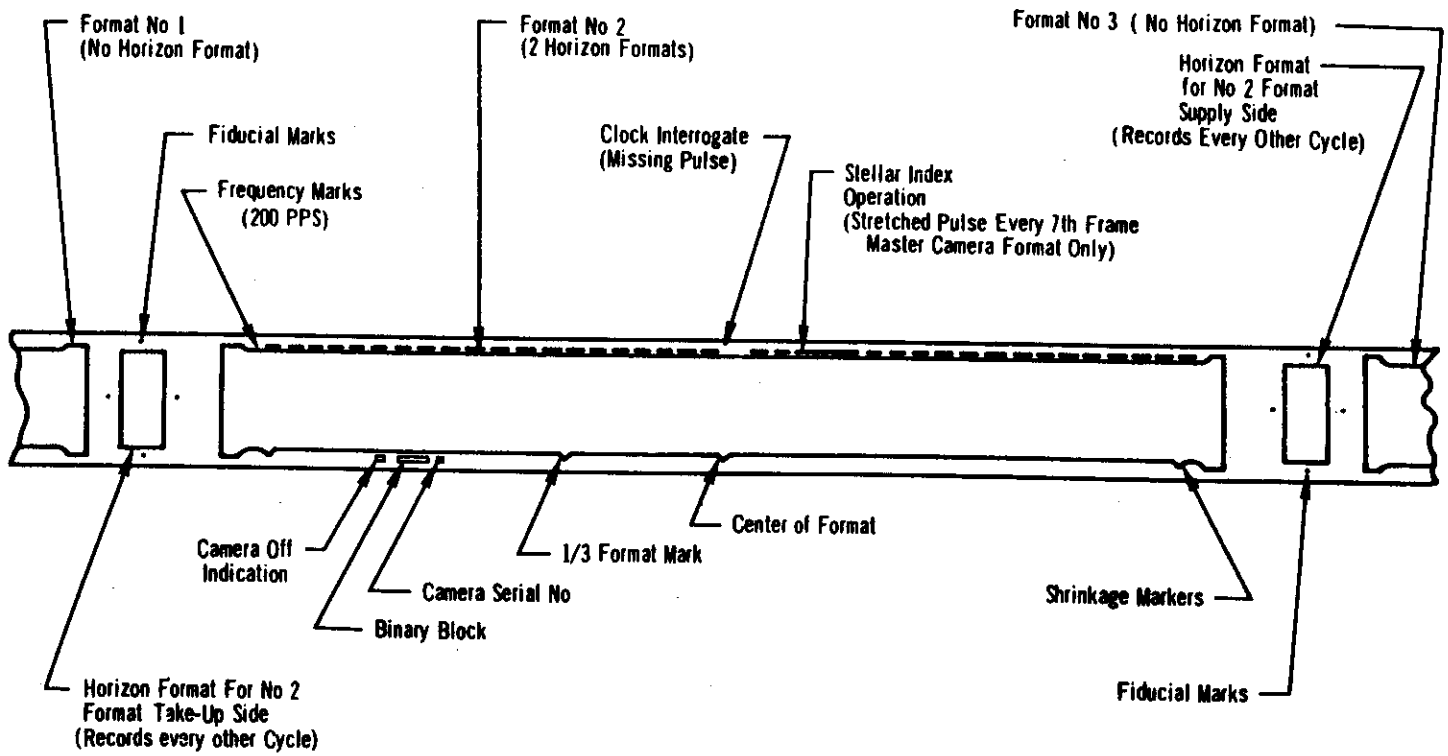
	Master Pan	Master Take-Up Horizon	Master Supply Horizon	Slave Pan	Slave Take-UP Horizon	Slave Supply Horizon	Mission 1030-1		Mission 1030-2	
							Stellar	Index	Stellar	Index
Camera No	182	NA	NA	183	NA	NA	D94/100/107	D94/100/107	D82/195/102	D82/195/102
Reseau No	NA	NA	NA	NA	NA	NA	107	100	102	195
Lens Serial No	1902435	12876	12864	1882435	12844	12845	11793	819959	10545	819187
Slit Width	.275	NA	NA	.175	NA	NA	NA	NA	NA	NA
Aperture	3.5	8.0	6.3	3.5	6.3	8.0	1.8	4.5	1.8	4.5
Exposure Time (sec)	1/230 Avg.	1/100	1/100	1/360 Avg.	1/100	1/100	2.0	1/500	2.0	1/500
Filter (Wratten)	25	25	25	21	25	25	None	21	None	21
Focal Length (mm)	609.602	55.00	55.00	609.602	55.00	49.90	84 Nom	38.54	84 Nom	38.50
Film Length (ft)	16,000	NA	NA	16,000	NA	NA	75	135	75	135
Splices	4	NA	NA	4	NA	NA	None	None	None	None
Emulsion	1-12-5-12/	235-12/ 1-12-5	235-12/ 1-12-5	235-12/ 1-12-5	235-12/ 1-12-5	235-12/ 1-12-5	124-35-10-5	106-14-8-5	124-35-10-5	106-14-8-5
Film Type	3404	3404	3404	3404	3404	3404	3401	3400	3401	3400
Resolution Data (L/mm)										
Static										
High Contrast	282	209	187	257	187	187	*	70 Awar	*	70 Awar
Low Contrast	164	*	*	143	*	*	*	*	*	*
Dynamic										
I High Contrast	190	*	*	200	*	*	*	*	*	*
I Low Contrast	130	*	*	124	*	*	*	*	*	*
P High Contrast	183	*	*	178	*	*	*	*	*	*
P Low Contrast	118	*	*	108	*	*	*	*	*	*

NA Not Applicable
* Not Available

2. VEHICLE CONFIGURATION AND EQUIPMENT LAYOUT



3. PANORAMIC FORMAT CONFIGURATION



Master (Fwd) Panoramic Camera No 182
Viewed With Negative Emulsion Down
Direction of Film Transport ←
Direction of Scan →
Direction of Vehicle Motion ↓

Slave (Aft) Panoramic Camera No 183
Viewed With Negative Emulsion Down
Direction of Film Transport ←
Direction of Scan →
Direction of Vehicle Motion ↑

NPIC K-9016 (7/66)

APPENDIX B. DENSITY READINGS

The following densities are recorded from the stellar and index original negatives of Mission 1030. A Macbeth Quantalog Densitometer, Model EP 1000 with an ET 20 attachment and a 0.5mm aperture was used in reading the values.

STELLAR CAMERA MISSION 1030-1

Pass	Frame	Dmax	Dmin	Delta	Gross Fog
1D	1	0.29	0.18	0.11	0.14
	3	0.33	0.14	0.19	0.13
4D	4	0.72	0.14	0.58	0.13
	12	0.70	0.14	0.56	0.12
5D	13	0.24	0.12	0.12	0.12
	29	0.46	0.14	0.32	0.12
6D	30	0.22	0.12	0.10	0.12
	51	0.75	0.14	0.61	0.12
7D	52	0.42	0.12	0.30	0.12
	69	0.72	0.13	0.59	0.12
8D	70	0.34	0.12	0.22	0.12
	80	0.62	0.13	0.49	0.12
9AE	81	NR	NR	NR	0.12
14D	82	0.63	0.13	0.50	0.12
	88	0.54	0.12	0.42	0.12
16D	89	0.62	0.14	0.48	0.12
	90	0.68	0.14	0.54	0.12
20D	91	0.31	0.12	0.19	0.12
	103	0.44	0.12	0.32	0.12
21D	104	0.58	0.12	0.46	0.12
	119	0.58	0.14	0.44	0.12
23D	120	0.46	0.12	0.34	0.12
	138	0.73	0.15	0.58	0.12
24D	139	0.52	0.12	0.38	0.12
	145	0.57	0.14	0.43	0.12
25D	146	0.46	0.13	0.33	0.12
	155	0.66	0.14	0.52	0.12
30D	156	0.55	0.14	0.41	0.12
	165	0.54	0.16	0.38	0.14
31D	166	0.52	0.16	0.36	0.12
	168	0.56	0.16	0.40	0.12
33D	169	0.36	0.14	0.22	0.12
	175	0.62	0.14	0.48	0.12
35M	176	0.16	0.14	0.02	0.12
	182	0.28	0.13	0.15	0.12
36D	183	0.33	0.13	0.20	0.12
	200	0.57	0.14	0.43	0.13
37D	201	0.27	0.13	0.14	0.13
	221	0.64	0.15	0.49	0.13