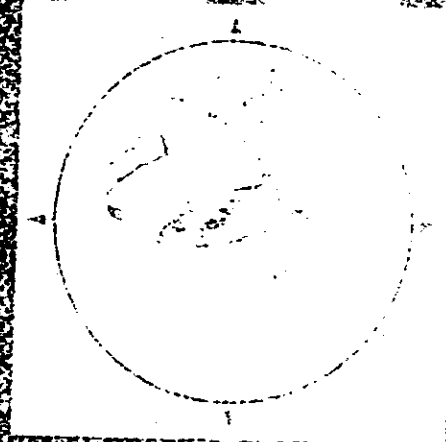


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TECHNICAL PUBLICATION



**PHOTOGRAPHIC
EVALUATION REPORT
MISSION 1016-1
15-20 JANUARY 1965
MISSION 1016-2
21-25 JANUARY 1965**

Declassified and Released by the NRO

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TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT
MISSION 1016-1
15 - 20 JANUARY 1965
MISSION 1016-2
21 - 25 JANUARY 1965

SEPTEMBER 1965

NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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- Figure 25. [Illegible text]
- Figure 26. [Illegible text]
- Figure 27. [Illegible text]
- Figure 28. [Illegible text]

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GENERAL FLIGHT DATA

Date of Launch: 15 January 1965

Actual Orbital Parameters

	<u>Revolution 10</u>	<u>Revolution 110</u>
Period	90.643 min	90.523 min
Perigee	98.721 nm	100. nm
Perigee Latitude	26.559°N	43.4°N
Apogee	235.69 nm	233.4 nm
Eccentricity	0.01898	0.01341
Inclination Angle	74.942°N	74.94°N

Recovery:

Mission 1016-1: 20 January 1965/2357Z

Mission 1016-2: 25 January 1965/2131Z

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PART I. CAMERA OPERATIONS

1. Master (FWD) Panoramic Camera No 132:

The master panoramic camera was operational throughout the mission. The film supply was exhausted during pass 156D and the last frame (16) is a partial frame. The film from the master camera is relatively free of camera-induced degradations throughout both parts of the mission. Brief descriptions of minor degradations which occurred during the mission follow:

a. A light struck area is present at the take-up end of the next-to-last frame in most passes. This area is similar to that present in the last several missions of this series.

b. The sixth-from-end frame on passes 25D through 79D contains a bar-shaped area of fog, extending edge to edge near the center of the format. Fog, associated with the film transport, including equipment shadowgraphs is present on the first and last frames of most passes. A faint band of fog extending from the camera number edge of the film is observed on passes 88AE, 115D, 116D, 118D, 120D, 126D, 131D, 132D, 134D, 140D, 142D, 147D, 149D, and 156D.

c. An intermittent minus density streak is present adjacent to the camera number edge of the format on passes 131D, 132D, 134D, 135D, 140D, 146D, 149D, 150D, and 156D.

d. Some highly reflective images are smeared on the material due to reflections within the camera. A good example of this smearing can be found on pass 57D, frame 39.

e. Plus density spots occur each 3.12 inches along the camera number edge of the film on the first 17 frames of pass 83D. These spots begin 0.56 inch from the film edge and disappear at the edge on frame 17.

f. Plus density bands are present at the start of scan on several passes. These are easily observed in thin density areas such as over water.

g. A small 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 are roughly parallel to the format edges and occur on each frame of photography from the master camera. Numerous fine, short scratches are present across the format under the camera number and adjacent to the take-up end bonus area. These 2 areas of small scratches combined constitute approximately 2.0 square inches on each frame.

2. Slave (AFT) Panoramic Camera No 133:

The slave panoramic camera was operational throughout the mission. The film supply was exhausted during pass 158D and the last frame (13) is a partial frame. The film from the slave camera is relatively free of camera-induced degradations throughout both parts of this mission. Brief descriptions of minor degradations or malfunctions which occur during the mission follow:

a. A light struck area is present at the take-up end of the third frame from the end and/or the supply end of the fourth frame from the end of most passes. This area is similar to that present in the last several missions of this series. The third frame from the end of most passes contains a bar-shaped area of fog, extending edge to edge of the film in the vicinity of the binary word.

b. Scratches similar to those described on the master camera film were also present on the material from the slave camera.

c. Smearing of highly reflective images, as reported on the master material, is also present on the slave material. A good example of this smearing can be found on pass 6D, frame 152.

d. Minus density streaks which follow the path of the field flattener, are present intermittently on passes 2D, 20D, 32D, 34D, 39D, 40D, and 61D. The majority of these occur near the camera number edge of the formats.

e. Very fine (hair-like) emulsion cracks, possibly due to film mistracking, occur intermittently along the camera number edge of the film on the first 16 photographic passes.

3. Horizon Cameras:

All horizon cameras were operational throughout the mission. The overall photographic quality is good. The starboard looking frames of photographic passes that begin in the northernmost latitudes were underexposed on approximately the first 20 frames. Examples of these underexposures are on passes 39D, 40D, 117D, 118D, and 149D. Density varied according to the solar elevation.

4. Stellar Camera No D55 (Mission 1016-1):

The stellar camera was operational throughout the mission. There are 411 titled frames of photography. A total of 37 star images in the field were used during this mission for attitude determination. Most stellar frames contain streaked and elongated images, which appear dumbell shaped. This degradation caused some difficulty in attitude determination. Stellar reduction did not agree as well as usual with the horizon camera attitude results. The image distortions may be partially attributed to a shutter blade hesitation anomaly. Flare effects approximately 55 percent of each format.

5. Stellar Camera No D59 (Mission 1016-2):

The stellar camera was operational throughout the mission. There are 433 titled frames of photography. As in the first part of Mission 1016 a total of 37 star images in the star field were used for attitude determination. A possible shutter anomaly (blade hesitation) resulted in overexposure of all frames. This added to the difficulty experienced in attitude determination in Mission 1016-1. The correlation fiducial is slightly bloomed at each exposure. Flare patterns appear to be less than usual, possibly due to the density of the photography minimizing the effects of the flare.

6. Index Camera No D55 (Mission 1016-1):

The index camera was operational throughout the mission. The photographic quality is good. There are 411 titled frames of photography.

7. Index Camera No D59 (Mission 1016-2):

The index camera was operational throughout the mission. The photographic quality is good. There are 433 titled frames of photography.

8. Associated Equipment:

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

Anomalies which occurred on this mission include:

The camera-off indicator was imaged twice on the last frame of each slave camera operation. At times one of these indicators is imaged in the binary word. The slave panoramic camera number and binary index lamp did not appear on the last frame of camera operations except passes 30D, 71D, and 100D. The binary lamps appeared faint throughout the mission. This presented machine difficulties resulting in delays of the binary word readout. Horizon camera fiducial lamps appeared faint or were non-existent on most of the last frames of camera operations that had corresponding horizon camera formats.

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 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 counter-clockwise 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.

6b



FIGURE 2. PHOTOGRAPH SHOWING GOOD IMAGE QUALITY, MASTER CAMERA.

11 PIC N 4794 (8/68)

Note the degrading effects of industrial smoke.

6c



Camera 132 (FWD)
Pass 37D
Frame 120
Date of Photography 18 January 65
Universal Grid Coordinates 42.7 . 10:6
Enlargement Factor 20X
Geographic Coordinates 30-43N 114-30E
Altitude (feet) 604,543
Camera:
Pitch 14° 29'
Roll 20° 34'
Yaw 1° 15'
Local Sun Time 1227
Solar Elevation 38° 32'
Solar Azimuth 172°
Exposure 1/269 sec
Vehicle Azimuth 165° 16'



Approximate flight direction
on photograph

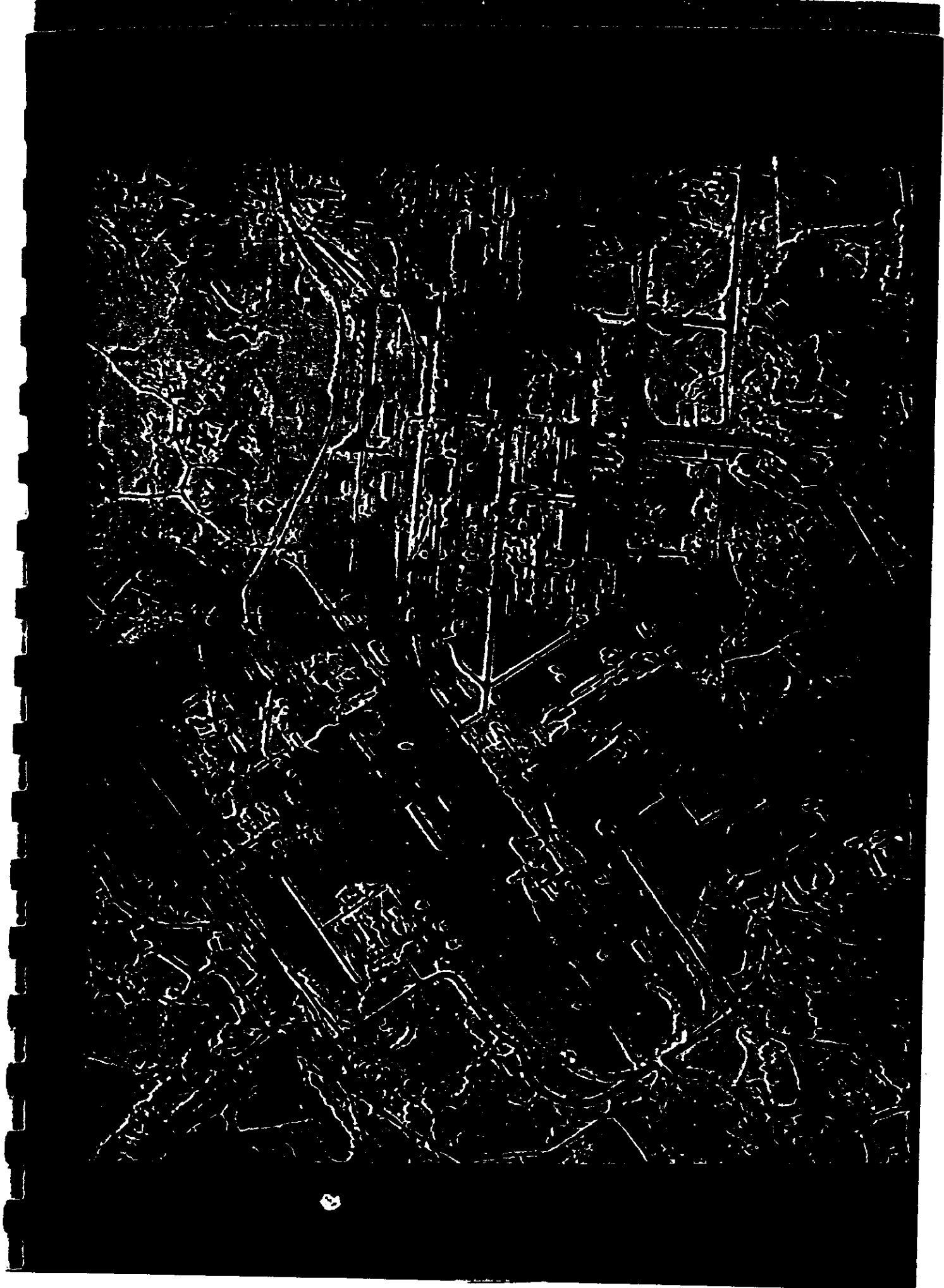


Approximate scan direction
on photograph

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



6d



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