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May 1965

TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT

MISSION 1011-1 5-9 OCTOBER 1964

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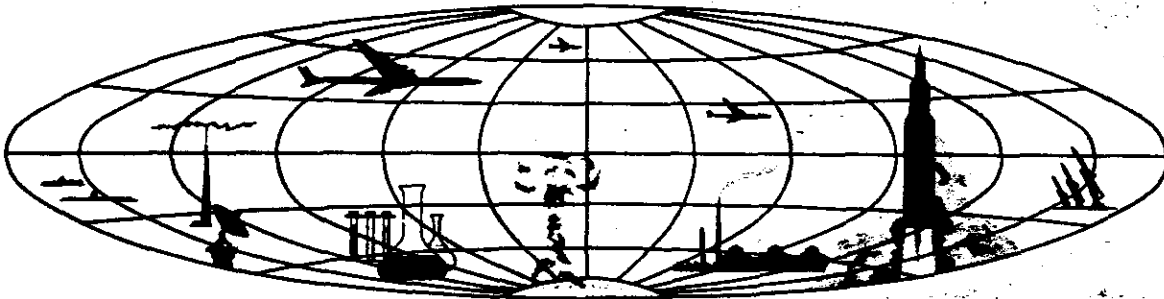
on NOV 26 1997

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FIGURE 2. PHOTOGRAPH SHOWING EFFECTS OF NON-IMAGE FORMING LIGHT.

NPIC J-9469 (4/65)

This fog pattern occurs on the next-to-last frame of each Master camera operation.

- 4c -

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SYNOPSIS

Mission 1011 (System J-3) was a two-part satellite photographic reconnaissance mission. A normal orbit was achieved and photographic coverage was accomplished between 5 and 9 October 1964. The cameras and associated equipment functioned properly, producing good quality photography comparable to Mission 1010. A monoscopic photographic mode was employed twice on the Slave Panoramic Camera during pass 38D. Clouds covered approximately 40.5 percent of the mission.

The recovery capsule from 1011-1 was retrieved by air catch during revolution 64. The cameras were reactivated on revolution 65 and continued to function through 12 October. Recovery of the second capsule, utilizing the normal recovery mode with life boat back-up, was attempted during revolution 112. The normal mode failed, and the life boat back-up could not be used due to the inability of the tracking station to transmit commands. Another attempt to recover the second capsule was unsuccessful during revolution 128. The photography recovered in the first capsule was assigned an MIP rating of 85.

GENERAL FLIGHT DATA

Date of Launch: 5 October 1964

Orbital Parameters

	<u>Planned</u>	<u>Actual (Rev 37)</u>
Period:	90.88 min	90.68 min
Perigee:	100 nm	98.29 nm
Perigee Latitude:	Not available	21.4 degrees N
Eccentricity:	0.02005	0.01978
Inclination Angle:	80 degrees	79.99 degrees
Apogee:	246 nm	241.96 nm

Recovery:

Mission 1011-1: 9 October 1964

Mission 1011-2: Not Recovered



PART I. CAMERA OPERATIONS

1. Master (FWD) Panoramic Camera No 160

The Master Panoramic Camera was operational throughout the mission. The last frame is number 87 on pass 57D. Several more frames of this pass would have been included in the second part of the mission if recovery had been successful. A small out-of-focus area occurs near the supply end of a few frames on passes 47DE and 52D. It varies slightly in size, shape, and degree of softness when it appears, and constitutes approximately 0.4 percent of each affected frame. Other degradations, which are considered minor, include:

a. A fine scratch appears just inside the format area, under the camera number, and just outside the format on the edge opposite the camera number. These scratches, approximately 2.5 inches long, are roughly parallel to the format edges and occur on each frame of photography from the Master Camera.

b. A wavering minus density streak, near the center of the film, occurs on the last three frames of 52D. This streak varies in width from 0.2 inch to 0.45 inch and is probably caused by foreign matter being present close to the aperture.

c. Non-image forming light caused fogged areas and shadowgraphs of equipment in the first, next-to-last, and last frame of all camera operations. A narrow diagonal fog streak from the non-frequency mark edge is evident on the third frame after a camera-on. A hook shaped fog streak is present in the fifth or sixth frame from the end of camera operation on passes 9D, 30D, 32D, 36D, 39D, 41D, and 52D.

2. Slave (AFT) Panoramic Camera No 161

The Slave Panoramic Camera was operational throughout the mission. The last frame, number 51 on pass 57D, is only a partial frame. Several more frames of this pass would have been included in the second part of the mission if recovery had been successful. Small out-of-focus areas occur on both ends of most frames during the mission. Those at the take-up end of the frame appear to be an extension of the bonus area. The affected portion covers an area approximately 0.5 percent in excess of the bonus area. The soft imagery on the supply end of each frame varies slightly in size, shape, and degree of softness. This affects approximately 2 percent of each frame near the bonus area. Other minor degradations include:



a. A fine scratch appears just inside the format, under the camera number, and just outside the format on the edge opposite the camera number. These scratches, approximately 2.5 inches long, are roughly parallel to the format edges and occur on each frame of photography.

b. A minus density streak, which follows the path of the field flattener, is present throughout passes 5D, 6D, 55D, 56D, 57D and on approximately the last 75 percent of passes 53D and 54D. This streak is caused by foreign matter on or near the field flattener.

c. Non-image forming light caused fogged areas and shadowgraphs on the last three or four frames of each pass.

3. Horizon Cameras

All Horizon Cameras were operational throughout the mission. The starboard looking frames of photographic passes that begin in the northernmost latitudes are underexposed on approximately the first 20 frames. Examples of this underexposure are on passes 6D and 19D. Density of the imagery varied according to the solar elevation.

4. Stellar Camera No 30

The Stellar Camera was operational throughout the mission. There are 415 titled frames of photography. Star images to the 6th magnitude can be detected and as many as 17 stars were used in some frames. Most stellar images are elongated and appear dumbbell shaped, as reported on previous missions. Flare effects approximately 40 percent of each format. A number of streaks, multidirectional in pattern and varying in density, effected a majority of the stellar formats in various degrees. These have been reported as images of crystallized jettisoned fuel.

5. Index Camera No D30

The Index Camera was operational throughout the mission. There are 415 titled frames of good-quality index photography. The overall density of the index imagery appears slightly thin but adequate for use. The correlation lamps are slightly bloomed during normal illumination and they appear as a faint semicircle when not in operation.



6. Associated Equipment

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

Anomalies which occur with the associated equipment of this mission include:

The Master Panoramic Camera number and binary index lamp are slightly bloomed throughout the mission. There are two camera-off markers at most camera-off positions of the Slave Panoramic Camera, and at the end of pass 9AE of the Master Panoramic Camera. The Slave Panoramic Camera frequency-mark lamp malfunctioned on passes 36D, frames 5-8 and 42-43; 37D, frames 1-4; 38D, frames 1-8; 39D, frames 1-17; 40D, frames 1-7; 41D, frames 1-17; and 47DE, frames 1-5. At these instances the frequency mark lamp remained illuminated, making a continuous streak from a half to one frame in length. After pass 47DE the lamp resumed normal operation.



FIGURE 1. DEFINITION OF PHOTOGRAPHIC DATA.

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

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

Date of Photography: The date of photography indicates the day, month, and year (GMT) that the photography was acquired.

Universal Grid Coordinates: These coordinates are included to locate the illustrated photography within the panoramic format.

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

Geographic Coordinates: These coordinates are included to indicate the latitude and longitude of the panoramic format.

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

Pitch: The pitch is the rotation of the vehicle about the transverse axis. Positive readings indicate nose-up attitude, negative readings indicate nose-down attitude.

Roll: The roll is the rotation of the vehicle about the longitudinal axis. Positive readings indicate left wing-up attitude. Negative readings indicate right wing-up attitude.



Yaw: The yaw is the rotation of the vehicle about the vertical axis. Positive readings indicate counterclockwise rotation when viewing the ground nadir from the vehicle.

Local Sun Time: This time is included to present to the viewer a realistic time of the acquisition of the photography illustrated.

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

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

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



FIGURE 2. PHOTOGRAPH SHOWING EFFECTS OF NON-IMAGE FORMING LIGHT.

NPIC J-9469 (4/65)

This fog pattern occurs on the next-to-last frame of each Master camera operation.

- 4c -



Camera	160 (Fwd)
Pass	9D
Frame	79
Date of Photography	6 Oct 64
Universal Grid Coordinates	71.5-12.0
Enlargement Factor	1.5X
Geographic Coordinates	41-32N 32-02E
Altitude (feet)	645,323
Vehicle:	
Pitch	15°16'
Roll	0°0'
Yaw	0°12'
Local Sun Time	1348
Solar Elevation	35°53'
Solar Azimuth	212°
Exposure	1 358

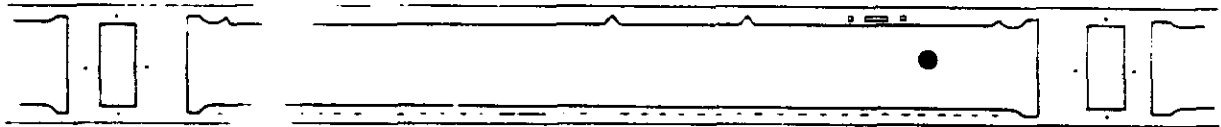


Approximate flight direction
on photograph

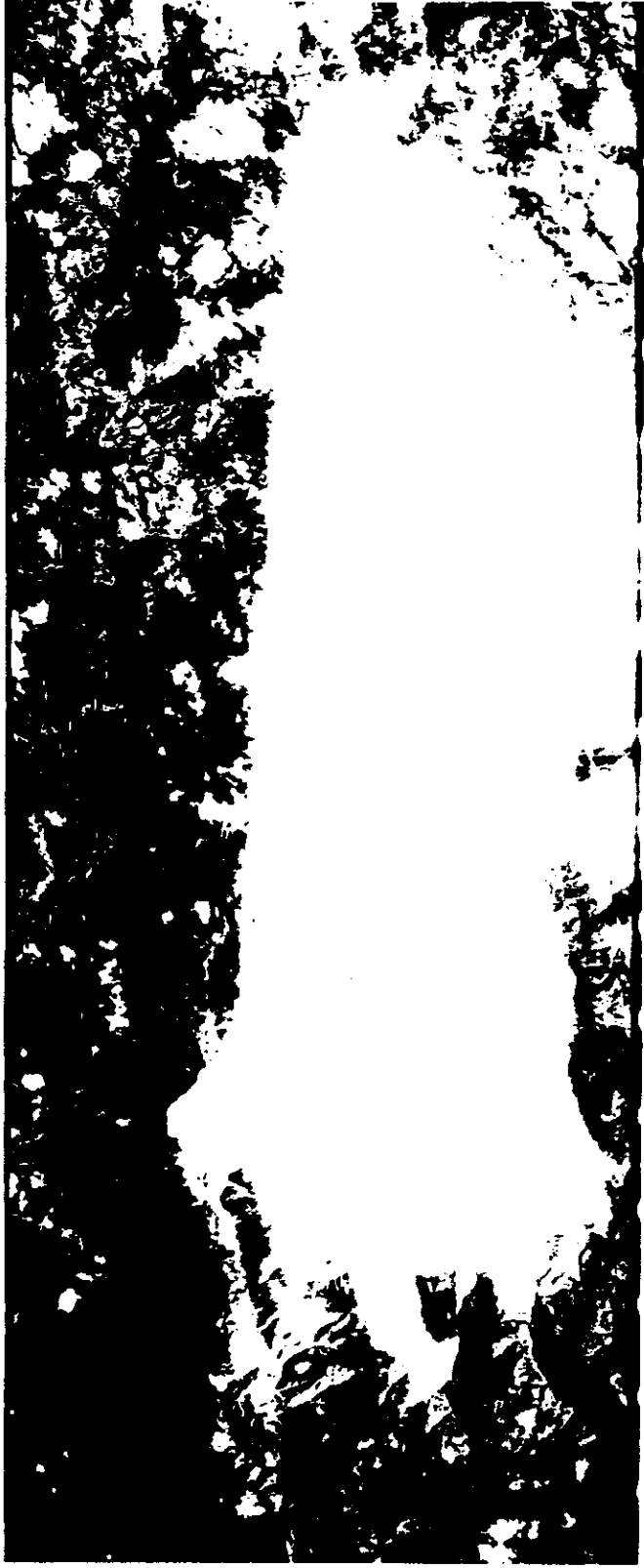


Approximate scan direction
on photograph

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



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FIGURE 3. PHOTOGRAPH SHOWING EFFECTS OF NON-IMAGE FORMING LIGHT.

NPIC J-9470 (4/65)

This fog pattern occurs between the third and fourth frame from the end of each Slave camera operation.

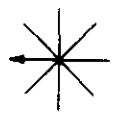
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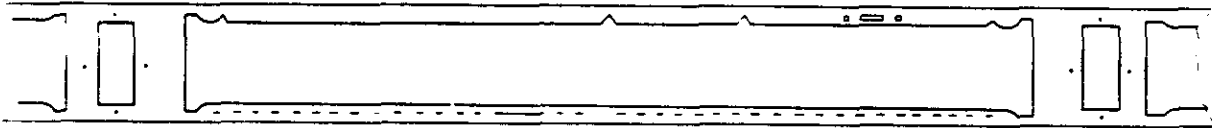


Camera	161 (Aft)
Pass	9D
Frame	Between 76 and 77
Date of Photography	6 Oct 64
Universal Grid Coordinates	Not applicable
Enlargement Factor	2X
Geographic Coordinates	42-29N 031-44E
Altitude (feet)	645,394
Vehicle:	
Pitch	-14°46'
Roll	0°1'
Yaw	0°9'
Local Sun Time	1347
Solar Elevation	35°13'
Solar Azimuth	212°
Exposure	1 '352



Approximate flight direction
on photograph

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

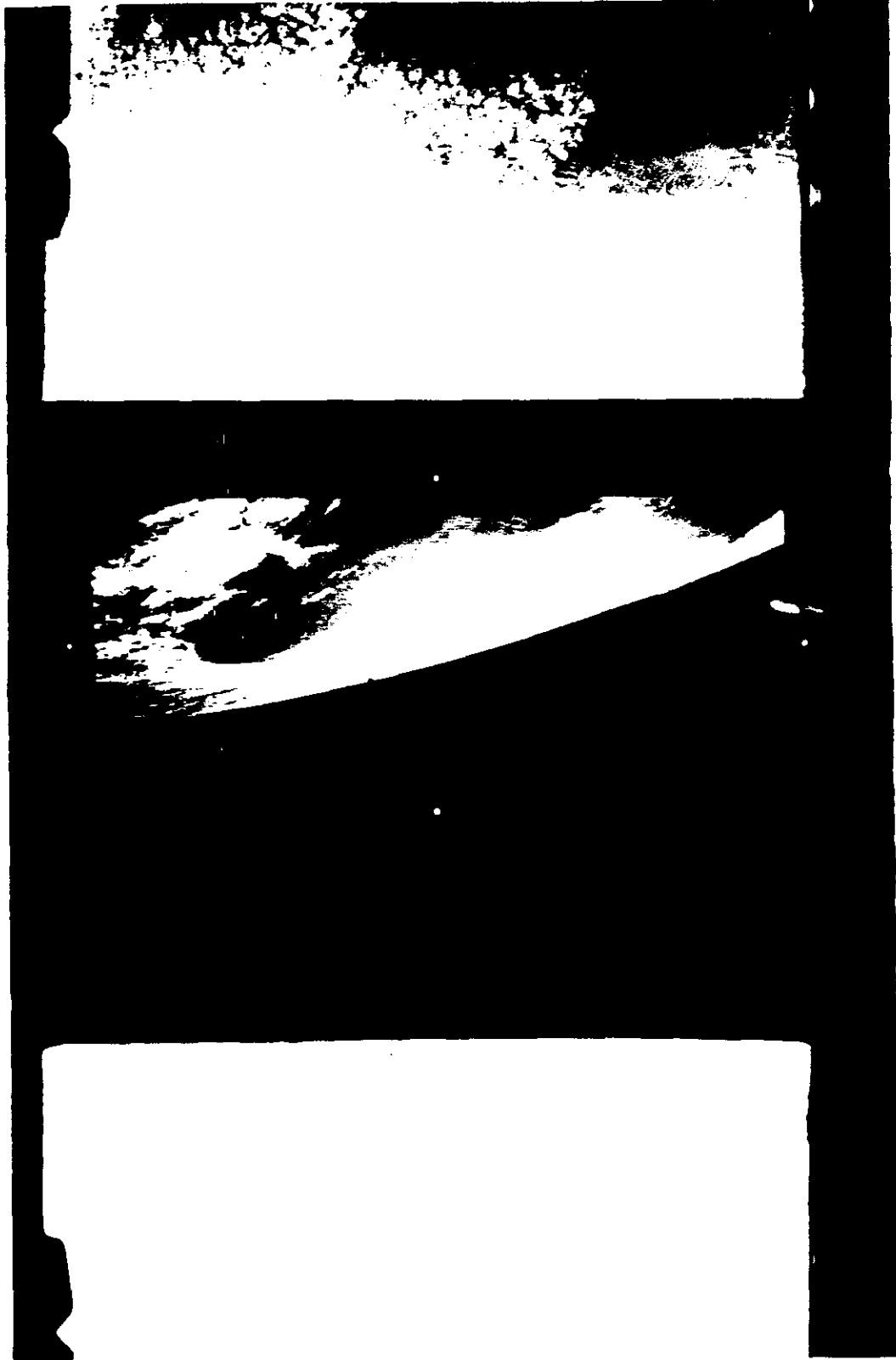


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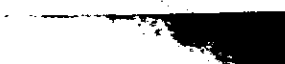


FIGURE 4. PHOTOGRAPH SHOWING EFFECTS OF NON-IMAGE FORMING LIGHT.

NPIC J-9471 (4/65)

This fog pattern occurs on the second frame from the end of each Slave camera operation.

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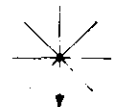
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Camera	161 (Aft)
Pass	9D
Frame	78
Date of Photography	6 Oct 64
Universal Grid Coordinates	25.0-12.0
Enlargement Factor	2X
Geographic Coordinates	42-19N 031-46E
Altitude (feet)	644,781
Vehicle:	
Pitch	-14°45'
Roll	0°1'
Yaw	0°8'
Local Sun Time	1347
Solar Elevation	35°20'
Solar Azimuth	212°
Exposure	1'352

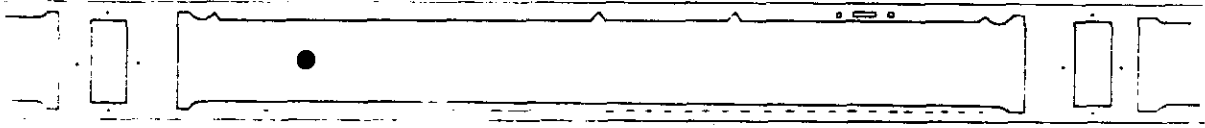


Approximate flight direction
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Approximate scan direction
on photograph

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



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FIGURE 5. PHOTOGRAPH SHOWING EQUIPMENT SHADOWGRAPH.

NPIC J-9472 (4/65)

This shadowgraph occurs on the last frame of each Slave camera operation.

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Camera	161 (Aft)
Pass	9D
Frame	79
Date of Photography	6 Oct 64
Universal Grid Coordinates	21.0 -12.0
Enlargement Factor	2X
Geographic Coordinates	42-09N 031-49E
Altitude (feet)	644, 173
Vehicle:	
Pitch	Not Determined
Roll	Not Determined
Yaw	Not Determined
Local Sun Time	1347
Solar Elevation	35°27'
Solar Azimuth	212°
Exposure	1 352

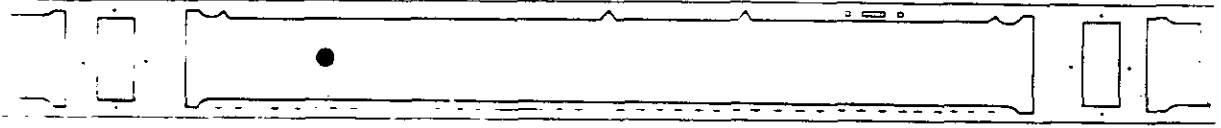


Approximate flight direction
on photograph



Approximate scan direction
on photograph

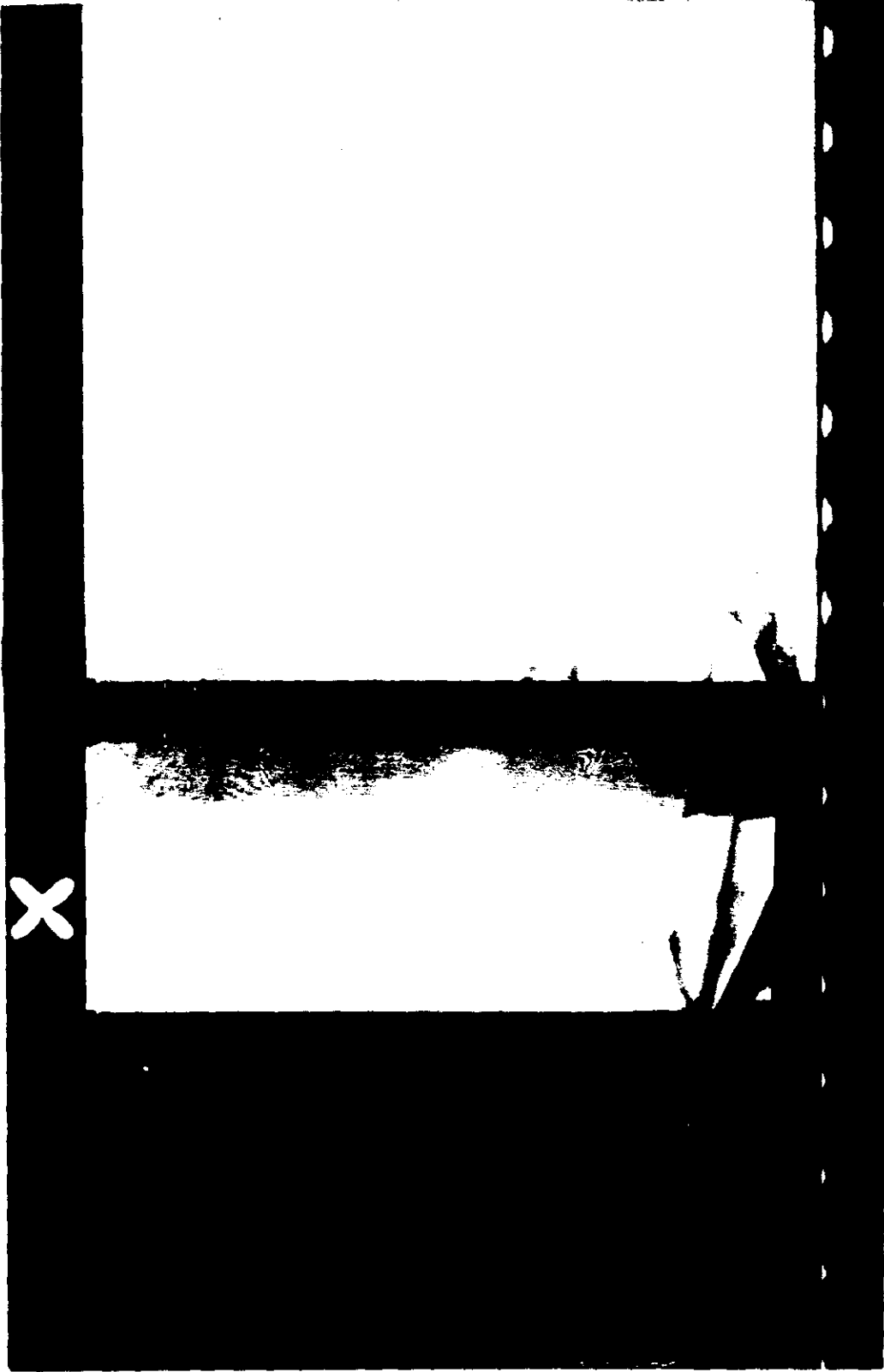
Approximate location of photograph in format. Negative viewed with emulsion side down.



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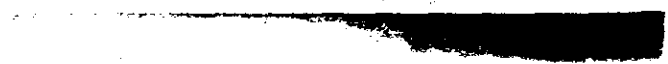
FIGURE 6. PHOTOGRAPH SHOWING EFFECTS OF SOFT IMAGERY.

NPIC J-9473 (4/85)

This degradation occurs on the supply end of each Slave camera frame.

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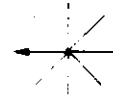
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Camera	161 (Aft)
Pass	6D
Frame	35
Date of Photography	6 Oct 64
Universal Grid Coordinates	13.0-10.0
Enlargement Factor	10X
Geographic Coordinates	56-51N 94-51E
Altitude (feet)	718,897
Vehicle:	
Pitch	-14°24'
Roll	0°3'
Yaw	-0°9'
Local Sun Time	1323
Solar Elevation	24°24'
Solar Azimuth	158°
Exposure	1 322



Approximate flight direction
on photograph



Approximate scan direction
on photograph

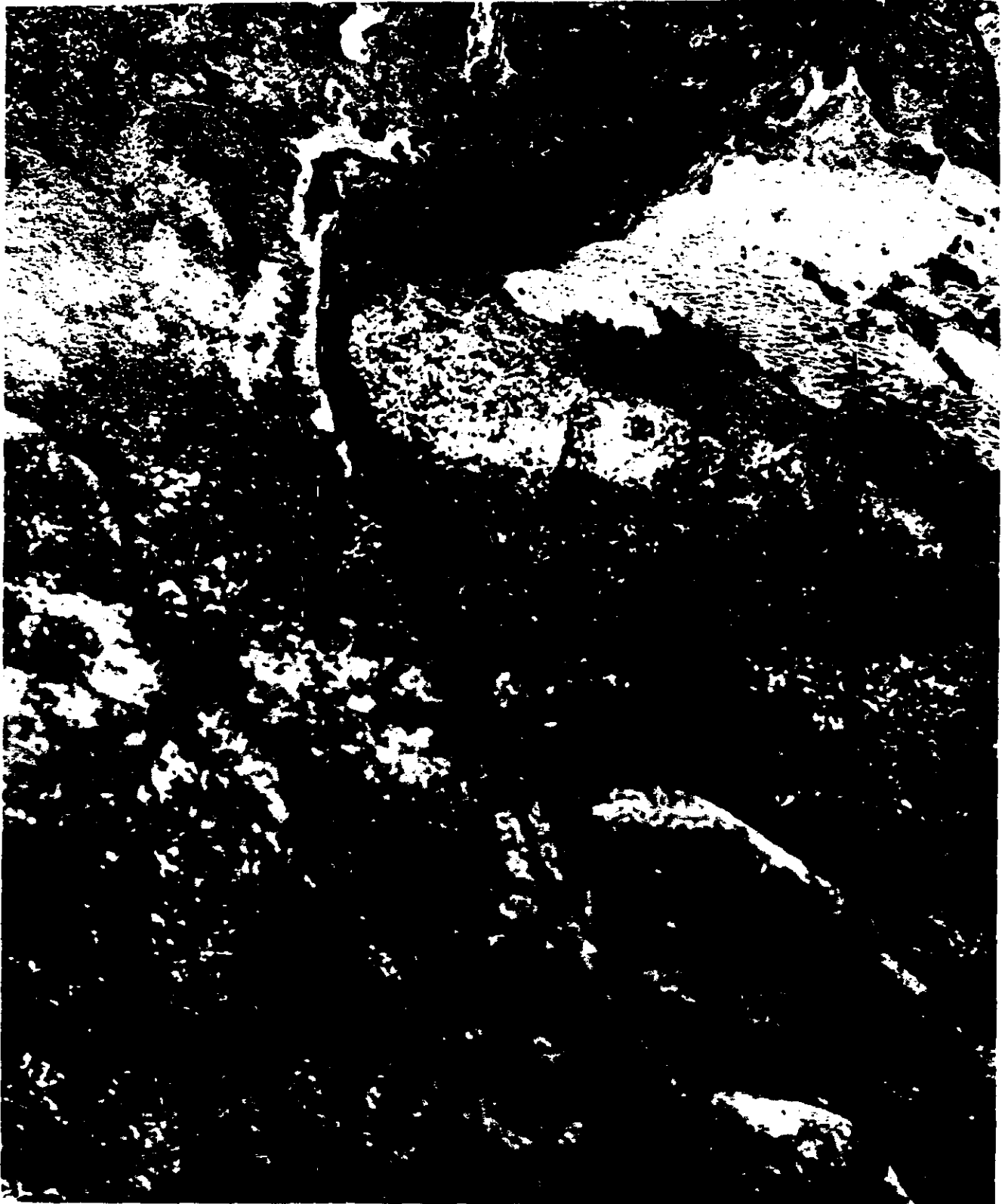
Approximate location of photograph in format. Negative viewed with emulsion side down.



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FIGURE 7. STELLAR FRAME NOS. 1, 2, AND 3.

NPIC J-9474 (4/65)

This photograph shows the multidirectional streaks which are present in most frames. Note there is a date change between the middle and bottom frame.

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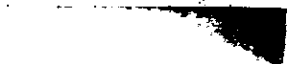


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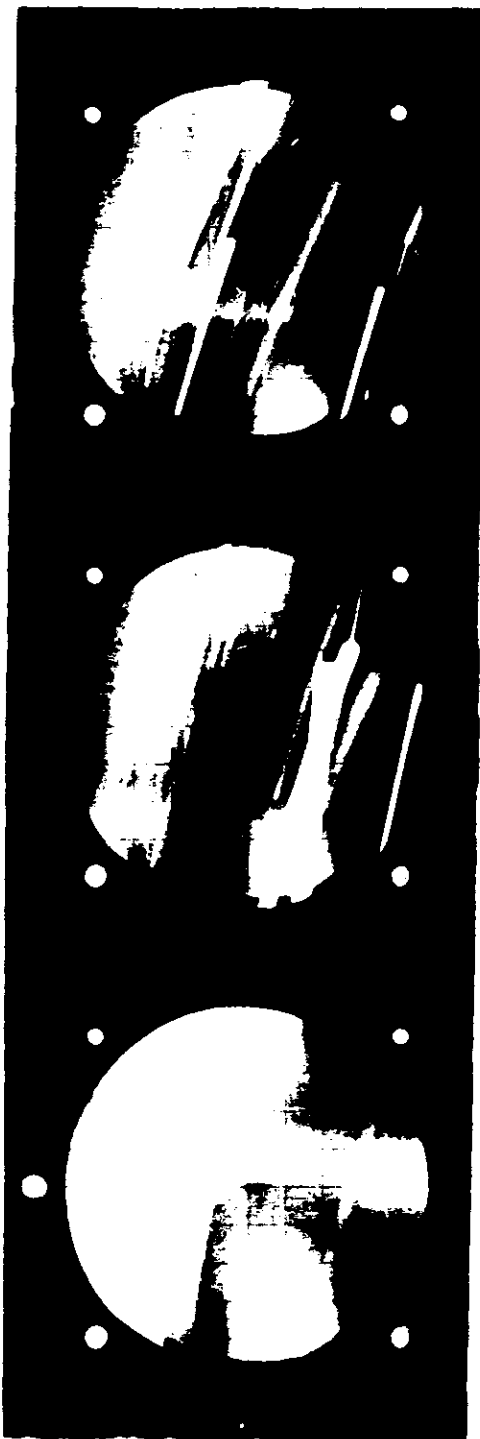
Stellar Frame Numbers 1, 2, and 3
Correlates with FWD Camera:
 Pass 1D - 5D
 Frame 4, 11, & 17
Date of Photography 5, 6 Oct 64
Enlargement Factor 2X
Exposure Time 2.0 sec

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FIGURE 8. INDEX FRAME NO. 153.

NPIC J-9475 (4/65)

This photograph is an example of good image quality attained by the Index Camera. The panoramic film MIP frame falls within this area.

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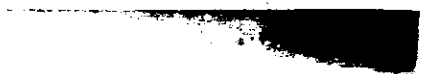


Index Frame Numbers	153
Correlates with FWD Camera:	
Pass	24D
Frame	73
Date of Photography	7 Oct 64
Enlargement Factor	3X
Exposure	1/500 sec

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PART II. FILM

1. Film Footage: The film footage and the frames processed from each of the cameras employed in Mission 1011-1 are as follows:

<u>CAMERA</u>	<u>FOOTAGE</u>	<u>FRAMES</u>
Master Panoramic Camera No 160	8,112'	2,915
Slave Panoramic Camera No 161	8,138'	2,935
Stellar Camera No 30	20'	415
Index Camera No D30	107'	415

2. Film Processing: This section provides an evaluation of exposure, processing, and densities of the original negatives from the 8 cameras used in Mission 1011-1.

(a) The exposure was good throughout the mission.

(b) Infrared detection densitometry was employed to determine the optimum levels of development for the various portions of the mission. Twenty-six development level changes were made on the mission record from the master camera and 34 changes on the slave camera.

The following percentages were processed at the 3 possible levels:

<u>LEVEL OF DEVELOPMENT</u>	<u>MASTER</u>	<u>SLAVE</u>
Primary	2%	3%
Intermediate	23%	47%
Full	75%	50%

(c) The average density of this mission is better than on Mission 1010. However, a few frames processed at the full level of development contain minimum densities considered too thin for PI exploitation.

3. Physical Film Degradations: This section provides an evaluation of the non-camera induced physical film degradations of the original negative from Mission 1011.

(a) Master Camera: Edge fog along the frequency mark of the film occurs intermittently on passes 19D, 20D, 40D, 41D, 47DE, and 52D through 57D. Static electrical discharges of undetermined origin caused minor dendritic-type fogging along the frequency mark edge of the film on pass 39D, frames 148 through 151. Base scratches are

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present intermittently on passes 1D, 6D, 24D, 37D, 47DE, and 57D. Emulsion scratches are present intermittently on passes 21D and 57D. Minus density comets are observed on pass 5D, frame 65, and pass 39D, frames 14 and 15. Handling marks, such as glove prints and crimps, occur on pass 6D, frame 103, and pass 53D, frame 86. Title information placed on the original negatives is partially removed on a number of frames on passes 30D, 54D, 55D, and pass 22D, frame 170. Foreign matter is noted on pass 47DE, frames 5, 6, and 7. A manufacturer's splice is present in frame 9 of pass 40D.

(b) Slave Camera: Edge fog along the non-frequency mark edge of the film occurs on the second frame of passes 30D and 52D and intermittently on passes 37D and 57D. Static electrical discharges of undetermined origin caused minor dendritic-type fogging along the frequency mark edge of the film on pass 5D. Minus density comets are observed on passes 6D, frame 3; 9D, frame 53; 25D, frame 15; and 36D, frame 120. Foreign matter and lifted emulsion occur on a few frames of passes 5D, 6D, and 14D. Passes 21D and 24D contain handling marks (fingerprints). Scratches on the base and emulsion side of the film are present intermittently on pass 30D and on pass 6D, frames 25 through 29. The original negative of pass 36D, frames 48 through 51, was severely damaged and partially repaired prior to this evaluation and after leaving the initial processing site. This damage consists of tears, wrinkles, emulsion digs and scrapes, portions of titling removed, numerous scratches, and several unrepaired holes. Manufacturer's splices are placed in passes 6D, frame 17, and 37D, frame 180.

(c) Stellar Camera: A group of small electrical discharges caused minor fogging between each frame of the mission. These discharges vary in intensity and in several instances, near the end of the mission, they become severe. Edge fog, along the film edge opposite the camera number, occurs intermittently throughout. The entire mission contains numerous base and emulsion scratches parallel to the film edges. These scratches are mostly attributed to film handling during data reduction. The film of the last 80 frames contain fine emulsion cracks, perpendicular to the film's edges and extending from end to end.

(d) Index Camera: There are several intermittent scratches, outside the format area, along the camera number edge.

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FIGURE 9. STELLAR FRAME NOS. 405, 406, AND 407.

NPIC J-9476 (4/65)

This photograph shows the static discharges which occur between the stellar formats during this mission.

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Stellar Frame Numbers 405, 406, and 407
Correlates with FWD Camera:
 Pass 56D
 Frame 60, 67, and 74
Date of Photography 9 Oct 64
Enlargement Factor 2X
Exposure Time 2.0 sec

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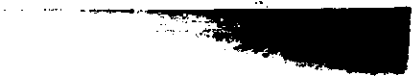
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4. Film Processing Curves: The following processing curves are a product of the processing contractor:

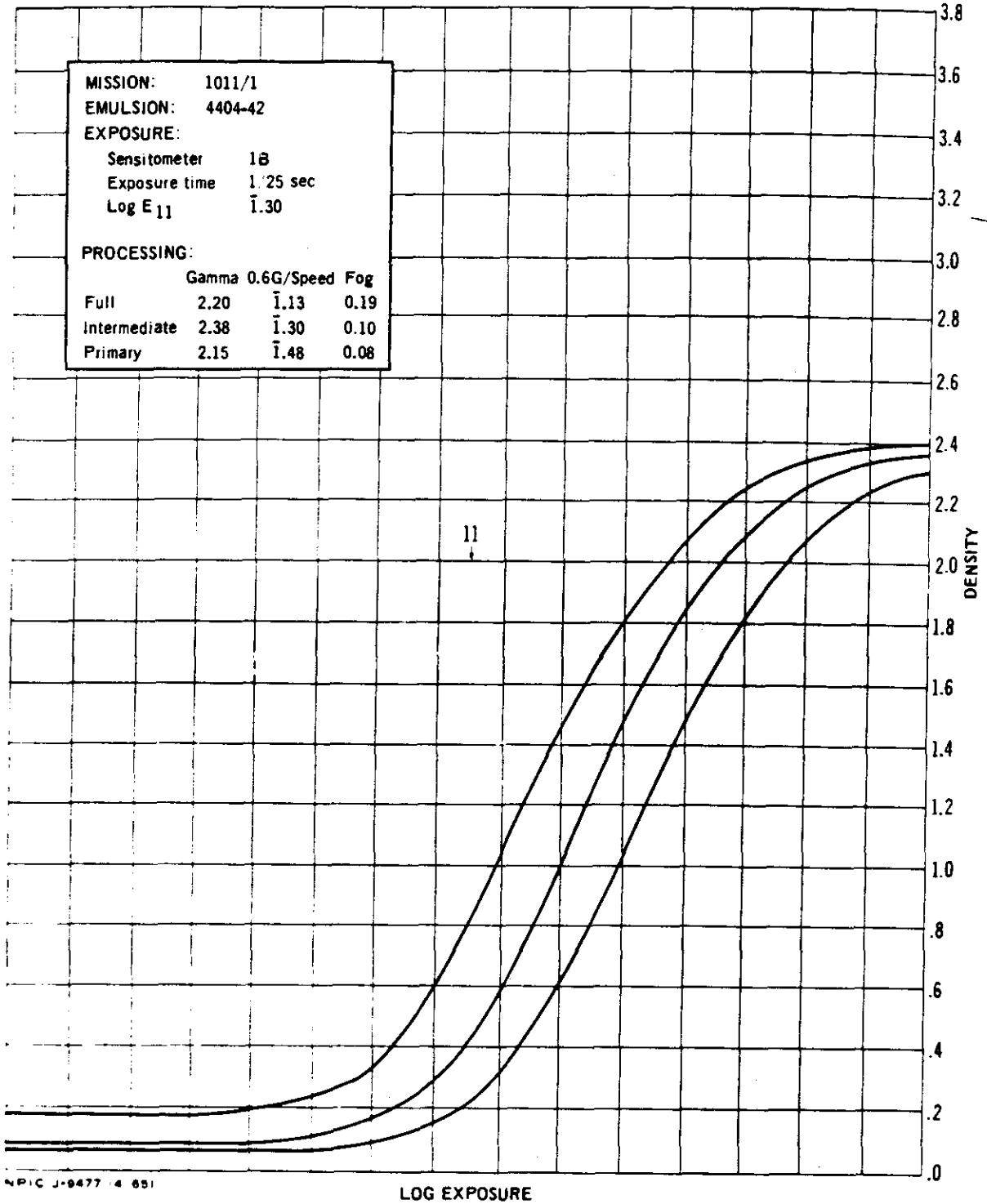
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STANDARD PROCESSING CONTROL CURVES



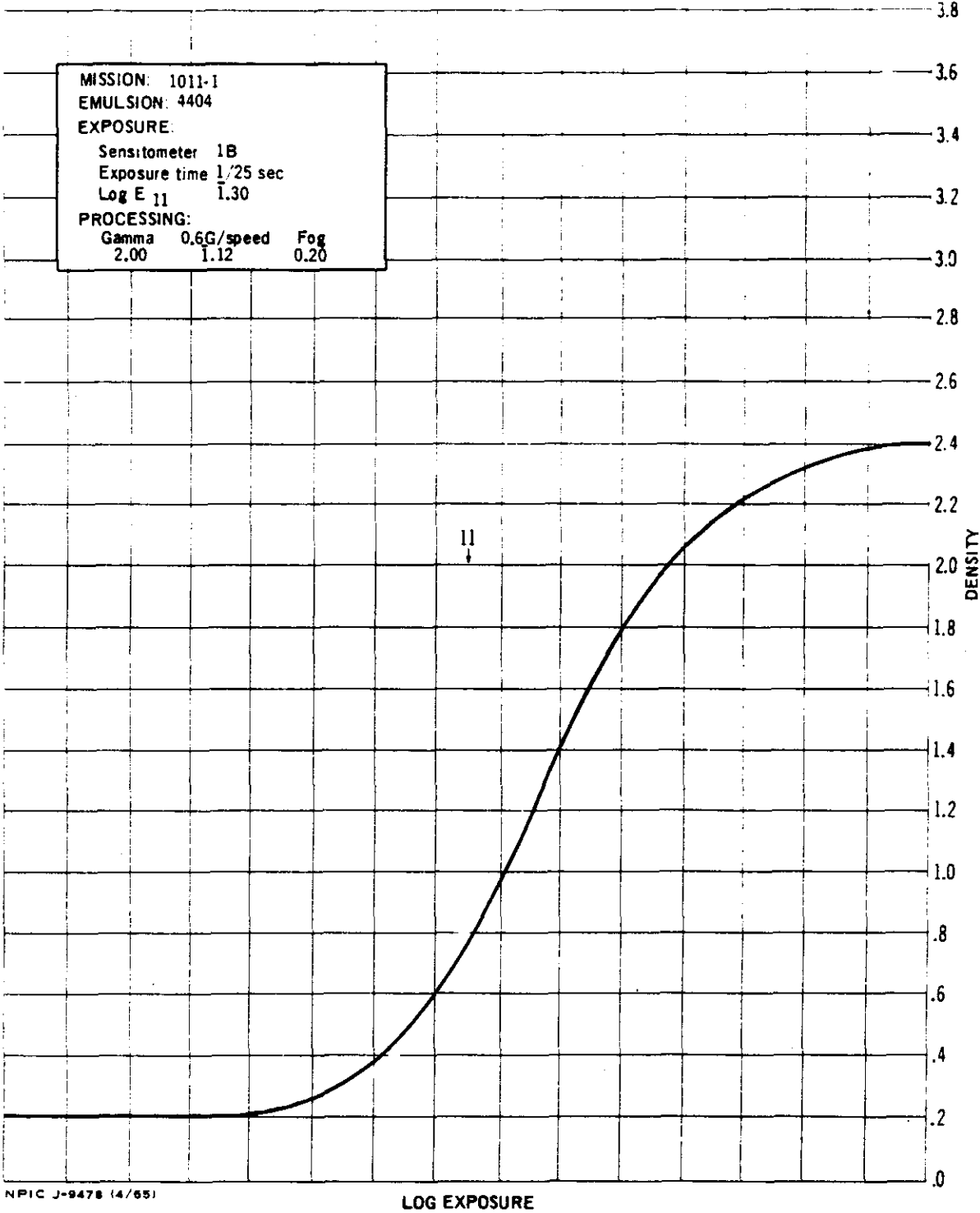
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CONTROL CURVE FOR HEAD AND TAIL OF MISSION MATERIAL



NPIC J-9478 (4/65)

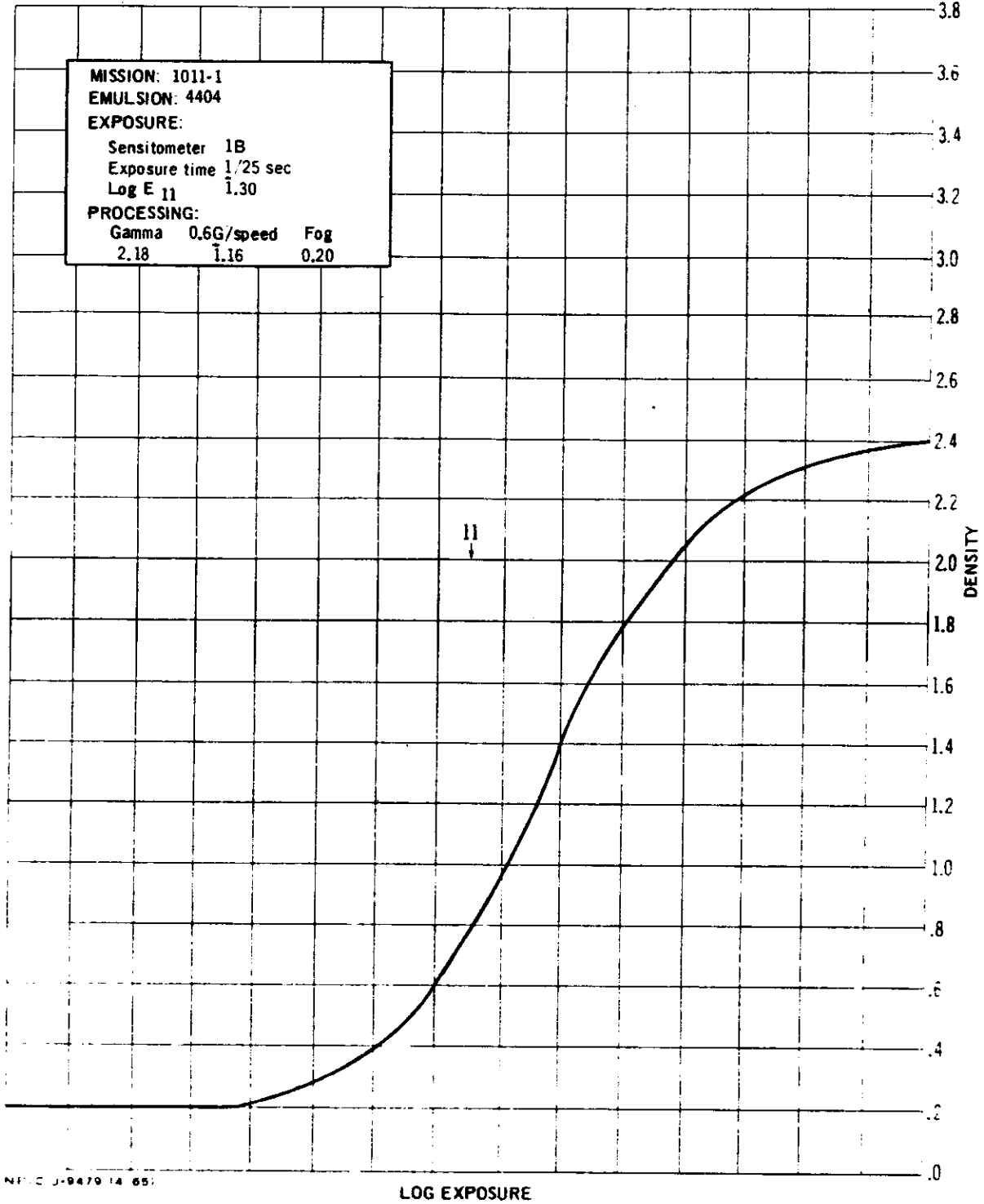
LOG EXPOSURE

DENSITY

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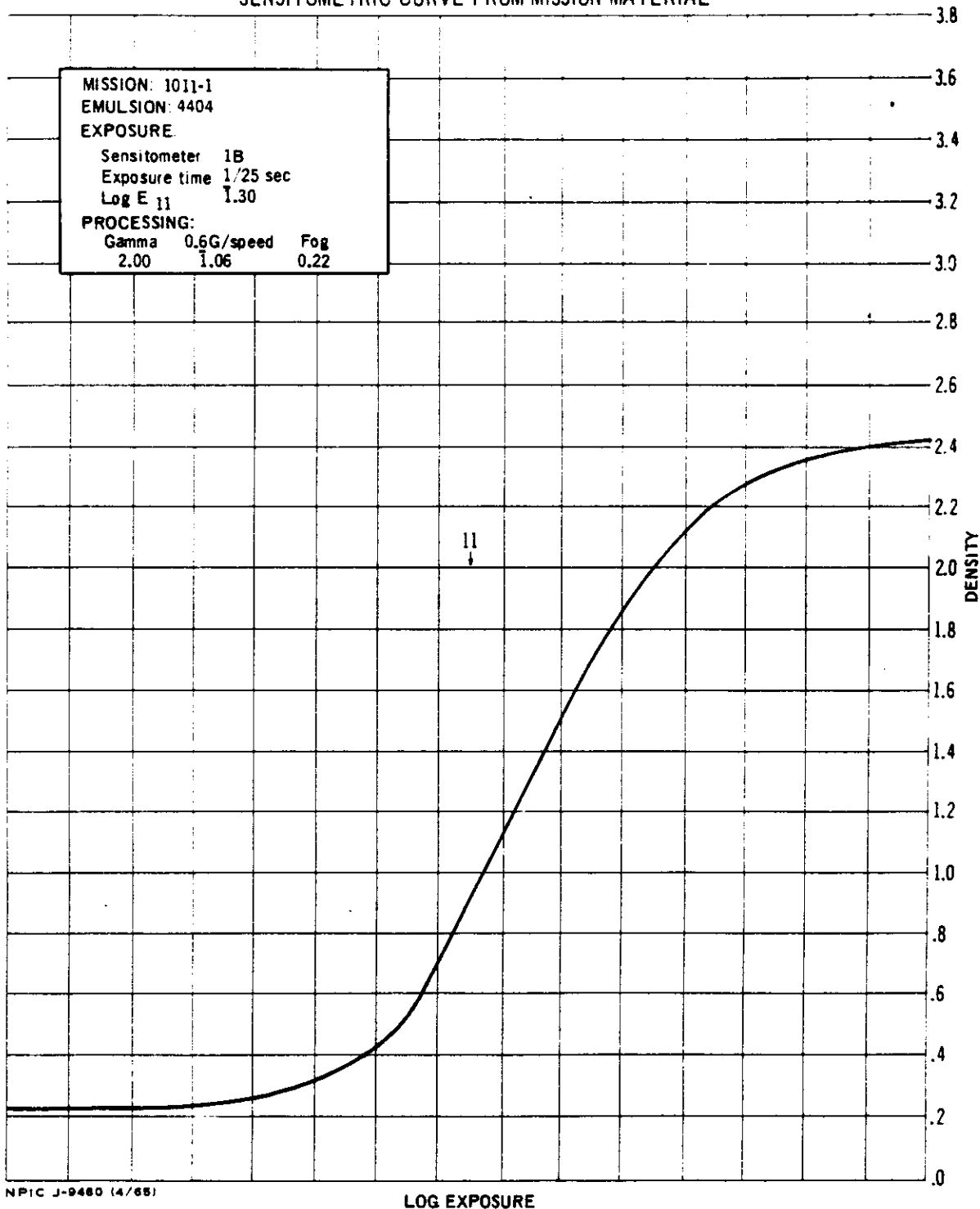
CONTROL CURVE FOR HEAD AND TAIL OF AFT MATERIAL



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SENSITOMETRIC CURVE FROM MISSION MATERIAL



NPIC J-9460 (4/66)

LOG EXPOSURE

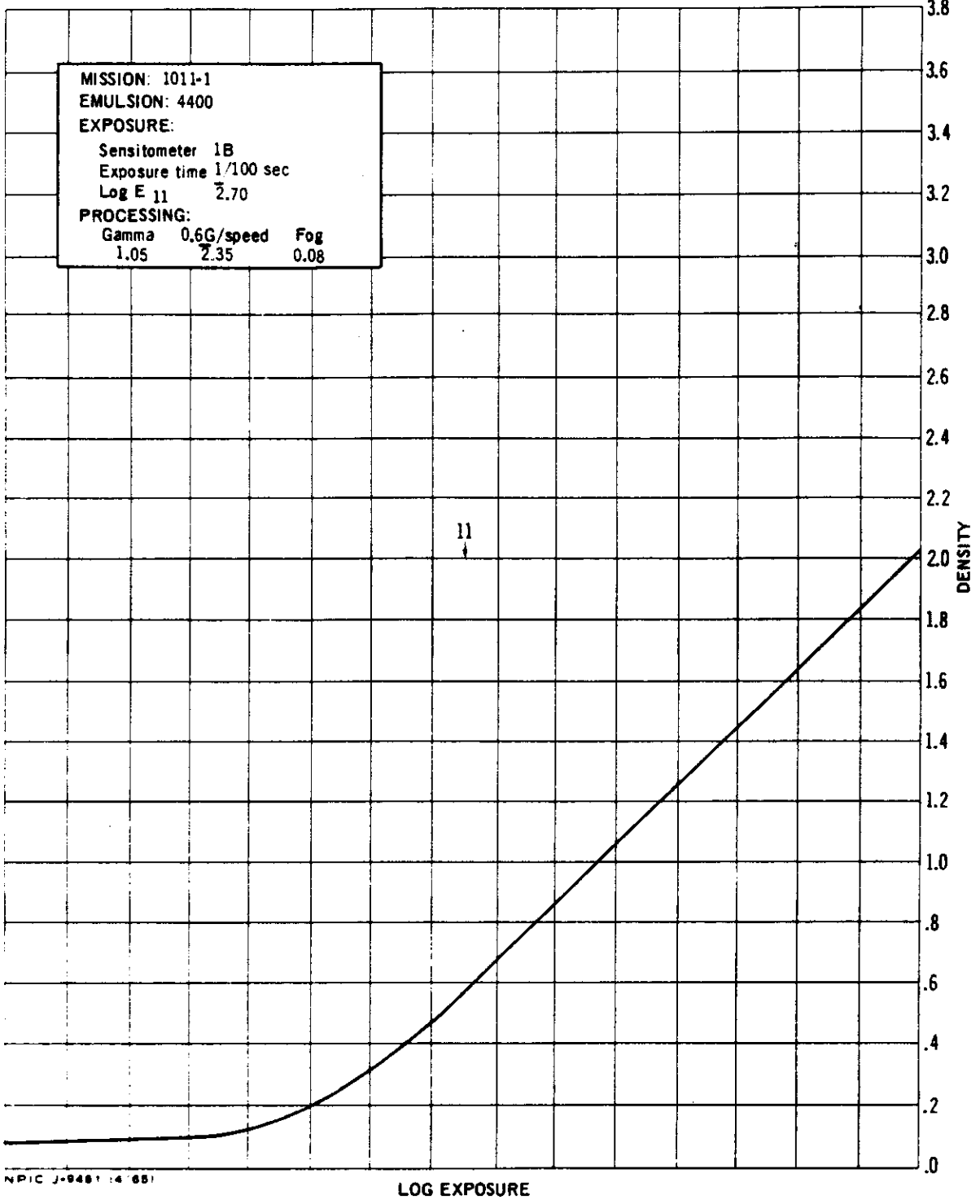
DENSITY

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CONTROL CURVE FOR HEAD AND TAIL OF INDEX MATERIAL

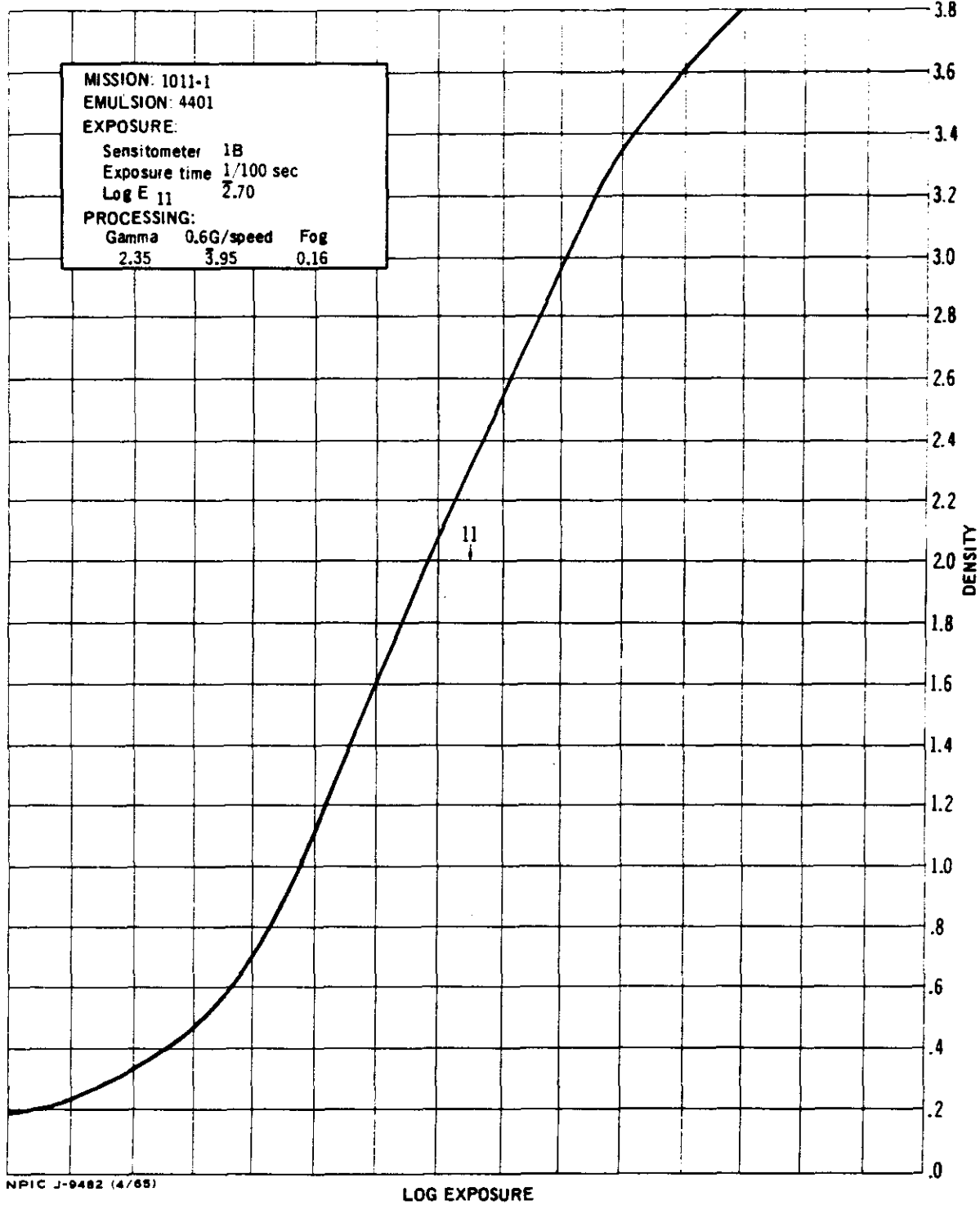


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CONTROL CURVE FOR HEAD AND TAIL OF STELLAR MATERIAL



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PART III. IMAGE QUALITY

1. Definition of Photographic Interpretation 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 Unusable. 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 superior quality of the photography.

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



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

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

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

2. PI Suitability for Mission 1011-1

The PI suitability is good for Mission 1011-1. Photographic interpreters reported on 117 priority and 13 bonus targets in the preliminary read-out. Twelve of these targets were reported as poor quality due to obliquity and haze, while several other targets were degraded by atmospheric effects.

It should be noted that the preliminary report represents the initial scan results only. More detailed study of the photography may develop additional information or may necessitate alteration of portions of the preliminary report.

The time of the launch and the inclination angle of the orbit were selected to produce optimum photographic coverage of the targets of interest. Since the majority of the targets of interest are between 40 degrees and 60 degrees north latitude, the combination of launch time and inclination angle located the sun on the western (starboard) side of the vehicle slightly forward of the beam of the vehicle at this time of day at these latitudes. Generally, this caused a variance in illumination across the format of most frames. The forward-looking camera starts taking the photograph of the terrain on the starboard side with the principal ray facing the light source.



When it completes the scan the rays of the sun are at right angles to the principal ray. The aft-looking camera starts taking the picture of the terrain on the port side with the principal ray facing away from and approximately parallel with the rays of the sun. When it completes the scan the rays of the sun are at right angles to the principal ray. This causes targets that are to be viewed in stereo to have radically different lighting, which may be beneficial for viewing some targets and detrimental for others. Examples are found on pass 21D, frames 55 FWD and 60 AFT. "Special" printing of 14 parts of the mission minimized the difference in contrast and density in the reproduction of the duplicate positives and no major complaints were voiced by the interpreters.

HIGHLIGHTS OF THE MISSION:

- (a) One hundred-thirty targets were observed in the material from Mission 1011-1.
- (b) Six newly identified launch sites were observed.
- (c) A solid propellant test facility was reported as incomplete and not yet operational.
- (d) A readout was made on a nuclear test site.
- (e) Two missile test centers were observed with no apparent change in their facilities.
- (f) Good, clear coverage reveals details of an atomic energy complex not previously reported.

3. Definition of Mission Information Potential (MIP)

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



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

Criteria for selection of the MIP frame:

- a. Eliminate all portions of the mission affected by system malfunctions.
- b. Select frames which are free of clouds or atmospheric attenuation.
- c. Eliminate the first 10 frames and last frame of a pass as these may be affected by incorrect scan speed.
- d. Select frames that are in a continuous strip of approximately 10 cloud-free frames, since cloud shadows from weather fronts are cast for great distances.
- e. Determine from the horizon cameras that the panoramic photography is not affected by apparent vehicle perturbations.
- f. Select targets that are near the center of the format and on frames as close as possible to perigee for scale purposes and to eliminate obliquity.
- g. Select frames having near optimum solar elevation.
- h. Select a high contrast target (preferably an airfield) and compare the target to a previous mission which has been given an MIP rating.

4. MIP Rating for Mission 1011:

Pass 24D, frame 74 AFT, has been selected as the MIP frame for Mission 1011. It has been assigned an MIP rating of 85 (comparable to Mission 1010). The information potential of the area acquired by the FWD camera (frame 71) is almost comparable to the MIP frame.

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5. Mensuration Data

The measurements in this analysis on Mission 1011-1 were accomplished with a one micron NRI comparator and found to be 0.53 percent or less in error. The accuracy of the mensuration was verified on domestic coverage where dimensions and reliable vehicle altitudes were available.

MEASURED OBJECTS and THEIR RESPECTIVE ERRORS

OBJECT	ACTUAL SIZE (ft)	MEASURED SIZE (ft)	ERROR %
Runway	5500	5471	0.53
Runway	6921	6940	0.27

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FIGURE 10. PHOTOGRAPH OF THE MIP FRAME.

NPIC J-9483 (4/65)

The following photograph has been selected from the MIP frame of Mission 1011. Note the aircraft in flight off the end of the runway.

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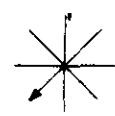
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Camera	161 (Aft)
Pass	24D
Frame	74
Date of Photography	7 Oct 64
Universal Grid Coordinates	43.7-14.3
Enlargement Factor	20X
Geographic Coordinates	51-32N 46-05E
Altitude (feet)	670,708
Vehicle:	
Pitch	-15°14'
Roll	-0°3'
Yaw	0°19'
Local Sun Time	1324
Solar Elevation	28°50'
Solar Azimuth	203°
Exposure	1/347



Approximate flight direction
on photograph



Approximate scan direction
on photograph

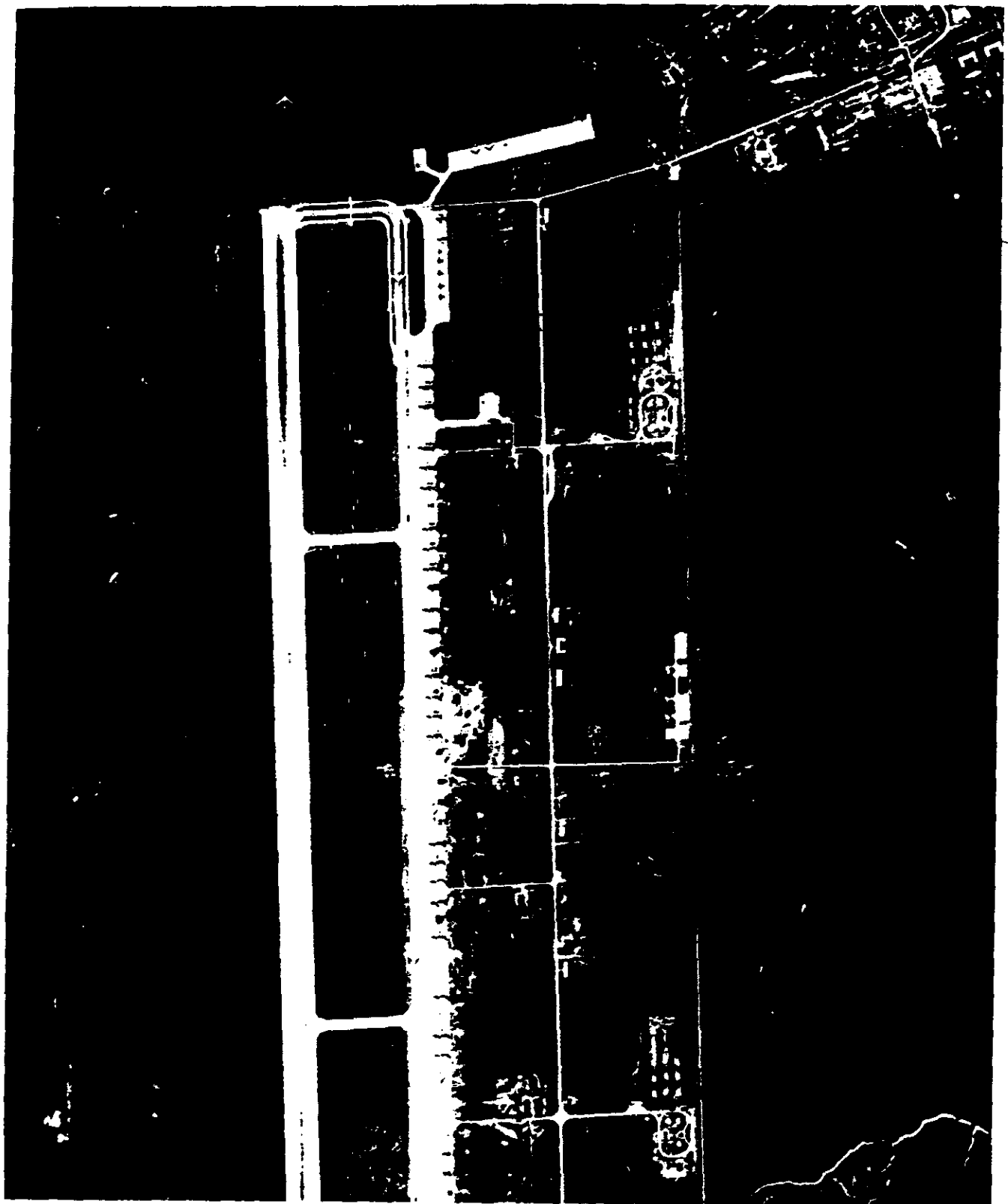
Approximate location of photograph in format. Negative viewed with emulsion side down.



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FIGURE 11. PHOTOGRAPH OF THE SAME AREA AS THE MIP FRAME
FROM THE MASTER (FWD) MATERIAL.

NPIC J-9484 (4/65)

The following photograph has been selected to show the comparative quality of the Master (FWD) material to the MIP frame of the Slave (AFT) material.

- 18c -

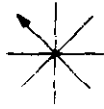
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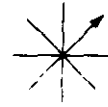
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Camera	160 (Fwd)
Pass	24D
Frame	71
Date of Photography	7 Oct 64
Universal Grid Coordinates	47.0-11.9
Enlargement Factor	20X
Geographic Coordinates	51-29N 46-09E
Altitude (feet)	674,791
Vehicle:	
Pitch	14°46'
Roll	-0°11'
Yaw	0°24'
Local Sun Time	1324
Solar Elevation	28°53'
Solar Azimuth	203°
Exposure	1.353



Approximate flight direction
on photograph

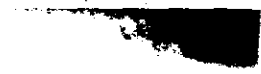


Approximate scan direction
on photograph

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

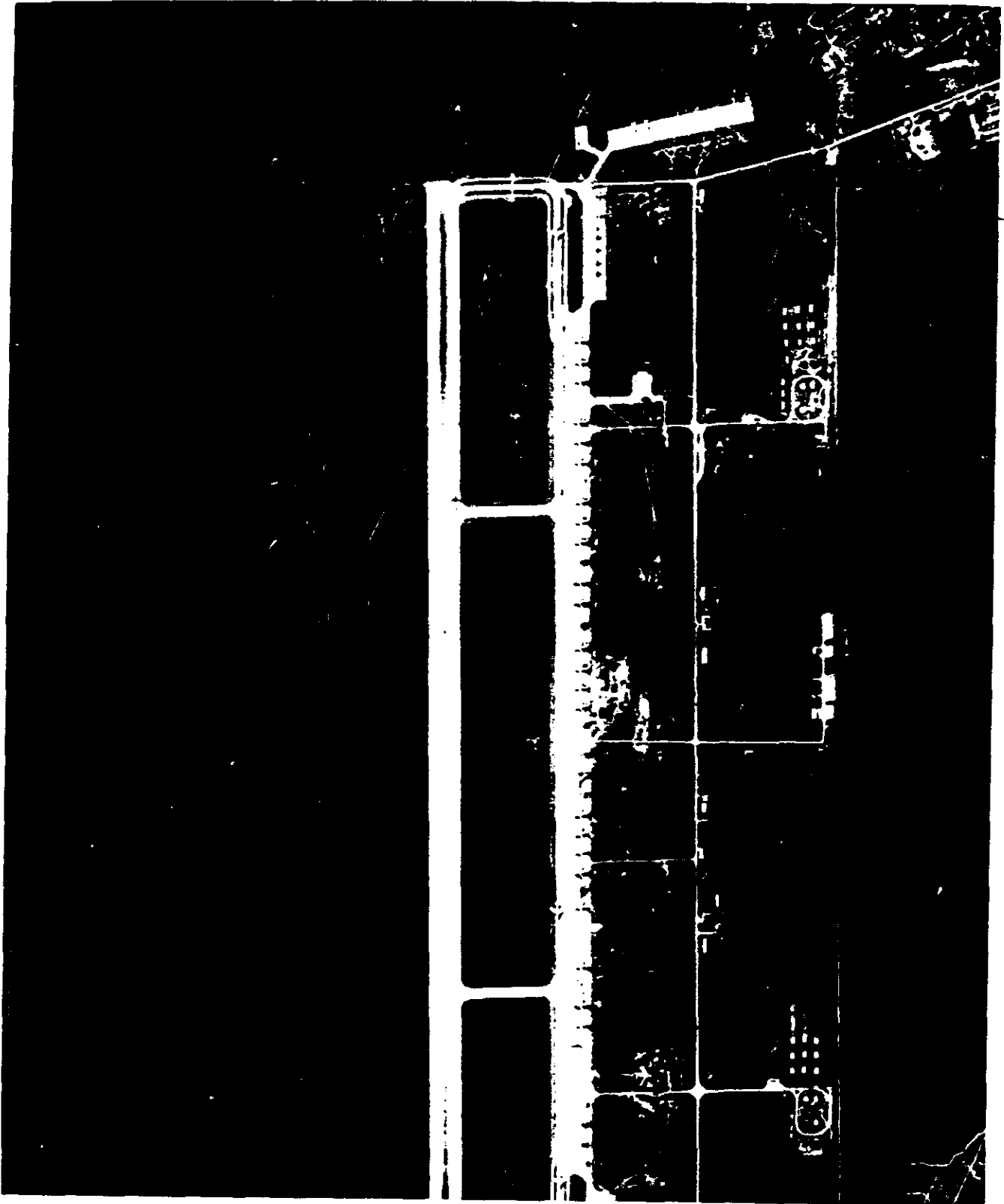


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FIGURE 12. PHOTOGRAPH OF GOOD QUALITY IMAGERY (MASTER CAMERA).

NPIC J-9485 (4/65)

- 18e -

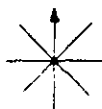
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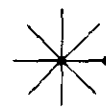
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Camera	160 (Fwd)
Pass	37D
Frame	120
Date of Photography	8 Oct 64
Universal Grid Coordinates	58.7-14.1
Enlargement Factor	20X
Geographic Coordinates	39-56N 112-46E
Altitude (feet)	622,940
Vehicle:	
Pitch	15°33'
Roll	-0°11'
Yaw	0°24'
Local Sun Time	1333
Solar Elevation	38°6'
Solar Azimuth	209°
Exposure	1/383

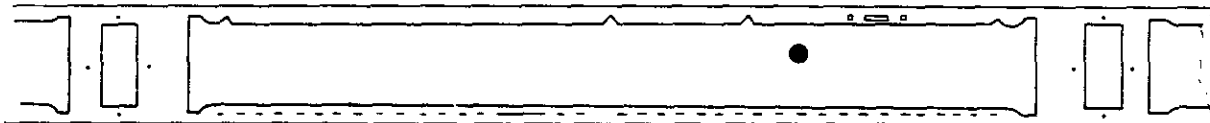


Approximate flight direction
on photograph



Approximate scan direction
on photograph

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



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