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TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT

MISSION 1036

[redacted]
SEPTEMBER 1967
COPY [redacted]
44 PAGES

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TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT

MISSION 1036

SEPTEMBER 1967

NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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Control System Only

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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

[redacted]

SYNOPSIS

Mission 1036 was launched on 9 August 1966/2046Z. The first capsule was recovered dry on 17 August 1966. The dry recovery of the second capsule, on 23 August 1966, ended the 14-day mission, accomplishing 119 photographic passes. The mission produced image quality comparable to the best that has been produced by this system. An MIP rating of 85 was assigned. Approximately 40 percent of the mission is affected by clouds.

The auxiliary cameras functioned properly throughout the mission. The horizon and index cameras produced sharp imagery. The flare level of the stellar record is low, and stellar images are detectable throughout the mission.

PART I. GENERAL SYSTEM INFORMATION

A. Camera Numbers

Forward-Looking Panoramic Camera	190
Aft-Looking Panoramic Camera	191
Stellar/Index Camera (Mission 1036-1)	D89/110/111
Stellar/Index Camera (Mission 1036-2)	D88/108/106

B. Launch and Recovery Dates

	Mission 1036-1	Mission 1036-2
Launch	9 Aug 66/2046Z	NA
Recovery	17 Aug 66/0034Z	23 Aug 66/0015Z

C. Orbit Elements

Element	Planned	Rev 56	Rev 163	Photo Range
Period (min)	*	89.323	89.119	NA
Perigee (nm)	*	102.000	103.000	102 nm (Rev 200)
Apogee (nm)	*	159.830	156.300	155 nm (Rev 4)
Eccentricity	*	0.00804	0.00742	NA
Inclination (deg)	*	100.114	100.114	NA
Perigee Latitude (deg)	*	23N	46N	NA

*Not Available.
NA - Not Applicable.

D. Photographic Operations

1. Panoramic Cameras

Type	Mission 1036-1 Revs	Mission 1036-1 Frames	Mission 1036-2 Revs	Mission 1036-2 Frames	Total Revs	Total Frames
Operational						
Fwd	49	2,523	44	2,812	93	5,335
Aft	49	2,521	44	2,803	93	5,326
Operational/Domestic						
Fwd	0	0	0	0	0	0
Aft	0	0	0	0	0	0
Domestic						
Fwd	14	298	8	184	22	476
Aft	14	300	8	194	22	494
Engineering (no imagery)						
Fwd	3	31	1	13	4	44
Aft	3	32	1	12	4	44
Totals						
Fwd	66	2,852	53	3,009	119	5,861
Aft	66	2,853	53	3,009	119	5,864

2. Secondary Cameras

Camera	Frames
Stellar (Mission 1036-1)	415
Index (Mission 1036-1)	415
Stellar (Mission 1036-2)	432
Index (Mission 1036-2)	432

E. Film Usage

	Film Load (Total)	Pre-Flight Footage	Processed Footage
Fwd-Looking (Mission 1036-1)	16,000*	405	7,933
Aft-Looking (Mission 1036-1)	16,000*	413	7,955
Fwd-Looking (Mission 1036-2)	NA	0	7,948
Aft-Looking (Mission 1036-2)	NA	0	7,958
Stellar (Mission 1036-1)	75	2.08	47.5
Stellar (Mission 1036-2)	75	NA	46
Index (Mission 1036-1)	135	4.16	98
Index (Mission 1036-2)	135	NA	97

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

[redacted]

PART II. IMAGE ANALYSIS

A. Fwd-Looking Panoramic Camera

1. Density: The density of the original negative of Mission 1036 is generally medium. The density of Mission 1036-2 is slightly thinner than Mission 1036-1.

2. Contrast: The contrast of the original negatives of Mission 1036 is generally medium.

3. Acuity: The edges of the imagery of the forward record are very sharp. Although a large percentage of the imagery is affected by atmospherics, the acuity is good throughout.

4. Imaged Degradations:

a. Light Leaks: The fog patterns caused by light leaks are similar to those of previous missions. On frame 1 of most passes, there is a band of fog extending into the format from the frequency mark edge (Graphic 1, page 9). A narrow band of fog is also noted on frame 5 of most passes (Graphic 2, page 9). A third band of fog is imaged on the second-to-last frame of most passes (Graphic 3, page 9). The density of the fog varies with the duration of the camera-off period, and the image degradation is minor.

b. Static: No static was noted on Mission 1036-1. A few dendritic static discharges were noted along both film edges intermittently throughout the mission. However, no apparent image degradation is noted.

c. Emulsion flaking along the binary format edge causes the image of that edge to be ragged throughout most of the mission.

5. Physical Degradations: Rail scratches are heavy throughout the mission. There is an emulsion scratch just within the format, under the binary word, on every frame of the mission. Degradation from these scratches is minor.

6. Product Quality: The image quality of the forward record is good and comparable to that of recent missions.

B. Aft-Looking Panoramic Camera

1. Density: The density of the aft camera record is slightly heavier than the forward. However, the majority of the mission has medium density.

2. Contrast: The contrast on the aft camera record is generally medium throughout.

3. Acuity: Most image edges in Mission 1036 are very sharp. A small area of soft focus, near the camera number, was first noted on pass 203D and continues through the end of the mission. The degradation affects about one square inch of the format and is therefore considered minor.

4. Imaged Degradations:

a. Light Leaks: Equipment images are present on the third-from-last frame of most passes (Graphic 4, page 9). The density varies with the duration of the camera-off period. The degradation to the imagery is minimal.

b. Static: A few dendritic static discharge images were noted outside the format randomly through Mission 1036-1. No image degradation was noted.

c. Emulsion flaking causes the binary edge of the format to become progressively more ragged in association with mission duration.

5. Physical Degradation: Rail scratches are present throughout the mission. There is a scratch just within the format, under the binary time word, on most frames of the mission. There is another emulsion scratch 1.2 inches from the camera number edge of the film intermittently throughout the mission. In some instances, the scratch extends through the horizon formats. Image degradation due to the above anomalies is minimal.

6. Product Quality: The overall image quality of the aft camera record is good and comparable to that of the forward. An MIP of 85 was assigned.

C. Stellar Camera (Mission 1036-1)

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: There are only about 10 images detectable per frame at the beginning of the mission. They become more numerous as the mission progresses, and over 20 images per frame are detectable at the end of the mission.

5. Flare Level: The flare level within the format is low, and stellar images are detectable within it.

6. Image Degradations

a. Light Leaks: None noted.

b. Static: None noted.

c. There is a continuous plus density line with hairlike traces around it from frame 300 through the end of the mission between the correlation lamp image and the format. Therefore, there is no degradation to the imagery.

d. Transverse bands of plus density, which appear to be pressure marks from the platten, are present intermittently throughout the mission. These marks are between the formats and do not degrade the stellar imagery.

e. Images, thought to be of jettisoned fuel particles, are present on stellar frames 4, 7, 9, and 93. Stellar image degradation is minor.

7. Physical Degradation: None noted.

8. Product Quality: The quality of the stellar record for Mission 1036-1 is good. The above-mentioned anomalies caused no serious problems in the reduction of the stellar record.

[redacted]

D. Stellar Camera (Mission 1036-2)

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 recorded as points or are slightly elongated. However, no odd configurations were noted.

4. Images Per Frame: There are about 15 stellar images per frame.

5. Flare Level: About 20 percent of each format is affected by flare. However, the flare level is low, and stellar images can be detected throughout the frame.

6. Image Degradations

a. Light Leaks: An area of fog is present on the sixth frame of the mission. This fog enters the format from the side opposite the correlation lamp and is believed to be associated with the preflight check.

b. Static: None noted.

c. A plus density line is noted beginning at about frame 387 and continuing through the end of the mission. It is similar to the one reported on Mission 1036-1 and causes no image degradation.

7. Physical Degradations: None noted.

8. Product Quality: The overall quality of the stellar for Mission 1036-2 is good. The above-mentioned anomalies caused no serious problems in reduction.

E. Index Camera (Mission 1036-1)

1. Density: Medium.

2. Contrast: Medium to high.

3. Acuity: The edge sharpness is as good as can be expected from this type of camera.

4. Imaged Degradations

a. Light Leaks: None noted.

b. Static: None noted.

5. Physical Degradations: None noted.

6. Product Quality: The overall quality of the index is good.

F. Index Camera (Mission 1036-2)

1. Density: Medium.

2. Contrast: Medium to high.

3. Acuity: As reported for Mission 1036-1.

4. Imaged Degradations

a. Light Leaks: None noted.

b. Static: None noted.

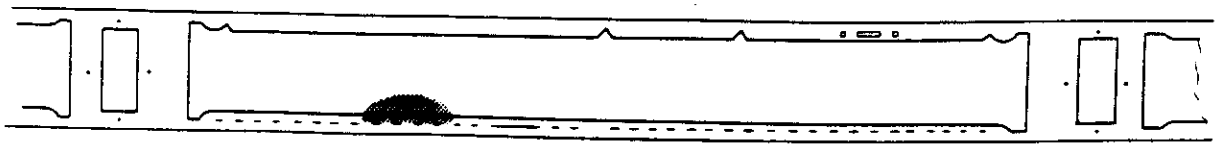
5. Physical Degradations: None noted.

6. Product Quality: The overall quality is good and comparable to that of Mission 1036-1.

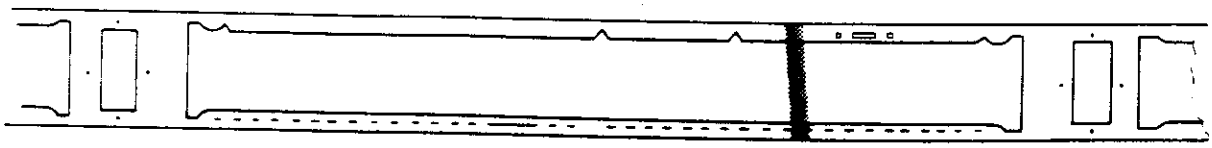
G. Graphic Display

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

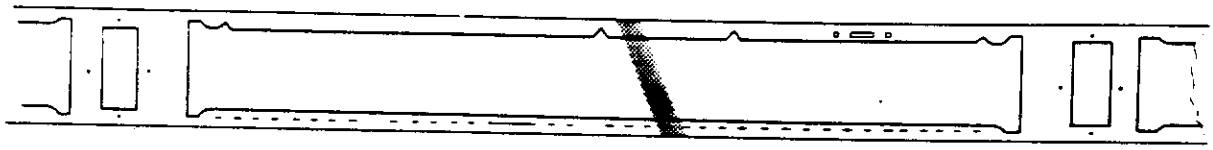
GRAPHIC 1



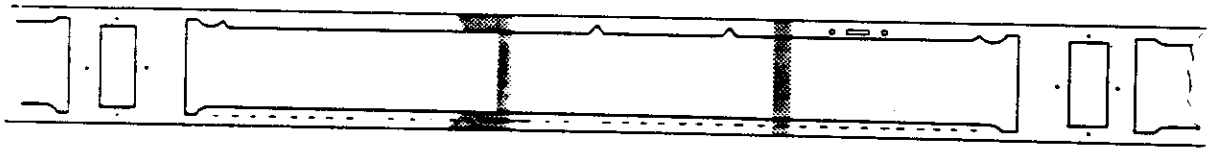
GRAPHIC 2



GRAPHIC 3



GRAPHIC 4



NPIC C-9685

PART III. IMAGED AUXILIARY DATA

A. Fwd-Looking Panoramic Camera

1. Horizon Cameras

a. Starboard-Looking

(1) Imagery: Good.

(2) Fiducials: Well defined throughout.

b. Port-Looking

(1) Imagery: Good.

(2) Fiducials: Well defined throughout.

2. Frequency Marks: Well defined throughout.

3. Binary Time Word: Operational with good quality throughout.

4. Binary Index: Bloomed but readable throughout.

5. Camera Number: Well defined throughout.

6. Pan Geometry Dots: Not applicable.

7. Nodal Traces: Not applicable.

8. Nod Indicators: Not applicable.

B. Aft-Looking Panoramic Camera

1. Horizon Camera

a. Starboard-Looking

(1) Imagery: Good.

(2) Fiducials: Well defined throughout.

b. Port-Looking

(1) Imagery: Good.

(2) Fiducials: Well defined throughout.

2. Frequency Marks: Well defined throughout.

3. Binary Time Word: Operational with good quality throughout.

4. Binary Index: Bloomed but readable throughout.

5. Camera Number: Well defined throughout.

6. Pan Geometry Dots: Not applicable.

7. Nodal Traces: Not applicable.

8. Nod Indicators: Not applicable.

C. Stellar Camera (Mission 1036-1)

1. Grid Image Quality: Sharp and well defined.

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

D. Stellar Camera (Mission 1036-2)

1. Grid Image Quality: Sharp and well defined.

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

E. Index Camera (Mission 1036-1)

1. Grid Image Quality: Sharp and well defined.

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

3. Camera Number Legibility: Readable throughout.

F. Index Camera (Mission 1036-2)

1. Grid Image Quality: Sharp and well defined.

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

3. Camera Number Legibility: Readable throughout.

PART IV. MENSURATION QUALITY

A. Fwd-Looking Panoramic Camera

The image quality of Mission 1036 is good, and no mensuration problems were encountered. Although a large portion of the mission is affected by atmospherics, the overall mensuration quality was unaffected.

B. Aft-Looking Panoramic Camera

The mensuration quality of the aft is comparable to that of the forward. The aft, as well as the forward, provided photography which was very useful in the acquisition of intelligence.

PART V. FILM PROCESSING

A. Processing Machines and Process Gamma

Film	Part: Entire Mission Machine	Gamma	Part: Machine	* Gamma
Fwd (Mission 1036-1)	Yardleigh	2.23	NA	NA
Aft (Mission 1036-1)	Trenton	2.25	NA	NA
Fwd (Mission 1036-2)	Trenton	2.26	NA	NA
Aft (Mission 1036-2)	Yardleigh	2.25	NA	NA
Stellar (Mission 1036-1)	Yardleigh	1.95	NA	NA
Stellar (Mission 1036-2)	Yardleigh	2.02	NA	NA
Index (Mission 1036-1)	Drape	1.25	NA	NA
Index (Mission 1036-2)	Drape	1.17	NA	NA

1. The forward record of Mission 1036-1 and the aft record of Mission 1036-2 were processed on the Yardleigh processing machine while the aft of Mission 1036-1 and the forward of Mission 1036-2 were processed on a Trenton processor. The entire mission was then evaluated and a comparison was made between the material processed on the 2 machines. The evaluation conducted by the processing contractor stated the Yardleigh processor deviated out of control by a smaller amount for the entire mission than did the Trenton processor. However, both machines were considered comparable in that respect.

2. The last 120 feet of the forward record and the last 117 feet of the aft record of Mission 1036-1 were removed prior to processing and were placed in storage for later low-gamma processing experimentation. The film, which involved only domestic material, subsequently was divided in half along the major axis and was committed to the experiment.

B. Processing Levels

1. Panoramic Cameras

Film	Primary	Intermediate	Full	Transition	Processing Changes
Fwd (Mission 1036-1)	9%	14%	77%	*	266
Aft (Mission 1036-1)	3%	9%	88%	*	22
Fwd (Mission 1036-2)	1%	19%	80%	*	34
Aft (Mission 1036-2)	3%	20%	77%	*	300

NA - Not Applicable.
* - Not Available.

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 1036-1)		Not applicable.			
Index (Mission 1036-2)		Not applicable.			

C. Film Handling Summary

1. Fwd-Looking Camera

a. Capsule De-Filming

(1) Mission 1036-1: No problems were reported.

(2) Mission 1036-2: No problems were reported.

b. Pre-Processing Inspection

(1) Mission 1036-1: No problems were reported.

(2) Mission 1036-2: No problems were reported.

c. Manufacturing Splices

(1) Mission 1036-1: Pass 74D, frame 49.

(2) Mission 1036-2: Pass 151D, frame 27.

d. Processing Splices

(1) Mission 1036-1: Pass 43D between frames 1 and 2
Pass 70D between frames 2 and 3
Pass 88D between frames 38 and 39

(2) Mission 1036-2: None were reported.

e. Manufacturing Defects

(1) Mission 1036-1: None noted.

(2) Mission 1036-2: None noted.

f. Processing Anomalies: As previously stated, the last 120 feet of the forward record was removed prior to mission processing and was placed in storage. The cut was made in frame 2, pass 111D. Only domestic imagery was affected.

g. Breakdown: No problems were encountered.

2. Aft-Looking Camera

a. Capsule De-Filming

(1) Mission 1036-1: No problems were encountered.

(2) Mission 1036-2: No problems were encountered.

b. Pre-Processing Inspection

(1) Mission 1036-1: No problems were reported.

(2) Mission 1036-2: No problems were reported.

c. Manufacturing Splices

(1) Mission 1036-1: Pass 72D, frame 10.

(2) Mission 1036-2: Pass 139D, frame 25.

d. Processing Splices

(1) Mission 1036-1: None other than those normal to mission processing.

(2) Mission 1036-2: None other than those normal to mission processing.

e. Manufacturing Defects

(1) Mission 1036-1: None noted.

(2) Mission 1036-2: None noted.

f. Processing Anomalies: The last 117 feet of the aft camera film was placed in storage. The cut was made in frame 4, pass 111D. Only domestic imagery was affected.

g. Breakdown: No problems were encountered.

3. Index Camera

a. Capsule De-Filming

(1) Mission 1036-1: No problems were reported.

(2) Mission 1036-2: No problems were reported.

b. Pre-Processing Inspection

(1) Mission 1036-1: No problems were reported.

(2) Mission 1036-2: No problems were reported.

c. Manufacturing Splices

(1) Mission 1036-1: None.

(2) Mission 1036-2: None.

d. Processing Splices

(1) Mission 1036-1: None, other than those normal to mission processing.

(2) Mission 1036-2: None, other than those normal to mission processing.

e. Manufacturing Defects

(1) Mission 1036-1: None noted.

(2) Mission 1036-2: None noted.

f. Processing Anomalies: None reported.

g. Breakdown: No problems were reported.

4. Stellar Camera

a. Capsule De-Filming

(1) Mission 1036-1: No problems were reported.

(2) Mission 1036-2: No problems were reported.

b. Pre-Processing Inspection

(1) Mission 1036-1: No problems were reported.

(2) Mission 1036-2: No problems were reported.

c. Manufacturing Splices

(1) Mission 1036-1: None.

(2) Mission 1036-2: None.

d. Processing Splices

(1) Mission 1036-1: None, other than those normal to mission processing.

(2) Mission 1036-2: None, other than those normal to mission processing.

e. Manufacturing Defects

(1) Mission 1036-1: None noted.

(2) Mission 1036-2: None noted.

f. Processing Anomalies: None reported.

g. Breakdown: No problems encountered.

D. Timetable

Film	Recovered	Received at Processing Site	**Spec Ship at NPIC Recd	Priority 1A at NPIC Recd
Fwd (Mission 1036-1)	17 Aug 66/0034Z	*	None	19 Aug 66/2010 EST
Aft (Mission 1036-1)	" "	*	"	" "
Stellar (Mission 1036-1)	" "	*	"	" "
Index (Mission 1036-1)	" "	*	"	" "
Fwd (Mission 1036-2)	23 Aug 66/0040Z	*	"	25 Aug 66/1611 EST
Aft (Mission 1036-2)	" "	*	"	" "
Stellar (Mission 1036-2)	" "	*	"	" "
Index (Mission 1036-2)	" "	*	"	" "

*Not Available.
**SpecialShipment Explanation: There was no special shipment associated with this mission.

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 1036-1	Mission 1036-2	Totals
Priority 1 Targets Programmed		Not Available.	
Priority 1 Targets Covered	778	478	1,256

2. PI Quality Appraisal

Rating	Missiles	Nuclear Energy	Air Facilities	Ports	Elect Commo	Military Activity	Complex
Good	106	6	13	1	7	7	0
Fair	451	34	32	9	7	21	9
Poor	400	32	48	19	3	36	15
Totals*	957	72	93	29	17	64	24

3. Summary of PI Quality Ratings (Percentage)

Good	11
Fair	45
Poor	44

957
72
93
29
17
64
24
256

*A discrepancy exists between the total number of targets covered and the total PI reports because several targets are covered more than once.

C. PI Comments

1. Atmospheric Attenuation: Listed below is the photo interpreter's report of weather conditions for the priority one targets covered on this mission:

a. Clear: 496 targets or 40 percent.

b. Scattered Clouds: 249 targets or 20 percent.

c. Heavy Clouds: 81 targets or 6 percent.

d. Haze: 269 targets or 21 percent.

e. Cloud Shadow: 161 targets or 13 percent.

2. Terrain Conditions: Since the mission was flown during mid-August, heavy foliage was the predominant terrain feature. The heavy ground cover caused only minor PI problems.

3. Product Interpretability: The interpretability of both parts of Mission 1036 is good. The photo interpreters reported that the mission contained sharp imagery and was rated good with regard to the acquisition of intelligence.

4. Resolution Target Analysis

RESOLUTION TARGET DATA

Target Designator
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

No resolution targets imaged on this mission.

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

[redacted]

PART VII. MISSION DATA

	Pan	Master Take-up Horizon	Master Supply Horizon	Slave Pan	Slave Take-up Horizon	Slave Supply Horizon	Mission 1036-1 Stellar	Mission 1036-1 Index	Mission 1036-2 Stellar	Mission 1036-2 Index
							D89/110/111		D88/108/106	
Camera Number	190	NA	NA	191	NA	NA	111	110	106	108
Reseau Number	NA	NA	NA	NA	NA	NA	11811	820191	11752	820190
Lens Serial Number	1842435	12891	12893	2022435	12905	12904	NA	NA	NA	NA
Slit Width	.200	NA	NA	.150	NA	NA	F1.8	F4.5	F1.8	F4.5
Aperture	NA	F8.0	F6.3	NA	F6.3	F8.0	2.0	1/500	1.0	1/500
Exposure Time (sec)	NA	1/100	1/100	NA	1/100	1/100	NA	21	NA	21
Filter (Wratten)	23A	25	25	21	25	25	84 Nom	38.56	84 Nom	38.35
Focal Length (nm)	609.602	55.00	55.00	609.602	54.95	55.00	75	135	75	135
Film Length (ft)	16,000	NA	NA	16,000	NA	NA	0	0	0	0
Splices	2	NA	NA	3	NA	NA	151-48-3-6	113-2-3-6	151-48-3-6	113-2-3-6
Emulsion	257-1-6-6	NA	NA	257-1-6-6	NA	NA	3401	3400	3401	3400
Film Type	3404	NA	NA	3404	NA	NA				
Resolution Data (L/mm)										
Static										
High Contrast	268	*	*	266	*	*	*	75 (A)	*	73 (A)
Low Contrast	152	*	*	151	*	*	*	NA	*	*
Dynamic										
I High Contrast	181	*	*	191	*	*	*	NA	*	*
I Low Contrast	117	*	*	119	*	*	*	NA	*	*
P High Contrast	168	*	*	172	*	*	*	NA	*	*
P Low Contrast	106	*	*	112	*	*	*	NA	*	*

*Not Available.
NA - Not Applicable.
A - AWAR
Nom - Nominal.

FIGURE 1. BEST IMAGE QUALITY

Image quality comparable to the best of this mission.

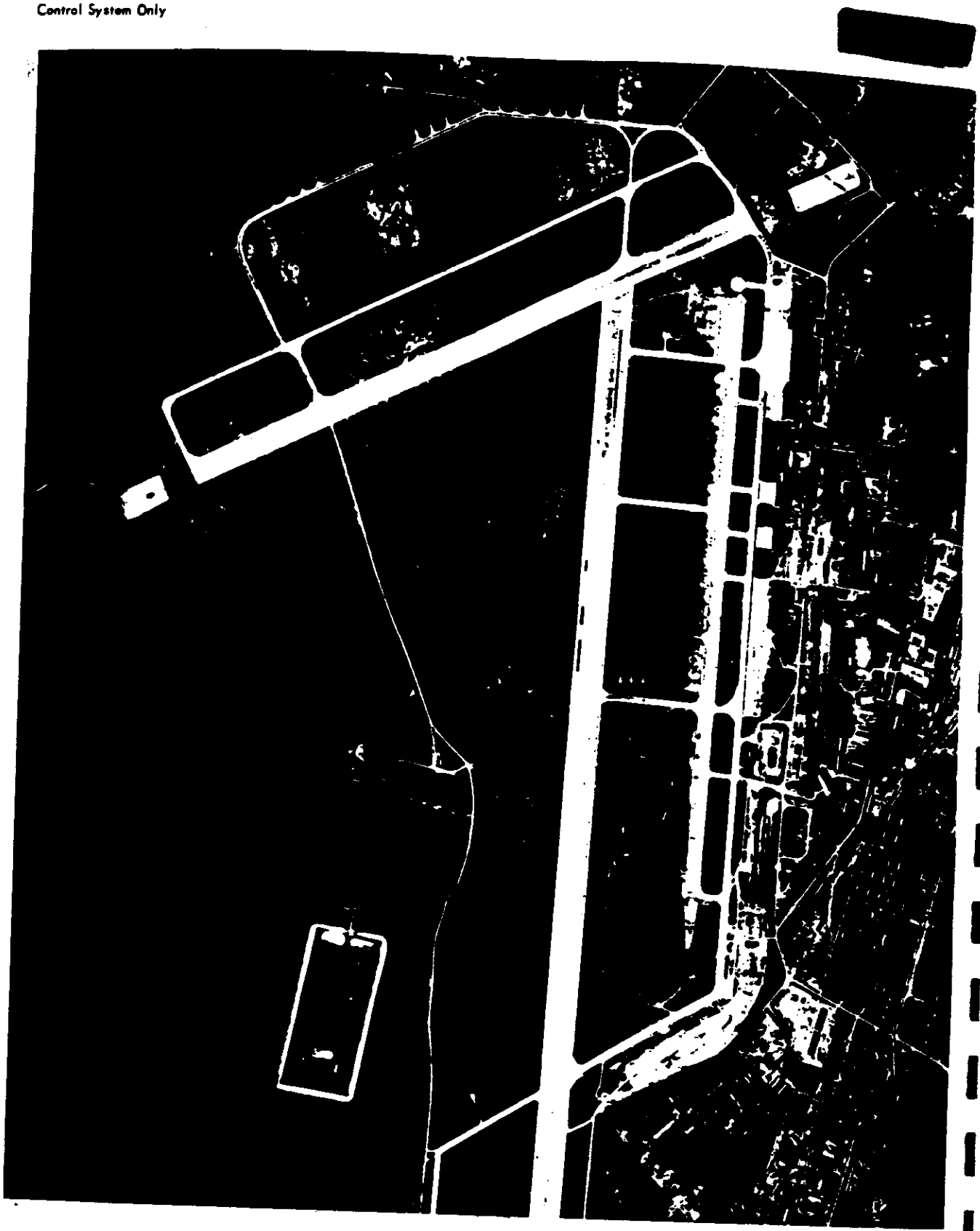
FIGURE 2. CORRESPONDING COVERAGE

Corresponding coverage as imaged by the fwd-looking camera.

NPIC L-4147

NPIC L-4148

	FIGURE 1	FIGURE 2
Camera	191	190
Pass	74D	74D
Frame	34	32
Date of Photography (GMT)	14 Aug 66	14 Aug 66
Universal Grid Coordinates	49.0 - 14.0	42.0 - 11.5
Enlargement Factor	20X	20X
Geographic Coordinates	55-54N 038-13E	55-52N 038-17E
Altitude (ft)	675,919	678,161
Camera Attitude:		
Pitch	-15°26'	14°19'
Roll	0°39'	0°37'
Yaw	0°19'	0°22'
Local Sun Time	1326	1326
Solar Elevation	45°11'	45°13'
Solar Azimuth	210°	210°
Exposure (sec)	2,498	2,412
Vehicle Azimuth	199°49'	200°12'
Processing Level	Full	Full



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Control System Only

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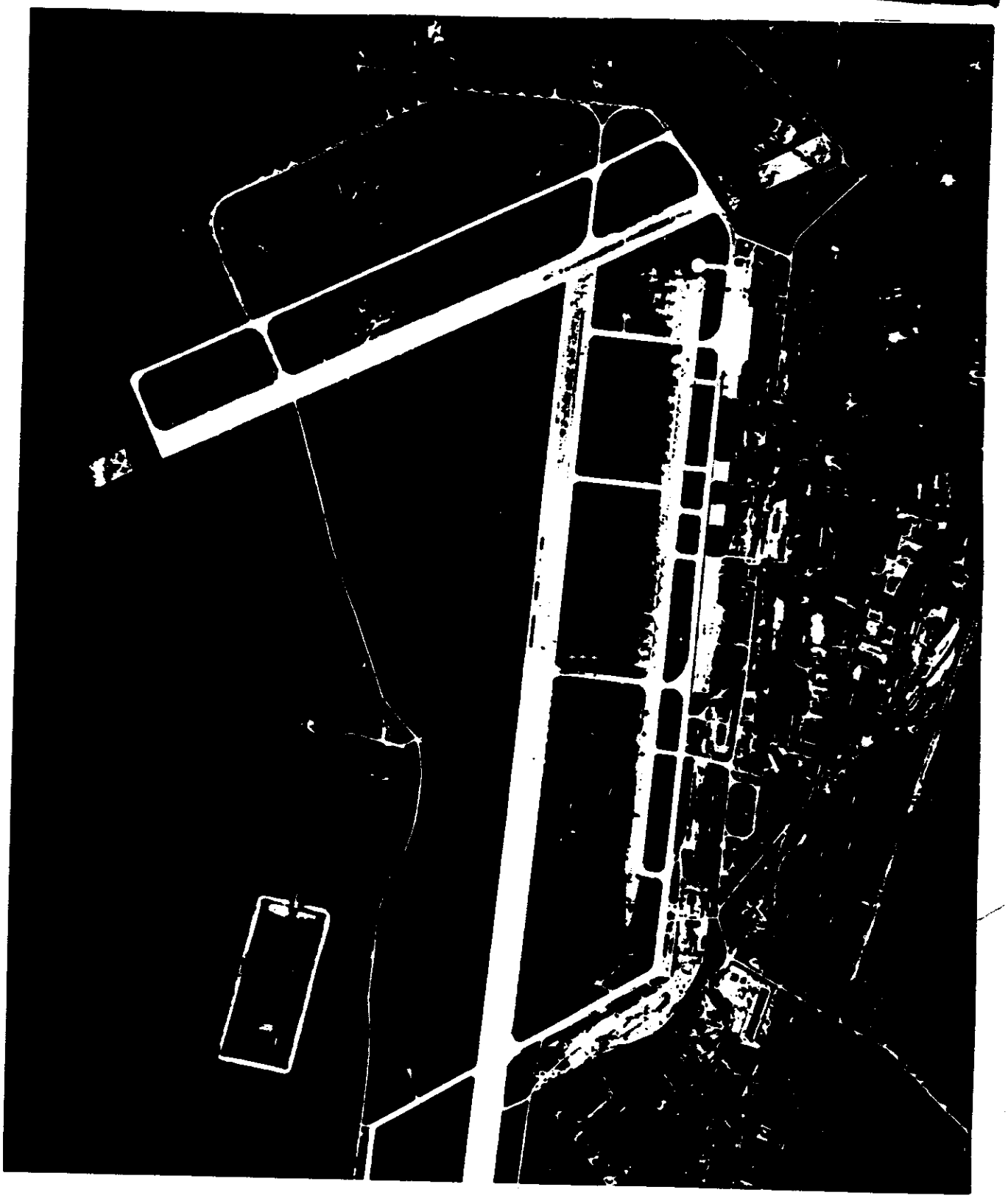

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FIGURE 3. STELLAR FORMAT (MISSION 1036-1)

Flare level typical throughout the mission.

FIGURE 4. STELLAR FORMAT (MISSION 1036-2)

Flare level typical throughout the mission.

NPIC L-4149

NPIC L-4150

	FIGURE 3	FIGURE 4
Mission Number.	1036-1	1036-2
Stellar Frame Numbers	123, 124, 125	176, 177, 178
Correlate with Forward Camera Number	190	190
Pass.	38D	154D
Frames.	35, 42, 49	26, 33, 40
Date of Photography	12 Aug 66	19 Aug 66
Enlargement Factor.	2.5X	2.5X
Exposure Time (sec)	2.0	1.0

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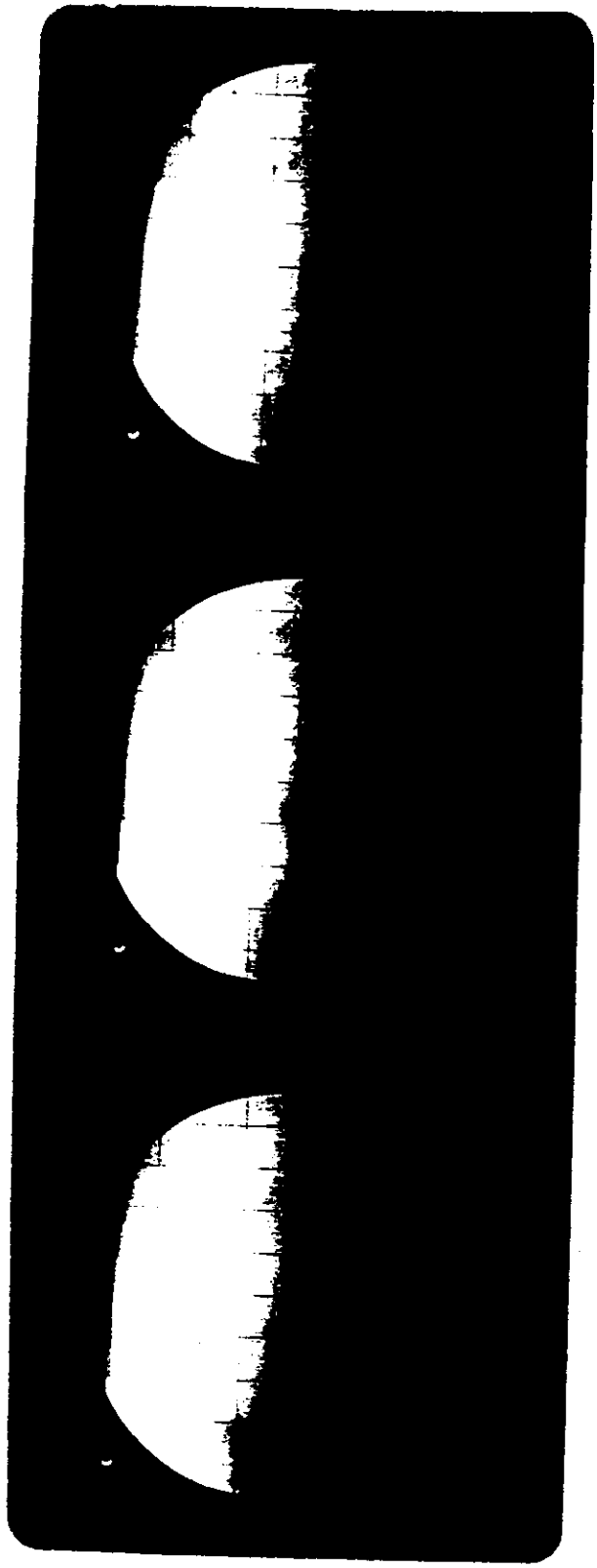

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