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TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT

MISSION 1025-1

5-10 OCTOBER 1965

MISSION 1025-2

10-15 OCTOBER 1965

[redacted]

JANUARY 1966

COPY [redacted]

88 PAGES

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Notice of Missing Page(s)

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PHOTOGRAPHIC EVALUATION REPORT
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NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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SYNOPSIS

Mission 1025 (JX-28) was a 2-part photographic mission programmed to achieve coverage which is to be utilized for cartographic purposes. The vehicle was intentionally flown with the camera system rotated horizonally 180 degrees from its normal position, orbiting nose-first instead of tail-first. Certain variations in normal system parameters resulted from this change in orientation: in the descending mode, the stellar camera looks westward, the master is the aft-looking and the slave is the forward-looking camera.

A normal orbit was achieved. Photographic coverage was accomplished between 5 and 15 October 1965. Clouds covered approximately 30 percent of the entire mission. Solar elevations ranged from minus 12.6 degrees to plus 70.5 degrees in Mission 1025-1 and from minus 16.4 degrees to plus 58.- degrees in Mission 1025-2. All cameras and associated equipment functioned properly throughout the mission except for the starboard horizon camera platen clamping device of the slave (forward-looking) camera. The platen clamping device malfunctioned at pass 9D, frame 13, and caused the starboard horizon imagery to be smeared for the rest of the mission. More than 16 million square nautical miles of plottable photographic coverage was acquired. The recovery capsules from missions 1025-1 and 1025-2 were retrieved by air catch during revolutions 81 and 161, respectively.

There is no significant difference in the panoramic material between mission 1025-1 and 1025-2. Both payloads of the mission were assigned MTF ratings of 85.

GENERAL FLIGHT DATA

1. Launch and Recovery Dates

Launch Date, Mission 1025-1: 5 October 1965
Recovery Date, Mission 1025-1: 10 October 1965

Activation Date, Mission 1025-2: 10 October 1965
Recovery Date, Mission 1025-2: 15 October 1965

2. Orbital Parameters (Actual)

	Mission 1025-1 Rev 40	Mission 1025-2 Rev 121
Period	89.76 min	89.69 min
Perigee	112.87 nm	111.40 nm
Apogee	180.80 nm	180.70 nm
Eccentricity	0.00947	0.00925
Inclination Angle	75.04 N	75.03 N
Perigee Latitude	44.34 N	57.08 N

3. Photographic Operations

A. Pass Information

	Mission 1025-1	Mission 1025-2
Operational Passes	40	33
Operational/Domestic Passes	4	1
Domestic Passes	2	6
Domestic/Engineering Passes	-	1
Engineering Passes	1	2
Total Photo Passes	47	43
Recovery Revolution	81	161

B. Film Footage/Frame Totals

	Master	Slave
Footage Available	16,000 (Approx)	16,000 (Approx)
Preflight Footage	264.5	264.5
Process Footage (1025-1)	8,054	7,970
Process Footage (1025-2)	7,981	8,020
Titled Frames (1025-1)	2,937	2,896
Titled Frames (1025-2)	3,016	3,034

PART I. CAMERA OPERATIONS

1. Master (Aft-looking) Panoramic Camera No 142

The master panoramic camera functioned properly throughout the mission. Detriments to the material are comparable to those of previous missions. These minor degradations include:

a. Continuous rail scratches are present on both edges of the film. They appear to be slightly more pronounced on this mission than on previous missions.

b. Fine scratches, parallel to the major axis, appear just under the camera number and along the frequency mark edge. These scratches have been reported on previous missions and cause very minor degradations to the photographic record.

c. Most frames contain numerous fine emulsion scratches within the format. They are located under the binary word and at the take-up end of the frame.

d. Film transport was noted on the first and last frames of most passes. A splash type fog pattern appears along the frequency mark on the next-to-last frame. This pattern occasionally extends into the format. A large fog pattern covering approximately 1/4 of the frame is found on the sixth frame from the end of a few passes. Equipment shadowgraphs were noted at the beginning and ending of each new pass. A diagonal streak of fog is present between the 4th and 5th frames of a few passes. An example of this may be found in pass 127. All fog patterns are commensurate with the solar elevation and the duration of the sit period between each new pass.

e. Banding is present, but is only detectable where contrast and density permits. It is not as pronounced in this mission as it has been in material from previous missions.

2. Slave (Fwd-looking) Panoramic Camera No 127

The slave panoramic camera functioned properly throughout both parts of the mission. The detriments of the photographic record associated with the operation of the camera are listed below.

a. A scratch is present just inside the format of both edges of the take-up end of each frame and on both edges of the format beneath the camera number.

b. A group of short fine emulsion scratches are located across the width of the film at the take-up end of each frame and beneath the binary number.

c. Continuous scratches parallel to the edge of the film and outside the format are present throughout the mission. These scratches are attributed to the rails which support the film during transport. The scratches are slightly more pronounced than on previous missions.

d. The imagery along the frequency-mark edge is consistently superior to that along the title edge. However, the difference in resolution appears very subtle.

e. Film transport is present on the first and last frames of most passes. Equipment shadowgraphs are located inside the transport pattern of the last frame and are also present on the third frame from the end. Fog caused by light reflected from a curved surface is present between the third and fourth frame from the end of most passes. A biased streak of fog approximately 0.5 inches wide extends into the format on the title edge approximately 1.0 inch on the next to last frame. Fog caused by extraneous light is present on the sixth frame from the end of a few passes. The degree of fog is relative to the solar elevation and the camera off/on period.

f. Banding, although slight, is noted on a few frames where contrast and density permit.

3. Master Horizon Cameras

The port (take-up) and starboard (supply) cameras were operational throughout the mission. Exposure was adequate except where low solar elevations prevailed. The fiducials of both cameras are slightly bloomed but still usable. In the second payload ("B" bucket) a small static discharge was noted at the fiducial nearest the titled edge. This static appears on both cameras and is present throughout the mission. Vignetting was very minor and did not affect the horizon arc.

4. Slave Horizon Cameras

The port (supply) horizon camera was operational throughout the mission. The image corners are vignetted, but the horizon curves are unaffected and are usable for attitude reduction. Small static discharges are located in the corners of the format inside the take-up edge of the horizon frame.

The starboard (take-up) horizon camera was operational throughout the mission. However, image loss is caused by a malfunction of the

horizon camera platen clamping device at pass 9D, frame 13. Thereafter, to the end of the mission, the horizon image is smeared due to film movement during exposure. The image corners are vignetted to a higher extent than that of the port horizon. Small static discharges are adjacent to the horizon fiducials on both edges of the film. The 3 horizon fiducials next to the corresponding panoramic frame are bloomed.

5. Stellar Camera No D73 Reseau No 88 (Mission 1025-1)

The stellar camera functioned properly, recording 403 frames. Flare affects approximately 60 percent of most formats, but the stellar images are detectable in the heaviest density of fog. Many of the stellar images are elongated but no other odd configurations were noted.

Edge fog is continuous along the film edge opposite the correlation mark and appears periodically along the correlation-mark edge. Static discharges are present on frames 340 through 360. The fiducials are bloomed, but the cross hairs are sharp and well defined. The most severe degradation was an abrasion and associated feather-like emulsion cracks. The degradation is located between the format and the correlation mark, beginning in the preflight and continuing through frame 320. It is present intermittently from frame 320 through 403 with an associated plus density streak. The final 20 frames are slightly abraded and the last 4 frames are fogged due to film exhaustion.

6. Stellar Camera No D70 Reseau No 81 (Mission 1025-2)

The camera functioned properly throughout the mission, recording 408 frames. Over 30 stellar images are detectable in most frames. The majority of the images are elongated and dumb-bell shaped.

Edge fog is present intermittently on both edges. Emulsion cracks, perpendicular to the major axis, are present on 70 percent of the mission and become more severe on the latter portion. A series of fine plus density streaks parallel to the major axis is present throughout the mission. A crease across the film is located between frames 52 and 53. The fiducial marks are bloomed, but the cross hairs are discernible. The last 5 frames are severely fogged. The final 15 frames contains abrasions and static discharges due to film exhaustion.

7. Index Camera Unit No D73 Reseau No 78 (Mission 1025-1)

The index camera functioned properly, recording 420 frames. The exposure was adequate and the imagery is good. A crease, indented from the base side, and located 0.25 inch from and approximately parallel to the camera number edge, is present in the preflight material through frame 374. At frame 374 the crease moves to the camera number edge of the film, and continues along this edge through frame 408. Associated

with the crease are abrasions which are present through frame 402 and extend into the format in frames 27-38 and 374-402. An irregular plus density streak probably emanating from the crease is located in frames 402-409. Another plus density streak, inside the format 0.4 inch from the camera number edge, is located in frames 1-4. Emulsion cracking has been attributed to the crease and abrasions. The correlation lamp is bloomed but readable. Edge fog along the correlation lamp edge is continuous, but on the edge opposite the correlation lamp it is intermittent. There is a small curved scratch inside the format of frame 371. The last 7 inches of film are fogged due to film exhaustion.

8. Index Camera Unit No D70, Reseau No 88 (Mission 1025-2)

The index camera functioned properly, recording 438 frames. The exposure was adequate and the quality of the mission is comparable to the best obtained in previous missions. The first frame of this mission shows the curvature of the earth due to the attitude of the vehicle during the recovery process of 1025-1. There is no imagery on frames 2-6 and the imagery is very faint on frames 7-8. Frame 9 is adequately exposed. The correlation lamps are bloomed but still readable throughout the mission. Edge fog is present intermittently on both edges of the film. Creases in the film indented from the base side were first noted on frame 99 and continued intermittently through frame 272. A good example of this crease may be found running diagonally across frames 119-122 and 139-142. A foreign object that is probably dirt on the reseau plate is located in the upper left hand corner of the format in frames 101-115. Frames 428-438 contain fog, abrasion marks, and slight static discharges due to film exhaustion.

9. Associated Equipment

This equipment records part of the information required for correlation and mensuration of the panoramic cameras.

a. There is a double end of pass marker at the end of most camera operations. They are heavily over-exposed.

b. The camera number is slightly flared.

c. The binary index lamp adjacent to the camera number is bloomed in every frame.

The following is a report on the binary read-out from the duplicate positive.

Mission 1025-1

Slave (Fwd-Looking) Camera

The only problems encountered in reading the fwd binary blocks were the missing binary numbers listed below.

Pass 10D - Frame 10 had no binary number.

Pass 13D - Frame 41 had no binary number.

Pass 70D - Frame 15 had no binary number.

Master (Aft-Looking) Camera

No index lights were missing on the aft material. In various areas the alignment was slightly off and the binary lights were faint. Light No 27 was on for approximately 2/3 of the mission, but was too faint to read. This problem was attributed to the camera and not to the reproduction of the film. This difficulty was corrected by "gang-punching" out the light on all passes where it occurred. Listed below are the frames which had binary numbers missing.

Pass 11D - Frame 38 had no binary number.

Pass 14D - Frame 42 had a partial binary number.

Pass 55D - Frame 110 had no binary number.

Mission 1025-2

Slave (Fwd-Looking) Camera

Fwd binary blocks were fairly good and few problems were encountered. However, the automatic reader had difficulty reading the number 16, 22, and 24 lights on the film. This problem is probably attributed to the photocells for these lights in the reader and not to camera equipment. Listed below are the frames which had binary number problems.

Pass 37D - Frame 35 had no binary number.

Pass 52D - Frame 14 had additional binary lights on that should not have been on.

Pass 61D - Frame 73 had no binary number.

Master (Aft-Looking) Camera

Aft binary blocks were fairly good throughout the mission. However, the number 27 light was still too faint to read. This problem was corrected by "gang-punching" out the light on frames where it appeared. This malfunction was attributed to the camera and was not due to the auto-

matic reader. Listed below are the frames which had binary lights missing.

Pass 87D - Frame 65 had no binary lights.

Pass 106D - Frame 9 had no binary lights.

Pass 106D - Frame 37 had no binary lights.

Pass 136D - Frame 1 had no binary lights.

Pass 149D - Frame 89 had no binary lights.

FIGURE 1. DESCRIPTION OF PHOTOGRAPHIC DATA

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

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

DATE OF PHOTOGRAPHY: The date of photography indicates the day, month, and year (GMT) that the photography was acquired.

UNIVERSAL GRID COORDINATES: These coordinates are included to locate the illustrated photography within the panoramic format.

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

GEOGRAPHIC COORDINATES: These coordinates are included to indicate the latitude and longitude of the panoramic format.

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

PITCH: Rotation of the camera about its transverse axis. Using appropriate aeronautical terminology, positive readings indicate nose-up attitude and negative readings indicate nose-down attitude.

ROLL: Rotation of the camera about its longitudinal axis. Using appropriate aeronautical terminology, positive readings indicate left wing-up attitude and negative readings indicate right wing-up attitude.

YAW: Rotation of the camera about its vertical axis. Positive readings indicate counterclockwise rotation when viewing the ground nadir from the vehicle mounted camera in-flight.

LOCAL SUN TIME: This time is included to present to the viewer a realistic time of acquisition of the photography illustrated.

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

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

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

VEHICLE AZIMUTH: The clockwise measurement from true north to the longitudinal axis of the vehicle heading.

FIGURE 2. PHOTOGRAPH OF THE DOUBLE IMAGE OCCURRING INSIDE THE STARBOARD HORIZON OF THE SLAVE CAMERA

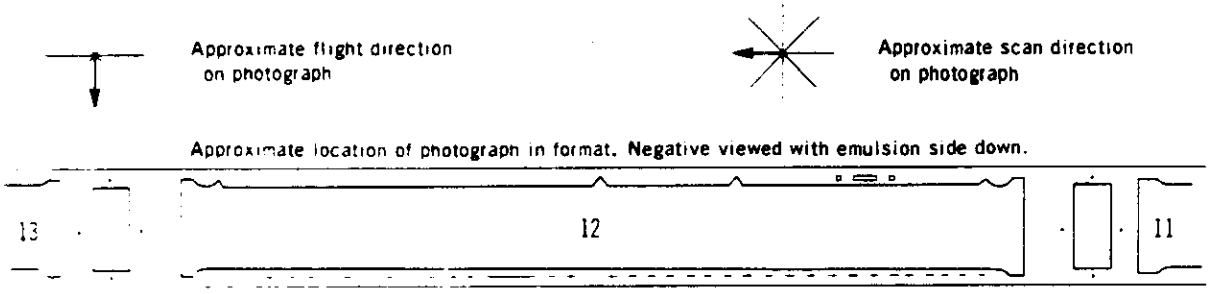
At pass [illegible] frame [illegible] the horizon camera pressure plate malfunctioned, allowing the film to slip during exposure. This caused the imagery to be smeared and double imaged throughout the rest of the mission.

Observe the vignetting in the corners of the format. Also note the bloomed fiducials near the supply end of the frame.

NPIC K-5929 (1/66)

[redacted]

Camera	12
Pass	11D
Frame	12 Fwd
Date of Photography	6 Oct 65
Universal Grid Coordinates	Not Applicable
Enlargement Factor	3X
Geographic Coordinates	22-35N 06-35W
Altitude (feet)	678,204
Camera:	
Pitch	Not Determined
Roll	Not Determined
Yaw	Not Determined
Local Sun Time	1005
Solar Elevation	50°12'
Solar Azimuth	130°
Exposure (fractions of second)	1/336
Processing Level	Primary
Vehicle Azimuth	166°54'



PART II. FILM

This section provides an evaluation of the processing, density, special printing, and physical condition of the original negatives from Mission 1025.

1. Film Processing

Infrared densitometry was used to determine the optimum level of development from the various parts of the panoramic photography. Fifty processing changes were required on the master record and 54 on the slave record of Mission 1025-1. Forty-six processing changes were required on the master record and 41 on the slave record of Mission 1025-2. The percentage of film processed at each level was:

Development Level	Mission 1025-1		Mission 1025-2	
	Master	Slave	Master	Slave
Primary	8%	10%	3%	3%
Intermediate	49%	41%	45%	42%
Full	43%	49%	52%	55%

2. Special Printing

Twelve parts of the master and 17 parts of the slave material required special printing on Mission 1025-1. Three parts of the master and 2 parts of the slave material required special printing on Mission 1025-2. Special printing is required when the range of the negative is such that 2 levels of printing duplicate positives are required for greater intelligence value to be gained from the original negative.

3. Physical Film Degradations

The photographic record is relatively free of physical film degradations. Possibly the reason for the cleanliness is due to the cartographic aspects of the mission. This reduces the amount of handling which the original negative usually receives. The minor degradations consist of intermittent pinholes, slight abrasions, and scratches. Static discharges are present on a few passes on both edges, but are more pronounced on the frequency-mark edge. The discharges extend into the format up to an inch on a number of instances. The most severe degradation was a tear on frames 11 and 12, pass 90D, of the fwd camera. This evidently occurred after the film left the processing site.

FIGURE 3. PHOTOGRAPH DEGRADED BY AN EMULSION DEFECT

The following photograph represents a degraded target caused by an emulsion defect in the film. The defect is due to the film being buckled, which caused the emulsion to crack. The plus and minus density areas over the target are due to chemical contamination.

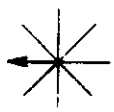
NPIC K-5930 (1/66)

[redacted]

[redacted]

Camera	142
Pass	134D
Frame	23 aft
Date of Photography	14 Oct 65
Universal Grid Coordinates	19.6 - 11.0
Enlargement Factor	10X
Geographic Coordinates	48-59N 79-45E
Altitude (feet)	687,485
Camera:	
Pitch	Not Determined
Roll	Not Determined
Yaw	Not Determined
Local Sun Time	740
Solar Elevation	9°47'
Solar Azimuth	114°
Exposure (fractions of second)	1/344
Processing Level	Full
Vehicle Azimuth	159°20'

Approximate flight direction on photograph



Approximate scan direction on photograph

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

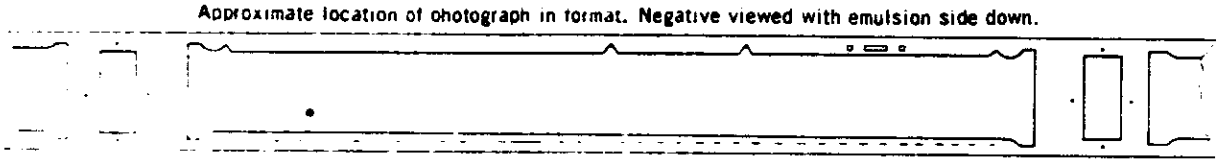


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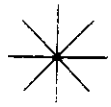
FIGURE 4. PHOTOGRAPH DEGRADED BY A SEVERE TEAR

The tear occurred after the film left the processing site. This illustrates that more precautions should be taken when handling the original negative.

NPIC K-5931 (1/66)

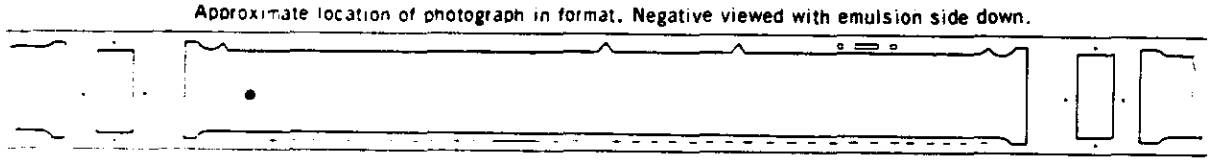
Camera	127
Pass	90D
Frame	11 fwd
Date of Photography	11 Oct 65
Universal Grid Coordinates	11.5 - 12.0
Enlargement Factor	2X
Geographic Coordinates	20-09S 14-14E
Altitude (feet)	809,480
Camera:	
Pitch	Not Determined
Roll	Not Determined
Yaw	Not Determined
Local Sun Time	949
Solar Elevation	55°59'
Solar Azimuth	107°
Exposure (fractions of second)	2.044
Processing Level	Intermediate
Vehicle Azimuth	167°24'

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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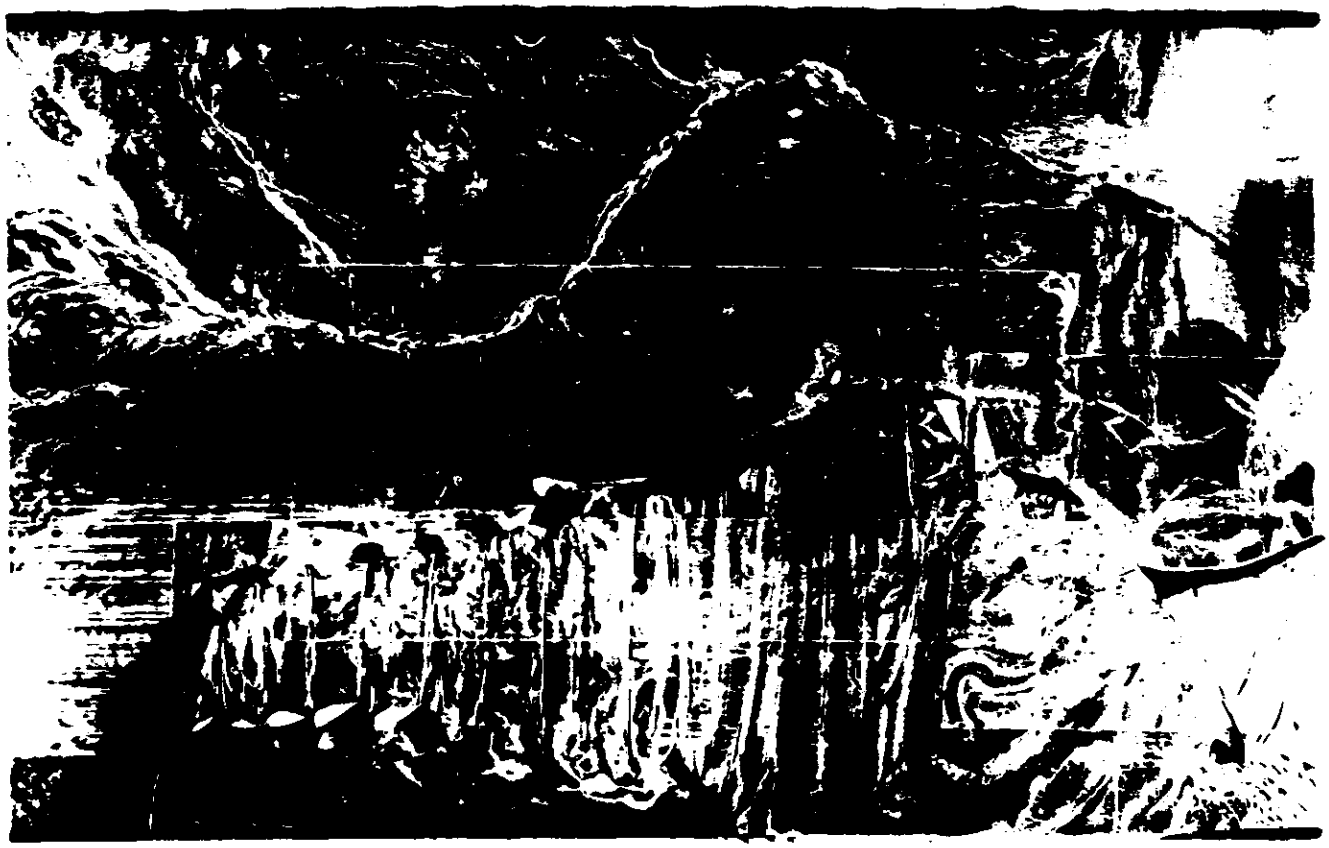

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PART III. IMAGE QUALITY

1. 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 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. 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, Mission 1025

The PI suitability of missions 1025-1 and 1025-2 is good. In the preliminary readout, 61 targets were observed in 1025-1 and 89 in 1025-2. The few targets are attributed to the fact that 1025 is primarily a mapping and charting mission. In regard to the quality of the mission it is concurred that 1025 is equal to or better than most previous missions. However, some targets were given a poor rating. The majority of the poor ratings resulted from obliquity, atmospheric conditions, or low solar elevations. Following is a list of the highlights of Mission 1025.

a. A new interferometer site has been identified.
b. A nuclear facility under construction has been observed.
c. A rail spur is newly identified.
d. A single silo under construction has been identified at a launch complex.
e. A launch area was confirmed to be complete.
f. Two newly identified bunkers appear to be completed and earth covered.

3. Mission Information Potential (MIP)

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

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

Criteria for selection of the MIP frame:

a. Eliminate all portions of the mission affected by system malfunctions.
b. Select frames which are free of clouds or atmospheric attenuation.
c. Eliminate the first 10 frames and last frame of a pass because these may be affected by incorrect scan speed.
d. Select frames that are in a continuous strip of approximately 10 cloud-free frames, 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 1025

Pass 63D, frame 16 aft has been selected as the MIP frame for Mission 1025-1. It was assigned an MIP rating of 85. The information potential of the area acquired by the fwd camera (Pass 63D, frame 10 fwd) is almost identical to this MIP frame. Pass 95D, frame 15 aft, has been selected as the MIP frame for Mission 1025-2. It also was assigned a rating of 85. The corresponding frame of the fwd camera is pass 95D, frame 9. Its quality is comparable to that of the aft material.

5. Analysis of Resolution Targets

A total of 9 resolution targets were recorded on the material obtained from missions 1025-1 and 1025-2. The best ground resolution obtained from a high contrast CORN target display was 7 feet in the flight direction as read from the original negative and the second generation dupe positive. The targets were read and analyzed by 3 qualified technicians.

Following is an analysis of the targets which were resolved. Pitch, roll, and yaw are not available at this time.

ANALYSIS OF RESOLUTION TARGETS

Target Description	Medium Contrast Portable	Medium Contrast Portable	High Contrast Fixed	High Contrast Fixed	High Contrast Fixed	High Contrast Fixed	High Contrast Fixed	High Contrast Fixed	High Contrast Fixed
Camera	127	142	127	142	127	142	127	142	127
Lens	31D	31D	63D	63D	63D	63D	63D	63D	95D
Frame	5 fwd	11 aft	7 fwd	13 aft	8 fwd	14 aft	10 fwd	16 aft	13 fwd
Date of Photography	7 Oct 65	7 Oct 65	9 Oct 65	9 Oct 65	9 Oct 65	9 Oct 65	9 Oct 65	9 Oct 65	11 Oct 65
Universal Grid Coordinates	43.4-10.0	47.7-13.4	59.5-10.8	30.6-13.2	58.6-12.0	31.4-12.1	61.9-13.2	28.3-11.1	53.3-9.5
Geographic Coordinates	39-49N 104-48W	39-49N 104-48W	33-09N 106-52W	33-09N 106-52W	32-59N 106-48W	32-59N 106-48W	32-39N 106-42W	32-39N 106-42W	31-37N 110-36W
Altitude (Ft)	682,779	682,010	679,844	679,909	679,850	679,927	679,868	679,969	685,398
Clouds:									
Type	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cover	ND	ND	ND	ND	ND	ND	ND	ND	ND
Top	ND	ND	ND	ND	ND	ND	ND	ND	ND
Local Sun Time	923	923	908	908	908	908	907	907	845
Sun Elevation	31°42'	31°44'	33°09'	33°10'	33°18'	33°19'	33°35'	33°35'	29°28'
Sun Azimuth	131°	131°	126°	126°	125°	125°	124°	124°	121°
Exposure (Fractions of sec)	1/329	1/339	1/336	1/341	1/336	1/342	1/336	1/343	1/337
Processing Level	Full	Full	Inter	Full	Inter	Full	Inter	Full	Full
Target Azimuth	162°51'	163°11'	164°49'	165°03'	164°52'	165°06'	164°56'	165°10'	165°11'
Resolution in Original Negs.									
Flight Direction	12 ft	12 ft	11 ft 2 in	10 ft 1 in	7 ft	10 ft 1 in	15 ft	15 ft	15 ft 8 in
Scan Direction	16 ft	12 ft	*	8 ft	*	8 ft 1 in	15 ft	15 ft	15 ft 8 in

* - Unresolved
ND - Not Determined

FIGURE 5. MIP SELECTION 1025-1

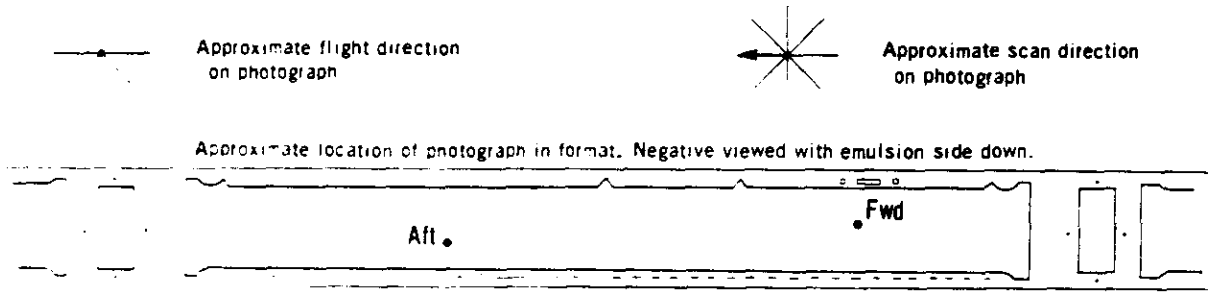
FIGURE 6. FWD PHOTOGRAPH COMPARED WITH THE MIP AREA, MISSION 1025-1

The following photographs show the difference between the MIP frame (aft photograph) and the corresponding fwd coverage. Note the difference in contrast and density, which is due to the solar azimuth. Also note the scratch in the center of the MIP frame. This frame was probably scratched during viewing of the particular area.

NPIC K-5932 (1/66) NPIC K-5933 (1/66)

[redacted]

	FIGURE 5	FIGURE 6
Camera	142	127
Pass	63D	63D
Frame	16 aft	10 fwd
Date of Photography	9 Oct 65	9 Oct 65
Universal Grid Coordinates	28.0 - 11.0	63.3 - 13.3
Enlargement Factor	20X	20X
Geographic Coordinates	32-39N 106-46W	32-39N 106-42W
Altitude (feet)	679,969	679,868
Camera:		
Pitch	Not Determined	Not Determined
Roll	Not Determined	Not Determined
Yaw	Not Determined	Not Determined
Local Sun Time	909	909
Solar Elevation	33°35'	33°35'
Solar Azimuth	125°	140°
Exposure (fractions of second)	1/342	1/336
Processing Level	Full	Intermediate
Vehicle Azimuth	165°10'	164°56'



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Control System Only

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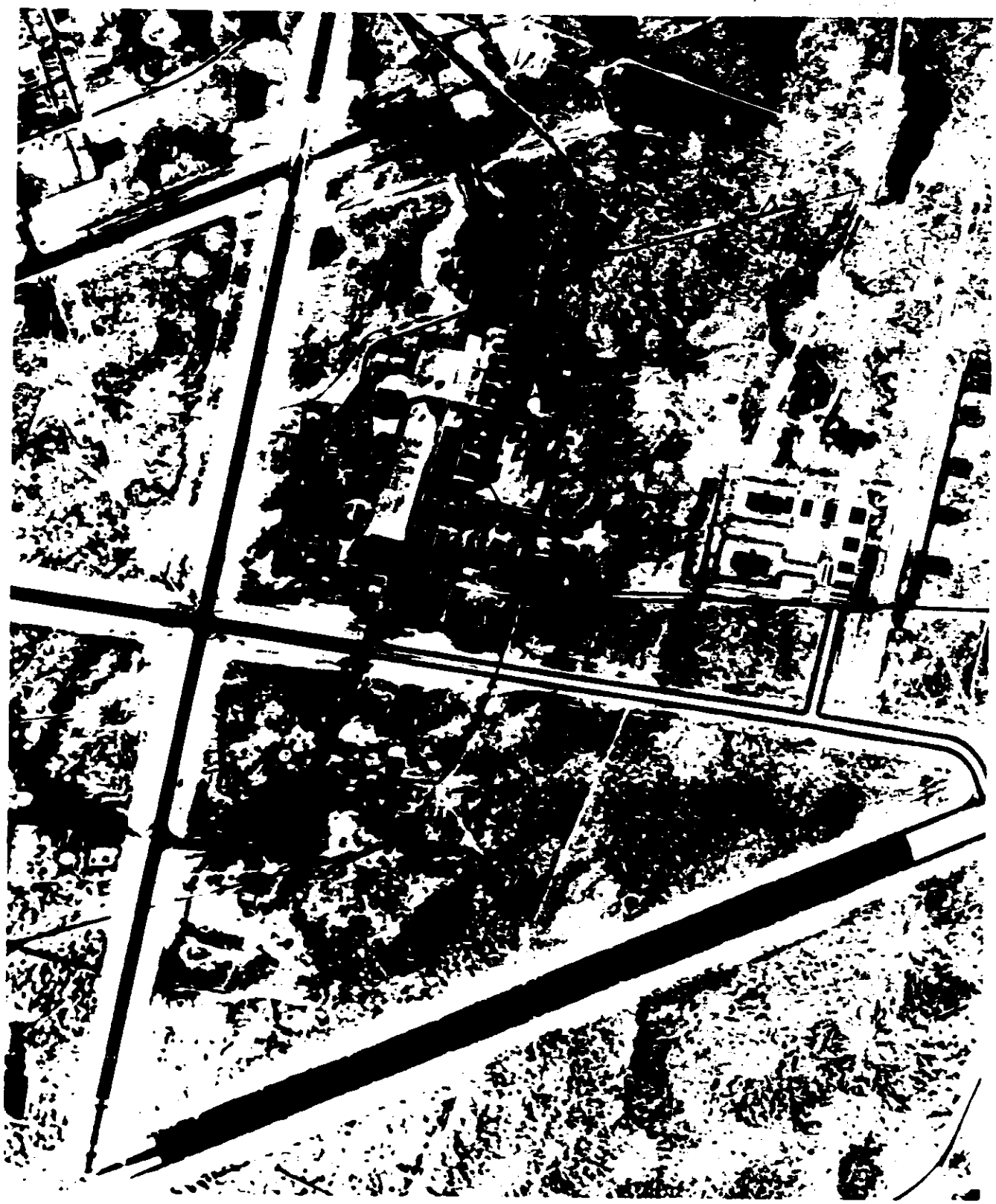

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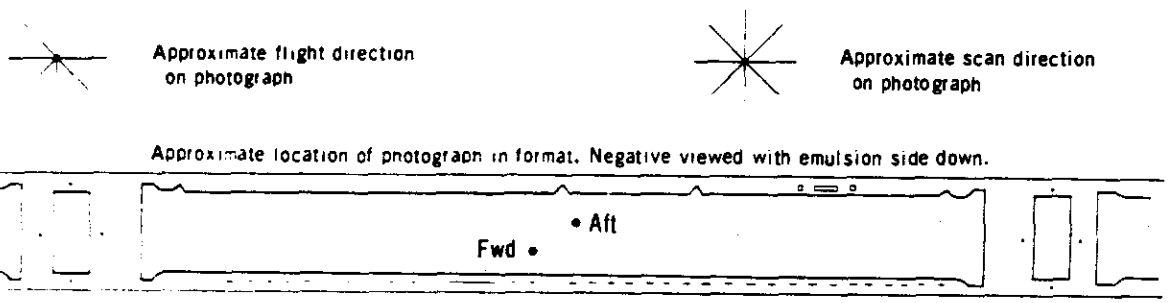
FIGURE 7. MIP SELECTION, 1025-2

FIGURE 8. FWD PHOTOGRAPH COMPARED WITH THE MIP AREA, MISSION 1025-2

The following 2 photographs are a comparison of the aft (MIP area) and the fwd material. The difference between these 2 photographs is very subtle; however, the aft material appears to be slightly better in quality.

NPIC K-5934 (1/66) NPIC K-5935 (1/66)

	FIGURE 7	FIGURE 8
Camera	142	127
Pass	95D	95D
Frame	15 aft	9 fwd
Date of Photography	11 Oct 65	11 Oct 65
Universal Grid Coordinates	46.8 - 14.1	43.2 - 10.5
Enlargement Factor	20X	20X
Geographic Coordinates	32-17N 110-52W	32-17N 110-48W
Altitude (feet)	685,545	685,093
Camera:		
Pitch	Not Determined	Not Determined
Roll	Not Determined	Not Determined
Yaw	Not Determined	Not Determined
Local Sun Time	844	844
Solar Elevation	28°57'	28°57'
Solar Azimuth	121°	121°
Exposure (fractions of second)	1/342	1/336
Processing Level	Full	Full
Vehicle Azimuth	165°15'	165°02'



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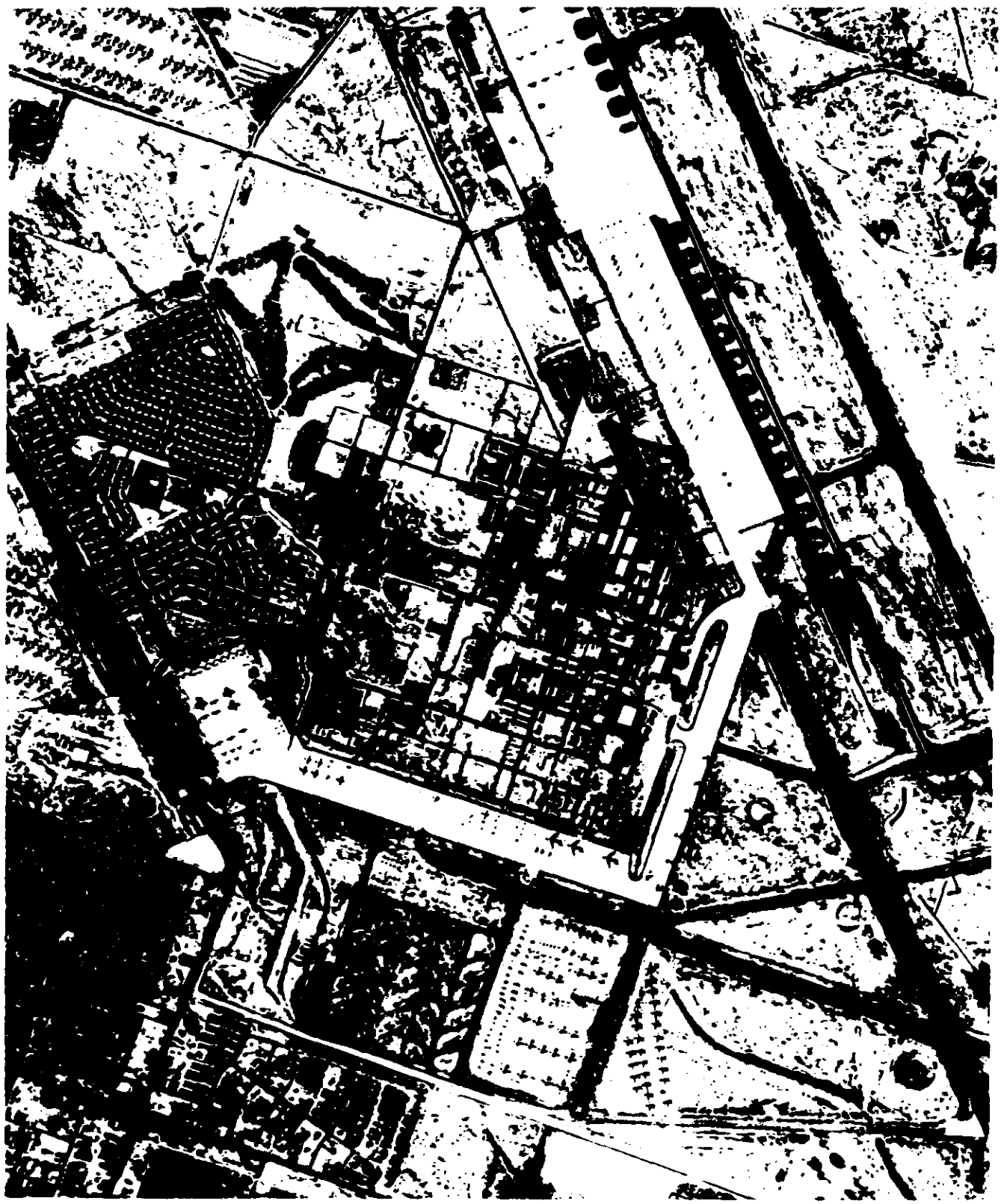

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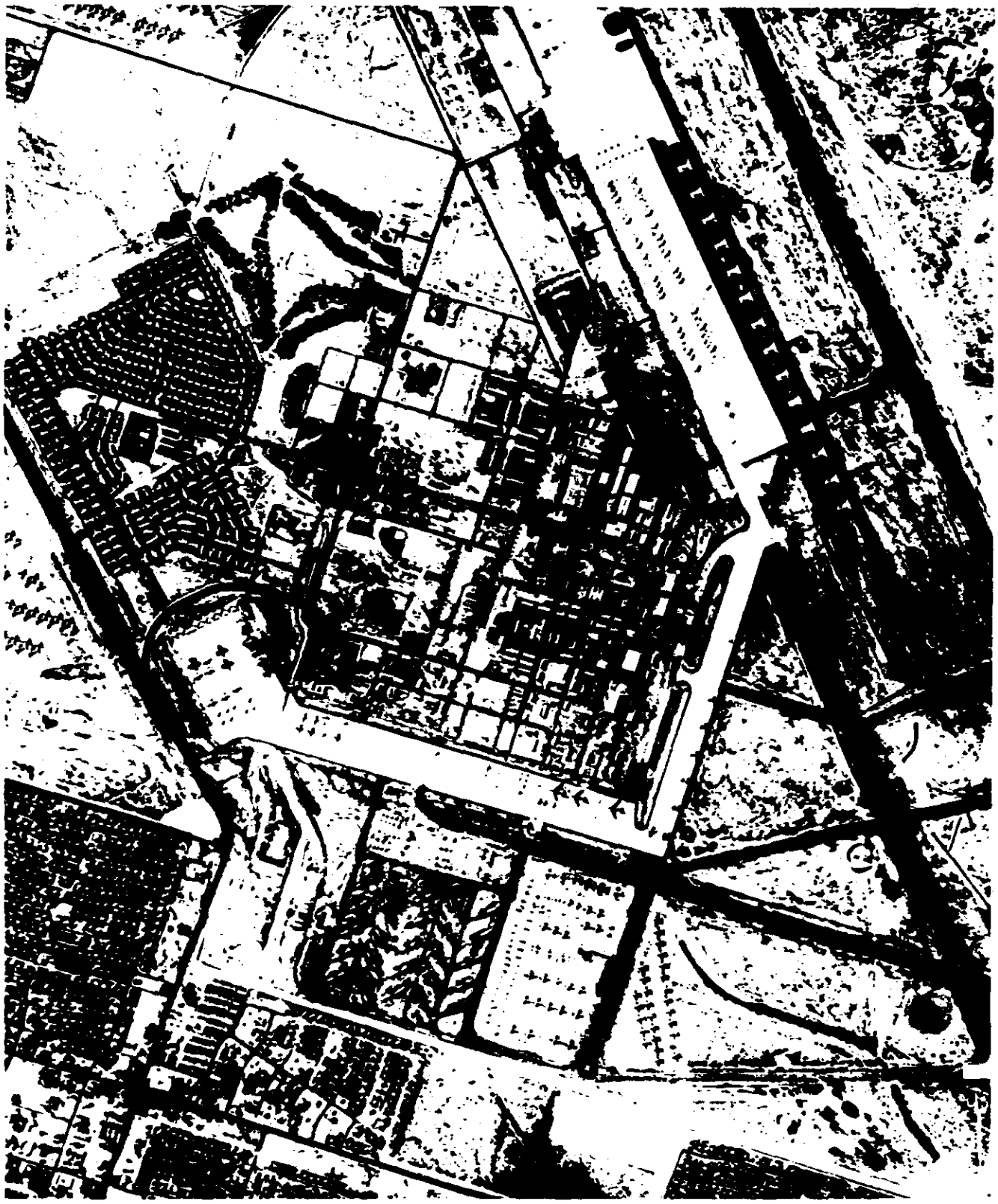

FIGURE 9. PHOTOGRAPHIC COMPARISON OF AFT WITH FWD; OBLIQUE PHOTOGRAPHY

FIGURE 10. PHOTOGRAPHIC COMPARISON OF FWD WITH AFT; OBLIQUE PHOTOGRAPHY

The following 2 photographs are examples of a target falling in the extreme portion of the format. This target was given a poor-quality rating due to obliquity. The aft material is superior to the fwd material.

NPIC K-5936 (1/66) NPIC K-5937 (1/66)

[redacted]

	FIGURE 9	FIGURE 10
Camera	142	127
Pass	22D	22D
Frame	62 aft	55 fwd
Date of Photography	7 Oct 65	7 Oct 65
Universal Grid Coordinates	75.5 - 11.2	15.3 - 12.6
Enlargement Factor	20X	20X
Geographic Coordinates	40-32N 98-38E	40-30N 98-41E
Altitude (feet)	683,392	684,298
Camera:		
Pitch	Not Determined	Not Determined
Roll	Not Determined	Not Determined
Yaw	Not Determined	Not Determined
Local Sun Time	929	929
Solar Elevation	32°11'	32°10'
Solar Azimuth	136°	134°
Exposure (fractions of second)	1/340	1/307
Processing Level	Intermediate	Intermediate
Vehicle Azimuth	162°56'	162°35'

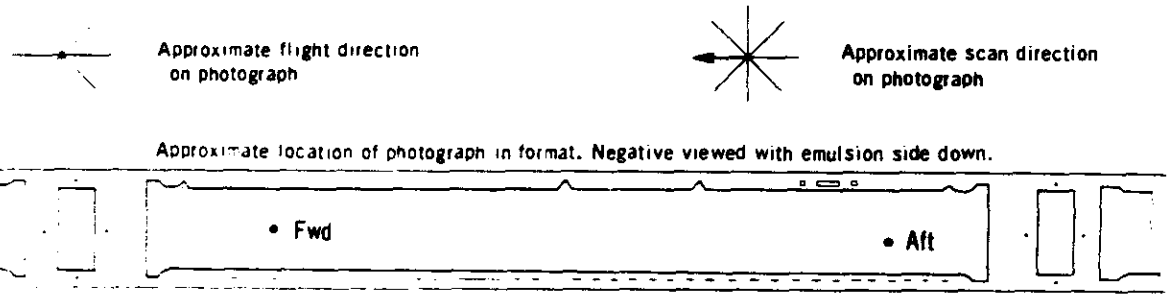

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FIGURE 11. PHOTOGRAPHIC COMPARISON OF AFT WITH FWD; LOW SOLAR ELEVATION

FIGURE 12. PHOTOGRAPHIC COMPARISON OF FWD WITH AFT; LOW SOLAR ELEVATION

The following photographs were given a poor-quality rating due to the low solar elevation and obliquity. The low contrast is caused by the low solar elevation. These photographs were printed on the highest contrast paper available to raise the contrast and increase the apparent quality of the target. The fine minus density areas on the fwd photograph are caused by the group of scratches appearing inside the take-up end of the negative.

NPIC K-5996 (1/66) NPIC K-5997 (1/66)

[redacted]

	FIGURE 11	FIGURE 12
Camera	142	127
Pass	8D	8D
Frame	30 aft	24 fwd
Date of Photography	6 Oct 65	6 Oct 65
Universal Grid Coordinates	14.2 - 11.9	76.7 - 12.8
Enlargement Factor	10X	10X
Geographic Coordinates	67-15N 31-22E	67-15N 31-26E
Altitude (feet)	736,057	738,738
Camera:		
Pitch	Not Determined	Not Determined
Roll	Not Determined	Not Determined
Yaw	Not Determined	Not Determined
Local Sun Time	755	755
Solar Elevation	$5^{o}41'$	$5^{o}41'$
Solar Azimuth	Not Determined	Not Determined
Exposure (fractions of second)	1/311	1/305
Processing Level	Full	Full
Vehicle Azimuth	$140^{o}17'$	$138^{o}31'$

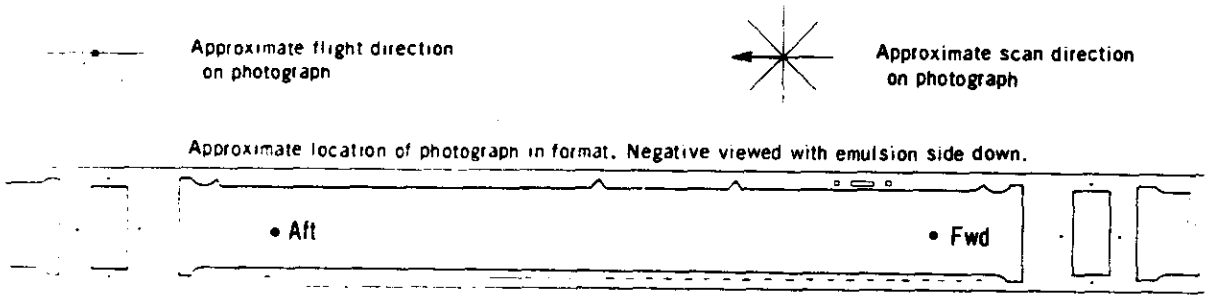

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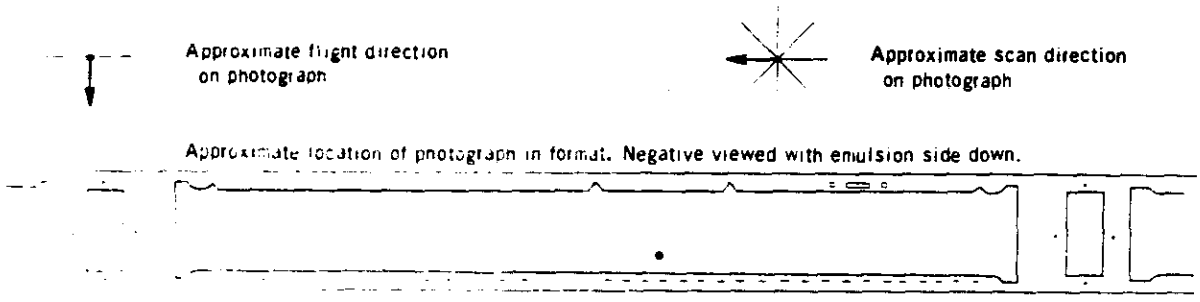
FIGURE 13. PHOTOGRAPHIC EXAMPLE OF FAIR QUALITY DURING LOW SOLAR ELEVATION

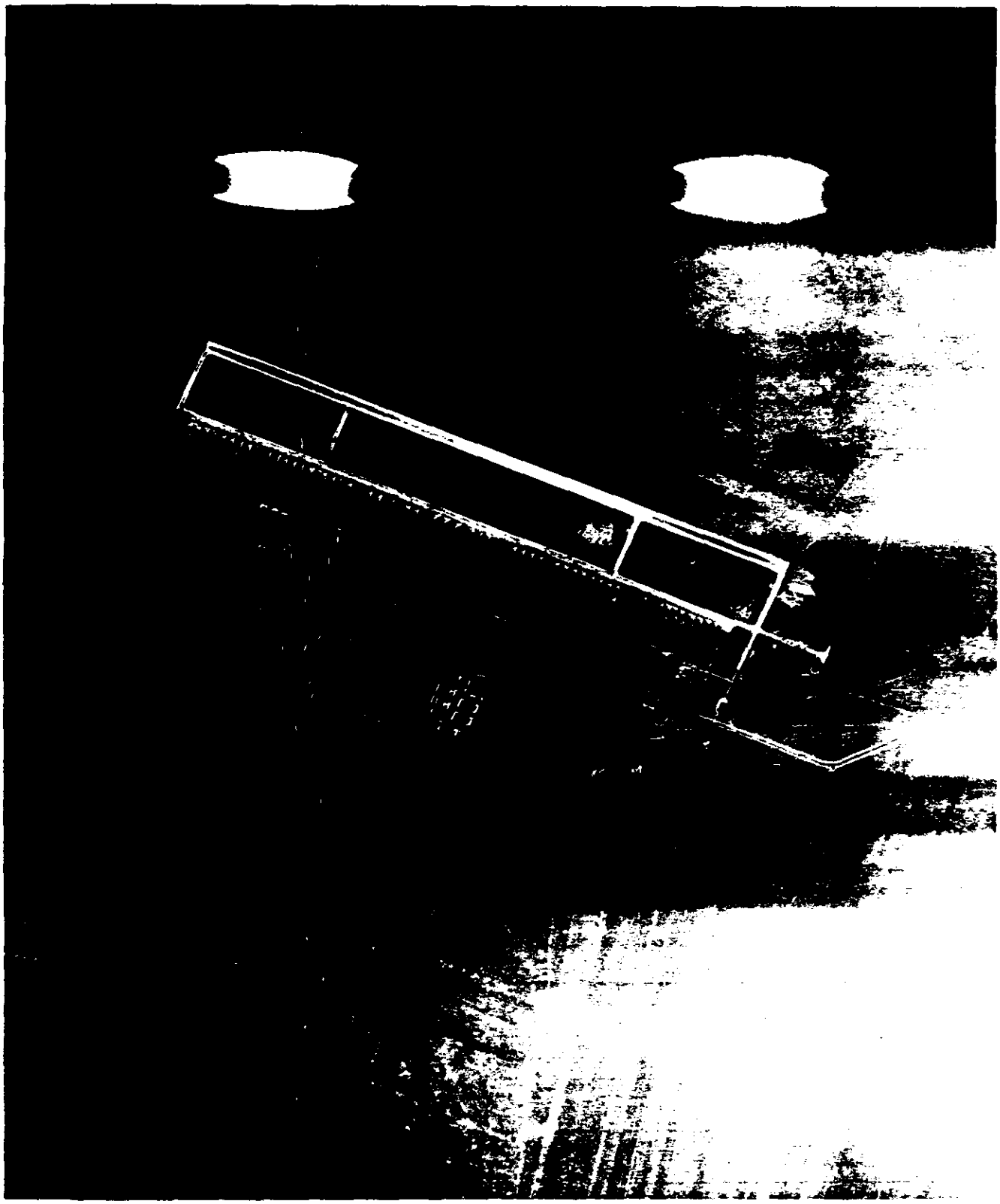
The target on this photograph was reported out by a photo interpreter. This particular target was given a poor rating due to the low solar elevation. However, the apparent quality of the photograph is greatly enhanced due to its reproduction on very high contrast paper.

NPIC K-5998 (1/66)

Camera	127
Pass	134D
Frame	7 fwd
Date of Photography	14 Oct 65
Universal Grid Coordinates	51.8 - 9.8
Enlargement Factor	10X
Geographic Coordinates	50-33N 78-52E
Altitude (feet)	688,318
Camera:	
Pitch	Not Determined
Roll	Not Determined
Yaw	Not Determined
Local Sun Time	735
Solar Elevation	8°31'
Solar Azimuth	114°
Exposure (fractions of second)	1/333
Processing Level	Full
Vehicle Azimuth	157°56'



[redacted]



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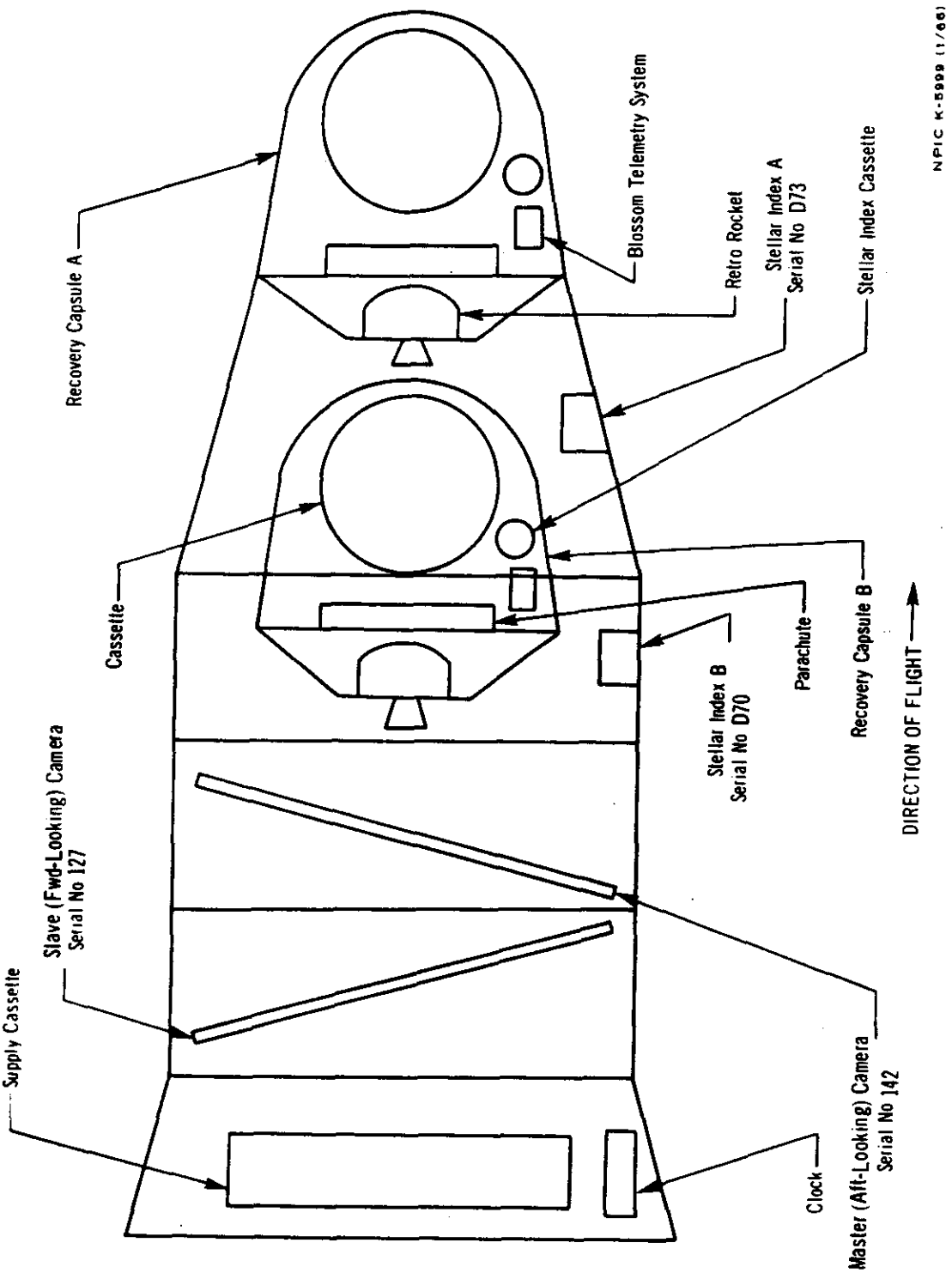
APPENDIX A. SYSTEM SPECIFICATIONS

1. Cameras

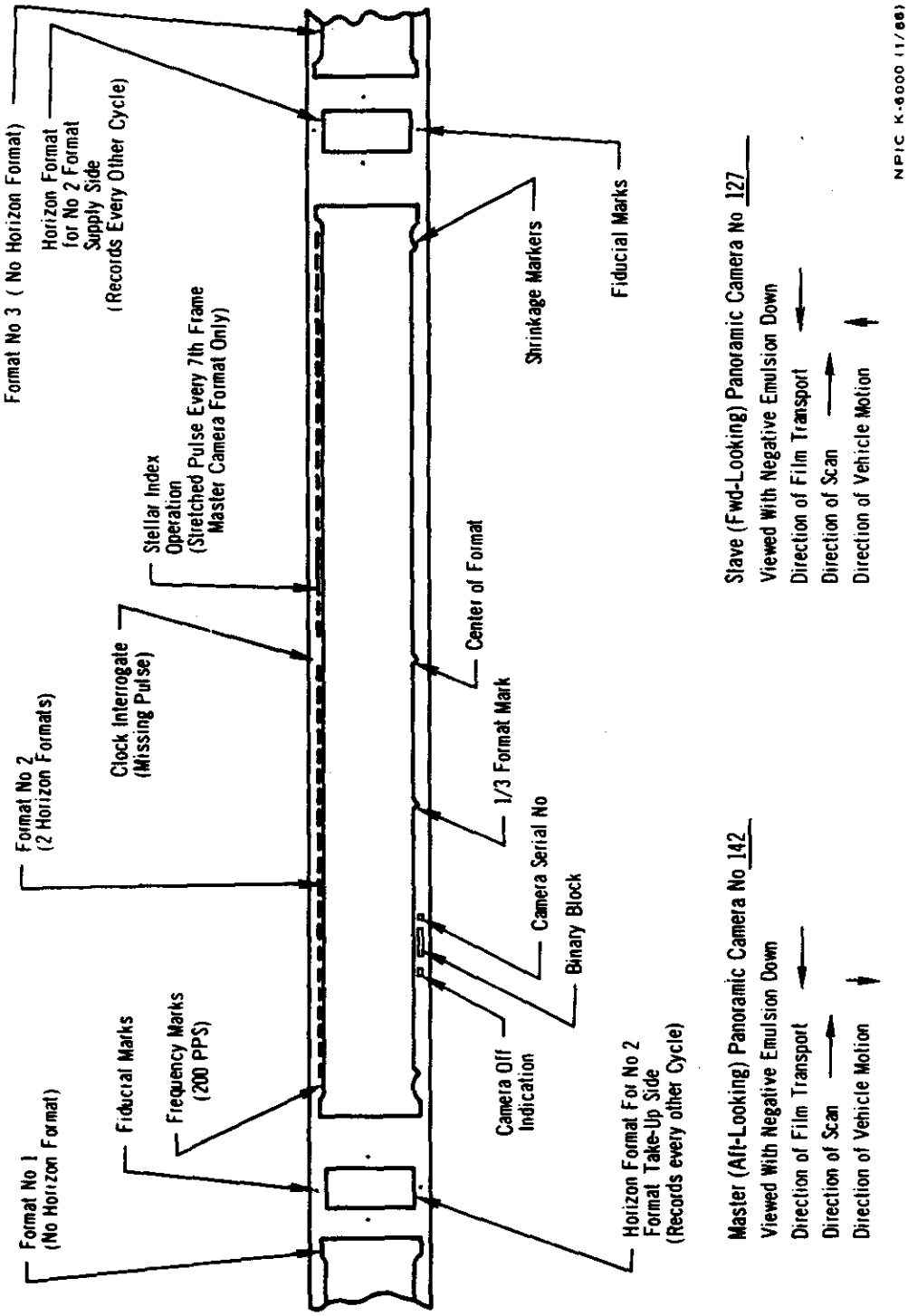
	Master Panoramic	Master Take-up Horizon	Master Supply Horizon	Slave Panoramic	Slave Take-up Horizon	Slave Supply Horizon	Mission 1025-1		Mission 1025-2	
							Stellar	Index	Stellar	Index
Camera No	142	NA	NA	127	NA	NA	D73	D73	D70	D70
Reseau No	NA	NA	NA	NA	NA	NA	88	78	81	88
Lens Serial No	1222435	812269	812289	1032435	812280	813549	11984	817717	11231	817711
Slit Width	.175	NA	NA	.175	NA	NA	NA	NA	NA	NA
Aperture	3.5	8.0	6.8	3.5	6.8	8.0	1.8	4.5	1.8	4.5
Exposure Time (Sec)	Varies	1/100	1/100	Varies	1/100	1/100	2	1/500	2	1/500
Filter (Wratten)	21	25	25	21	25	25	None	21	None	21
Focal Length (mm)	609.602	54.49	54.01	609.602	54.67	54.83	84	38.46	84	38.40
Film Length (ft)	16,000	NA	NA	16,000	NA	NA	46	92	46	92
Splices	5	NA	NA	5	NA	NA	None	None	None	None
Emulsion	222-1-7-5	222-1-7-5	222-1-7-5	222-1-7-5	222-1-7-5	222-1-7-5	124-35-8-5	104-14-6-5	124-35-8-5	104-14-6-5
Film Type	3404	3404	3404	3404	3404	3404	3401	3400	3401	3400
Resolution Data (L/mm)										
Static										
High Contrast	255	147(A)	134(A)	233	151(A)	134(A)	*	77(A)	*	71(A)
Low Contrast	150	*	*	162	*	*	*	*	*	*
Dynamic										
I High Contrast	183	*	*	175	*	*	*	*	*	*
I Low Contrast	132	*	*	132	*	*	*	*	*	*
P High Contrast	190	*	*	205	*	*	*	*	*	*
P Low Contrast	130	*	*	132	*	*	*	*	*	*

NA = Not Applicable
* = Not Available
(A)= AWAR

2. VEHICLE CONFIGURATION AND EQUIPMENT LAYOUT



3. PANORAMIC FORMAT CONFIGURATIONS



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APPENDIX B. DENSITY READINGS

1. Density Readings from Stellar Material

The following is a compilation of the density values recorded from the stellar negatives. A Macbeth Quantalog Densitometer, Model EP 1000, with an ET 20 attachment and an 0.05 millimeter aperture was used in taking the values listed. The averages and ranges of the D-Max, D-Min, Delta and gross fog are included at the end of the readings.

Mission 1025-1

Pass	Frame	Dmax	Dmin	Delta	Gross Fog
1D	1	1.23	0.22	1.01	0.14
	2	1.20	0.23	0.97	0.14
5D	3	0.79	0.22	0.57	0.14
	14	1.50	0.37	1.13	0.14
7D	15	1.25	0.37	0.88	0.14
	24	1.34	0.33	1.01	0.14
8D	25	0.60	0.15	0.45	0.14
	34	1.20	0.27	0.93	0.14
9AE	35	NR	NR	NR	0.14
9D	36	1.96	0.40	1.56	0.14
	38	1.87	0.38	1.49	0.14
10D	39	1.87	0.38	1.49	0.14
	50	1.87	0.47	1.40	0.14
11D	51	2.05	0.45	1.60	0.14
	59	1.77	0.34	1.43	0.14
13D	60	1.90	0.36	1.54	0.14
	67	1.18	0.27	0.91	0.14
14D	68	1.85	0.42	1.43	0.14
	78	1.94	0.46	1.48	0.14
16D	79	2.18	0.50	1.68	0.14
	80	2.20	0.49	1.71	0.14
20D	81	1.09	0.20	0.89	0.14
	91	1.60	0.36	1.24	0.14
21D	92	1.31	0.25	1.06	0.14
	97	1.69	0.30	1.39	0.14
22D	98	NR	NR	NR	0.14
	115	2.10	0.45	1.65	0.14
23D	116	1.80	0.36	1.44	0.14
	127	1.60	0.32	1.28	0.14
24D	128	1.74	0.34	1.40	0.14
	130	1.79	0.34	1.45	0.14
25D	131	1.90	0.33	1.57	0.14
	139	1.82	0.35	1.47	0.14
26D	140	1.96	0.39	1.57	0.14
	150	2.27	0.54	1.73	0.14
27D	151	1.94	0.36	1.58	0.14
	161	1.87	0.38	1.49	0.14
31D	162	1.90	0.40	1.50	0.14
	163	1.43	0.29	1.14	0.14
32D	164	1.54	0.30	1.24	0.14
	165	1.72	0.37	1.35	0.14
33D	166	0.50	0.16	0.34	0.14
	168	0.69	0.18	0.51	0.14
34D	169	0.57	0.18	0.39	0.14
	174	1.04	0.20	0.84	0.14
37D	175	1.32	0.27	1.05	0.14
	181	1.95	0.45	1.50	0.14

Mission 1025-1 (Continued)

Pass	Frame	Dmax	Dmin	Delta	Gross Fog
39D	182	1.68	0.30	1.38	0.14
	196	1.30	0.25	1.05	0.14
40D	197	1.30	0.25	1.05	0.14
	201	1.56	0.30	1.26	0.14
41D	202	1.50	0.28	1.22	0.14
	212	1.59	0.35	1.24	0.14
43D	213	1.21	0.26	0.95	0.14
	219	1.74	0.34	1.40	0.14
47D	220	0.99	0.26	0.73	0.14
	222	0.89	0.27	0.62	0.14
51D	223	0.32	0.15	0.17	0.14
	235	0.87	0.25	0.62	0.14
52D	236	1.00	0.21	0.79	0.14
	241	0.77	0.19	0.58	0.14
53D	242	NR	NR	NR	0.14
	255	1.70	0.35	1.35	0.14
54D	256	0.88	0.20	0.68	0.14
	265	1.63	0.26	1.37	0.14
55D	266	0.26	0.14	0.12	0.14
	288	1.39	0.27	1.12	0.14
56D	289	1.27	0.23	1.04	0.14
	293	1.18	0.27	0.91	0.14
57D	294	1.36	0.24	1.12	0.14
	298	1.14	0.22	0.92	0.14
63D	299	1.00	0.22	0.78	0.14
	304	1.06	0.23	0.83	0.14
66D	305	NR	NR	NR	0.14
	310	0.45	0.15	0.30	0.14
68D	311	NR	NR	NR	0.14
	322	1.17	0.20	0.97	0.14
69D	323	NR	NR	NR	0.14
	334	0.55	0.24	1.31	0.14
70D	335	0.89	0.19	0.70	0.14
	349	1.52	0.30	1.22	0.14
71D	350	1.20	0.21	0.99	0.14
	366	1.61	0.28	1.33	0.14
72D	367	0.97	0.17	0.80	0.14
	382	1.03	0.27	0.76	0.14
73D	383	1.21	0.27	0.94	0.14
	*397	1.68	0.30	1.38	0.18*
75D	*398	1.46	0.30	1.16	0.18*
	*403	1.50	0.70	0.80	0.63*
Average		1.40	0.34	1.06	0.14
Range		0.26 - 2.20	0.14 - 0.54	0.17 - 1.73	0.14

*Not included in averages due to fog caused by film exhaustion
NR - No Reading

Mission 1025-2

Pass	Frame	Dmax	Dmin	Delta	Gross Fog
81D	1	2.12	0.43	1.69	0.18
84D	2	NR	NR	NR	0.18
	16	1.59	0.53	1.06	0.18
86D	17	0.58	0.20	0.38	0.17
	39	2.37	0.52	1.85	0.17
87D	40	2.42	0.52	1.90	0.16
	55	2.32	0.32	2.00	0.16
89AE	56	NR	NR	NR	0.16
	57	NR	NR	NR	0.16
89D	58	2.76	0.33	2.43	0.16
	72	2.59	0.32	2.27	0.16
90D	73	2.82	0.38	2.44	0.16
	80	2.15	0.36	1.79	0.16
94D	81	2.62	0.32	2.30	0.16
	89	2.88	0.46	2.42	0.16
95D	90	2.65	0.34	2.31	0.16
	92	2.75	0.34	2.41	0.16
101D	93	2.72	0.32	2.40	0.16
	102	2.20	0.28	1.92	0.16
102D	103	2.54	0.32	2.22	0.16
	122	2.95	0.55	2.40	0.18
103D	123	1.10	0.19	0.91	0.18
	133	2.80	0.35	2.45	0.18
104D	134	2.82	0.37	2.45	0.18
	149	2.75	0.38	2.37	0.18
105D	150	0.70	0.20	0.50	0.18
	167	2.34	0.44	1.90	0.18
106D	168	2.75	0.40	2.35	0.18
	174	2.62	0.34	2.28	0.18
110D	175	2.38	0.32	2.06	0.18
	177	2.40	0.34	2.06	0.18
117D	178	1.95	0.27	1.68	0.18
	192	2.75	0.47	2.28	0.18
118D	193	1.50	0.22	1.28	0.18
	206	1.80	0.34	1.46	0.18
119D	207	2.35	0.32	2.03	0.18
	217	2.50	0.33	2.17	0.18
120D	218	2.62	0.37	2.25	0.18
	230	2.90	0.52	2.38	0.18
121D	231	2.78	0.37	2.41	0.18
	249	2.74	0.52	2.22	0.18
122D	250	2.68	0.40	2.28	0.18
	256	2.62	0.37	2.25	0.18
127D	257	1.75	0.36	1.39	0.18
	259	2.64	0.38	2.26	0.18
133D	260	0.52	0.20	0.32	0.18
	274	2.78	0.38	2.40	0.18

Mission 1025-2 (Continued)

Pass	Frame	Dmax	Dmin	Delta	Gross Fog
134D	275	1.52	0.28	1.24	0.18
	289	2.45	0.32	2.13	0.18
135D	290	2.63	0.32	2.31	0.18
	294	2.52	0.32	2.20	0.18
136AE	295	NR	NR	NR	0.18
	296	NR	NR	NR	0.18
136D	297	2.62	0.34	2.28	0.18
	308	2.68	0.38	2.30	0.18
137D	309	2.60	0.38	2.22	0.18
	322	2.80	0.42	2.38	0.18
141D	323	2.74	0.48	2.26	0.18
	331	2.30	0.30	2.00	0.18
143D	332	2.58	0.36	2.22	0.18
	334	2.68	0.38	2.30	0.18
148D	335	2.35	0.35	2.00	0.18
	346	2.50	0.39	2.11	0.18
149D	347	2.64	0.40	2.24	0.18
	361	2.55	0.38	2.17	0.18
150D	362	NR	NR	NR	0.18
	376	2.22	0.32	1.90	0.18
151D	377	2.50	0.32	2.18	0.18
	380	2.18	0.34	1.84	0.18
152D	381	2.60	0.36	2.24	0.18
	391	2.45	0.32	2.13	0.18
153D	392	2.35	0.35	2.00	0.18
	401	2.60	0.40	2.20	0.20
154D	*402	2.08	0.45	1.63	0.24
	408	NR	NR	NR	NR
Average		2.37	0.36	2.01	0.18
Range		0.52 - 2.95	0.19 - 0.55	0.32 - 2.45	0.16 - 0.20

*Not included in averages due to fog caused by film exhaustion
NR - No Reading

2. Index Material

The density and contrast of the index negatives from missions 1025-1 and 1025-2 are good. They compare favorably with the density and contrast of material from previous missions.

Density readings of the index negatives are not included in this report. There have been indications that recipients do not require tabulated values of the densities of index negatives. If there is a requirement for this information the values will be furnished by the National Photographic Interpretation Center upon request.

APPENDIX C. MICRODENSITOMETRY

1. Edge Spread Function

The spread function is obtained from microdensitometer edge traces to provide an objective measure of the image quality in mission photography. The spread function curve represents a summation of the separate elements of the photographic system. By taking the Fourier Transform of the spread function the modulation transfer function of the system is obtained.

To satisfy the desire to express image quality in terms of a value, a single number is determined from the spread function curve by measuring its width at 50 percent amplitude. This width is expressed as a micron distance in image space and may be converted to a distance on the ground. On domestic passes, where 3-bar resolution targets have been available, the ground distance determined from edge trace analysis and from the targets has been found to be comparable.

The microdensitometric analysis of edges in the image requires that the object edge fulfill the conditions of a unit step function, i.e., exist for an appreciable distance at a fixed brightness level and change abruptly to a new level which exists for an appreciable distance. This requirement is usually achieved by rooftops of buildings in large-scale photography and aircraft runways or taxiways in small-scale photography.

The mission is examined to determine the MIP frame (Mission Information Potential) which is a subjective selection of the best photography. Straight edges in this imagery meeting the criteria of a step function for a length of at least 120 microns are selected for scanning with the microdensitometer.

The microdensitometer used for the traces in this report is located at the SPPL facility. The location of the traces was directed by representatives from NPIC at SPPL. The instrument is the Mann-Data Micro-Analyzer used with an effective slit of 1 micron by 80 microns. A scan speed of 0.05 mm/minute and a chart speed of 4.1 inches/minute was used for a recording-to-specimen expansion of 2,083:1, one inch on the recording equals 12.2 microns on the specimen. The traces produced represent a plot of deflection versus distance. The deflection of the pen is essentially linear with density and the horizontal lines on the chart numbered 1 to 7 equal 0 to 3.0 density. At the same time the

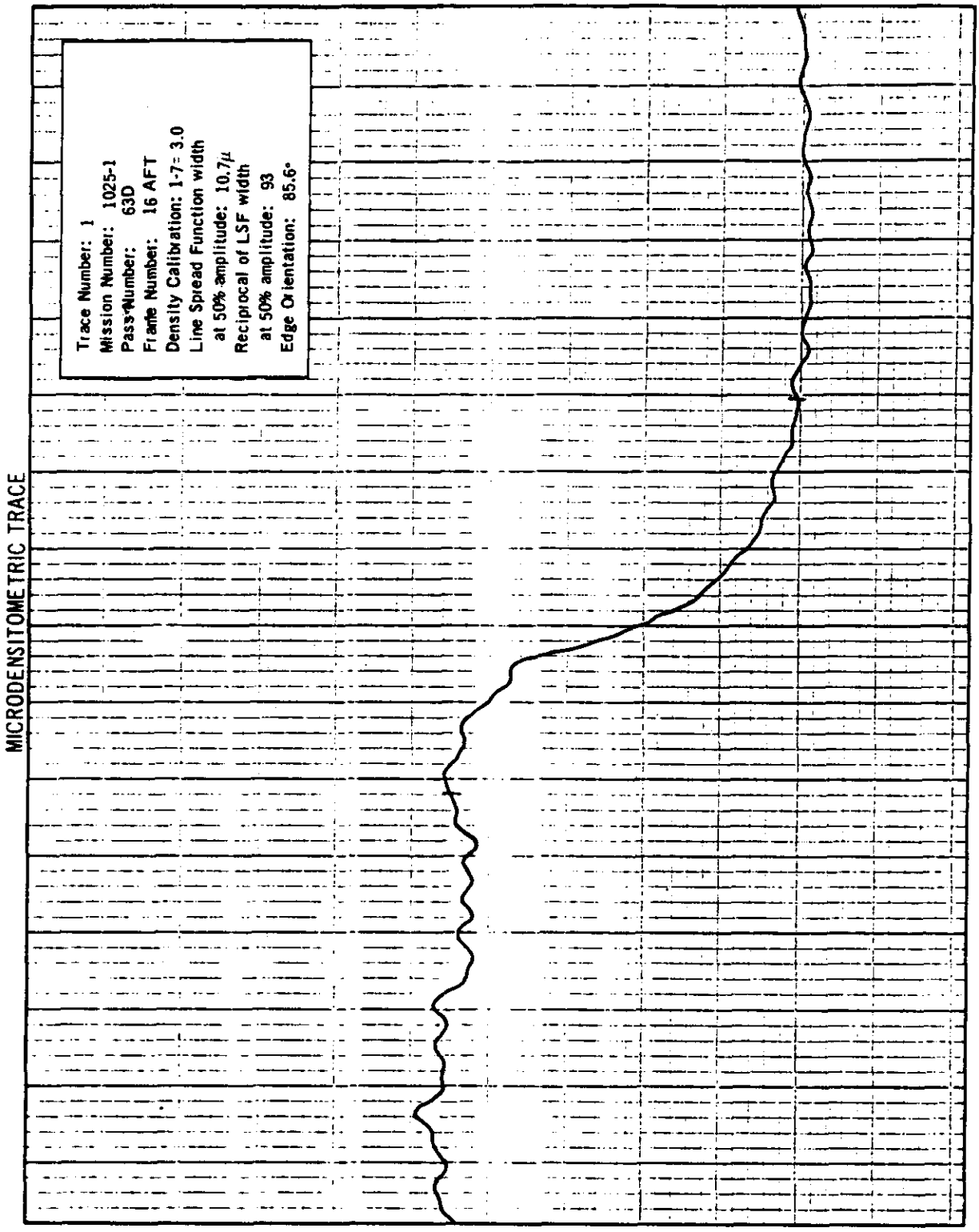
traces were made, the electronic output signals from the instrument were digitized as density values and recorded on paper tape for direct analysis by an IBM 1710 computer.

In the table on the next page the following computer outputs are listed for each edge traced: The 50 percent amplitude width of the Line Spread Function in microns, the reciprocal of the 50 percent width in millimeters, and the intersection point of the modulation transfer curve and the aerial image modulation curve. The procedure used in the derivation of these values is described in the SPPL Technical Report No. 101-31 (pages 79-82). The edge orientation angle is determined in the microdensitometer and is 0 degree when the edge is parallel to the major axis of the film and 90 degrees when the edge is perpendicular to the major axis of the film.

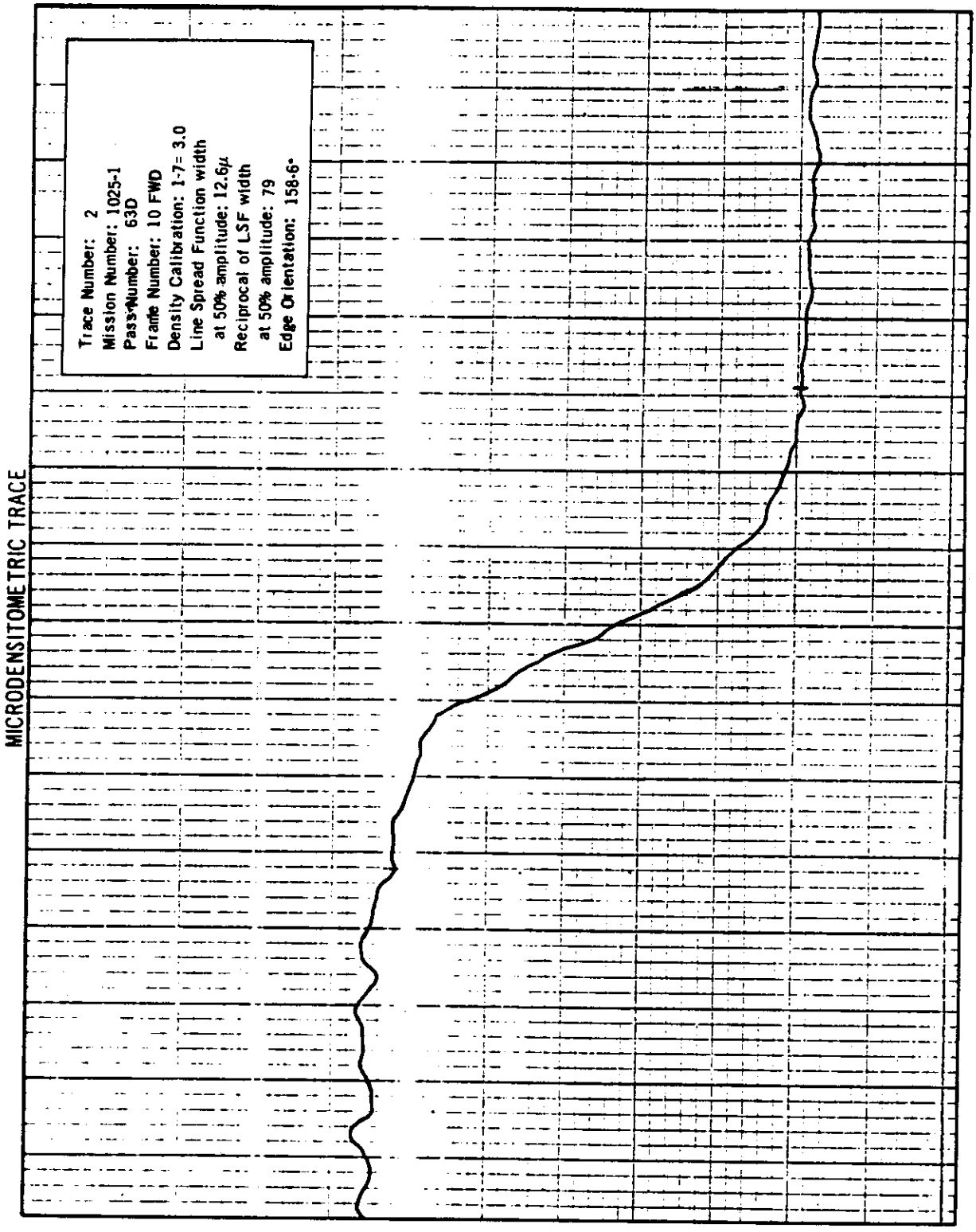
The edge traces were made on the original negative of this mission. Edge trace No. 1 was made on the MIP frame of Mission 1025-1. Edge trace No. 2 was made on the corresponding frame of the fwd material. Edge traces Nos. 3, 4, and 5 were made on the MIP frame of Mission 1025-2.

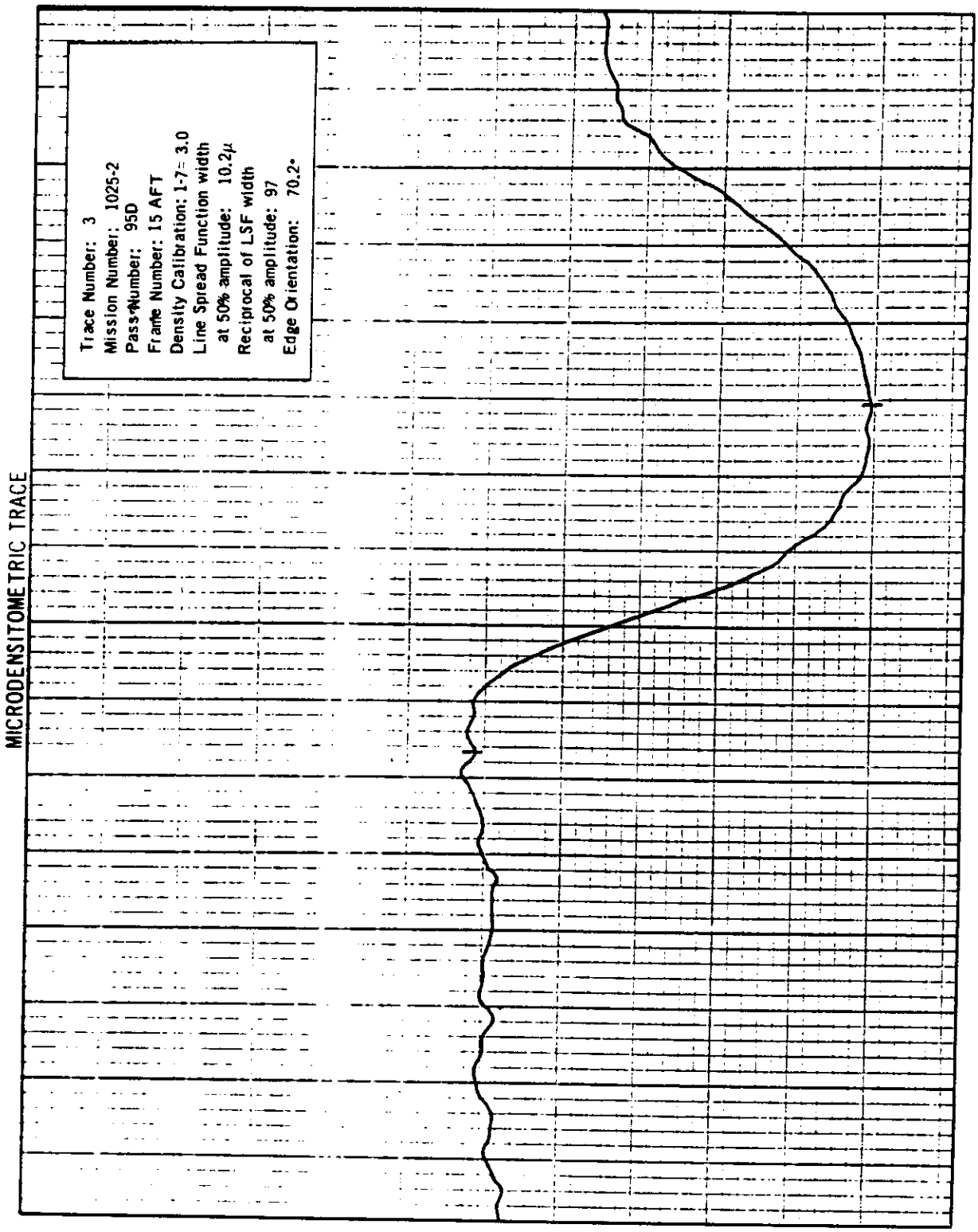
SUMMARY TABLE OF EDGE TRACES

Trace Number	Pass/ Frame	LINE SPREAD FUNCTION		MTF/AIM Intersect	Edge Orientation
		50% Width In Microns	1000/50% Width		
1	63D/16AFT	10.7	93	91	85.6°
2	63D/10FWD	12.6	79	90	158.6°
3	95D/15AFT	10.2	97	94	70.2°
4	95D/15AFT	8.5	117	119	70.2°
5	95D/15AFT	8.6	116	122	170.0°

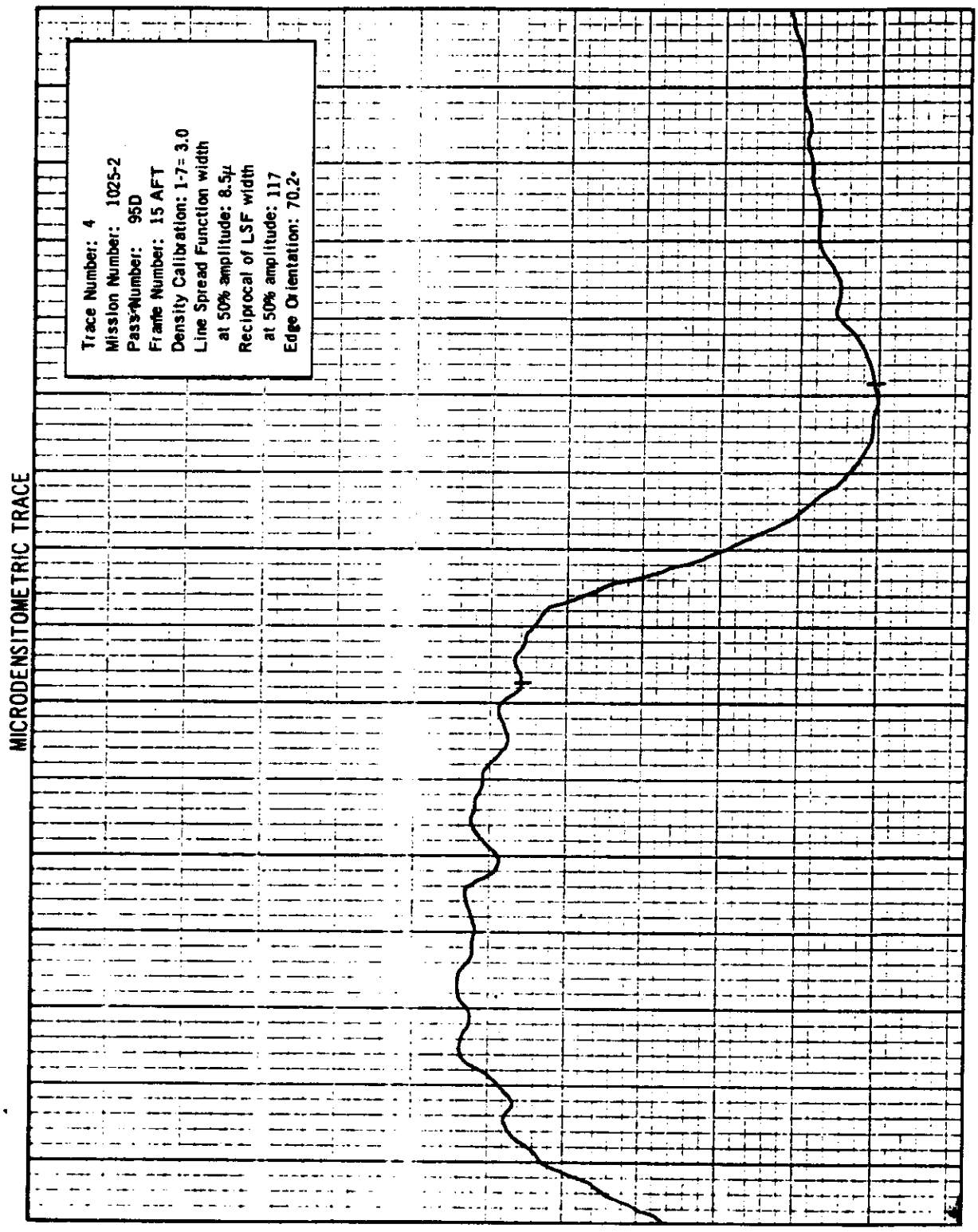


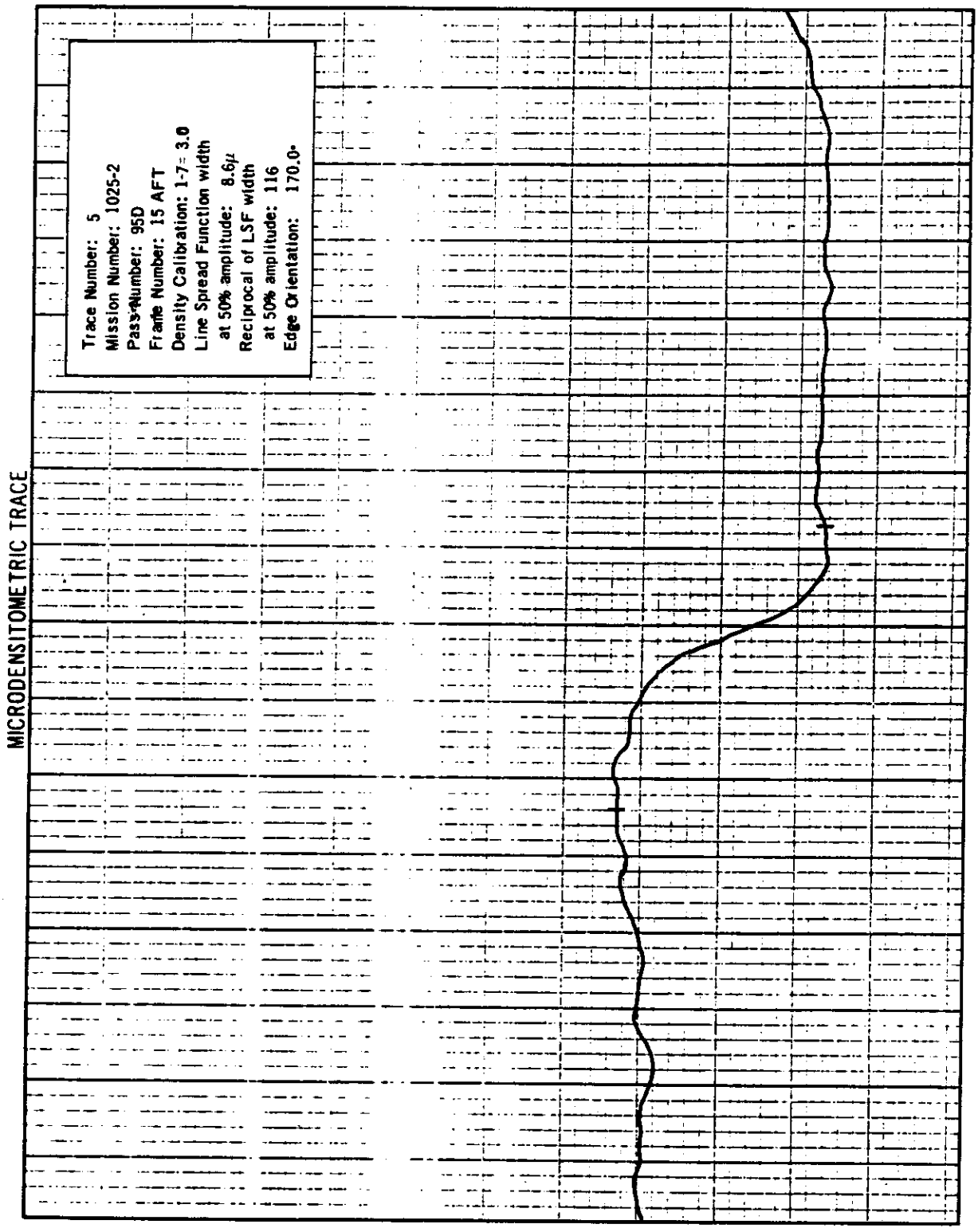
NPIC K-6001 (1/66)


Trace Number: 2
Mission Number: 1025-1
Pass Number: 63D
Frame Number: 10 FWD
Density Calibration: 1-7= 3.0
Line Spread Function width
at 50% amplitude: 12.6μ
Reciprocal of LSF width
at 50% amplitude: 79
Edge Orientation: 158-6°
MICRODENSITOMETRIC TRACE
NPIC K-6002 (1/68)


MICRODENSITOMETRIC TRACE
Trace Number: 3
Mission Number: 1025-2
Pass Number: 95D
Frame Number: 15 AFT
Density Calibration: 1.7= 3.0
Line Spread Function width at 50% amplitude: 10.2μ
Reciprocal of LSF width at 50% amplitude: 97
Edge Orientation: 70.2°
NPIC K-6003 (1/66)

[redacted]


Trace Number: 4
Mission Number: 1025-2
Pass Number: 95D
Frame Number: 15 AFT
Density Calibration: 1-7= 3.0
Line Spread Function width
at 50% amplitude: 8.5μ
Reciprocal of LSF width
at 50% amplitude: 117
Edge Orientation: 70.2°
MICRODENSITOMETRIC TRACE
NPIC K-6004 (1/66)



NPIC K-6008 (1/66)

APPENDIX D. CLOUD COVER ANALYSIS

1. Introduction

This study represents a statistical analysis of the cloud cover on the photography of Mission 1025. The basis of this study is the cloud cover data for each quarter segment of every individual frame of photography. The data is obtained by analysts specifically trained in estimating cloud cover by designated categories.

Five cloud categories have been formulated for use in this photography (Reference, Table 1). These categories allow for the wide latitude of cloud cover conditions commonly found on a frame of this photography. Note in Table 1 that a mean cloud percentage value has been calculated for each category for use in determining a combined cloud cover percentage for all operational passes of the mission.

The occurrence of each cloud category within an operational pass is expressed as a percentage of 100 and appears in Table 2. Each percentage is a ratio of the number of occurrences of a given cloud cover category to the total number of cloud observations in a photo pass. For example: if the number of category 1 occurrences in a given pass is 200 out of a total of 1,000 (250 frames x 4 quarters), all categories combined, then 20 percent of the pass would be classed as category 1.

Also a cloud cover percentage per pass is included in the last column of Table 2 under "Cloud Cover % Per Pass". This value is determined by the summation of the products of category percentage in each pass and the mean cloud percentage for that category as established in Table 1. For example: if it is determined that the following percentages exist in a given pass:

20% Category 1
15% Category 2
30% Category 3
25% Category 4
10% Category 5

Then, by using the mean cloud percentage established in Table 1 the following computations are made:

0.20	x 5.0	=	1.00%
0.15	x 17.5	=	2.63%
0.30	x 38.0	=	11.40%
0.25	x 75.0	=	18.75%
0.10	x 100.0	=	10.00%
			43.78%

Hence, 43.8 percent of this pass is cloud covered.

TABLE 1

CLOUD COVER CATEGORIES

Category Number	Percent of Cloud Cover	Description	Mean Cloud Percentage
1	Less than 10%	Clear	5%
2	10% - 25%	Small Scattered Clouds	17.5%
3	26% - 50%	Large Scattered Clouds	38%
4	51% - 99%	Broken or Connected Clouds	75%
5	100%	Complete Overcast	100%

2. Cloud Cover Data, Mission 1025-1 and 1025-2

Mission 1025-1

Pass Number	1	2	3	4	5	Cloud Cover % Per Pass
5D	57.0	15.0	21.5	6.5	0.0	18.5
7D	80.4	13.5	3.1	3.0	0.0	9.8
8D	32.9	17.1	18.1	22.4	9.5	37.8
9D	100.0	0.0	0.0	0.0	0.0	5.0
10D	76.4	13.8	7.1	2.7	0.0	11.0
11D	59.8	16.3	15.5	8.0	0.4	18.1
13D	26.1	25.8	26.1	20.8	1.2	32.5
14D	15.2	21.8	48.9	13.2	0.9	33.9
20D	40.4	13.4	13.4	24.1	8.7	36.3
21D	64.5	23.7	7.9	3.5	0.4	13.4
22D	27.5	17.2	19.8	27.3	8.2	40.6
23D	50.0	14.4	7.9	27.7	0.0	28.8
24D	70.7	17.4	4.3	7.6	0.0	13.9
25D	38.7	2.2	5.9	34.4	18.8	49.1
26D	68.1	5.7	9.3	5.7	11.2	23.4
27D	56.5	18.2	19.8	4.9	0.6	17.8
33D	0.0	5.4	35.9	51.1	7.6	60.5
34D	10.9	7.0	19.0	27.2	35.9	65.3
37D	47.7	19.5	11.3	10.6	10.9	29.0
39D	91.1	6.5	2.4	0.0	0.0	6.6
40D	97.3	2.7	0.0	0.0	0.0	5.3
41D	75.7	7.5	8.9	6.2	1.7	14.8
43D	26.2	25.4	27.5	20.9	0.0	31.9
51D	45.5	6.4	20.7	25.8	1.6	32.2
52D	98.4	1.1	0.0	0.5	0.0	5.5
53D	80.1	6.8	9.1	4.0	0.0	11.6
54D	30.5	3.5	12.5	40.7	12.8	50.2
55D	31.1	18.7	7.0	25.3	17.9	44.4
56D	56.3	5.7	7.8	13.0	17.2	33.7
57D	30.7	18.7	50.6	0.0	0.0	24.0
66D	37.1	4.5	15.2	25.0	18.2	45.3
68D	8.3	11.4	14.0	54.5	11.7	60.4
69D	95.5	0.3	2.1	2.1	0.0	7.2
70D	50.4	12.2	17.7	15.5	4.2	27.2
71D	76.7	11.8	6.5	4.8	0.2	12.2
72D	27.9	6.9	5.6	2.7	56.9	63.6
73D	37.7	11.0	17.1	19.7	14.5	39.6
75D	53.9	19.6	19.6	5.9	1.0	19.0
78D	22.1	2.9	19.7	41.8	13.5	53.9
	50.3*	11.9*	13.8*	15.9*	8.1*	29.8**

Mission 1025-2

Pass Number	1	2	3	4	5	Cloud Cover % Per Pass
84D	67.4	12.7	6.5	5.4	8.0	20.1
86D	54.5	6.8	6.2	18.0	14.5	34.2
87D	65.9	8.7	7.3	18.1	0.0	21.2
89D	60.1	11.6	9.0	19.3	0.0	22.9
90D	94.1	1.2	3.9	0.8	0.0	7.0
94D	0.5	5.3	9.6	37.0	47.1	79.6
101D	86.6	8.5	4.9	0.0	0.0	7.7
102D	69.3	8.4	12.1	8.9	1.3	17.5
103D	44.6	0.0	0.0	53.9	1.5	44.2
104D	87.2	4.9	3.5	4.4	0.0	9.9
105D	43.6	5.3	9.1	41.1	0.9	38.3
106D	100.0	0.0	0.0	0.0	0.0	5.0
117D	57.6	16.8	8.0	15.6	2.0	22.6
118D	54.5	22.3	9.9	13.3	0.0	20.4
119D	78.7	16.3	3.9	1.1	0.0	9.1
120D	37.0	32.5	14.8	14.7	1.0	25.2
121D	63.7	9.7	13.7	12.9	0.0	19.8
122D	95.5	3.5	1.0	0.0	0.0	5.8
133D	46.4	24.3	23.3	6.0	0.0	19.9
134D	78.0	9.6	10.0	2.4	0.0	11.2
135D	90.6	8.3	1.1	0.0	0.0	6.4
136D	44.9	23.6	15.9	14.5	1.1	24.4
137D	47.9	13.0	22.2	16.2	0.7	26.0
141D	39.9	3.7	10.8	21.3	24.3	47.0
148D	78.0	0.0	0.0	0.0	22.0	25.9
149D	48.3	3.8	12.7	35.2	0.0	34.3
150D	40.1	6.3	8.7	35.2	9.7	42.5
151D	80.4	10.8	8.1	0.7	0.0	9.5
152D	74.7	6.2	10.8	8.3	0.0	15.2
153D	82.4	5.1	6.0	6.5	0.0	12.2
154D	41.2	8.4	11.3	35.2	3.9	38.1
157D	25.0	5.5	11.2	34.6	23.7	56.1
158D	1.8	6.3	12.5	58.0	21.4	70.9
	60.0*	10.0*	9.3*	16.2*	4.5*	24.9**

*Average percentage by category for mission.
**Overall mission cloud cover percentage.

APPENDIX E. MISSION COVERAGE STATISTICS

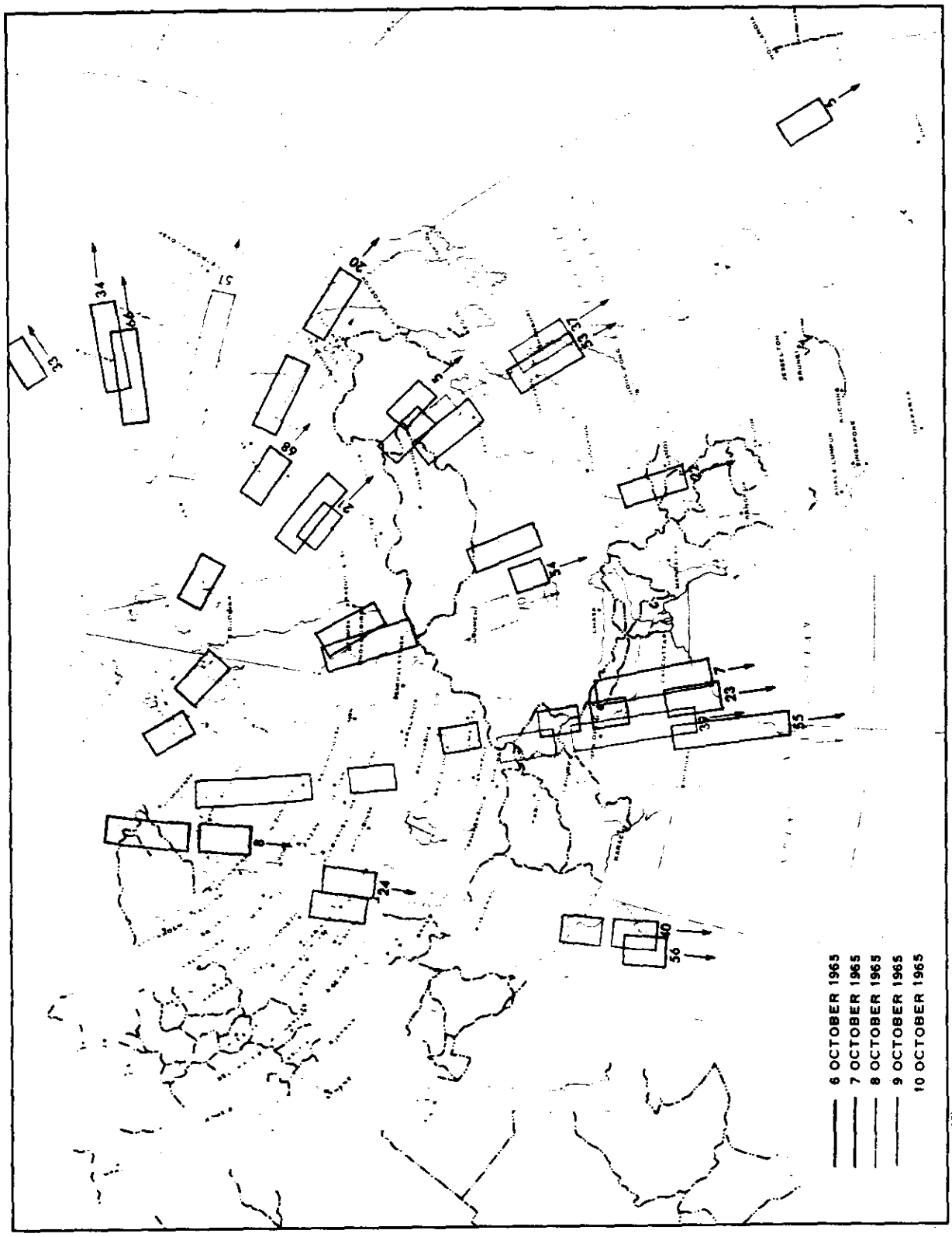
1. Summary of Plottable Photographic Coverage, Mission 1025-1 and Mission 1025-2

Mission 1025-1

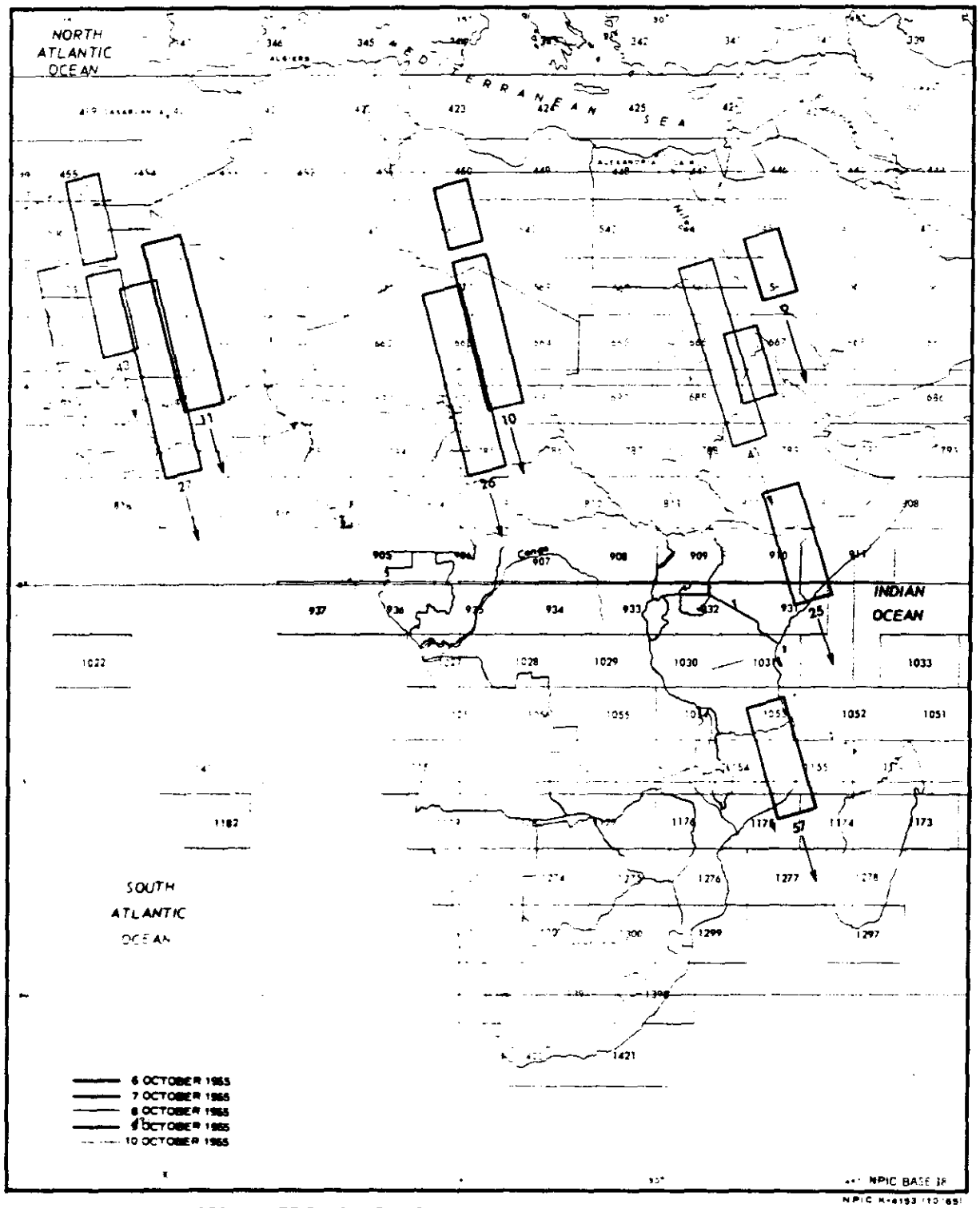
Country	Forward Camera		Aft Camera		TOTALS	
	Linear nm	Square nm	Linear nm	Square nm	Linear nm	Square nm
USSR	6,252	936,892	6,455	966,184	12,707	1,902,876
India	3,119	493,192	3,116	498,774	6,235	991,966
China	2,729	404,336	2,701	400,260	5,430	804,596
Sudan	1,232	193,864	1,348	212,984	2,580	406,848
Mauritania	1,155	189,732	1,131	186,004	2,286	375,736
Chad	725	120,908	921	153,888	1,646	274,796
Australia	769	123,040	769	123,040	1,538	246,080
Mexico	761	119,902	673	110,132	1,434	230,034
Brazil	533	102,336	583	111,936	1,116	214,272
Mali	552	91,048	550	90,716	1,102	181,764
Peru	521	94,822	521	94,822	1,042	189,644
Saudi Arabia	492	46,084	408	45,884	900	91,968
Ethiopia	412	66,460	375	60,244	787	126,704
Mozambique	375	59,390	342	53,384	717	112,774
Indonesia	348	60,552	348	60,552	696	121,104
Bolivia	335	64,320	335	64,320	670	128,640
Tanganyika	294	53,922	377	69,328	671	123,250
Libya	292	47,056	348	55,680	640	102,736
Spanish Sahara	243	39,228	273	41,816	516	81,044
Kashmir	267	41,916	218	34,272	485	76,188
Venezuela	243	40,824	217	36,456	460	77,280
Mongolia	198	30,888	226	35,256	424	66,144
New Guinea	205	25,632	205	29,192	410	54,824
Somali Republic	205	34,440	164	27,552	369	61,992
Kenya	183	30,820	164	27,552	347	58,372
Colombia	178	27,412	167	25,900	345	53,312
Niger	143	23,564	190	31,272	333	54,836
New Britain	155	14,196	155	14,196	310	28,392
Papua	155	16,926	155	16,926	310	33,852
Ecuador	149	27,118	149	27,118	298	54,236
Nepal	86	13,760	141	22,560	227	36,320
Pakistan	82	13,120	144	23,040	226	36,160
N Vietnam	130	20,800	72	11,520	205	32,320
Norway	74	11,840	105	15,200	179	27,040
Finland	74	11,840	70	11,200	144	23,040
Morocco	52	4,960	99	6,400	151	11,360
Alaska US	99	4,480	50	1,600	149	6,080
Ivory Coast	74	12,284	32	5,312	106	17,596
Ceylon	102	6,806	---	---	102	6,806
Cameroon	31	5,208	57	9,576	88	14,784
Laos	55	3,800	31	4,960	86	13,760
Iran	29	4,524	43	2,080	72	6,604
Egypt	31	5,084	41	6,724	72	11,808
[illegible]	[illegible]	[illegible]	28	4,592	71	11,644
[illegible]	[illegible]	[illegible]	32	5,312	69	11,454
[illegible]	41	[illegible]	---	---	41	1,248
Afghanistan	[illegible]	936	12	1,872	46	2,808
[illegible]	18	3,096	---	---	18	3,096
[illegible]	24,284	[illegible]	24,541	3,837,588	48,825	7,600,188
[illegible]	[illegible]	[illegible]	778	106,588	1,393	203,088
[illegible]	[illegible]	[illegible]	25,319	3,944,176	50,218	7,803,276

Mission 1025-2

Country	Forward Camera		Aft Camera		TOTALS	
	Lin nm	Sq nm	Lin nm	Sq nm	Lin nm	Sq nm
China	3,669	566,946	3,766	586,314	7,435	1,153,260
Sudan	2,598	433,496	2,521	438,012	5,109	871,508
Australia	2,146	417,168	2,070	377,892	4,216	795,060
Saudi Arabia	2,046	324,960	1,947	310,400	3,993	635,360
USSR	1,933	299,052	1,955	304,980	3,888	604,032
India	1,612	219,446	1,274	175,658	2,886	395,104
Pakistan	1,424	226,720	1,182	185,280	2,606	412,000
Mongolia	964	150,384	1,057	164,892	2,021	315,276
Mali	934	153,430	938	154,736	1,872	308,166
Iraq	784	124,128	732	115,952	1,516	240,080
Argentina	774	163,676	889	188,580	1,663	352,256
Libya	728	116,936	893	144,688	1,621	261,624
Chad	665	110,248	674	113,004	1,339	223,252
SW Africa	581	103,554	626	112,034	1,207	215,588
Indonesia	535	48,220	592	57,512	1,127	105,732
Tanganyika	446	79,388	436	77,608	882	156,996
Chile	437	95,364	328	71,384	765	166,748
Paraguay	336	65,820	272	53,352	608	119,172
Bolivia	328	62,976	350	67,200	678	130,176
Niger	289	47,770	198	32,868	487	80,638
Algeria	285	46,994	426	70,472	711	117,466
Somali Rep	267	26,880	308	33,600	575	60,480
Cen Af Rep	184	30,912	222	37,296	406	68,208
Congo	156	26,332	--	--	156	26,332
Syria	156	24,648	161	25,438	317	50,086
Nepal	125	20,000	134	21,440	259	41,440
Yemen	123	19,754	39	6,474	162	26,228
Brazil	105	19,790	146	27,324	251	47,114
Bhutan	102	16,320	102	16,320	204	32,640
Afghanistan	80	11,680	474	75,840	554	87,520
Un of S Africa	65	7,722	--	--	65	7,722
Mexico	56	8,848	--	--	56	8,848
Upper Volta	56	9,296	--	--	56	9,296
Uruguay	55	10,890	--	--	55	10,890
Rhodesia	50	8,900	--	--	50	8,900
Denmark	45	1,716	--	--	45	1,716
Sweden	37	936	41	312	78	1,248
Iran	30	4,800	25	4,000	55	8,800
Burma	23	3,680	--	--	23	3,680
Egypt	21	3,444	55	10,560	76	14,004
Kuwait	20	3,200	9	1,440	29	4,640
Nigeria	12	1,992	--	--	12	1,992
Turkey	8	1,248	105	16,478	113	17,726
Angola	--	--	19	3,572	19	3,572
Uganda	--	--	48	4,272	48	4,272
TOTAL	25,280	4,113,604	25,014	4,087,184	50,294	8,206,348
Intercontinental US	960	152,344	1,177	178,952	2,137	324,300
GRAND TOTAL	26,240	4,265,948	26,191	4,266,136	52,431	8,531,148



APPROXIMATE TRACK OF MISSION 1025-1, 6-10 OCTOBER 1965 OVER USSR, FAR AND MIDDLE EAST



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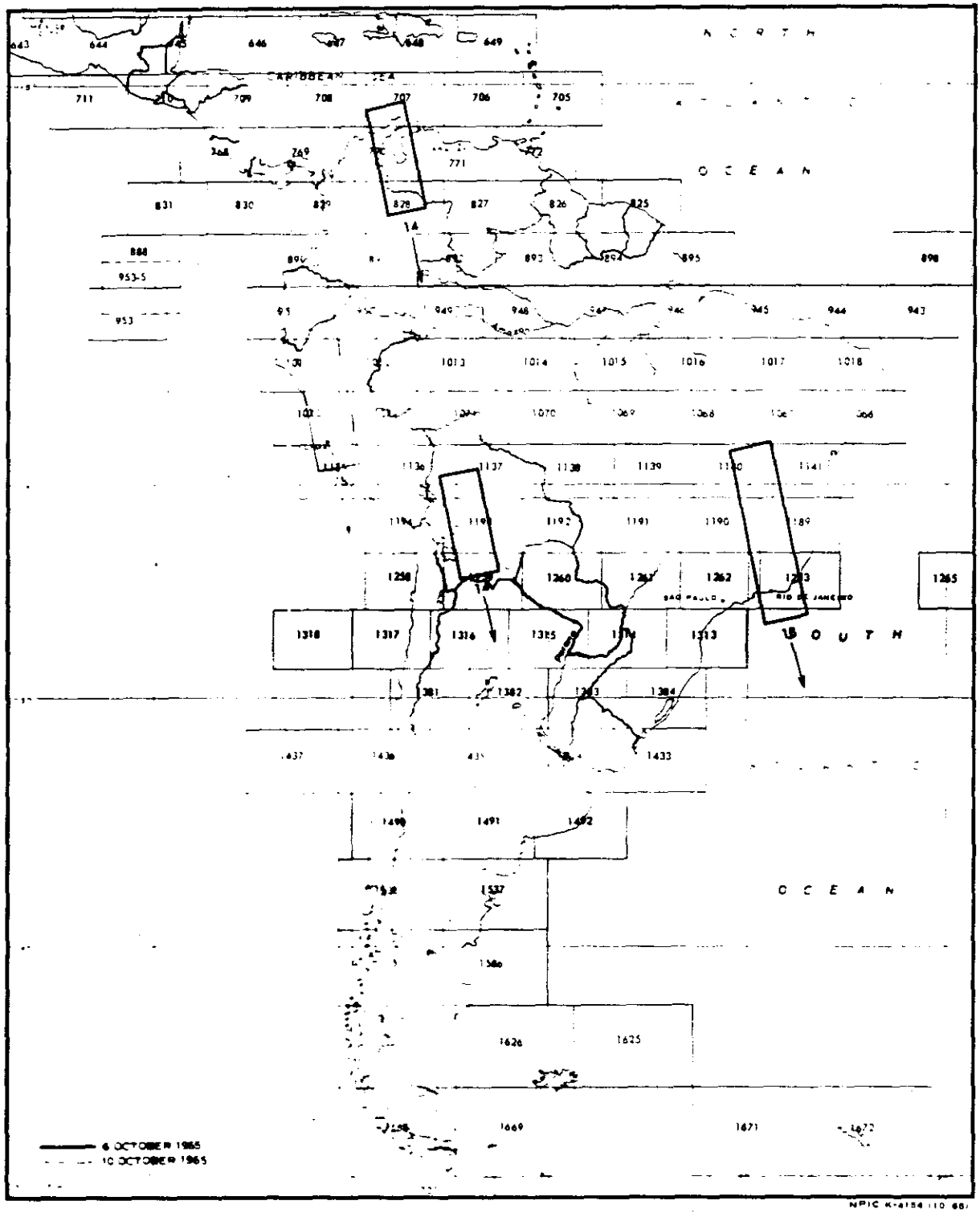
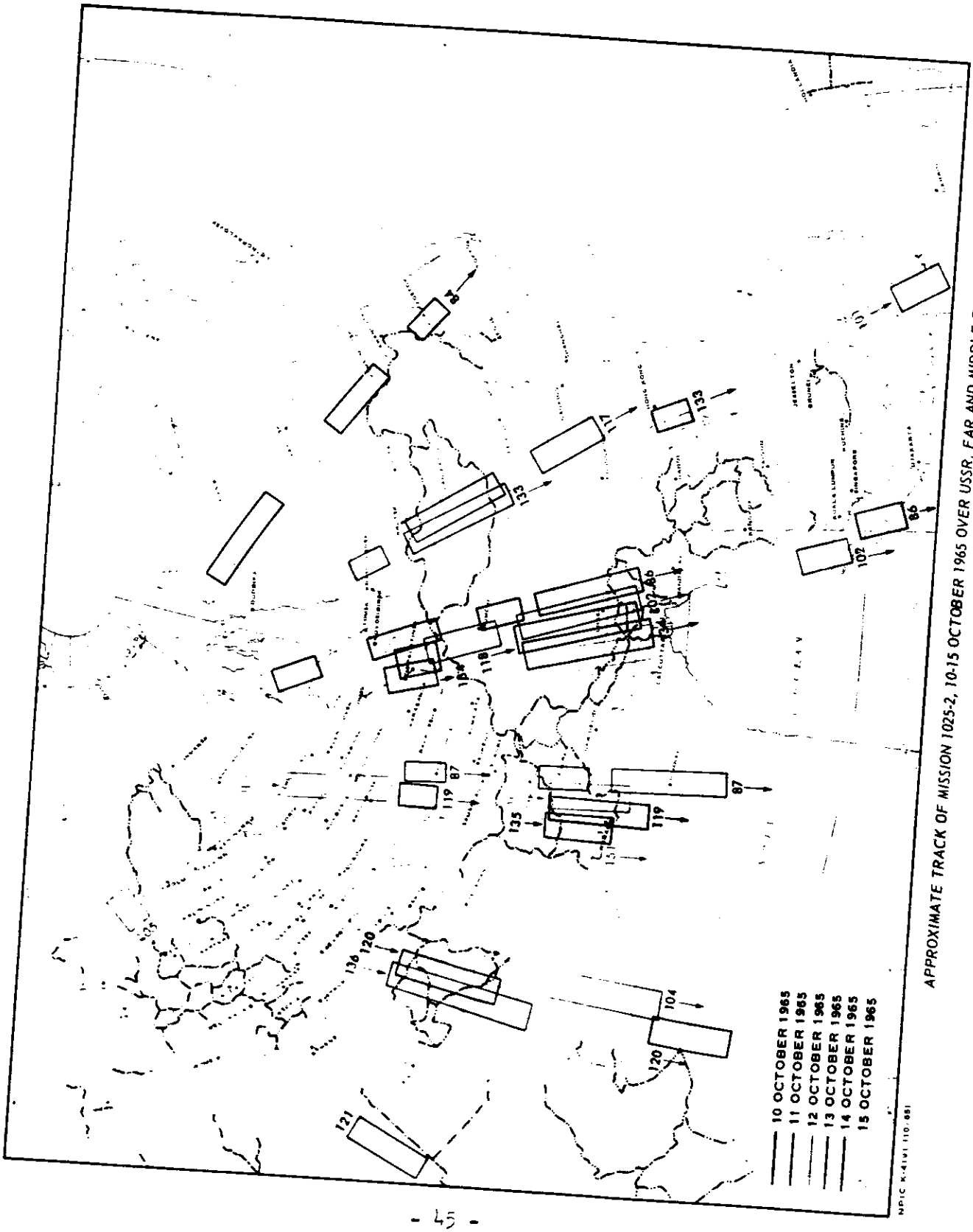
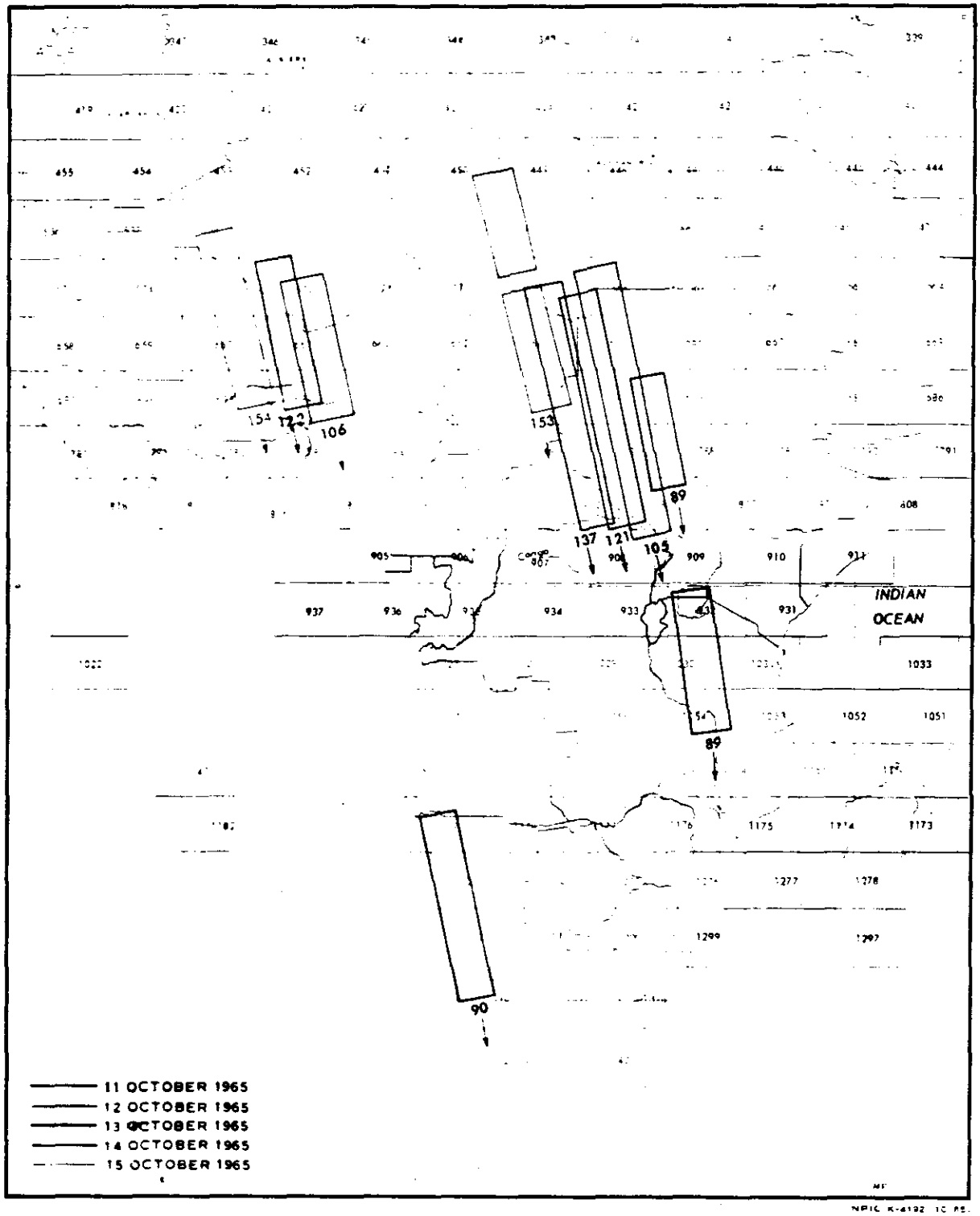


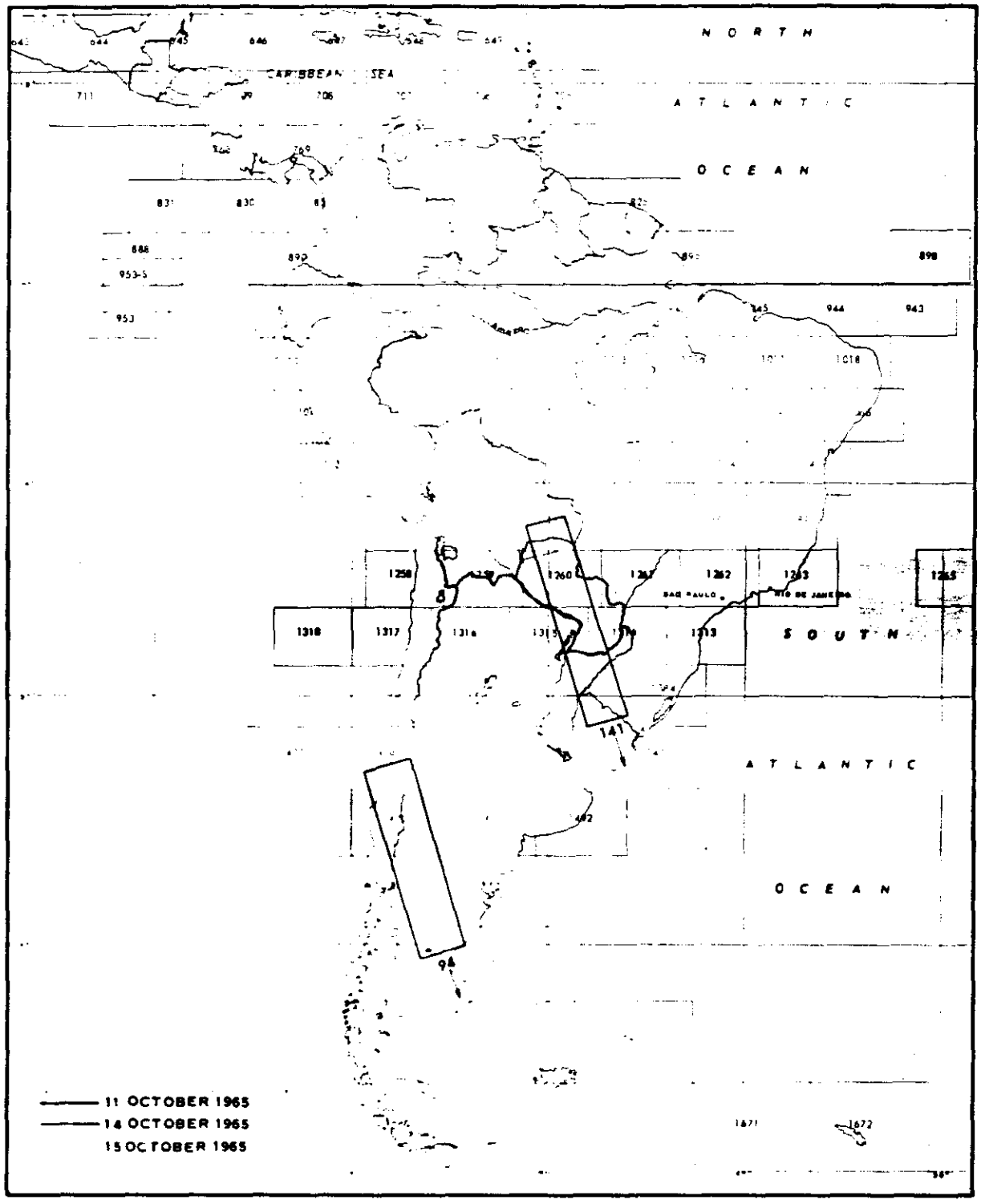
APPROXIMATE TRACK OF MISSION 1025-1, 6-10 OCTOBER 1965 OVER SOUTH AMERICA



APPROXIMATE TRACK OF MISSION 1025-2, 10-15 OCTOBER 1965 OVER USSR, FAR AND MIDDLE EAST



APPROXIMATE TRACK OF MISSION 1025-2, 10-15 OCTOBER 1965 OVER AFRICA



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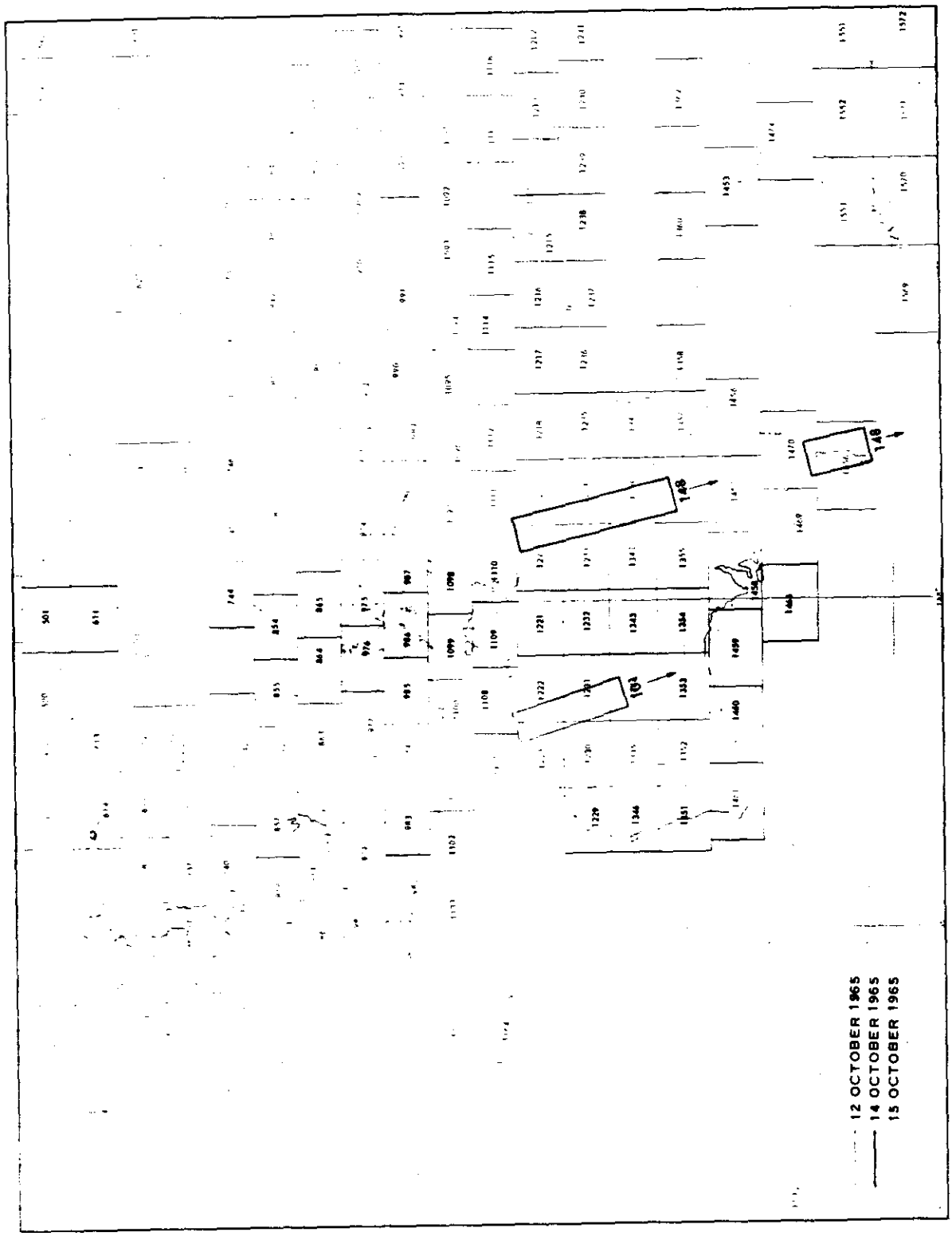
APPROXIMATE TRACK OF MISSION 1025-2, 10-15 OCTOBER 1965 OVER SOUTH AMERICA



APPROXIMATE TRACK OF MISSION 1025-2, 10-15 OCTOBER 1965 OVER AUSTRALIA.