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PHOTOGRAPHIC EVALUATION REPORT

MISSION 1039

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MAY 1967

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35 PAGES

This document contains information referring to Project Corona

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TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT

MISSION 1039

The Photographic Evaluation Report reflects a format revision designed to emphasize production, increase information content, and provide reports to the reader in a more timely basis.

While the new PER format does not include a depth analysis of all [illegible] conditions, provisions have been made to include special studies to dwell upon conditions requiring detailed analysis. These reports will appear, if and when warranted, as attachments to basic PER's. Time permitting, attachments will be issued to the mission PER in which the anomaly occurs; otherwise they will be published with a subsequent PER. Each special study will be identified on the cover of the PER to which it is attached. In addition, an index of the PER's and the associated special studies will appear in each report.

MAY 1967

NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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GLOSSARY OF TERMS

ABSOLUTE HEIGHT	Vertical distance from the vehicle to the mean ground level of the area being photographed.
ACUITY	Sharpness - Edge definition.
ACUTANCE	Measure of the ability of a lens to reproduce sharp images.
AIR BASE	The distance between 2 exposure stations. (Points in space occupied by the camera lens at the moment of exposure.)
ALTITUDE	Vertical distance from the vehicle to the Hough Ellipsoid at the time of exposure.
AZIMUTH OF THE PRINCIPAL RAY	Horizontal clockwise angle, measured from true north to the camera principal ray.
BASE HEIGHT RATIO	Ratio between the air base and the absolute attitude of a stereoscopic pair of photographs.
CAMERA NADIR	Geodetic latitude and longitude of a point vertically beneath the perspective center of the camera lens on the Hough Ellipsoid.
CONE ANGLE	Angle between the principal ray and the vehicle nadir.
COPY GENERATION	Number of reproductive steps by which a negative or positive photographic copy is separated from the original.
DATE OF PHOTOGRAPHY	Indicates the day, month, and year (GMT) that the photography was acquired.

EXPOSURE*	Total quantity of light received per unit area on a sensitized plate or film.
EXPOSURE DURATION	Time during which a light-sensitive material is subjected to the influence of light. Expressed in this text in fractions of a second. Formula: Exposure Time (sec) = $\frac{\text{Slit Width (in)}}{\text{Scan Rate (in per sec)}}$
EXPOSURE STATION	Position occupied by the camera lens at the moment of exposure.
FIDUCIAL MARK	A standard geometrical reference point imaged at the margin of a photograph. The intersection of the primary fiducial marks usually defines the principal point.
FOCAL LENGTH: CALIBRATED	Adjusted value of the equivalent focal length. Computed to distribute the effect of lens distortion over the entire field.
FOCAL LENGTH: EQUIVALENT	Distance measured along the lens axis from the rear nodal point to the plane of best average definition over the entire field. Points other than the rear nodal point may be used but must be specified for correct interpretation of data.
FOCAL PLANE	Plane perpendicular to lens axis, in which images of points in the object field of the lens are focused.
FRAME	One of a series of full-format photographs comprising a roll of film.
GROUND RESOLUTION*	Resolved ground distance as determined from standard bar target resolution targets. A target is considered to be resolved when a grouping of 3 bars can be distinguished as 3 distinct lines. The lines need not have linear form.

HOLEY RAIL DOTS	Images of the rail holes associated with the pan-geometry calibration of the camera.
IMC (Image Motion Compensation)	Correction for the forward motion of the vehicle while photographing the terrain.
ISODENSITOMETER	An instrument which is basically a microdensitometer with the capability of repeatedly scanning an image at pre-set intervals. Its output is in the form of a plot representing distance along 2 axes and density differences as code changes within each scan line.
LOCAL SUN TIME	Time of day computed from the position of the sun relative to the imaged terrain.
MICRODENSITOMETER	An instrument which measures the optical density of very small areas in an image. Its output is in the form of a continuous plot of density versus distance across an image. The microdensitometer used in NPIC can accurately measure distances as small as 1 micron and densities up to 5.0+.
NOD INDICATORS	A series of marks imaged in the border area of each frame for the purpose of defining the relative orientation of the optical axis and the ground scene.
NODAL TRACE	A continuous line imaged along the major axis of each frame to define the optical axis of the lens relative to any given instant of exposure.
PANORAMIC CAMERA	Photographs a partial or complete panorama of the terrain in a transverse direction through a scanning motion of the lens system.

PARALLAX	Apparent displacement of the position of an object in relation to a reference point, caused by a change in the point of observation.
PASS	Operational portion of an orbital revolution. A suffix D indicates the descending node and a suffix A indicates the ascending node. An additional suffix E indicates that the associated photography was generated for engineering purposes.
PITCH	Rotation of the camera about its transverse axis. Positive pitch indicates nose-up attitude.
PROCESSING LEVEL	Degree of development. Three levels of processing are currently employed -- primary, intermediate, and full.
PRINCIPAL RAY	That ray of light which emanates from a point in object space and passes undeviated through the lens to become imaged at the principal point of the camera system. It is coincident with the optical axis of the lens.
RESOLUTION	Measure of the smallest array of point objects distinguishable as independent point images, expressed in lines/mm.
ROLL	Rotation of the camera about its longitudinal axis. Positive roll indicates left wing-up attitude.
SHADOW FACTOR	A constant for each frame, used to calculate heights from shadow lengths.
SHIMIMAGE MARKERS	Calibrated reference points used to calculate deformations of the photographic material.
SOLAR ELEVATION	Vertical angle measured from a plane (tangent to the surface of the earth at the point of intersection of the principal ray) to the sun, the vertex being at the center of format.

STELLAR CAMERA	Used simultaneously with the index camera to photograph stars in order to determine vehicle attitude.
SYSTEM TIME LABEL	Binary presentation of the accumulative system time.
UNIVERSAL GRID	X, Y coordinate system used to locate images on photographic formats.
VEHICLE AZIMUTH	Clockwise horizontal angle measured from true north to the vehicle ground track.
VIGNETTING	Gradual reduction in density of parts of a photographic image due to the stopping of some of the rays entering the lens.
YAW	Rotation of the camera about its vertical axis. Positive yaw represents nose-left attitude, as viewed from the top of the camera.

*Defined differently than in the "Glossary of NPIC Terminology."

INDEX OF PHOTOGRAPHIC EVALUATION REPORTS AND SPECIAL STUDIES

PER	DOCUMENT NUMBER	SPECIAL STUDY
1037	[redacted]	None
1038		None
1039		None

SYNOPSIS

Mission 1039 was launched on 22 February 1967/2202Z. The first capsule was recovered dry on 28 February 1967/0015Z. The air catch of the second recovery capsule, on 5 March 1967/2351Z, ended the 12-day mission which accomplished 110 photographic passes. Although there was a high percentage of cloud cover throughout the mission, the image quality is good and an NIF rating of 85 was assigned. The imagery from the aft-looking camera is of better image quality than that of the forward-looking camera.

The starboard-looking horizon formats of both panoramic cameras are veiled throughout Mission 1039-1 with a gradual clearing near the end. On Mission 1039-2, no veiling is present in either horizon format.

The index camera was operational throughout the mission and there are no major anomalies.

Fifty percent of each stellar format on Mission 1039-1 is effected by flare. Flare covers approximately 20 percent of each format on Mission 1039-2. Stellar images are numerous and of good quality on the photography of both missions.

[redacted]

PART I. GENERAL SYSTEM INFORMATION

A. Camera Numbers

Forward-Looking Panoramic Camera	206
Aft-Looking Panoramic Camera	207
Stellar/Index Camera (Mission 1039-1)	D103/131/132
Stellar/Index Camera (Mission 1039-2)	D100/125/125

B. Launch and Recovery Dates

	(Mission 1039-1)	(Mission 1039-2)
Launch	22 Feb 67/2202Z	- - - - - - -
Recovery	28 Feb 67/0015Z	5 Mar 67/2351Z

C. Orbit Elements

Element	Planned	(Actual) Rev 42	(Actual) Rev 122	Photo Range	
Period (min.)	N/A	90.069	89.857	N/A	
Perigee (nm)	N/A	97.027	98.285	98.202	Rev 6
Apogee (nm)	N/A	207.330	201.660	193.317	Rev 7
Eccentricity	N/A	.01535	.01441	N/A	N/A
Inclination (deg)	N/A	80.021	80.020	N/A	N/A
Perigee Latitude	N/A	30.231	47.979	N/A	N/A

* Not Available.
N/A - Not Applicable.

D. Photographic Operations

1. Panoramic Cameras

Type of Pass	Mission 1039-1 Revs	Mission 1039-1 Frames	Mission 1039-2 Revs	Mission 1039-2 Frames	Total Revs	Total Frames
Operational						
Fwd	46	2,686	42	2,791	88	5,477
Aft	46	2,666	42	2,813	88	5,479
Operational/Domestic						
Fwd	3	121	--	--	3	121
Aft	3	120	--	--	3	120

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	Mission 1039-1		Mission 1039-2		Total	
	Revs	Frames	Revs	Frames	Revs	Frames
Domestic						
Fwd	3	77	9	195	12	272
Aft	3	77	9	195	12	272
Engineering (no imagery)						
Fwd	4	31	3	25	7	56
Aft	4	31	3	25	7	56
Totals						
Fwd	56	2,916	54	3,011	110	5,927
Aft	56	2,901	54	3,033	110	5,934

2. Secondary Cameras

Camera	Frames
Stellar (Mission 1039-1)	457
Index (Mission 1039-1)	457
Stellar (Mission 1039-2)	472
Index (Mission 1039-2)	472

E. Film Usage

	Film Load (TOTAL)	Pre-Flight Footage	Processed Footage
Fwd-Looking (Mission 1039-1)	16,000*	317.4	8,027
Aft-Looking (Mission 1039-1)	16,000*	29.9	7,966
Fwd-Looking (Mission 1039-2)	NA	NA	7,967
Aft-Looking (Mission 1039-2)	NA	NA	8,032
Stellar (Mission 1039-1)	75	1.68	61
Stellar (Mission 1039-2)	75	**	57
Index (Mission 1039-1)	135	3.37	112
Index (Mission 1039-2)	135	**	113

*Total load for both
NA - Not Applicable.
**Not Available.

[redacted]

PART II. IMAGE ANALYSIS

A. Fwd-Looking Panoramic Camera

1. Density: The density of the original negative of Mission 1039-2 is generally medium with approximately 30 percent of the record considered to be heavy. However, the original negative of Mission 1039-1 was judged to be approximately 50 percent heavy. This is attributed to the fact that a considerable amount of snow-covered terrain was photographed on the first half of the mission.

2. Contrast: The contrast is generally medium throughout the mission with the imagery of Mission 1039-1 being of slightly lower contrast. In some snow-covered areas, the lack of contrast caused considerable loss of edge definition. However, the contrast is generally adequate to provide good image detail.

3. Acuity: The edge sharpness of the forward material is superior to that of the two most previous missions. Although a Wratten 23A filter was used and the atmospheric conditions were bad, no loss of acuity is noticeable.

4. Imaged Degradations

a. Light Leaks: The fog patterns caused by the light leaks are similar to those noted in previous missions. Fog is present on the fifth frame (graphic No 1, page 9) and the second to the last frame (graphic No 2, page 8) of most camera operations. The density varies with the duration of camera inactivity.

b. Static: None noted except that associated with manufacturing splices and film supply depletion.

5. Physical Degradations: Rail scratches are continuous along both film edges throughout the mission. A slight base rub is apparent throughout the forward camera record. It appears as a very subtle minus density line parallel to the major axis of the film approximately 0.75 inch from the camera number edge. The Performance Evaluation Team (PET) agreed that it was caused by the supply cassette constant tension assembly at the final mechanical aperture.

The last 3.[illegible] feet of the master camera material from Mission 1039-2 were removed during presplice because of excessive film damage. The damaged film was hand processed and returned to the mission film flow.

Scratches within the format caused by the scan head rollers are less severe than normal.

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6. Product Quality: The overall quality of the forward-looking panoramic photography is good. None of the above-mentioned anomalies caused serious degradation to the image quality. Although visible atmospheric conditions were more severe than on most previous missions, the imagery is comparable to some of the better missions in this system.

B. Aft-Looking Panoramic Camera

1. Density: As reported for the forward camera.

2. Contrast: As reported for the forward camera.

3. Acuity: The edges of cultural imagery are very sharp and are slightly superior to those of the forward camera record.

4. Image Degradations

a. Light Leaks: Fog patterns appear on the third from last frame (graphic No 3, page 8) and second from last frame (graphic no 4, page 9) of some camera operations. These patterns are similar to those found in previous missions and their density varies with the duration of camera off periods.

b. Static: Same as reported for the forward-looking camera.

5. Physical Degradation: The format edge image on the camera number side becomes ragged approximately mid-way through Mission 1039-1. The condition becomes progressively worse throughout the mission and edge image is very ragged throughout Mission 1039-2. The anomaly is obviously a result of emulsion buildup associated with rail scratches. Although polished rails were used in this mission, the format edges on the aft materials are more ragged than on recent missions.

6. Product Quality: None of the anomalies of Mission 1039 caused any serious degradation of imagery. The imagery is slightly better than that of the forward material and it is better than that of most recent missions.

C. Stellar Camera (Mission 1039-1)

1. Density: Adequate for the detection of stellar images.

2. Contrast: Adequate for the detection of stellar images.

3. Image Shape: The images are generally point type.

4. Images per Frame: There are 15 to 25 stellar images per frame.

5. **Flare Level:** Approximately 50 percent of each frame is affected by flare.

6. **Image Degradations**

a. **Light Leaks:** None noted.

b. **Static:** Small static-induced fog patterns, approximately 1.5 inches apart, are present on the first 29 frames. Other static-induced fog is present intermittently throughout the mission on the edge opposite the correlation lamp.

7. **Physical Degradations:** None noted.

8. **Product Quality:** The high flare level caused difficulties in detecting the images. However, after the images were detected, no problems were encountered during the data reduction phase.

[illegible]. Stellar Camera (Mission 1039-2)

1. Density: Adequate for the detection of stellar images.

2. Contrast: Adequate for the detection of stellar images.

3. Image Shape: The stellar images are generally point type.

4. Images per Frame: Fifteen to 20 stellar images are detectable on each frame.

5. Flare Level: Approximately 20 percent of each format is affected by flare.

6. Image Degradations

a. Light Leaks: None noted.

b. Static: [illegible].

7. Physical Degradations: None noted.

8. Product Quality: [illegible]. The aforementioned anomalies had little [illegible] on the image quality.

[illegible]. Image Camera (Mission [illegible])

1. Density: [illegible].

2. Contrast: Medium to low.

3. Acuity: The sharpness of the edges is as good as can be expected from this camera system.

4. Imaged Degradations

a. Light Leaks: None noted.

b. Static: None.

5. Physical Degradations: None.

6. Product Quality: The film and image quality are good.

F. Index Camera (Mission 1039-2)

1. Density: Medium.

2. Contrast: Medium.

3. Acuity: As reported for Mission 1039-1.

4. Image Degradations

a. Light Leaks: None.

b. Static: None.

5. Physical Degradations: None.

6. Product Quality: Similar to that of the index camera on Mission 1039-1.

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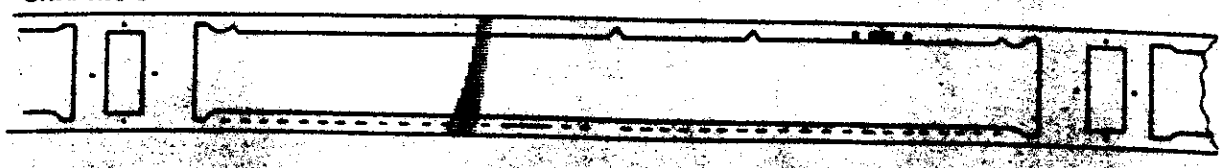
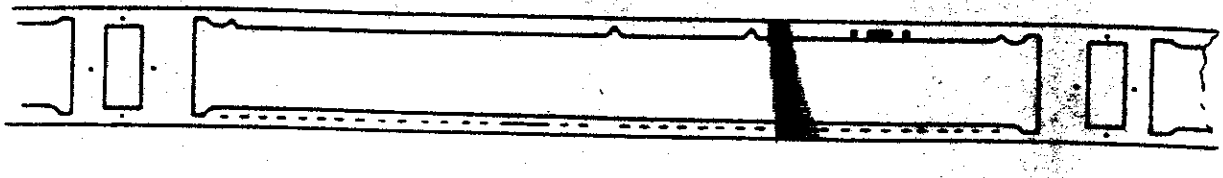
G. Graphic Display

The patterns illustrated below are referenced in the text of this report.

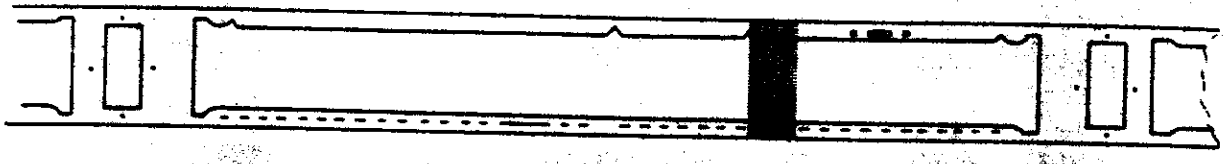
GRAPHIC 1



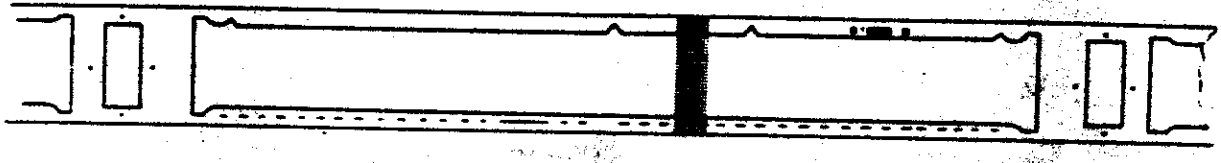
GRAPHIC 2



GRAPHIC 3



GRAPHIC 4



PART III. IMAGED AUXILIARY DATA

A. Fwd-Looking Panoramic Camera

1. Horizon Cameras

a. Starboard-looking

(1) Imagery: Veiling of the horizon camera begins on rev 5 and continues throughout the photography recovered in the first capsule. No veiling is noted on Mission 1039-2.

(2) Fiducials: Well defined throughout the missions.

b. Port-looking

(1) Imagery: Good. No veiling noted.

(2) Fiducials: Well defined throughout.

2. Frequency Marks: Well defined throughout the mission.

3. Binary Time Word: The image of lamp No 12 is weak and sometimes not detectable. The lamp image was occasionally bright enough for the binary reader to detect. However, it was generally too weak and the time words had to be read manually.

4. Binary Index: The binary index is bloomed but useable.

5. Camera Number: The first digit is missing throughout the mission. On all 200 series J-1 instruments, the serial number lamp fails to provide enough illumination for the larger 200 series mask. This causes a partial loss of the camera number in the vicinity of digit No 2.

6. Pan-Geometry Dots: N/A.

7. Nodal Traces: N/A.

8. Nodal Indicators: N/A.

B. Aft-looking Panoramic Camera

1. Horizon Cameras

a. Starboard-looking

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(1) Imagery: As reported for the forward camera.

(2) Fiducials: Well defined throughout.

b. Port-looking

(1) Imagery: Good with no veiling noted.

(2) Fiducials: Well defined throughout.

2. Frequency Marks: The 200 PPS timing pulses are missing on the first 2 - 5 inches of the first frame of a few passes on the aleve camera. As a result of a study by the camera manufacturer, extensive electrical changes will be incorporated in flight systems J-49 and J-50.

3. Binary Time Word: Same as reported for the forward.

4. Binary Index: The index is bloomed but useable.

5. Camera Number: Same as reported for the forward.

6. Tau-Geometry Dots: N/A.

7. Nodal Traces: N/A.

8. Nod Indicators: N/A.

C. Stellar Camera (Mission 1039-1)

1. Grid Image Quality: Sharp and well defined.

2. Correlation Lamp Image Quality: Sharp and well defined.

D. Stellar Camera (Mission 1039-2)

1. Grid Image Quality: Sharp and well defined.

2. Correlation Lamp Image Quality: Sharp and well defined.

E. Index Camera (Mission 1039-1)

1. Grid Image Quality: Sharp and well defined.

2. Correlation Lamp Image Quality: Sharp and well defined.

3. Camera Number Legibility: Sharp and well defined.

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F. Index Camera (Mission 1039-2)

1. Grid Image Quality: Sharp and well defined.

2. Correlation Lamp Image Quality: Sharp and well defined.

3. Camera Number Legibility: Sharp and well defined.

N/A - Not Applicable.

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PART IV. MENSURATION QUALITY

A. Fwd-Looking Panoramic Camera

The mensuration quality of Mission 1039 is superior to that of the most recent missions in this system. The problems encountered in reading the binary time word caused a delay in production, but no apparent intelligence value was lost because of the delay.

B. Aft-Looking Panoramic Camera

The mensuration quality of the aft is slightly better than that of the forward. A similar delay in production occurred as was noted in the forward material.

PART V. FILM PROCESSING

A. Processing Machines and Processing Gamma

Film	Part: All Machine	Gamma	Part: N/A Machine Gamma
Fwd (Mission 1039-1)	Trenton	*	N/A
Aft (Mission 1039-1)	Trenton	*	N/A
Fwd (Mission 1039-2)	Trenton	*	N/A
Aft (Mission 1039-2)	Trenton	*	N/A
Stellar (Mission 1039-1)	Yardleigh	*	N/A
Stellar (Mission 1039-2)	Yardleigh	*	N/A
Index (Mission 1039-1)	Drape	*	N/A
Index (Mission 1039-2)	Drape	*	N/A

B. Processing Levels

1. Panoramic Cameras

Film	Primary	Intermediate	Full	Transition	Processing Changes
Fwd (Mission 1039-1)	9%	19%	72%	*	*
Aft (Mission 1039-1)	6%	28%	66%	*	*
Fwd (Mission 1039-2)	32%	34%	34%	*	79
Aft (Mission 1039-2)	30%	41%	29%	*	*

*Not Available.
N/A - Not Applicable.

2. Secondary Cameras

a. Stellar Cameras: Yardleigh. No interruption in process.

b. Index Cameras: Drape. No interruption in process.

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C. Film Handling Summary

1. Fwd-Looking Camera

a. Capsule Defilming

(1) Mission 1039-1: The film had a severe positive (emulsion in) curl. However, the curl did not cause a serious delay in defilming.

(2) Mission 1039-2: No problems were encountered.

b. Pre-inspection

(1) Mission 1039-1: Intermittent moderate-to-severe static discharges occurred up to the first manufacturing splice (tail of mission). Intermittent moderate static discharging was observed between the second and third splices from the tail of the mission. In checking the capsule for radioactivity, it was discovered that the radio antenna was still emitting a signal. The antenna was removed by personnel at the processing site.

(2) Mission 1039-2: Minor static was noted near the tail of the mission. No other abnormalities were noted.

c. Manufacturing Splices

(1) Mission 1039-1: Pass 22D, frame 190
Pass 54D, frame 31

(2) Mission 1039-2: Pass 150D, frame 9
Pass 166D, frame 20

d. Processing Splices

(1) Mission 1039-1: Processing cuts were made between frames within certain passes because no end-of-pass marker was imaged.

(2) Mission 1039-2: Same as noted for Mission 1039-1. One splice is located between frames 1 and 2 of pass 120D.

e. Manufacturing Defects

(1) Mission 1039-1: None noted.

(2) Mission 1039-2: None noted.

f. Processing Anomalies

(1) Mission 1039-1: A routine chemistry check indicated that the Trenton processor was out of control (0.08 Log E light of aim), necessitating an emergency cut after the first 295 feet of pre-flight had been processed. No imagery was affected. After the PH and the specific gravity of the developer were checked and ballast dips were accomplished, the H and D curves indicated that the process was in control. There is no apparent explanation for the process delay.

(2) Mission 1039-2: The last 3.5 feet of film were removed during pre-splicing because of damage incurred in association with film supply exhaustion. The damaged film was processed on the Drape processing machine and was introduced into the normal system flow. The affected film is badly scratched and abraided.

g. Breakdown

(1) Mission 1039-1: The absence of the end-of-operation mark image had a minimal effect on the breakdown.

(2) Mission 1039-2: The film from both panoramic cameras was processed on the same Trenton processor. Therefore, the duration of original negative handling was nearly doubled.

2. Aft-Looking Camera

a. Capsule Defilming

(1) Mission 1039-1: Same as reported for the forward camera record.

(2) Mission 1039-2: No problems were encountered.

b. Pre-inspection

(1) Mission 1039-1: Only 2 or 3 minor static discharges were noted between the first and second splices (from the tail). One large severe discharge was observed between the second and third splices (from the tail).

(2) Mission 1039-2: No anomalies reported.

c. [illegible]

(1) Mission 1039-1: Pass 27D, frame 7
Pass 64D, frame 25

(2) Mission 1039-2: Pass 103D, frame 25
Pass 149D, frame 123

d. Processing Splices

(1) Mission 1039-1: Head and tail only.

(2) Mission 1039-2: Head and tail only.

e. Manufacturing Defects

(1) Mission 1039-1: None noted.

(2) Mission 1039-2: None noted.

f. Processing Anomalies: None.

g. Breakdown: None.

3. Index Camera

a. Capsule De-filming

(1) Mission 1039-1: No problems reported.

(2) Mission 1039-2: No problems reported.

b. Pre-Spooling

(1) Mission 1039-1: No problems reported.

(2) Mission 1039-2: No problems reported.

c. Manufacturing Splices

(1) Mission 1039-1: None.

(2) Mission 1039-2: None

d. Processing Splices

(1) Mission 1039-1: Head and tail only.

(2) Mission 1039-2: Head and tail only.

[redacted]

e. Manufacturing Defects

(1) Mission 1039-1: None noted.

(2) Mission 1039-2: None noted

f. Processing Anomalies

(1) Mission 1039-1: None.

(2) Mission 1039-2: None.

g. Breakdown

(1) Mission 1039-1: Normal.

(2) Mission 1039-2: Normal.

4. Stellar Camera

a. Capsule De-Filming

(1) Mission 1039-1: No problems reported.

(2) Mission 1039-2: No problems reported.

b. Pre-Spooling

(1) Mission 1039-1: No problems reported.

(2) Mission 1039-2: No problems reported.

c. Manufacturing Splices

(1) Mission 1039-1: None.

(2) Mission 1039-2: None.

d. Processing Splices

(1) Mission 1039-1: Head and tail only.

(2) Mission 1039-2: Head and tail only.

e. Manufacturing Defects

(1) Mission 1039-1: None noted.

(2) Mission 1039-2: None noted.

f. Processing Anomalies

(1) Mission 1039-1: None.

(2) Mission 1039-2: None.

g. Breakdown

(1) Mission 1039-1: Normal.

(2) Mission 1039-2: Normal.

D. Timetable

Film	Recovered	Received at Processing Site	Special Shipment Received at NPIC	Priority 1A Received at NPIC
Fwd (Mission 1039-1)	28 Feb 67/0015Z	1 Mar 67/1215 EST	None	3 Mar 67/0230 EST
Aft (Mission 1039-1)	" "	" "	"	" "
Stellar (Mission 1039-1)	" "	" "	"	" "
Index (Mission 1039-1)	" "	" "	"	" "
Fwd (Mission 1039-2)	5 Mar 67/2351Z	6 Mar 67/1235 EST	"	10 Mar 67/0172 EST
Aft (Mission 1039-2)	" "	" "	"	" "
Stellar (Mission 1039-2)	" "	" "	"	" "
Index (Mission 1039-2)	" "	" "	"	" "

TOP SECRET
CORONA
NO FOREIGN DISSEM

TOP SECRET
CORONA
NO FOREIGN DISSEM

[redacted]

PART VI. PI SUITABILITY

A. Definition of Photographic Interpretation (PI) Suitability

The 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 categorized as 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 the 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/highlight areas. Detection and identification of small objects are possible, but accuracy of mensuration is reduced by the fall-off in image quality and the less-than-optimum contrast that prevails.

Poor: Camera-induced degradations/weather limitations severely reduce the effectiveness of the photography. Definition of edges and corners is not sharp. 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.

[redacted]

B. PI Statistics

1. Target Coverage

	Mission 1039-1	Mission 1039-2	Totals
Priority 1 Targets Programmed	131	69	200
Priority 1 Targets Covered	96	60	156

2. PI Quality Appraisal

Rating	Missiles	Nuclear Energy	Air Facilities	Ports	Elect/ Commo	Military Activity	Complexes
Good	2	0	0	0	0	11	1
Fair	65	14	15	2	0	21	1
Poor	54	9	14	1	0	9	0
Totals	120	23	29	3	0	41	2

3. Summary of PI Quality Ratings (Percentage)

Good 6.4
Fair 54.1
Poor 39.5

C. II Comments

1. Atmospheric Attenuation: The photo interpreters reported a large percentage of cloud-free photography over targets on this mission. The following statistics on the type of weather over the target areas was compiled from the photo interpreters' reports for Mission 1039.

Heavy clouds on 20 targets, 9.5 percent.
Scattered clouds on 30 targets, 14.3 percent.
Haze on 22 targets, 10.5 percent.
Clear weather on 138 targets, 65.7 percent.
Cloud shadow was reported on one target.

2. Terrain Conditions: Mission 1039 covers a large percentage of snow-covered terrain which is normal for a mission flown at this time of year.

3. Product Interpretability: The photo interpreters reported that the heavy snow caused some difficulty in the identification of certain images. In general, however, the photo interpreters reported that Mission 1039 was [illegible] for the study and of intelligence acquisition. They also reported that [illegible] enlargements were used in some cases.

4. Resolution Target Analysis

RESOLUTION TARGET DATA

Target Designator	A	A1	B	B1	C	C1	D	D1
Camera (Looking)								
Pass								
Frame								
Date of Photography								
Universal Grid Coordinates								
Geographic Coordinates of Format Center								
Altitude (ft)								
Camera								
Pitch (deg)	(No Targets Covered)							
Roll (deg)								
Yaw (deg)								
Local Sun Time								
Solar Elevation (deg)								
Solar Azimuth (deg)								
Exposure (fraction of sec)								
Processing Level								
Vehicle Azimuth (deg)								
Filter (Wratten)								
Target Type								
Target Contrast								
Weather Conditions								

GROUND RESOLUTION IN FEET AS DETERMINED FROM THE ORIGINAL NEGATIVE

Target Designator	Observer Number 1		Observer Number 2		Observer Number 3	
	Along Track	Across Track	Along Track	Across Track	Along Track	Across Track
A						
A1						
B						
B1						
C						
C1						

[illegible]

	[illegible]	Master Take-up Horiz	Master Supply Horizon	[illegible]	[illegible]	[illegible]	Mission [illegible]-1 Stellar	Mission [illegible]-1 Index	Mission 1039-2 Stellar	Mission 1039-2 Index
[illegible]		N/A	N/A	[illegible]	[illegible]	[illegible]	D1[illegible]32		D100/125/125	
[illegible]		N/A	N/A	N/A	[illegible]	[illegible]	132	131	125	125
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11352	[illegible]	10741	821120
[illegible]		N/A	N/A	[illegible]	[illegible]	[illegible]	N/A	N/A	N/A	N/A
[illegible]	N/A	F8.0	F6.3	N/A	[illegible]	[illegible]	F1.8	F4.5	F1.8	F4.5
[illegible] Time ([illegible])	N/A	1/100	1/100	N/A	[illegible]	1/100	2.0	1/500	1.0	1/500
[illegible] (Wratten)	[illegible]	25	25	21	25	25	None	21	None	21
[illegible] Length ([illegible])	[illegible]	55.0	[illegible]	[illegible]	[illegible]	55.00	85 nom	38.48	85 nom	38.47
[illegible] Length (ft)	[illegible]	N/A	N/A	[illegible]	N/A	N/A	75	135	75	135
Spliger	4	N/A	N/A	4	N/A	N/A	None	None	None	None
Emulsion	273-2-12-6	N/A	N/A	272-1/26-12-6	N/A	N/A	169-49-7-6	116-8-5-6	169-49-7-6	116-8-5-6
Film Type	3404	N/A	N/A	3404	N/A	N/A	3401	3400	3401	3400
Resolution Data (L/mm)										
Static										
High Contrast	247	*	*	257	*	*	*	760 AWAR	*	710 AWAR
Low Contrast	153	*	*	158	*	*	*	*	*	*
Dynamic										
I High Contrast	200	*	*	220	*	*	*	*	*	*
I Low Contrast	116	*	*	124	*	*	*	*	*	*
P High Contrast	178	*	*	183	*	*	*	*	*	*
P Low Contrast	119	*	*	125	*	*	*	*	*	*

N/A - Not Applicable.
*Not Available.