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TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT

MISSION 1042

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OCTOBER 1967
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PHOTOGRAPHIC EVALUATION REPORT

MISSION 1042

OCTOBER 1967

NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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LIST OF ILLUSTRATIONS

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	Ground distance between 2 exposure stations.
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, i.e. the original negative is copy 1, a positive made from the original negative is copy 2, etc.
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 the 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 co-incident 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.

SHRINKAGE 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 the 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
1033	[redacted]	None
1034		None
1036		None
1037		None
1038		None
1039		None
1040		None
1041		Slant Range Computations Related to Universal Grid Coordinates for the KH-4 Camera System
1042	[redacted]	None

SYNOPSIS

Mission 1042, a 2-part photographic satellite reconnaissance mission, was launched into orbit on 16 June 1967/2135Z. The first capsule (Mission 1042-1) was recovered dry on 22 June 1967/2335Z. The second capsule was retrieved from the water, approximately 1 hour after splash down, on 1 July 1967/2151Z. Photography was obtained on 117 orbital revolutions, consisting of 104 operational passes, 10 domestic passes, and 3 engineering passes.

The standard "J" camera configuration was employed during the mission. All cameras operated satisfactorily throughout both missions. The overall image quality of the main cameras is considered to be good. An MIP rating of 85 is assigned.

A small out-of-focus area is apparent at the end of each frame on the forward camera photography of Mission 1042-1. After the cut and wrap between mission halves, the out-of-focus area cannot be detected. The out-of-focus condition does not exist on part 2.

Approximately 35 percent of the mission is obscured by clouds.

PART I. GENERAL SYSTEM INFORMATION

A. Camera Numbers

Forward-Looking Panoramic Camera 204
Aft-Looking Panoramic Camera 205
Stellar/Index Camera (Mission 1042-1) D97/120/117
Stellar/Index Camera (Mission 1042-2) D98/121/118

B. Launch and Recovery Dates

	(Mission 1042-1)	(Mission 1042-2)
Launch	16 Jun 67/2135Z	--
Recovery	22 Jun 67/2335Z	1 Jul 67/2151Z

C. Orbit Elements

Element	Planned	Rev No 45	Rev No 165	Photo Range
Period (min)	*	89.944	89.875	NA
Perigee (nm)	*	96.5	100.6	96.3
Apogee (nm)	*	200.7	201.0	140.1
Eccentricity	*	0.01452	0.01399	NA
Inclination (deg)	*	80.01	80.01	NA
Perigee Latitude (deg)	*	29.1N	40.0N	NA

*Not Available.
NA - Not Applicable.

D. Photographic Operations

1. Panoramic Cameras

Type	Mission 1042-1 Revs	Mission 1042-1 Frames	Mission 1042-2 Revs	Mission 1042-2 Frames	Totals Revs	Totals Frames
Operational						
Fwd	44	2,740	58	2,931	102	5,671
Aft	44	2,712	58	2,973	102	5,685
Operational/Domestic						
Fwd	2	73	0	0	2	73
Aft	2	71	0	0	2	71
Domestic						
Fwd	3	47	7	109	10	156
Aft	3	47	7	105	10	152
Engineering (no imagery)						
Fwd	1	11	2	14	3	25
Aft	1	11	2	14	3	25
Totals						
Fwd	50	2,871	67	3,054	117	5,925
Aft	50	2,841	67	3,092	117	5,933

2. Secondary cameras

Camera	Frames
Stellar (Mission 1042-1)	446
Index (Mission 1042-1)	446
Stellar (Mission 1042-2)	489
Index (Mission 1042-2)	489

E. Film Usage

	Film Load	Pre-Flight Footage	Processed Footage
Fwd-Looking (Mission 1042-1)	16,000*	344	7,929
Aft-Looking (Mission 1042-1)	16,000*	333	7,827
Fwd-Looking (Mission 1042-2)	NA	NA	8,067
Aft-Looking (Mission 1042-2)	NA	NA	8,160
Stellar (Mission 1042-1)	75	5.9	53
Stellar (Mission 1042-2)	75	3.2	53
Index (Mission 1042-1)	135	9.0	113
Index (Mission 1042-2)	135	6.0	106

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

PART II. IMAGE ANALYSIS

A. Fwd-Looking Panoramic Camera

1. Density: The original negative is generally of medium density. The existing small percentage of heavy density is attributed to some snow cover and to photography of desert areas.

2. Contrast: The contrast of the original negative is considered to be mostly medium. The snow cover and desert areas caused some low contrast.

3. Acuity: The edge sharpness of the fwd film is generally good throughout. Although the cloud cover was average for this mission, there appears to be less than the normal amount of haze to degrade the photography.

4. Imaged Degradations

a. Light Leaks:

1) There are 2 narrow bands of fog on the fifth frame of most passes (Graphic 1, page 10).

2) A very subtle fog pattern occurs on the next-to-last frame of several passes (Graphic 2, page 10).

b. Static: None noted.

c. Other: A small out-of-focus area is present intermittently on imagery from the fwd camera on Mission 1042 approximately 1.5 inches from the supply end and continues up to 2 inches along the binary edge. At its maximum size, it extends approximately 1 inch into the format. This anomaly appears to have been caused by tension tracking variations. At the cut and wrap between the 2 missions, the condition was rectified, and no out-of-focus area is present on the second half of the mission (Graphic 3, page 10).

5. Physical Degradations: Minor rail scratches are present along both edges. The scratches caused by the scan head rollers are normal for this type of mission. The extent of the abrasions and pinholes is about normal. The last few feet of the second mission was tacky due to the wet recovery. The effected film shows the result of water marking.

6. Product Quality: The imaged and physical degradations had a minor effect on the product quality.

B. Aft-Looking Panoramic Camera

1. Density: Same as reported for the fwd-looking camera.

2. Contrast: Same as the fwd-looking camera.

3. Acuity: The edge sharpness of the aft camera is good, but the quality of the fwd camera is slightly better.

4. Imaged Degradations

a. Light Leaks

1) A minor fogged streak occurs on the fifth frame of most passes (Graphic 4, page 10).

2) A minor area of fog is present near the center of format on the third frame from the end of some passes. (Graphic 5, page 10).

b. Static: None noted.

c. Other: An obstruction on the binary rail edge 3.75 inches from the supply end caused a small minus density spot. There are minus density streaks up to 1/8 inch wide intermittently throughout the mission. They appear to follow the path of the field flattener, and apparently are the result of foreign matter on the field flattener during exposure.

5. Physical Degradations: Minor rail scratches are continuous along both edges of the aft film. Numerous emulsion scratches are present intermittently throughout the mission. The predominant scratches are 7/8 inch and 1 and 7/16 inches from the binary edge. They are parallel to the major axis and extend through the horizon formats. The last few feet of film from the second half of the mission are degraded by numerous stained areas that are the result of moisture deposited on the film from the wet recovery.

6. Product Quality: The above degradations have only a minor effect on the product quality.

C. Stellar Camera (Mission 1042-1)

1. Density: The base-plus-fog is lower on this stellar photography than on the last few missions. The difference is attributed to a change in processing machines and processing chemistry. A Trenton processing

[redacted]

machine was used instead of the Yardleigh. The density of the film is adequate for the detection of stellar images.

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

3. Image Shape: Most of the stellar images are elongated.

4. Image Per Frame: Approximately 15 stellar images are detectable on each frame.

5. Flare Level: Flare effects approximately 60 percent of each frame. The flare density is less than that of the last few missions due in part to the changes made in processing technique.

6. Imaged Degradations:

a. Light Leaks: None noted.

b. Static: Minor static traces are present intermittently throughout. The static originates from the edge opposite the correlation lamp and extends up to 0.25 inch into the format.

c. Others: An unexposed frame was metered between titled frames 318 and 319. Three of the 4 stellar fiducials are overexposed throughout the mission.

7. Physical Degradations: None noted.

8. Product Quality: The overexposed fiducials rendered them useless for grid alignment. Therefore, the stellar reduction process was additionally complicated.

D. Stellar Camera (Mission 1042-2)

1. Density: The density is comparable to that of Mission 1042-1 and is adequate for the detection of stellar images.

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

3. Image Shape: Most of the stellar images are of a point type.

4. Images Per Frame: There are 10 to 15 images per frame.

5. Flare Level: Flare effects approximately 20 percent of each frame, with stellar images visible in the flared area.

6. Image Degradations

a. Light Leaks: None noted.

b. Static: None noted.

c. Other: None.

7. Physical Degradations: Because of the wet recovery, moisture degraded the last 8 frames of the stellar film. Water seepage along the film edge opposite the correlation lamp caused minor emulsion blistering and peeling on the last 50 frames during prespooling. A film tear near the end of the mission caused the loss of one stellar frame for attitude determination purposes.

8. Product Quality: The general quality of the stellar film is not seriously degraded by any of the above anomalies.

E. Index Camera (Mission 1042-1)

1. Density: The density is generally medium.

2. Contrast: Mostly medium, with some low contrast.

3. Acuity: The acuity is good with the normal fall-off of quality at the format edges.

4. Imaged Degradations

a. Light Leaks: None noted.

b. Static: None noted.

c. Other: The metering is slightly erratic on the first 60 frames with no overlap between frames. A blank metered frame occurred between titled frames 318 and 319.

5. Physical Degradations: Two emulsion scratches, 1.25 inches and 5/16 inch from the reseau number edge, are present on the last 46 frames and on the post flight material.

6. Product Quality: The product quality is good and is comparable to that of recent missions.

F. Index Camera (Mission 1042-2)

1. Density: The density is medium throughout.

2. Contrast: Mostly medium with some low contrast.

3. Acuity: Good.

4. Imaged Degradations:

   a. Light Leaks: None noted.

   b. Static: None noted.

   c. Other: None.

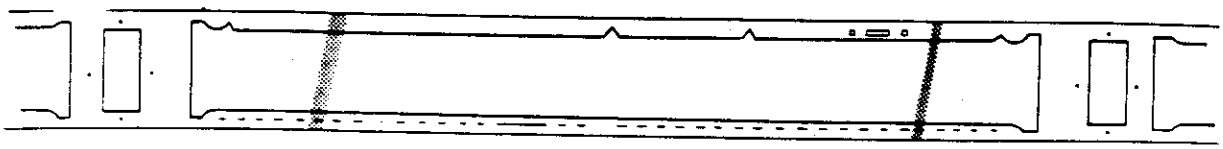
5. Physical Degradations: None noted.

6. Product Quality: The quality is good and is comparable to the index photography of the first mission.

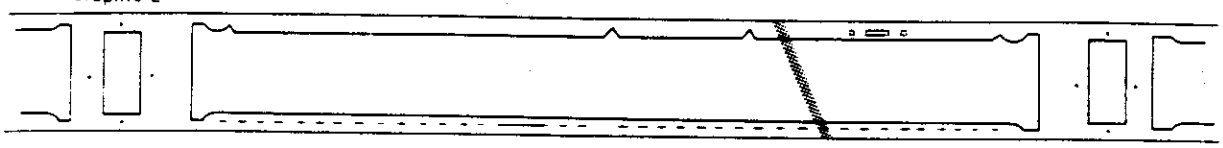
G. Graphic Display (Mission 1042)

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

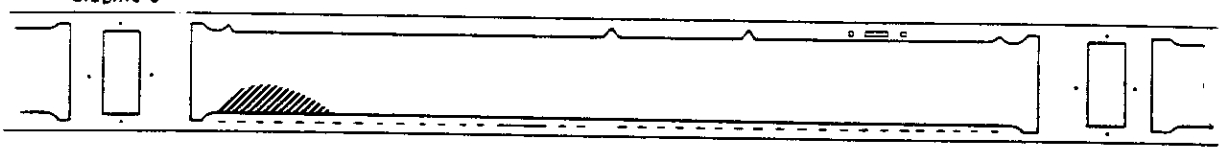
Graphic 1



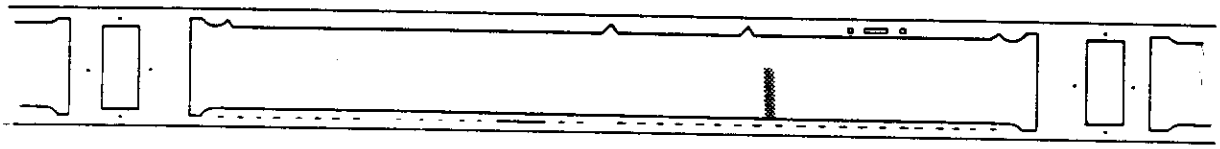
Graphic 2



Graphic 3



Graphic 4



Graphic 5

NPIC L-9716

PART III. IMAGED AUXILIARY DATA

A. Fwd-Looking Panoramic Camera

1. Horizon Cameras

a. Starboard-Looking

1) Imagery: The imagery is good, and the earth's curvature is sharp and well defined.

2) Fiducials: Sharp and well defined.

b. Port-Looking

1) Imagery: The imagery is good during the first mission. Beginning in pass 92D, the imagery is slightly underexposed, and the exposure gradually decreases during the remainder of the mission. This condition appears to be caused by a loose F-stop mechanism which made the iris gradually close.

2) Fiducials: Sharp and well defined.

2. Frequency Marks: Operational throughout the mission.

3. Binary Time Word: The number 1 and 16 light images are weak. They caused difficulty in the automatic reading equipment. On frames 47 to 86, pass 9D and frames 80 to 108, pass 45D, the binary block is slightly displaced toward the edge of the film. On pass 87D, frame 38 and pass 223D, frame 10 the binary lights failed. Fog, caused by film runout, effects the binary on frames 30 to 36 of pass 233D. Printing drift of the binary caused some reader problems.

4. Binary Index: Slightly bloomed, but readable.

5. Camera Number: Readable.

6. Pan Geometry Dots: Not applicable.

7. Nodal Traces: Not applicable.

8. Nod Indicators: Not applicable.

B. Aft-Looking Panoramic Camera

1. Horizon Cameras

a. Starboard-Looking

1) Imagery: The imagery is good.

2) Fiducials: Sharp and well defined.

b. Port-Looking

1) Imagery: The imagery is good.

2) Fiducials: Sharp and well defined.

2. Frequency Marks: Frequency marks are missing along the first 6 inches of the frame and at various locations along the frame edge intermittently throughout the mission.

3. Binary Time Word: All light images of the binary time word were of good quality. Following is a list of the malfunctions during the mission:

a. The wrong binary lights were lit on pass 8D, frame 1; pass 53D, frame 43; and pass 86D, frame 21.

b. The number 15 light was erroneously imaged on pass 95D, frame 30; pass 168D, frame 67; and pass 182D, frame 6.

c. The binary lights were inoperative on pass 13D, frame 50; pass 73D, frame 22; and pass 167D, frame 21.

4. Binary Index: Slightly bloomed, but readable.

5. Camera Number: Readable.

6. Pan Geometry Dots: Not applicable.

7. Nodal Traces: Not applicable.

8. Nod Indicators: Not applicable.

[redacted]

C. Stellar Camera (Mission 1042-1)

1. Grid Image Quality: Sharp and well defined.

2. Correlation Lamp Image Quality: Good.

D. Stellar Camera (Mission 1042-2)

1. Grid Image Quality: Sharp and well defined.

2. Correlation Lamp Image Quality: Good.

E. Index Camera (Mission 1042-1)

1. Grid Image Quality: Sharp and well defined.

2. Correlation Lamp Image Quality: Good.

3. Camera Number Legibility: Readable.

F. Index Camera (Mission 1042-2)

1. Grid Image Quality: Sharp and well defined.

2. Correlation Lamp Image Quality: Good.

3. Camera Number Legibility: Readable.

PART IV. MENSURATION QUALITY

A. Fwd-Looking Panoramic Camera

The image quality is considered good for measuring purposes. A total of 31 mensuration requests was received by the photogrammetric branch. A normal attitude was used for the first phase mensuration of Mission 1042-2 because of the underexposure of the port horizon imagery.

B. Aft-Looking Panoramic Camera

The image quality is considered good, and no problems were encountered during mensuration.

PART V. FILM PROCESSING

A. Processing Machines and Process Gamma

Film	Part: Entire Mission Machine	Gamma	Part: NA Machine	Gamma
Fwd (Mission 1042-1)	Trenton	2.10	NA	NA
Aft (Mission 1042-1)	"	2.15	"	"
Fwd (Mission 1042-2)	"	2.12	"	"
Aft (Mission 1042-2)	"	2.06	"	"
Stellar (Mission 1042-1)	"	2.21	"	"
Stellar (Mission 1042-2)	"	2.36	"	"
Index (Mission 1042-1)	Drape	1.29	"	"
Index (Mission 1042-2)	"	1.14	"	"

B. Processing Levels

1. Panoramic Cameras

Film	Primary	Intermediate	Full	Transition	Processing Changes
Fwd (Mission 1042-1)	4%	7%	75%	14%	37
Aft (Mission 1042-1)	2%	5%	81%	12%	30
Fwd (Mission 1042-2)	2.5%	9.9%	71.8%	15.8%	42
Aft (Mission 1042-2)	4.3%	10.6%	69.3%	15.8%	46

NA - Not Applicable.

2. Secondary Cameras

a. Stellar Cameras: No interruption in processing.

b. Index Cameras: No interruption in processing.

Film	Primary	Intermediate	Full	Transition	Processing Changes
Index (Mission 1042-1)	Not Applicable.				
Index (Mission 1042-2)	"				

C. Film Handling Summary

1. Fwd-Looking Camera

a. Capsule De-Filming

1) Mission 1042-1: No problems encountered.

2) Mission 1042-2: Because of the wet recovery, equipment and procedures were established for handling wet film. The last few feet of the fwd camera film were slightly tacky. It was not necessary to remove any film for special processing.

b. Pre-Processing Inspection

1) Mission 1042-1: Minor static discharges were noted during inspection.

2) Mission 1042-2: No static noted.

c. Manufacturing Splices

1) Mission 1042-1: Pass 55, frame 5.

2) Mission 1042-2: Pass 119, frame 6.

d. Processing Splices

1) Mission 1042-1: None.

2) Mission 1042-2: None.

e. Manufacturing Defects

1) Mission 1042-1: Minimal.

2) Mission 1042-2: Minimal.

f. Processing Anomalies

1) Mission 1042-1: None.

2) Mission 1042-2: Because of other priority commitments at the processing site, both the fwd and aft film were processed on one machine. This required over twice the normal amount of processing time.

g. Breakdown

1) Mission 1042-1: Normal.

2) Mission 1042-2: Due to the longer processing time, the breakdown required over 16 hours.

2. Aft-Looking Camera

a. Capsule De-Filming

1) Mission 1042-1: No problems encountered.

2) Mission 1042-2: The same procedure for handling wet film was used on the aft. The last few feet of the aft film were slightly tacky.

b. Pre-Processing Inspection

1) Mission 1042-1: No problems encountered.

2) Mission 1042-2: No problems encountered.

c. Manufacturing Splices

1) Mission 1042-1: Pass 39D, frame 37.

2) Mission 1042-2: Pass 105D, frame 97 and pass 214D, frame 37.

d. Processing Splices

1) Mission 1042-1: None.

2) Mission 1042-2: None.

e. Manufacturing Defects

1) Mission 1042-1: Minimal.

2) Mission 1042-2: Minimal.

f. Processing Anomalies

1) Mission 1042-1: None.

2) Mission 1042-2: Same as the fwd.

g. Breakdown

1) Mission 1042-1: Normal.

2) Mission 1042-2: Same as the fwd.

3. Index Camera

a. Capsule De-Filming

1) Mission 1042-1: No problems.

2) Mission 1042-2: Procedures for handling wet film were employed.

b. Pre-Processing Inspection

1) Mission 1042-1: No problems.

2) Mission 1042-2: No problems.

c. Manufacturing Splices

1) Mission 1042-1: None.

2) Mission 1042-2: None.

d. Processing Splices

1) Mission 1042-1: None.

2) Mission 1042-2: None.

e. Manufacturing Defects

1) Mission 1042-1: None noted.

2) Mission 1042-2: None noted.

f. Processing Anomalies: None.

g. Breakdown: Normal.

4. Stellar Camera

a. Capsule De-Filming

1) Mission 1042-1: The film was loosely wound on the take-up spool.

2) Mission 1042-2: Procedure for handling wet film was used.

b. Pre-Processing Inspection

1) Mission 1042-1: No problems.

2) Mission 1042-2: A slight tear was noted near the end of the mission.

c. Manufacturing Splices

1) Mission 1042-1: None.

2) Mission 1042-2: None.

d. Processing Splices

1) Mission 1042-1: None.

2) Mission 1042-2: A repair splice was made at the aforementioned film tear.

e. Manufacturing Defects

1) Mission 1042-1: None noted.

2) Mission 1042-2: None noted.

f. Processing Anomalies: None.

g. Breakdown: Normal.

[redacted]

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D. Timetable

Film	Recovered	Received at Processing Site	Spec Ship at NPIC Recd	Priority 1A at NPIC Recd
Fwd (Mission 1042-1)	22 Jun 67/2335Z	23 Jun 67/1145 EDT	None	25 Jun 67/2305 EDT
Aft (Mission 1042-1)	"	"	"	"
Stellar (Mission 1042-1)	"	"	"	"
Index (Mission 1042-1)	"	"	"	"
Fwd (Mission 1042-2)	1 Jul 67/2151Z	2 Jul 67/1420 EDT	"	6 Jul 67/1126 EDT
Aft (Mission 1042-2)	"	"	"	"
Stellar (Mission 1042-2)	"	"	"	"
Index (Mission 1042-2)	"	"	"	"

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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 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 and/or 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 and/or 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.

B. PI Statistics

1. Target Coverage

	Mission 1042-1	Mission 1042-2	Totals
Priority Targets Programmed	No specific priority targets were programmed for this mission. Specific areas of the world were selected for target reporting during the initial readout.		
Priority Targets Reported	344	393	737

There were 1,847 targets reported in the supplements printed after the initial readout.

2. PI Quality Appraisal

Rating	Missiles	Nuclear Energy	Air Facilities	Ports	Elect Commo	Military Activity	Complex
Good	17	1	21	16	1	22	23
Fair	319	16	103	10	7	60	24
Poor	136	10	39	4	-	35	14
Totals	472	27	163	30	8	117	61

3. Summary of PI Quality Ratings

Good	101 or 11%
Fair	539 or 62%
Poor	238 or 27%

C. PI Comments

1. Atmospheric Attenuation: An analysis of atmospheric conditions affecting the priority targets as reported by the photo interpreters during the initial scan of the mission is as follows:

Weather	Number of Targets
Heavy Clouds	44
Scattered Clouds	151
Haze	217
Clear	466

2. Terrain Conditions: Less that 5 percent of the imagery is snow covered. The heavy vegetation at this time of the year has an adverse effect on a large number of targets. The trees tend to be a natural camouflage for some small targets.

3. Product Interpretability: The interpretability of both parts of Mission 1042 ranges from fair to good. The slight out-of-focus area as reported had little effect on the PI suitability of the mission. The photo interpreters reported a lower than normal haze condition throughout the mission, resulting in a sharper appearance of the imagery.

4. Resolution Target Analysis

RESOLUTION TARGET DATA

Target Designator — No targets were covered.
Camera (Looking)
Pass
Frame
Date of Photography
Universal Grid Coordinates
Geographic Coordinate of Format Center
Altitude (ft)
Camera
  Pitch (deg)
  Roll (deg)
  Yaw (deg)
Local Sun Time
Solar Elevation (deg)
Solar Azimuth (deg)
Exposure (Fraction of second)
Processing Level
Vehicle Azimuth (deg)
Filter (Wratten)
Target Type
Target Contrast
Weather Conditions

GROUND RESOLUTION IN FEET AS DETERMINED FROM THE ORIGINAL NEGATIVE

	Observer Number 1		Observer Number 2		Observer Number 3	
Target Designator	Along Track	Across Track	Along Track	Across Track	Along Track	Across Track

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PART VII. MISSION DATA

	Pan	Master Take-up Horizon	Master Supply Horizon	Slave Pan	Slave Take-up Horizon	Slave Supply Horizon	Mission 1042-1 Stellar	Mission 1042-1 Index	Mission 1042-2 Stellar	Mission 1042-2 Index
							D97/120/117		D98/121/118	
Camera Number	204	NA	NA	205	NA	NA	117	120	118	121
Reseau Number	NA	NA	NA	NA	NA	NA	11819	820192	10794	820201
Lens Serial Number	2102435	12853	12871	2012435	12879	19098	NA	NA	NA	NA
Slit Width	.200	NA	NA	.150	NA	NA	1.8	4.5	1.8	4.5
Aperture	3.5	8.0	6.3	3.5	5.3	8.0	1.0	1/500	1.0	1/500
Exposure Time (sec)	*	1/100	1/100	*	1/100	1/100	None	21	None	21
Filter (Wratten)	23A	25	25	21	25	25	83.91	38.34	83.72	38.26
Focal Length (mm)	609.628	55.00	55.00	609.628	55.00	55.00	75	135	75	135
Film Length (ft)	16,000	NA	NA	16,000	NA	NA	None	None	None	None
Splices	2	NA	NA	3	NA	NA	183-4-10-6	128-1-10-6	183-4-10-6	128-1-10-6
Emulsion	278-2-3-7	278-2-3-7	278-2-3-7	278-2-3-7	278-2-3-7	278-2-3-7	3401	3400	3401	3400
Film Type	3404	3404	3404	3404	3404	3404				
Resolution Data (L/mm)										
Static										
High Contrast	238	209	209	236	235	209	*	74 AWAR	*	71 AWAR
Low Contrast	153	*	*	145	*	*	*	NA	*	NA
Dynamic										
I High Contrast	205	*	*	205	*	*	*	NA	*	NA
I Low Contrast	128	*	*	127	*	*	*	NA	*	NA
P High Contrast	205	*	*	205	*	*	*	NA	*	NA
P Low Contrast	128	*	*	127	*	*	*	NA	*	NA

NA - Not Applicable.
* - Not Available.

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FIGURE 1. BEST IMAGE QUALITY

Image quality comparable to the best of this mission.

FIGURE 2. CORRESPONDING COVERAGE

Corresponding coverage as imaged by the aft camera.

NPIC L-4222 NPIC L-4223

[redacted]

	FIGURE 1	FIGURE 2
Camera	204	205
Pass	183D	183D
Frame	23	22
Date of Photography (GMT)	28 Jun 67	28 Jun 67
Universal Grid Coordinates	26.2 - 12.7	67.5 - 13.6
Enlargement Factor	20X	20X
Geographic Coordinates	53-47N 51-02E	52-59N 51-23E
Altitude (ft)	610,240	609,497
Camera Attitude:		
Pitch	15°7'	-14°53'
Roll	0°13'	0°11'
Yaw	-1°11'	-1°4'
Local Sun Time	1112	1112
Solar Elevation	58°29'	58°25'
Solar Azimuth	153°	153°
Exposure (sec)	1/338	1/448
Vehicle Azimuth	165°	165°
Processing Level	Full	Full

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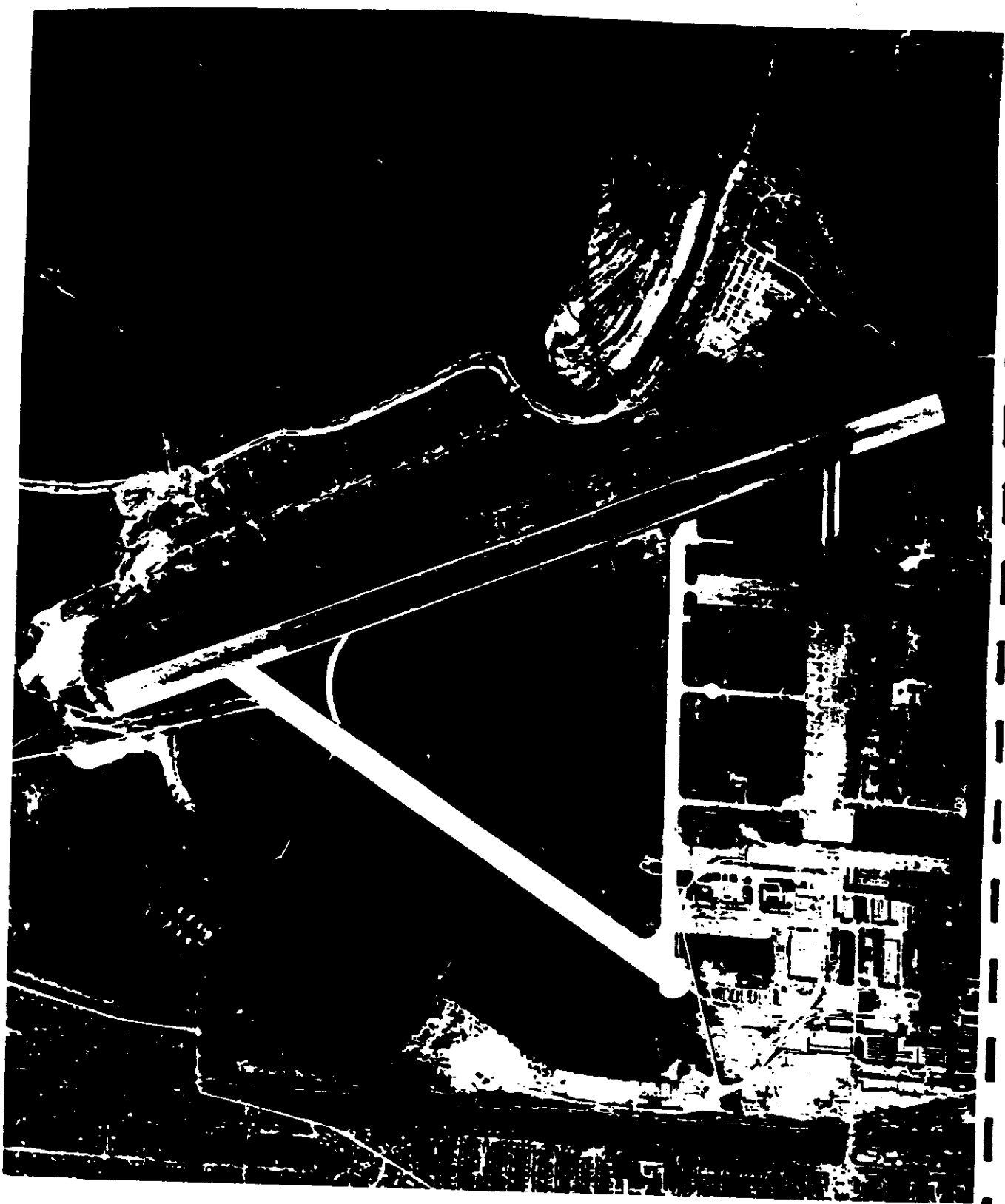
[redacted]



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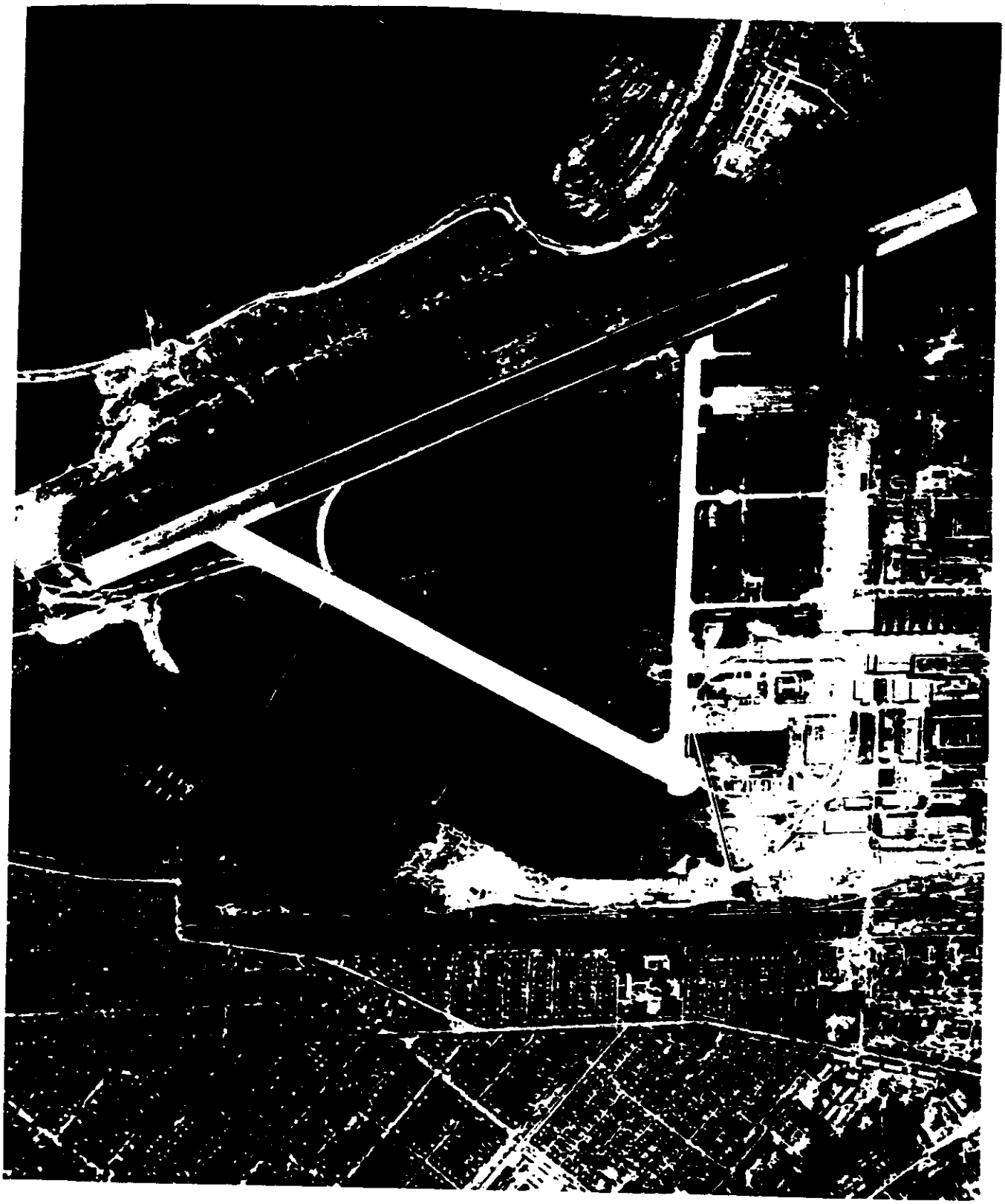

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FIGURE 3. STELLAR FORMAT (MISSION 1042-1)

FIGURE 4. STELLAR FORMAT (MISSION 1042-2)

NPIC L-4224 NPIC L-4225

	FIGURE 3	FIGURE 4
Mission Number	1042-1	1042-2
Stellar Frame Numbers	9,10,11	11,12,13
Correlates with:		
Main Camera Numbers	204,204,205	204,204,205
Pass	5D	88D
Frames	8 fwd, 15 fwd, 19 aft	75 fwd, 82 fwd, 85 aft
Date of Photography	17 Jun 67	22 Jun 67
Enlargement Factor	2.5X	2.5X
Exposure Time	1 sec	1 sec

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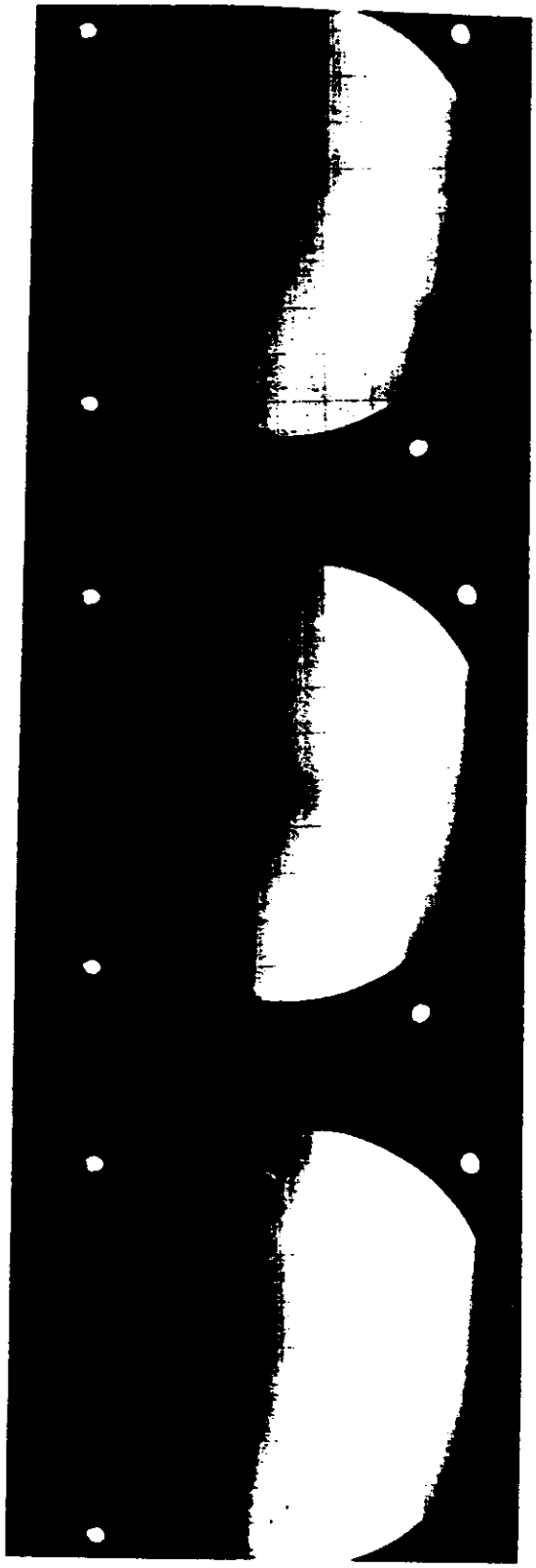

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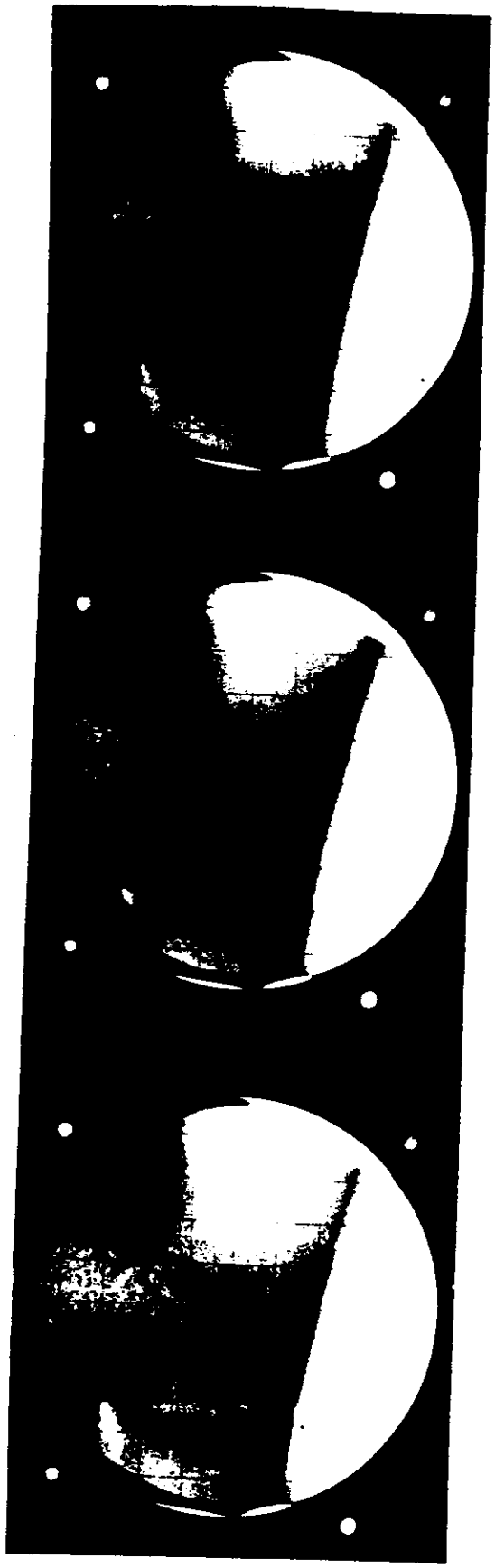

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