

NASA SP-206

LUNAR ORBITER PHOTOGRAPHIC ATLAS OF THE MOON

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Prepared by Langley Research Center



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Foreword

In July of 1969 the United States landed two men on the Moon and safely returned them to Earth in response to the challenge set forth by President John F. Kennedy at the beginning of the decade. That response required the marshaling of hundreds of thousands of persons in an intensive effort to resolve a host of substantial problems, some of which required extension of the existing limits of human knowledge. Among the major problems was the determination of the nature of the lunar surface. Could it support a manned spacecraft, and what were the possibilities of finding sufficiently smooth sites for the landings? The early lunar exploration program of NASA, which was based on the use of unmanned spacecraft, was designed to provide answers to these questions and also to provide a wealth of scientific data.

The Lunar Orbiter program, designed to obtain detailed photographs of potential Apollo landing sites, was a significant part of this exploration program. The program was managed by the Langley Research Center, with The Boeing Co. as prime contractor and Radio Corp. of America and Eastman Kodak Co. as major subcontractors. Five spacecraft were placed in lunar orbit from 1966 to 1967, and photographs covering landing sites and specific areas of high scientific interest were sent back to Earth. The last flight completed the photographic survey of the entire surface. A selection of these photographs, covering all the lunar surface, both front and back, is collected in this Atlas and shows greater surface detail than has previously been available from any source. This store of information is presented as a base for planning future exploration of Earth's nearest neighbor and also to stimulate interest in further scientific study of the Moon.

The undersigned, who were program manager and spacecraft manager, respectively, of the Lunar Orbiter program, take this opportunity to acknowledge the outstanding contributions of the many individuals from companies, universities, and Government organizations who contributed to the success of the program; to them we dedicate this atlas.

CLIFFORD H. NELSON
ISRAEL TABACK

LANGLEY RESEARCH CENTER
Hampton, Va.

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Introduction

During 1966 and 1967 the National Aeronautics and Space Administration launched five Lunar Orbiter spacecraft to obtain photographs from orbit of the surface of the Moon. The reconstructed photographs and support data are now on file at the National Space Science Data Center (NSSDC), Goddard Space Flight Center, Greenbelt, Md. The purpose of this Atlas is to present a selection of these photographs which provides essentially complete coverage of the near side and far side of the Moon in greater detail than any publication now in existence.

A summary of the five missions is given in table 1 (p. 19). The first three spacecraft essentially satisfied the primary objective to obtain high-resolution photographs of proposed Apollo landing sites. The fourth spacecraft systematically photographed the near side of the Moon and the fifth spacecraft completed the far-side coverage. The primary emphasis was not only to support the Apollo program but also to provide more detail in many areas that have been studied from Earth-based observations. At the average spacecraft altitude of about 3000 km for the photographs contained herein, the resolutions of the two cameras were approximately 500 meters and 65 meters; whereas under favorable conditions, Earth-based photography of the Moon can reveal details only as small as 500 to 1000 meters.

All the Lunar Orbiter photographs have been reprocessed from the original video data tapes. Special attention was given to the Atlas photographs to insure high quality and uniformity of appearance. They are presented here as 300-line-per-inch halftone reproductions (plates 1 to 675). The halftone negatives were prepared by the Army Topographic Command (TOPOCOM). The Lunar Orbiter photographs have been referenced to the lunar surface by a complete set of index maps which permit identification of those photographs showing a particular site or area. The Apollo

zone photographs and the Atlas photographs have also been referenced separately by two additional sets of index maps. The index maps were prepared by the Aeronautical Chart and Information Center (ACIC). An alphabetical listing of prominent lunar features is given which will aid in the location of these features within the Atlas. A bibliography has also been included to refer the interested reader to additional information on the results of the program.

Lunar Orbiter Spacecraft

The Lunar Orbiter spacecraft is shown in flight configuration in figure 1. Detailed information regarding the spacecraft can be obtained from documents cited in the bibliography. Since the photography cannot be fully interpreted without an understanding of its origin, the photographic subsystem is herein discussed in detail.

PHOTOGRAPHIC SUBSYSTEM

The primary elements of the photographic system (fig. 2) were a dual-lens camera, a film processor, and a readout system. The 80-mm focal-length lens provided an angular coverage of 44.4° by 38° . The 610-mm focal-length lens photographed a small area, centered within this field, with an angular coverage of 20.4° by

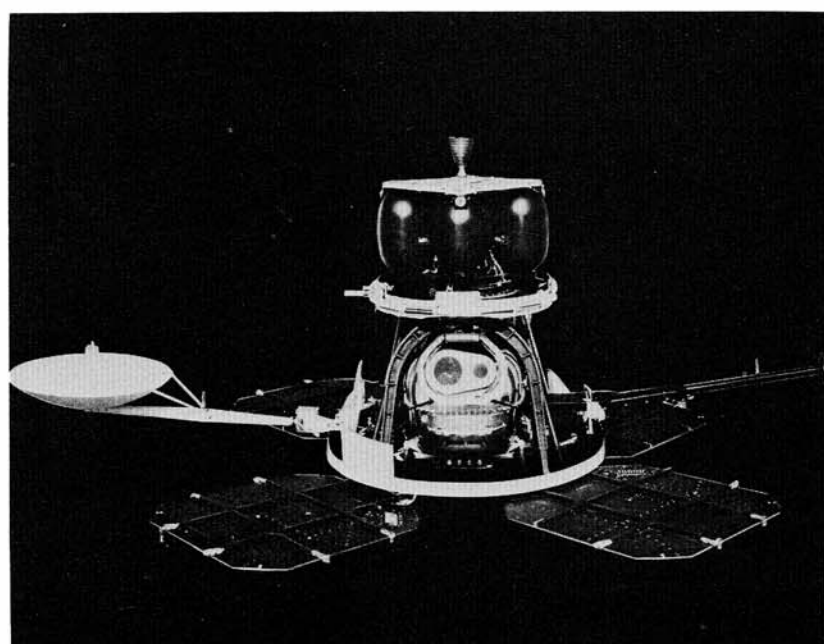


FIGURE 1.—Lunar Orbiter spacecraft in flight configuration.

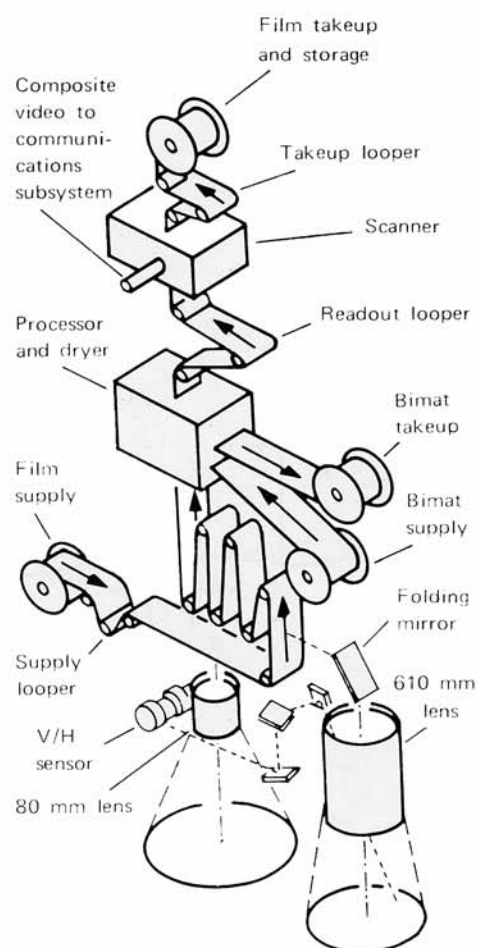


FIGURE 2.—Photographic subsystem.

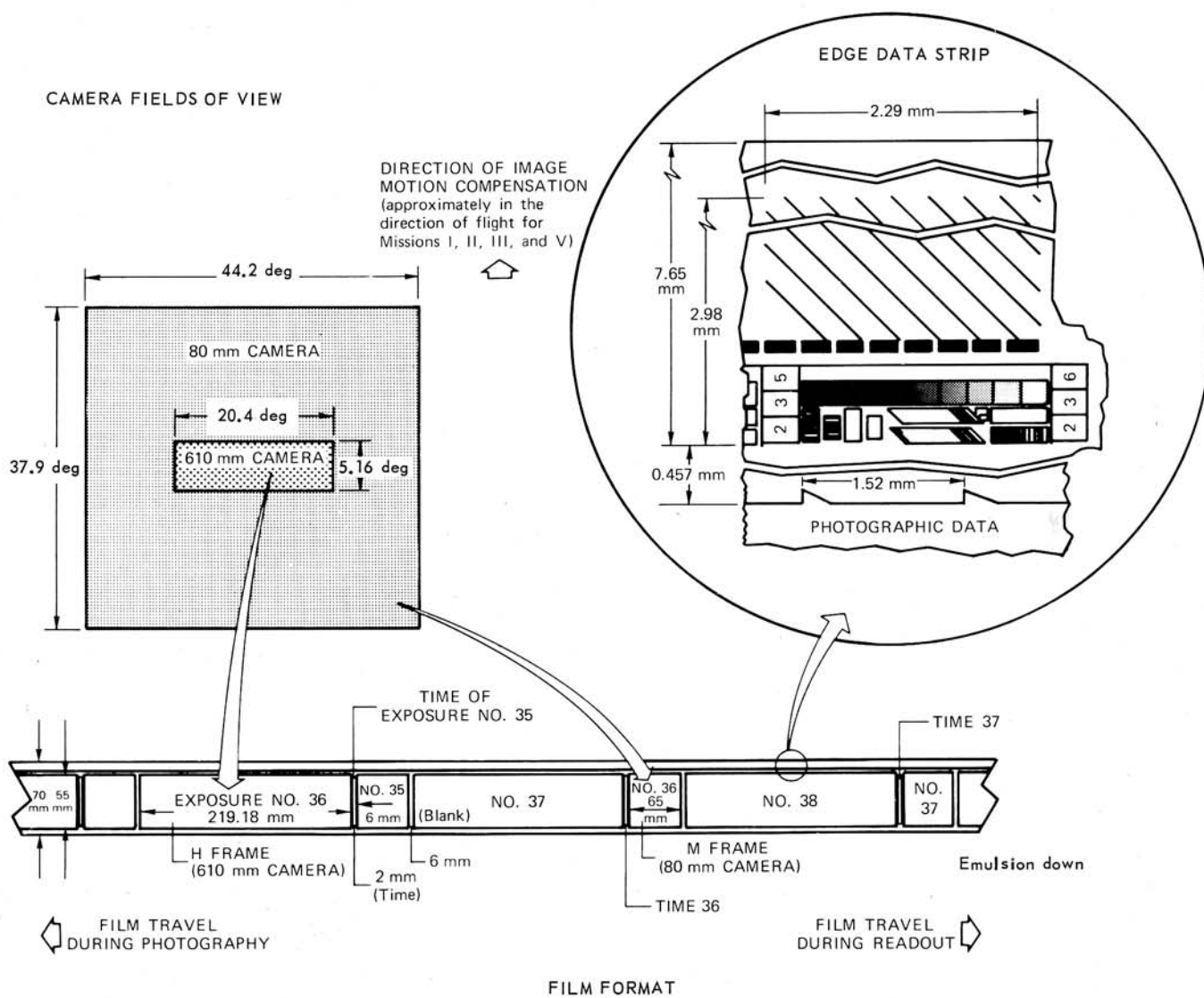


FIGURE 3.—Spacecraft film format.

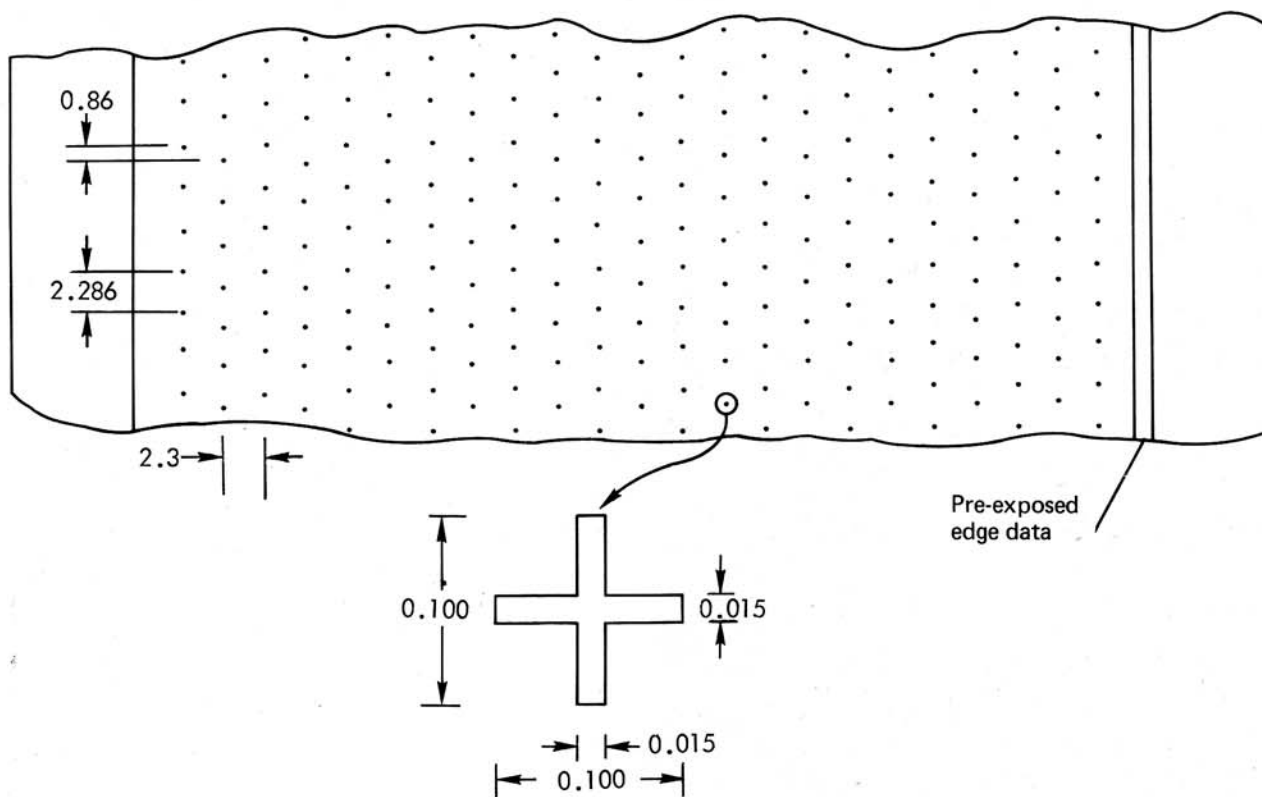


FIGURE 4.—Preexposed geometric pattern for Lunar Orbiters III, IV, and V. Dimensions are in millimeters.

5.16°. (See fig. 3.) To distinguish between the two exposures, those made with the 610-mm focal-length lens are referred to as high-resolution frames (or H frames) and those made with the 80-mm focal-length lens, medium-resolution frames (or M frames).

The photographs were interlaced on a single strip of Kodak high-definition aerial film, type SO-243, 70 mm wide and 80 meters long, as shown in figure 3. The SO-243 film was selected because it is relatively insensitive to radiation and, although its aerial exposure index of 1.6 is slow compared with that of other emulsions, it has an extremely fine grain structure. At a contrast ratio of 3 to 1, the angular line-pair resolutions of the recovered photographs were 34 and 4.4 seconds of arc, respectively, for the medium- and high-resolution cameras. Prior to use, the edges of the film were preexposed with framelet numbers, a 9-level gray scale, and resolving power charts. A geometric pattern (fig. 4) was preexposed on the spacecraft film of Lunar Orbiters II to V at the same time as the edge data. This pattern aided in the detection of and compensation for distortion introduced by the processing, readout, and ground reproduction systems. The folding mirror in the optical path of the 610-mm focal-length lens caused reversal of the high-resolution images with respect to the medium-resolution images. This condition resulted in the edge data being turned over when the film was printed in reverse to give properly oriented pictures.

Essentially, both lenses opened simultaneously at a fixed aperture of $f/5.6$. Timing lights which encoded the exposure time were recorded on the film. A between-the-lens shutter was used with the 80-mm focal-length lens; a double-curtain focal-plane shutter, with the 610-mm focal-length lens. Shutter speeds of 0.04, 0.02, and 0.01 second were selectable by transmitted commands. Photographs could be taken as single exposures or in 4-, 8-, or 16-exposure sequences, both the sequence and the time between successive exposures being selectable. Multiple-frame sequences gave an overlap in the direction of flight.

The film was held in the focal plane by film clamps and vacuum which held it flat against the platens during exposure. The platens moved the film during exposure to eliminate image smear caused by the rapid movement of the spacecraft over the lunar surface at low altitudes. The platen velocity, which provided the image motion compensation (IMC), was regulated by a mechanical linkage to an image-motion-sensing device, the velocity-height (V/H) sensor. The V/H sensor optically locked on to the image of the lunar surface through the high-resolution lens and caused the platens of each camera to move at the velocity of its image.

In a normal photographic sequence, the spacecraft was oriented to the correct attitude, the lenses were uncovered by the opening of a thermal door on the spacecraft, the V/H sensor was activated, and the camera was turned on. After the "camera-on" command, the cameras operated in an automatic sequence to: (1) clamp the film to the platen and draw it flat by differential pressure, (2) start moving the platens in synchronization with the image motion, (3) open the shutters for simultaneous exposures, (4) return the platens to the rest position, and (5) advance the film for the next exposure. This sequence was repeated until all photographs commanded were taken.

After exposure, the film was held in the camera storage looper. The storage looper (fig. 2) consisted of a series of fixed rollers in a stationary carriage and a series of rollers in a movable carriage which rode on a track. As film entered the looper, a spring caused the movable carriage to move away from the fixed carriage; thus, a storage capacity for up to 6 meters (≈ 20 ft) of film was provided.

Upon completion of a photographic sequence, a processor dryer, on command, processed film from the storage looper at a rate of 6.09 cm (2.4 in.) per minute. Processing was accomplished by pressing the film into contact with Kodak dry Bimat transfer film, type SO-111. Kodak Bimat film consists of a normal film base coated with a gelatin layer presoaked with a special mono-

bath processing solution. The solution both developed and fixed the photographic image during the 3.4 minutes the exposed film and Bimat film were in contact on the processing drum. Processing temperature was closely controlled at 29.5° C.

The exposed film and Bimat film were then separated, the Bimat film going to a takeup spool and the developed film to a dryer drum. The film was in contact with the dryer drum for 11.5 minutes at a temperature of 35° C. Moisture driven from the film by the heat of the dryer drum was absorbed by special chemical salts in pads around the dryer; thus a controlled humidity environment was maintained in the photographic subsystem. After leaving the dryer, the film was transported through the readout storage looper and readout mechanism and stored on a takeup spool. The film was then ready for readout.

At the completion of all photography, the procedure was to cut the Bimat film and read out all the photographs by running the film in reverse and taking it up on the film supply reel. Because of limitations on the number of frames that could be scanned per orbit, this procedure required about 2 weeks. However, throughout the mission the readout storage looper provided the capability of reading the last four exposed frames for priority return of important data and for monitoring system performance.

The readout section (fig. 5) consisted of a line scan tube, a photomultiplier tube, and the associated optics and electronics. In the line scan tube, a spot of light, 112 microns in diameter, generated by the electron beam moved linearly across the face of a revolving phosphor drum. Rotation of the drum avoided local overheating of the phosphor, but it did not affect the orientation of the line. The spot was focused by the scanner lens and projected as a reduced image, 6.5 microns in diameter, onto the film where it moved 2.67 mm horizontally in one direction (the return trace was blanked out). The scanner lens moved continuously at right angles to the film edge. The result was a complete scan of a "framelet" consisting of 16 359 parallel scan lines, each 2.67 mm long, across 57 mm of the 70-mm film. At the completion of a framelet, the film was advanced 2.54 mm to allow for an overlap before making the next scan in the reverse direction across the film. A complete dual-exposure frame, 298 mm long, required 117 framelets.

The light passing through the film, modulated by image density, was sensed by a photomultiplier tube through the associated light-collector optics. An electrical signal proportional to the intensity of the transmitted light was generated, amplified, and transmitted to the ground receiving station. The received video signal was sent to the ground reconstruction electronics (GRE) where it was converted to a line scan on a kinescope tube. The variations in light intensity on this kinescope tube corresponded to the variations in image density on the spacecraft film.

The line on the kinescope tube was recorded on moving 35-mm Kodak television recording film, type SO-349. The image on the

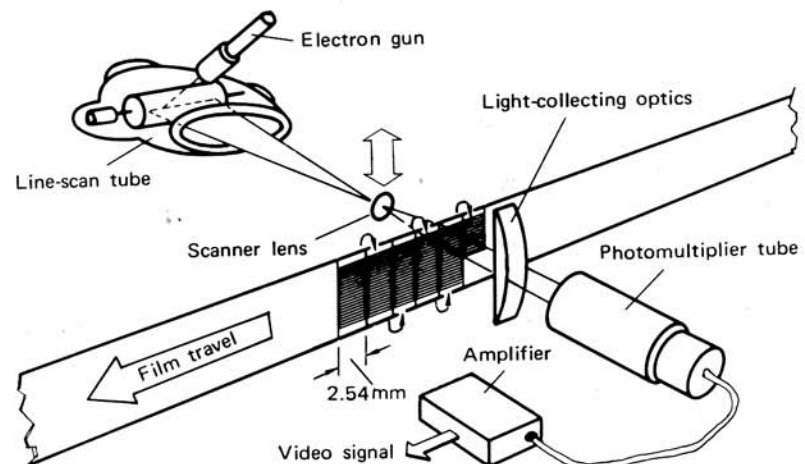


FIGURE 5.—Readout scanner.

35-mm film was 7.2 times the size of the image on the spacecraft film. After processing, this positive image film was run through a film cutter to remove excess film and the individual framelets were separated. The framelets were then laid side by side on stable-base polyester film to reconstruct the original photograph. Master negatives were made from these positives.

A full medium-resolution photograph was reconstructed from approximately 27 framelets and measured 47 cm by 40 cm. The high-resolution photograph consisted of approximately 86 framelets and measured 158 cm by 40 cm. Because this size was unwieldy, the practice was to assemble high-resolution frames into three sections. Photographic reassembly is illustrated in figure 6.

IMPERFECTIONS

Certain imperfections may be observed in some of the photographs. These imperfections are directly traceable to the method of film development, the readout system, the video data, or the GRE system.

Most photographs are not perfectly rectangular. This distortion was caused by a misalignment of the line-scan tube with respect to the mechanical scan direction. When the projected line was not perpendicular to the scan direction during readout, and the kinescope trace in the GRE system was perpendicular to the edge of the 35-mm film, then a noticeable tilt could be observed when successive framelets were laid side by side to reconstruct a complete frame.

Many framelets appear to have light and dark stripes running parallel to their edges. This effect was due primarily to an inherent nonuniformity in the light output of the scan system in the spacecraft that caused a variation in light intensity and affected the video signal level during a scan across the width of a framelet. Ideally, the level should be constant for a constant film density.

In some photographs small-scale streaks appear as bright white lines (see plate 297) parallel to the framelet edge. This condition was caused by phosphor granularity in the GRE kinescope tube.

The Bimat technique introduced several development imperfections that are scattered throughout many of the frames. Bimat stop lines (shown in plate 75) and Bimat pull-off lines (shown in plate 144) result from anomalous development conditions which occurred at the entrance to and exit from the development system. Two oval-shaped spots (shown in plate 92) appear near the center of the film and are associated with the location of the Bimat stop line; they follow it by about 10.7 cm (4.2 in.). "Lace" (shown in plate 116) appears as a spotted area of unprocessed film arranged in a random manner. The areas vary in size and location on the film and do not follow any pattern. Because of overlapping photography, the amount of data lost by these processing defects is small; their main effect is the spoiling of the appearance of the photographs.

Various other minor imperfections are scattered throughout the photographs. Occasionally, momentary dropout of the video modulation on the transmitted carrier caused extremely fine white lines to appear in the framelets (shown in plate 573). In plate 2 there appears to be an area of double exposure. This condition was caused by a failure of the film to advance completely after a photograph was taken; as a result, a medium-resolution image overlaps a high-resolution image. A few photographs (such as plate 344) have a blurred or out-of-focus appearance that was a result of water vapor condensing on the camera window. Once the problem was recognized, it was eliminated by closer control of the window temperature.

ENHANCEMENT

Although the electronic nature of the photographic system introduced undesirable defects in the photographs, it also allowed for flexibility during reconstruction. An important example was

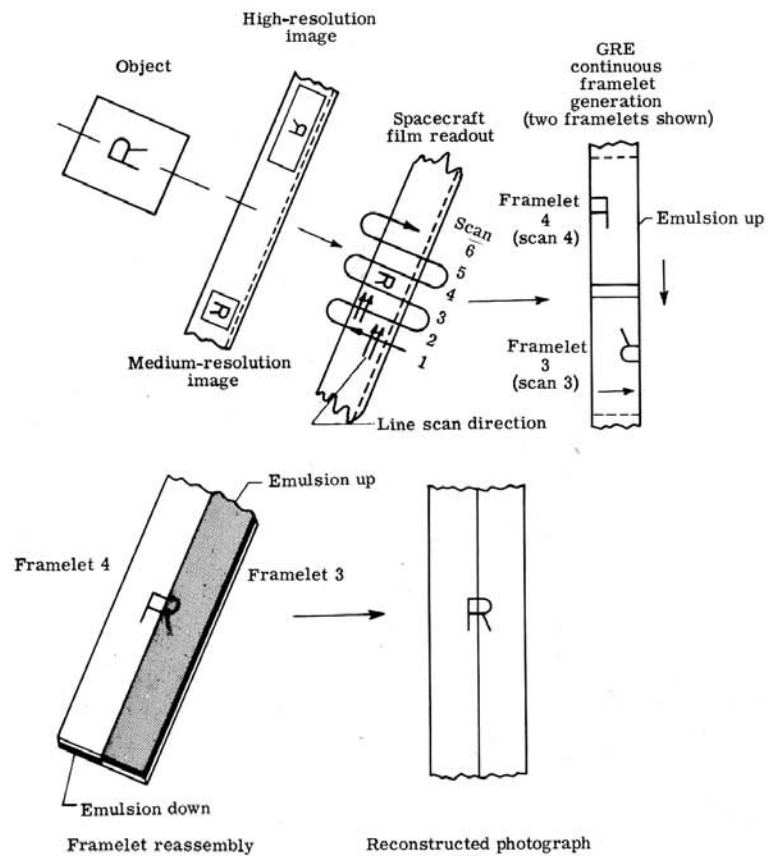


FIGURE 6.—Photographic reconstruction procedure. Not to scale.

adjusting for overexposure often evident in the bright areas of the medium-resolution photographs. By amplifying the video signal during reconstruction, photographic detail, lost by normal processing, was retrieved.

In addition to the electronic enhancement techniques often employed during reconstruction, photographic dodging techniques were used (in the production of the negatives) to compensate for large density variations within the photographs. The enhancement process, although it increases the information content of the photographs, distorts the photometric fidelity. It is therefore not advisable to draw conclusions based on a comparison of photographic density.

Lunar Orbiter Photographs

A listing of the support data required to analyze the Atlas photographs is contained in table 2. Additional information may be found in the references cited in the bibliography. The positional data are subject to possible future revision. The terms presented in the support data are defined in this section (in the order given in the table). Figure 7 illustrates the geometry of these parameters.

Although the primary purpose of this Atlas is to present a complete photographic coverage of the near and far sides of the Moon, an index of all Lunar Orbiter photographs has been included. Figures 8 and 9 (p. 8-13) include mercator and polar projections which display the lunar-surface outlines of photographs from the five missions. The concentration of photography in the Apollo landing zones required the front-side equatorial region to be displayed in greater detail to avoid confusion. Any photograph in this Atlas can be located by means of these maps, and the maps also show whether additional photographs are available for any specific area of interest.

An index of the photographs presented in this Atlas is given in figure 10. (A few Mission I and Mission IV photographs are not given, either because the photography is oblique, only part of the frame is available, or they are redundant; they are I-35, I-37, I-39, I-102, I-117, IV-39, IV-45, IV-46, IV-51, IV-54, IV-55, IV-56, IV-61, IV-99, IV-123, IV-178, IV-184, and IV-192.)

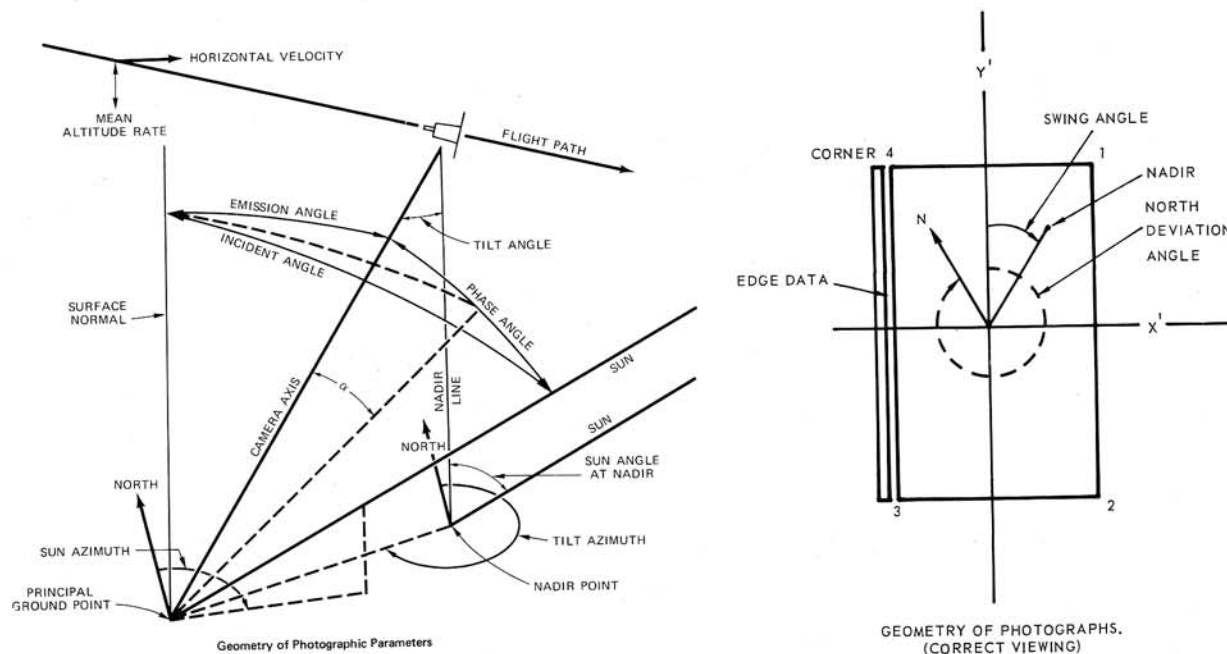


FIGURE 7.—Photographic geometry.

DEFINITION OF TERMS

- Plate number—sequential order of presentation in the Atlas from 1 to 675.
- Frame number—sequential order of exposure on a given mission.
- Spacecraft radius—distance from the center of the Moon to the spacecraft.
- Spacecraft altitude—distance of the spacecraft above the mean lunar surface; a spherical moon is assumed with a radius of 1738.09 km.
- Longitude (latitude) of nadir point—selenographic longitude (latitude) of the point on the Moon's surface directly below the spacecraft.
- Mean altitude rate—rate of change of altitude with respect to time.
- Horizontal velocity—component of the spacecraft velocity perpendicular to a lunar radial line through the spacecraft and in the direction of the flightpath.
- Tilt azimuth—azimuth of the principal ground point from the spacecraft nadir.
- Emission angle—angle between the camera axis and the surface normal at the principal ground point, a level surface being assumed.
- Tilt angle—angle between the camera axis and the spacecraft nadir line.
- Swing angle—angle between the cross-axis of film frame (the Y' -axis) and a line from the center of the frame to the image of the nadir point (measured positive clockwise from the positive Y' -axis).
- North deviation angle—direction on the photograph of the north vector at the camera axis, measured clockwise from the Y' -axis, which is parallel to the 2-1 and the 3-4 sides of the frame.
- Sun angle at nadir—angle between the spacecraft nadir line and the Sun's rays.
- Phase angle—angle between the camera axis and the Sun's rays.
- Sun azimuth at principal ground point—azimuth of the Sun's rays at the principal ground point, measured clockwise from north.
- Sun arc at nadir—arc length (km) from the nadir point to the intersection on the lunar surface of the Moon center to the Sun centerline.
- Alpha—angle between the camera axis and the projection of surface normal into the phase angle plane.

- Incidence angle (Sun angle on photographs)—angle between the surface normal and the Sun's rays at the principal ground point.
- Tilt distance—distance from the image of the principal ground point to the image of nadir point measured on the spacecraft film (given for both high- and medium-resolution frames and computed at the scale of the spacecraft film).
- Resolution constant—theoretical or geometrical ground resolution of the medium-resolution photographs (in meters). The resolution constant is equal to the slant range along the camera axis, in km, divided by 46 and multiplied by 7.62. The value for the high-resolution photograph is smaller by a factor of 7.62.
- Principal ground point—intersection of the camera axis with the lunar surface.
- Slant distance—distance from the spacecraft camera to the principal ground point.
- Corner coordinates—selenographic coordinates of the corners of ground coverage by each photograph.

LUNAR FEATURES

To facilitate the location of the principal named lunar features, an alphabetical listing is provided in table 3 identifying the feature, the plate on which it can be found, and the corresponding Lunar Orbiter photograph number. The associated Lunar Aeronautical Chart (LAC) published by the Aeronautical Chart and Information Center, U.S. Air Force, St. Louis, Mo., is referenced. The LAC charts are based on telescopic observation and may be updated by use of Lunar Orbiter photographs.

These charts were of great assistance in locating features on Lunar Orbiter photographs. Where charts were not available, Kuiper's "Rectified Lunar Atlas" was used. Table 3 by no means covers all identifiable features, only about 450 of the most prominent features. Catalogs (see bibliography) prepared by the Lunar and Planetary Laboratory, University of Arizona, list approximately 7000 features and give selenographic coordinates and other pertinent data.

The areas covered by the high-resolution photographs are typically too small to include all, or even most, of a mare. Accordingly, the maria are not specifically identified and located on the high-resolution photographs; they are indicated only on the medium-resolution photographs. Since identification of the maria is helpful in obtaining the proper perspective, these areas are identified on many more photographs than are referenced in table 3.

PRESENTATION AND ARRANGEMENT OF ATLAS PHOTOGRAPHS

The photographs (plates 1 to 675) are reproduced in 300-line-per-inch halftones at 55 percent GRE scale. They are oriented with north at the top of the page. Because of different orientations of the spacecraft, the edge data may appear on either the right or left margin. Several of the support parameters useful in interpreting the photographs are given in the lower margin. Each high-resolution photograph is presented in three sections. Because of the unequal lengths of the sections, the center coordinates given at the bottom of the photographs are located only approximately in the center of the middle section (designated H2). An approximate scale is provided to help in estimating the size of the prominent lunar features; for comparison, the width of a framelet is approximately 1 cm. The alphanumeric coordinates of major features are given at the bottom of each photograph.

For quick reference as to location, a sketch of a lunar globe with a cartographic coordinate system is included with each photograph. The centers of medium-resolution photographs are indicated on the globe by a cross. The outline of the entire high-resolution photograph is drawn on the globe with the particular section darkened.

The sequence in which photographs are presented in this Atlas has no relationship to a specific mission or the order in which exposures were made on each mission. Rather, a plan similar to that used by ACIC in their LAC charts and Kuiper in the "Rectified Lunar Atlas" was adopted. The Moon is viewed with north at the top. The near and far sides are treated separately. Beginning with the near side, the photographs are presented by starting at the northwestern limb, sweeping to the right to the

northeastern limb, then moving southward, and repeating the procedure. The result is six bands running west to east. The same left-to-right procedure was used on the far side, although the coverage was not as orderly and symmetrical. The medium-resolution photograph is generally presented first, always on a left-hand page, followed by the three sections of the corresponding high-resolution photograph. The reference globe in the lower outside edge of the page permits rapid location of a plate showing a particular area.

In a few cases, medium-resolution photographs were significantly degraded and are not included. To maintain an orderly sequence, however, intentional blank pages have been substituted. No data are lost by the omission, since these areas are adequately covered in adjacent photographs.

AVAILABILITY OF LUNAR ORBITER PHOTOGRAPHS

The halftone prints within this Atlas do not reproduce all the detail in the original photographs. For some uses it may therefore be desirable to obtain prints from the original negatives. Prints may be obtained from the NSSDC in Greenbelt, Md. The standard format is approximately 50 x 60 cm (20 x 24 in.) (GRE scale); other formats, such as microfilm, are available. For further information on availability, inquiries should be addressed to—

National Space Science Data Center
Code 601-4
Goddard Space Flight Center
Greenbelt, Md. 20771

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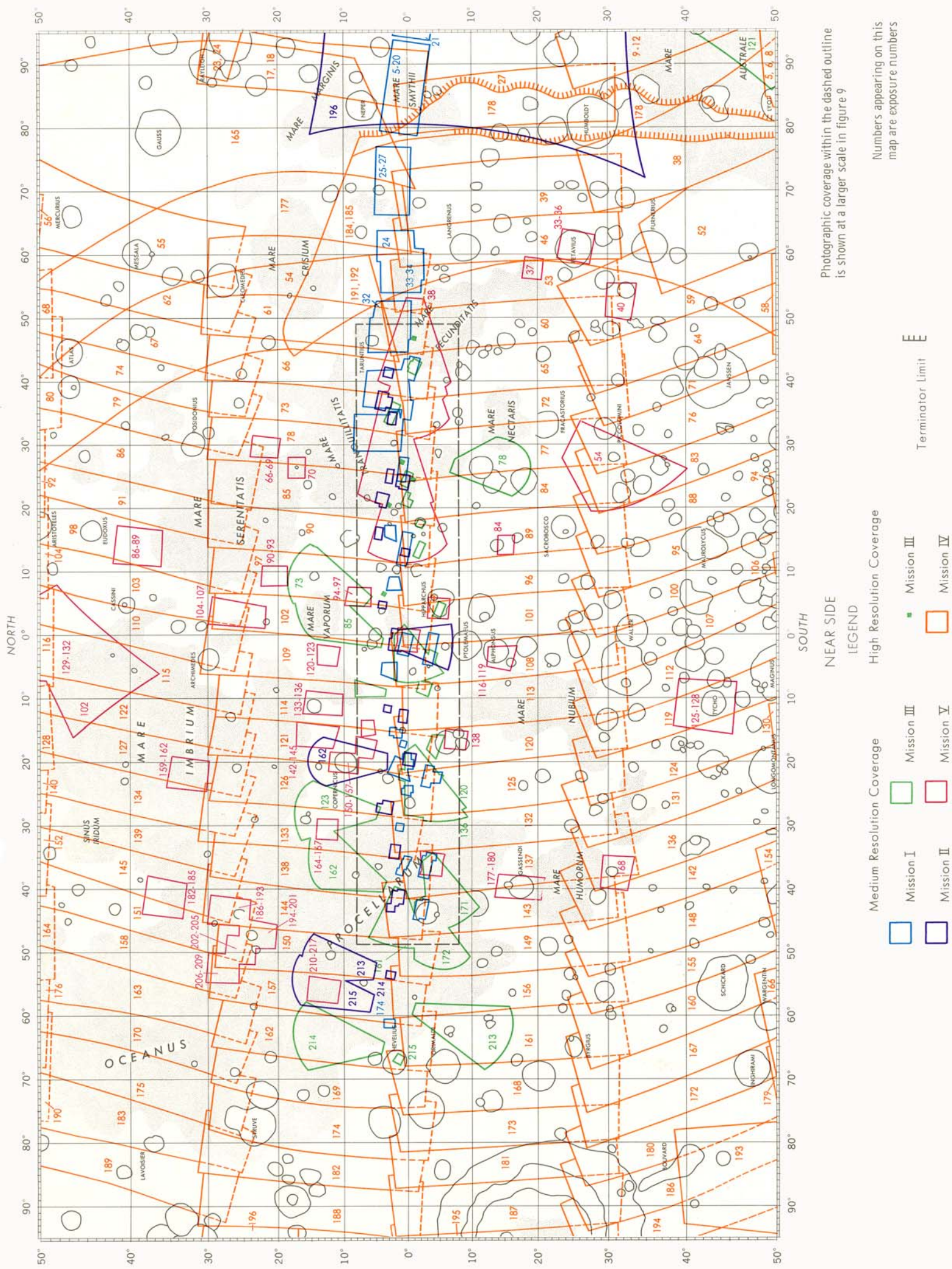
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LUNAR ATLASES

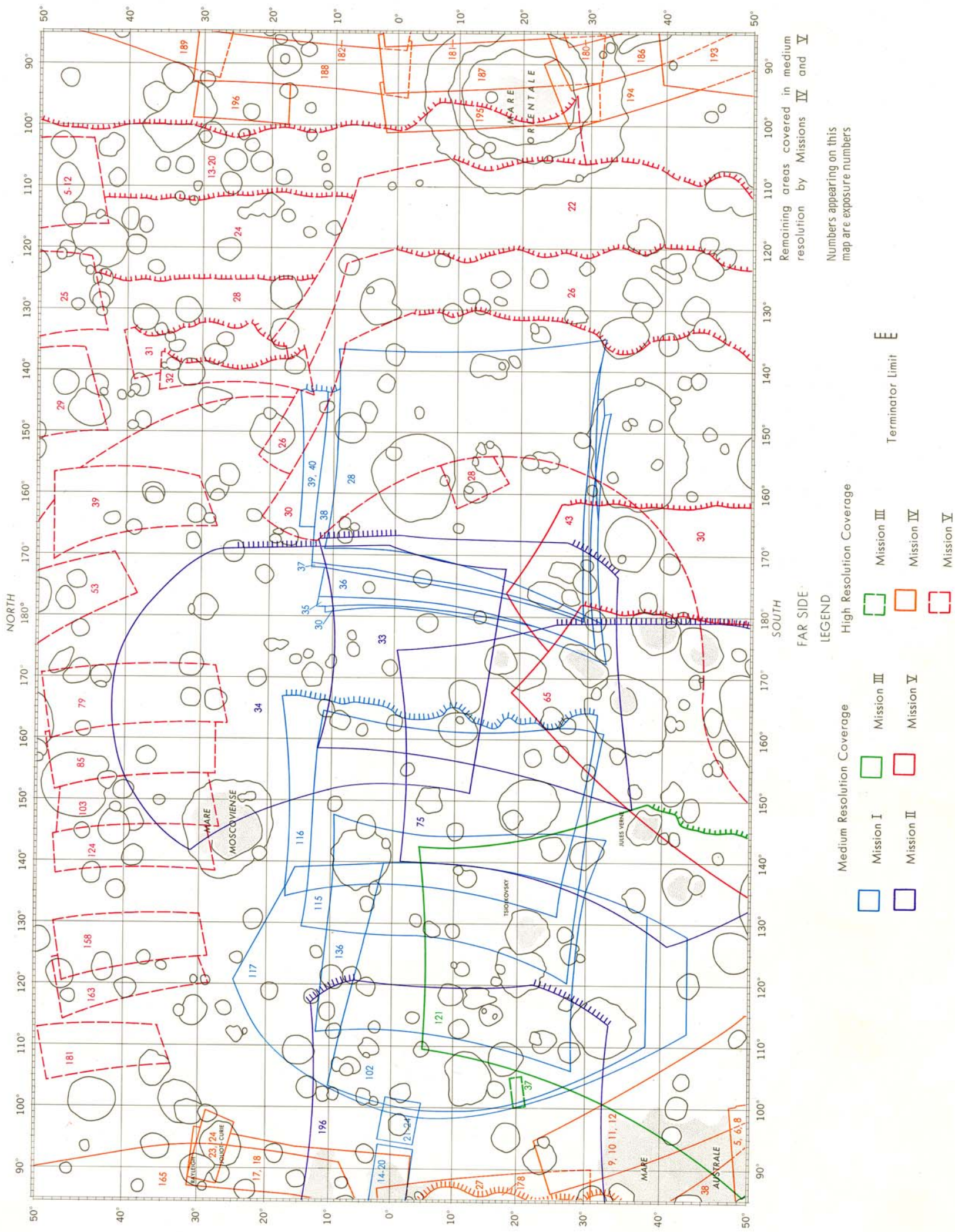
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(a) Equatorial zone, near side.
 FIGURE 8.—Index map of all Lunar Orbiter photographs.



Remaining areas covered in medium resolution by Missions IV and V

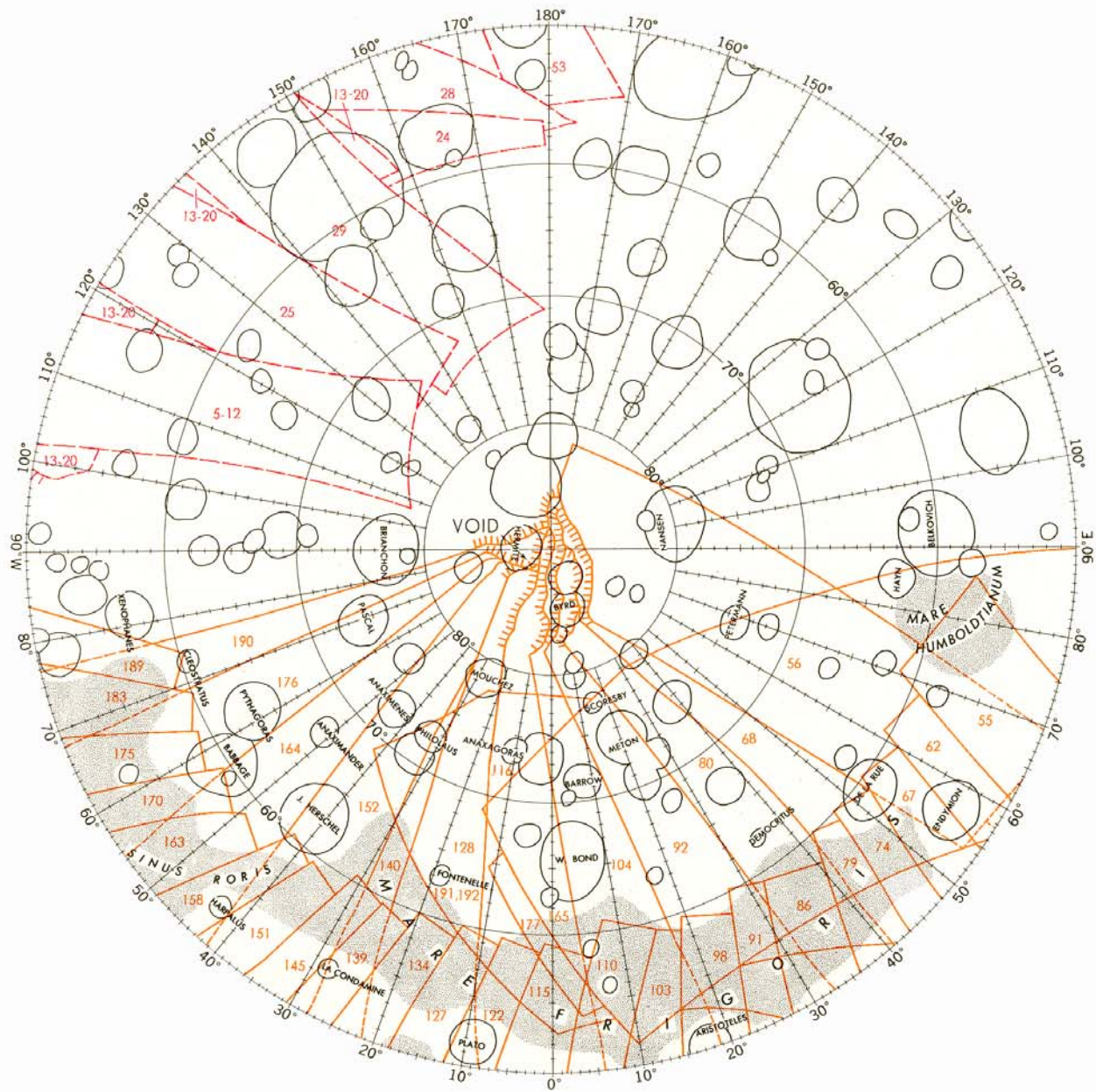
Numbers appearing on this map are exposure numbers

FAR SIDE

LEGEND

Medium Resolution Coverage	High Resolution Coverage
Mission I	Mission III
Mission II	Mission IV
	Mission V
	Terminator Limit

NORTH POLAR REGION



LEGEND

High Resolution Coverage



Mission IV

Terminator Limit

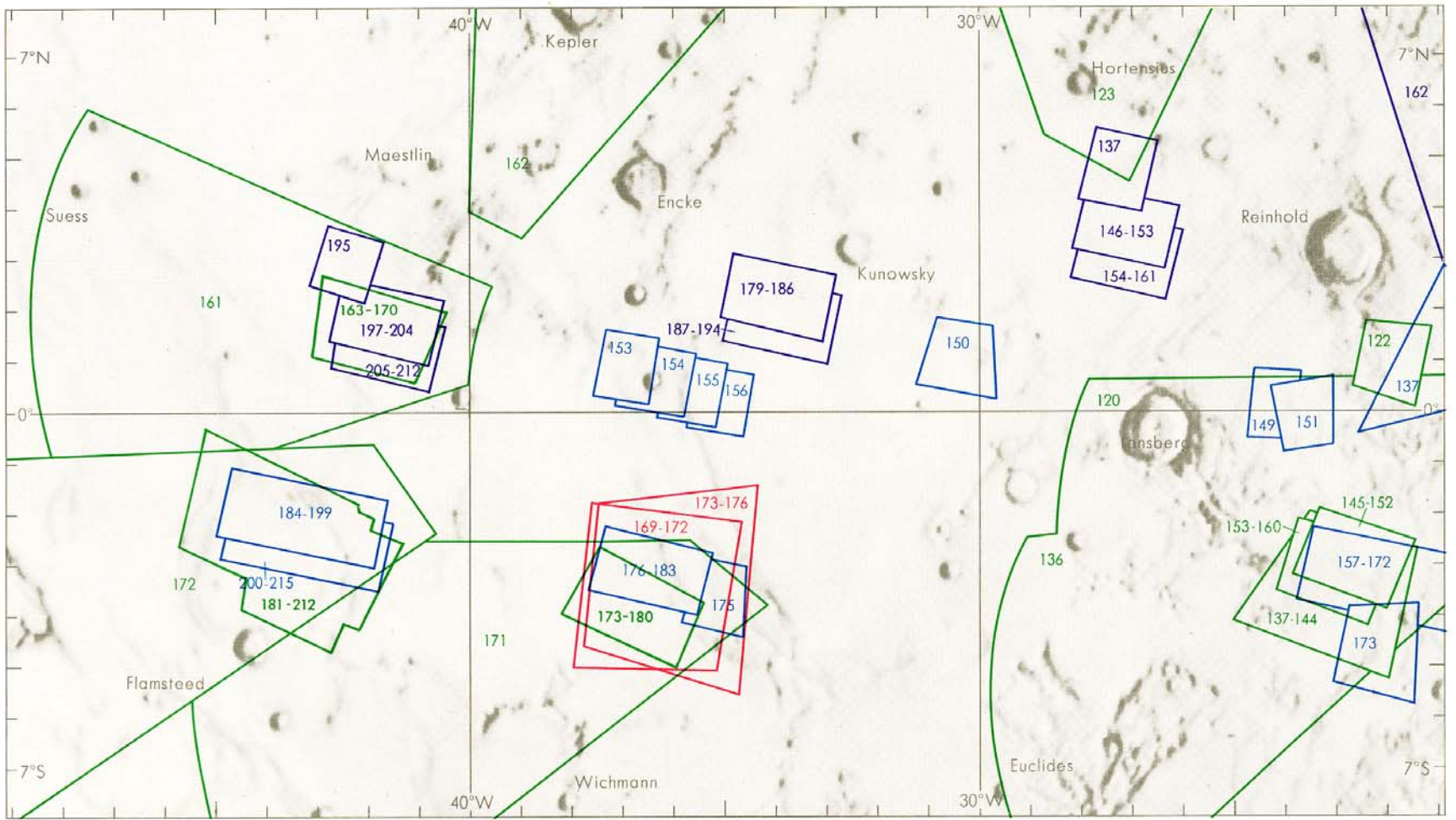


Mission V

Remaining area covered by Missions IV & V medium resolution.

(c) North polar region.

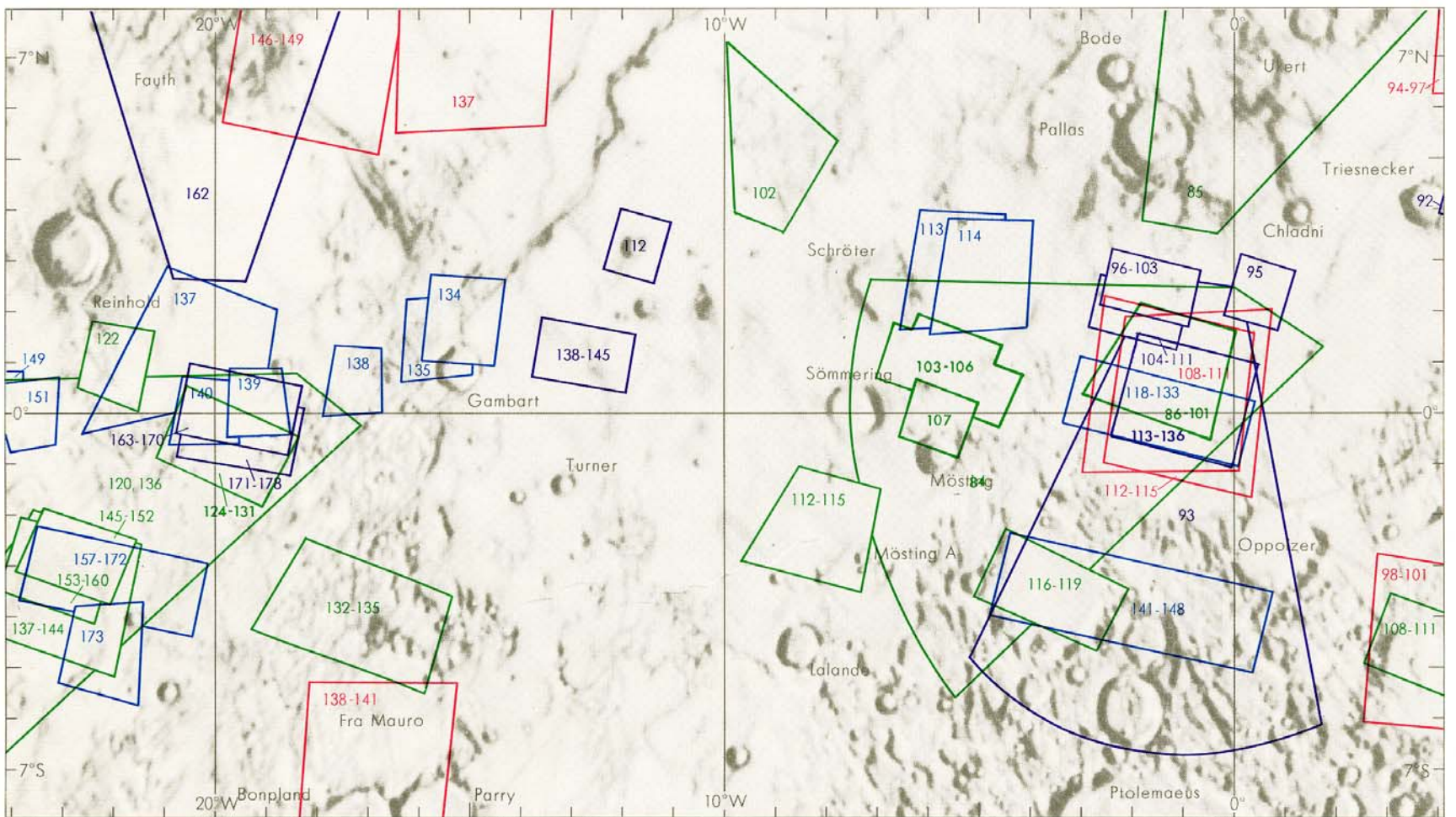
FIGURE 8.—Index map of all Lunar Orbiter photographs.—Continued.



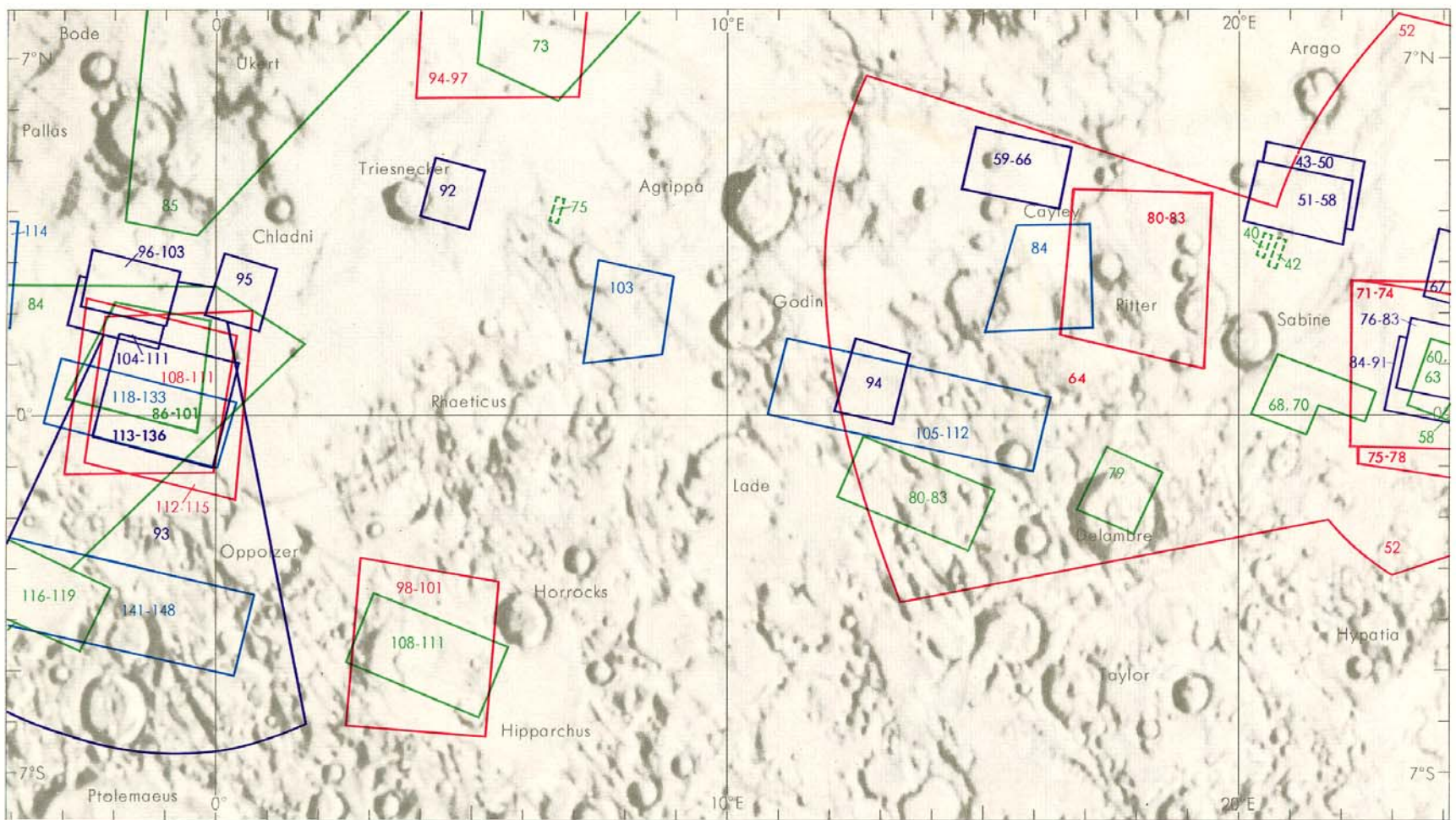
Medium Resolution Coverage

 Mission I	 Mission III
 Mission II	 Mission V

Numbers appearing on this map are exposure numbers



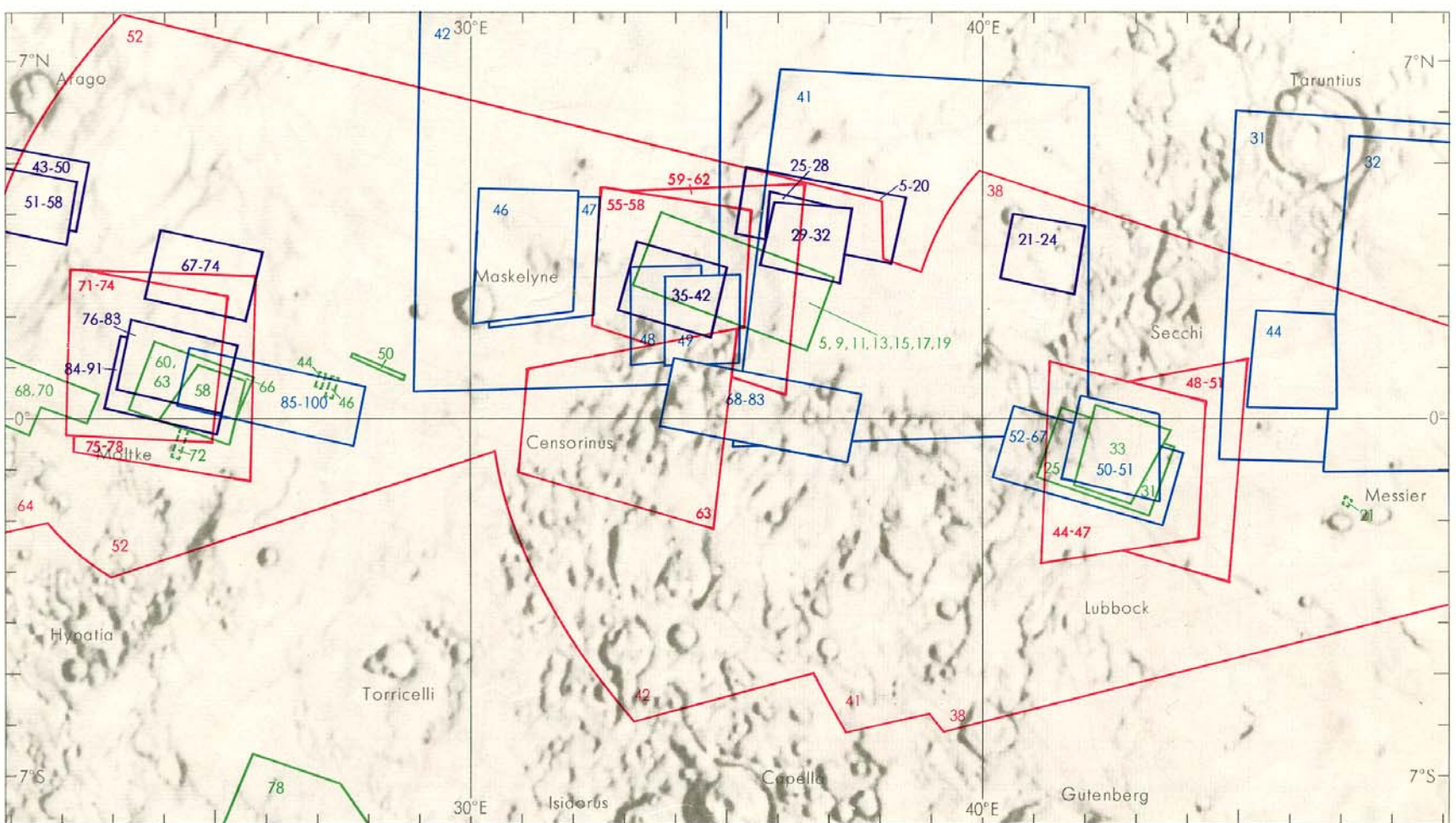
(a) West (top) and West Central (bottom) sections.
 FIGURE 9.—Index map of Apollo zone photographs.



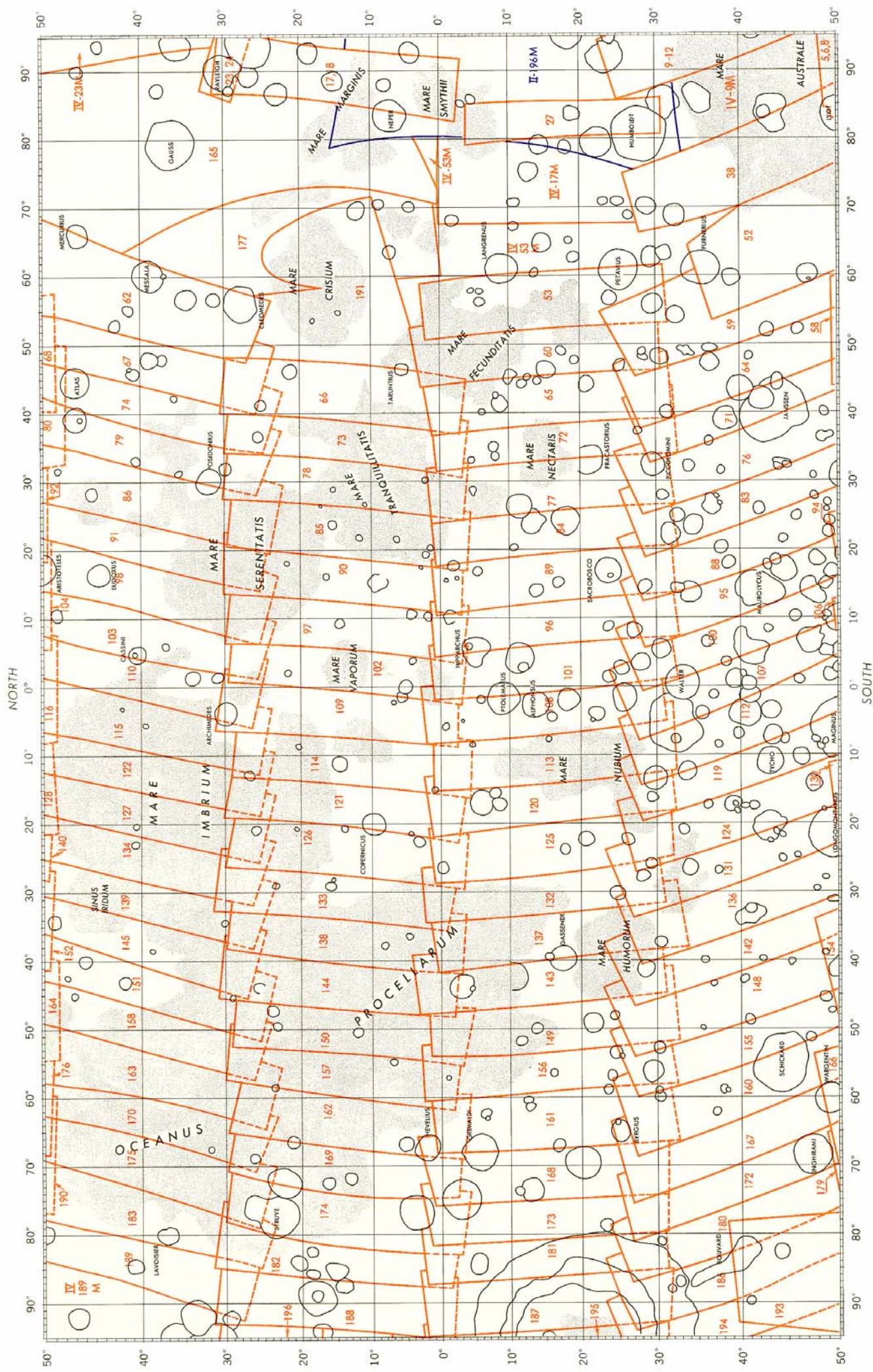
Medium Resolution Coverage High Resolution Coverage

□ Mission I □ Mission III □ Mission III
□ Mission II □ Mission V

Numbers appearing on this map are exposure numbers



(b) East Central (top) and East (bottom) sections.
 FIGURE 9.—Index map of Apollo zone photographs.—Concluded.

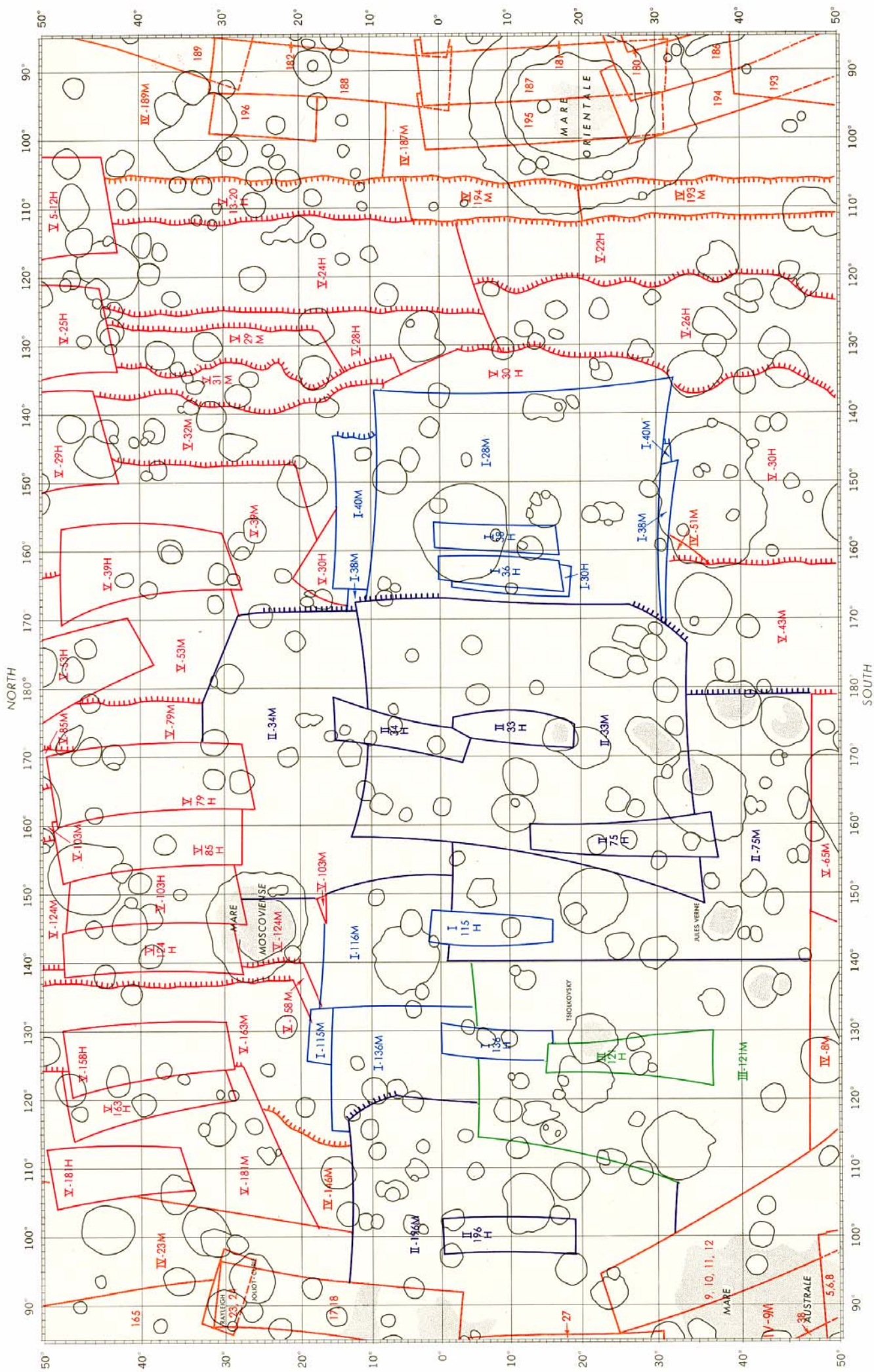


Several Atlas photographs are not shown in this figure. Refer to the text for a listing.

LEGEND

- Mission III
- Mission IV

(a) Equatorial zone, near side.
 FIGURE 10.—Index map of Atlas photographs.

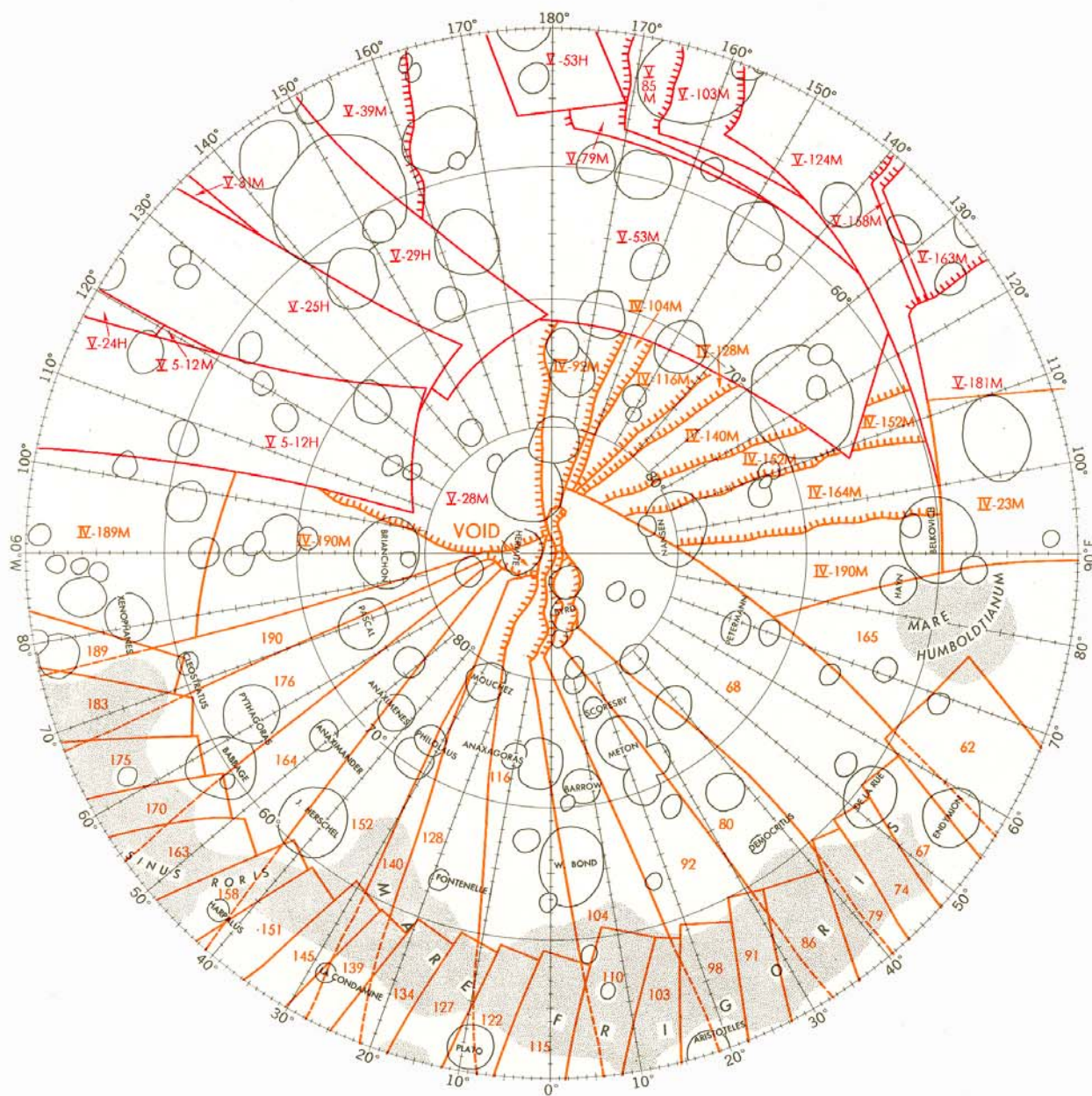


Several Atlas photographs are not shown in this figure. Refer to the text for a listing.



(b) Equatorial zone, far side.
 FIGURE 10.—Index map of Atlas photographs.—Continued.

NORTH POLAR REGION



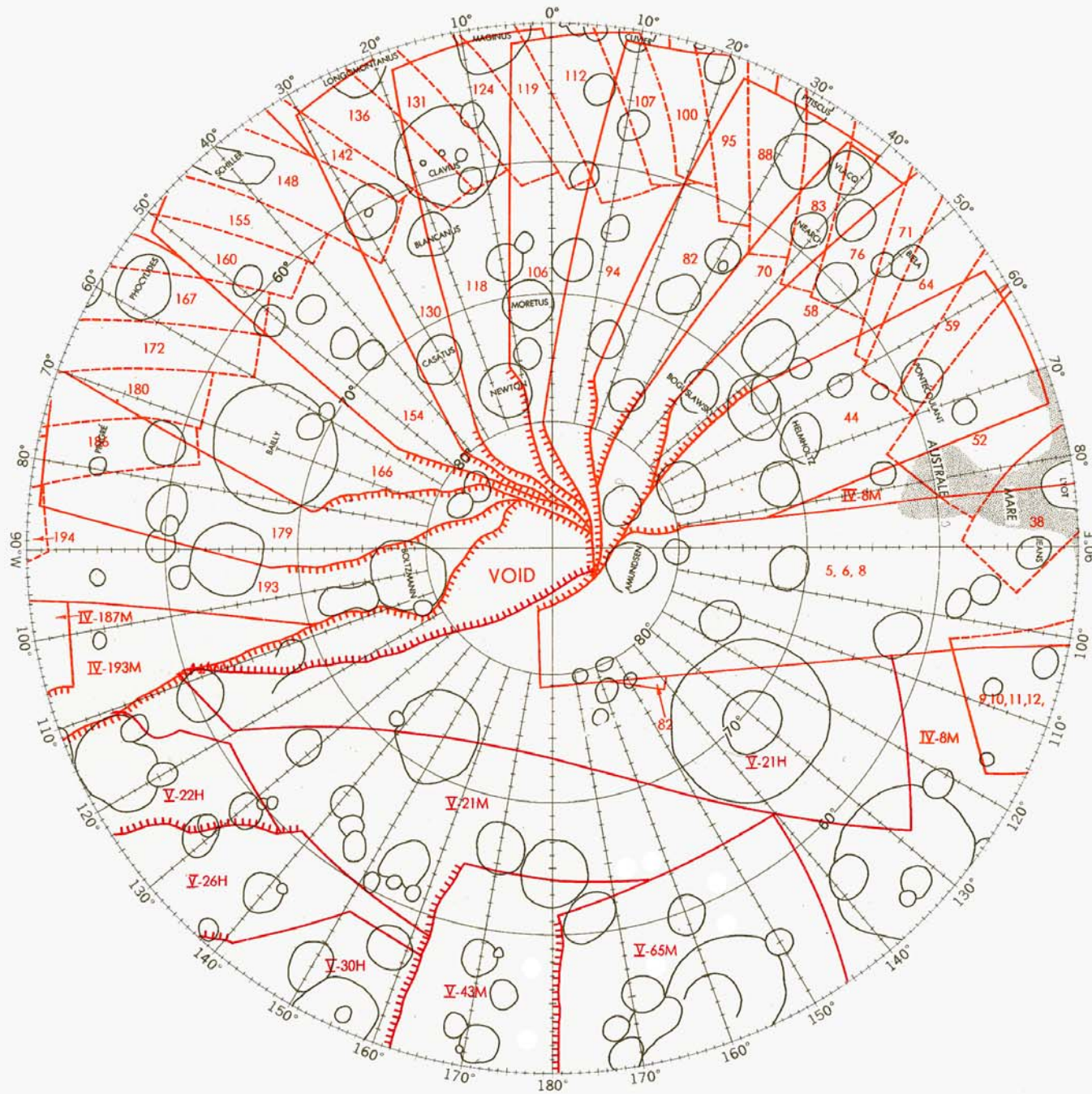
LEGEND

- Mission IV
- Mission V
- Terminator Limit

Several Atlas photographs are not shown in this figure. Refer to the text for a listing.

(c) North polar region.
 FIGURE 10.—Index map of Atlas photographs.—Continued.

SOUTH POLAR REGION



LEGEND

- Mission IV
- Mission V
- Terminator Limit

Several Atlas photographs are not shown in this figure. Refer to the text for a listing.

(d) South polar region.
 FIGURE 10.—Index map of Atlas photographs.— Concluded.

TABLE 1.—*Summary of Lunar Orbiter Missions*

	Lunar Orbiter mission—						
	I	II	III	IV	V		
					Initial	Intermediate	Final
Primary orbital parameters:							
Orbital period.....	3 ^h 26 ^m 21 ^s *	3 ^h 28 ^m 34 ^s *	3 ^h 28 ^m	12 ^h 1 ^m	8 ^h 30 ^m 29.1 ^s *	8 ^h 22 ^m 40 ^s *	3 ^h 11 ^m 14 ^s *
Inclination, deg.....	12	12	21	85	85	85	85
Perilune altitude, km.....	50	50	55	2700	200	100	100
Apolune altitude, km.....	1850	1850	1850	6110	6092	6092	1500
Time in orbit summary:							
Orbit injection date.....	8-14-66	11-10-66	2-8-67	5-8-67		8-5-67	
Total orbits.....	547	2289	1843	225		1201	
Total days.....	76	335	243	70		179	
Impact date.....	10-29-66	10-11-67	10-9-67	¹ 7-17-67		1-31-68	
Photography summary:							
First photography date.....	8-18-66	11-18-66	2-15-67	5-11-67		8-6-67	
Last photography date.....	8-29-66	11-25-66	2-23-67	5-26-67		8-18-67	
Total medium-resolution photographs read out.....	211	208	157	179		212	
Total high-resolution photographs read out.....	211	209	170	180		213	
Altitude range, km.....	45 to 1454	41 to 1517	44 to 1460	2670 to 6150		96 to 5755	

¹ Last communication.

TABLE 2.—Photographic

Plate number.....	1	5	9	13	17	21	25	29	33
Frame number.....	IV-190	IV-176	IV-164	IV-152	IV-140	IV-128	IV-116	IV-104	IV-92
<i>Spacecraft</i>									
Position:									
Spacecraft radius (km).....	5109.51	5090.09	5081.94	5081.06	5091.27	5105.30	5133.07	5163.77	5193.28
Spacecraft altitude (km).....	3373.41	3353.98	3345.84	3344.96	3355.17	3369.20	3396.97	3427.67	3457.18
Latitude of nadir point (deg).....	72.71	72.28	72.26	72.23	72.21	71.90	71.88	71.87	71.92
Longitude of nadir point (deg).....	-72.45	-59.77	-47.11	-34.79	-22.53	-10.32	2.48	15.88	29.48
Orientation:									
Mean altitude rate (km/sec).....	0.25	0.24	0.24	0.24	0.25	0.25	0.25	0.25	0.25
Horizontal velocity (km/sec).....	1.03	1.03	1.04	1.04	1.03	1.03	1.03	1.02	1.02
Tilt azimuth (med. res.).....	125.54	142.71	136.12	142.85	117.53	171.20	148.11	153.57	129.65
Tilt azimuth (high res.).....	125.57	142.75	136.17	142.89	117.60	171.23	148.19	153.63	129.77
Emission angle (deg).....	5.60	4.28	4.16	4.50	3.45	3.01	1.90	2.53	1.73
Tilt angle (deg).....	1.90	1.46	1.42	1.54	1.18	1.02	0.64	0.85	0.58
Swing angle (deg) (med. res.).....	306.25	319.55	313.07	321.03	297.38	347.27	325.70	330.30	306.33
Swing angle (deg) (high res.).....	306.29	319.60	313.12	321.07	297.45	347.30	325.78	330.36	306.45
North deviation angle (deg).....	352.33	352.19	351.70	353.35	353.99	355.25	355.69	354.65	354.09
<i>Photography</i>									
Time of exposure (GMT):									
Year.....	1967	1967	1967	1967	1967	1967	1967	1967	1967
Month.....	5	5	5	5	5	5	5	5	5
Day.....	25	24	23	22	21	20	19	18	17
Hour.....	7	7	7	7	7	7	7	6	6
Minute.....	15	14	12	10	8	4	0	57	53
Second (med. res.).....	53.53	12.83	46.93	43.83	0.93	17.03	41.03	8.03	57.03
Second (high res.).....	53.41	12.71	46.81	43.71	0.81	16.91	40.91	7.91	56.91
Illumination (deg):									
Sun angle at nadir.....	80.19	79.87	79.77	79.76	79.77	79.64	79.51	79.23	78.94
Phase angle.....	82.08	81.23	81.15	81.19	80.94	80.31	80.09	79.96	79.51
Sun azimuth at principal ground point.....	129.21	125.69	126.81	126.44	127.75	122.30	124.13	125.31	127.43
Sun arc at nadir.....	2429.76	2420.19	2417.16	2416.70	2417.09	2413.11	2409.26	2400.73	2391.83
Alpha.....	-5.59	-3.99	-4.03	-4.21	-3.44	-1.97	-1.71	-2.19	-1.72
Incidence angle.....	76.50	77.25	77.12	76.99	77.50	78.35	78.38	77.78	77.79
<i>Photographs</i>									
Tilt distance (mm) (film scale):									
Med. res.....	2.65	2.04	1.98	2.14	1.64	1.43	0.89	1.18	0.80
High res.....	20.28	15.57	15.16	16.40	12.54	10.94	6.85	9.06	6.16
Resolution constant (m).....	559.08	555.49	554.11	554.05	555.50	557.74	562.17	567.34	572.12
Principal ground point:									
Latitude (deg).....	70.33	69.96	70.20	69.78	71.06	69.93	70.80	70.35	71.17
Longitude (deg).....	-63.47	-54.77	-41.49	-29.60	-16.31	-9.43	4.49	18.10	32.23
Slant distance (km).....	3378.89	3357.18	3348.85	3348.49	3357.25	3370.79	3397.60	3428.79	3457.71
Corner coordinates (med. res.):									
1 Latitude (deg).....	43.43	42.01	42.72	20.33	41.92	24.04	29.20	26.11	19.33
1 Longitude (deg).....	-147.49	-139.33	-126.59	49.91	-100.74	83.90	84.94	98.10	115.00
2 Latitude (deg).....	38.75	37.16	38.05	36.94	37.72	25.01	23.27	16.71	32.42
2 Longitude (deg).....	-137.25	-129.24	-116.37	-102.70	-90.28	56.98	73.36	87.71	-44.74
3 Latitude (deg).....	25.97	21.95	24.22	21.83	25.15	31.67	15.01	14.67	16.06
3 Longitude (deg).....	-128.38	-121.33	-108.00	-94.82	-81.32	-82.55	-64.27	-52.39	-39.03
4 Latitude (deg).....	30.50	28.82	29.35	28.31	40.71	34.49	32.24	32.27	27.86
4 Longitude (deg).....	176.57	-171.95	-159.82	-146.11	-118.12	-110.80	-98.84	-85.82	-74.84
Corner coordinates (high res.):									
1 Latitude (deg).....	81.80	81.96	81.78	82.37	82.36	83.13	82.98	82.64	82.08
1 Longitude (deg).....	29.10	34.11	48.57	58.34	84.16	83.00	107.51	116.95	138.67
2 Latitude (deg).....	47.68	47.57	47.92	47.43	49.02	47.67	48.61	47.77	48.57
2 Longitude (deg).....	-59.38	-51.01	-37.96	-25.20	-11.38	-4.18	10.17	23.18	37.11
3 Latitude (deg).....	48.75	48.52	48.92	48.28	49.77	48.17	49.08	48.37	49.21
3 Longitude (deg).....	-75.25	-66.69	-53.68	-40.81	-27.41	-19.88	-5.87	7.20	20.80
4 Latitude (deg).....	87.41	87.61	87.66	87.35	86.41	86.44	85.77	86.22	85.59
4 Longitude (deg).....	170.33	-171.22	-165.28	-136.04	-145.92	-116.88	-118.06	-103.99	-104.66

Support Data

37	41	45	49	53	57	61	65	69	73	77	81	85	89
IV-80	IV-68	IV-56	IV-189	IV-183	IV-175	IV-170	IV-163	IV-158	IV-151	IV-145	IV-139	IV-134	IV-127
5215.16	5223.87	5230.75	4613.99	4610.71	4607.88	4606.76	4602.84	4601.72	4602.03	4604.24	4608.55	4614.63	4622.47
3479.06	3487.77	3494.65	2877.89	2874.61	2871.78	2870.66	2866.74	2865.62	2865.93	2868.14	2872.45	2878.53	2886.37
71.89	71.63	71.63	42.88	42.84	42.86	43.00	42.87	42.85	42.84	42.82	42.82	42.80	42.81
43.34	57.12	71.06	-84.00	-77.39	-70.79	-64.22	-57.71	-51.22	-44.74	-38.27	-31.79	-25.30	-18.79
0.25	0.25	0.25	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
1.01	1.01	1.01	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
146.98	239.67	214.97	110.09	79.46	116.46	108.25	115.78	106.80	118.58	96.52	102.72	53.02	114.03
147.04	239.59	214.94	110.14	79.49	116.51	108.30	115.82	106.86	118.61	96.57	102.78	53.04	114.07
2.53	1.96	2.30	5.11	7.52	5.40	5.81	5.81	4.44	6.26	5.45	4.32	9.91	5.93
0.84	0.65	0.76	1.92	2.82	2.03	2.19	2.19	1.67	2.36	2.05	1.62	3.71	2.22
322.63	50.45	24.90	273.13	242.60	279.55	270.84	278.78	270.65	281.89	259.58	267.12	218.14	278.25
322.70	50.37	24.87	273.18	242.63	279.59	270.88	278.83	270.71	281.93	259.63	267.18	218.16	278.29
353.08	354.04	352.38	340.43	338.73	340.50	339.57	340.23	341.49	340.45	340.01	342.05	339.70	341.33
1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967
5	5	5	5	5	5	5	5	5	5	5	5	5	5
16	15	14	25	24	24	23	23	22	22	21	21	20	20
6	6	6	6	18	6	18	6	18	6	18	6	18	6
51	48	46	36	36	35	35	34	33	32	31	29	27	26
7.13	26.73	39.33	36.03	7.43	41.23	18.43	26.23	33.13	27.63	9.33	40.13	59.13	10.33
7.01	26.61	39.21	35.91	7.31	41.11	18.31	26.11	33.01	27.51	9.21	40.01	59.01	10.21
78.54	78.02	77.63	74.79	74.42	74.09	73.79	73.48	73.21	72.95	72.70	72.45	72.19	71.92
79.33	77.78	77.69	76.70	77.00	76.07	75.98	75.63	74.88	75.25	74.72	74.07	74.43	74.13
128.92	124.40	126.81	106.13	108.91	106.76	107.74	107.66	107.65	108.29	109.12	108.58	113.25	109.58
2379.71	2364.12	2352.30	2266.26	2255.09	2244.92	2236.00	2226.58	2218.33	2210.43	2202.80	2195.22	2187.45	2179.31
-2.37	0.72	-0.19	-5.07	-6.87	-5.28	-5.80	-5.71	-4.44	-6.10	-5.38	-4.31	-6.07	-5.89
76.96	78.51	77.51	71.63	70.16	70.80	70.18	69.93	70.45	69.15	69.35	69.76	68.57	68.25
1.17	0.91	1.06	2.68	3.94	2.83	3.05	3.05	2.34	3.29	2.86	2.27	5.18	3.10
8.99	6.95	8.14	20.47	30.12	21.67	23.33	23.34	17.85	25.15	21.87	17.33	39.60	23.73
575.84	577.21	578.39	476.90	477.18	475.97	475.91	475.26	474.69	475.27	475.38	475.79	478.97	478.55
70.45	70.93	70.36	41.71	43.52	41.29	41.77	41.22	41.99	40.88	42.34	42.17	46.31	41.21
46.09	53.66	68.44	-79.99	-71.01	-66.78	-59.60	-53.37	-47.65	-40.20	-33.70	-28.24	-18.14	-14.29
3480.19	3488.44	3495.58	2882.19	2883.93	2876.59	2876.23	2872.30	2868.87	2872.38	2873.03	2875.52	2894.74	2892.19
36.49	22.51	21.85	20.46	15.90	20.26	16.42	18.59	23.49	16.44	17.80	23.89	18.61	16.57
-41.59	149.07	160.07	-16.04	-15.88	-3.45	7.70	11.56	14.29	26.99	34.68	34.37	41.32	54.21
31.70	27.08	24.13	-2.87	-5.05	-6.16	-5.84	-6.23	1.34	-5.83	-0.80	2.07	6.67	-4.72
-31.23	119.49	133.03	-38.24	-25.54	-23.07	-15.62	-8.79	-7.75	5.77	7.24	11.89	23.34	31.85
30.95	27.77	24.96	1.84	5.14	2.64	0.22	0.85	2.57	0.64	2.05	2.14	-1.18	1.30
-30.48	120.25	133.74	-139.51	-127.54	125.23	-120.16	-112.75	-106.15	-98.96	-92.76	-86.73	-77.82	-72.30
28.87	32.00	25.24	59.30	58.96	58.37	59.93	59.75	56.26	59.78	57.18	57.21	60.08	59.28
-61.25	130.48	-25.91	165.46	165.72	174.77	-178.16	-170.98	-164.75	-158.88	-154.99	-140.49	-127.81	-129.12
81.89	82.26	81.84	55.73	57.34	55.26	55.55	55.09	56.23	54.78	56.29	56.58	60.84	55.44
146.08	159.70	167.49	-61.25	-49.76	-48.39	-40.45	-34.90	-29.36	-21.97	-14.34	-10.00	5.72	3.97
47.47	48.19	47.34	23.11	25.34	22.64	23.23	22.58	23.52	22.17	23.96	23.68	28.44	22.41
50.36	58.18	72.01	-81.62	-73.11	-68.38	-61.49	-55.04	-48.94	-41.78	-35.44	-29.35	-19.88	-15.57
48.24	48.63	47.99	25.76	28.12	25.31	26.01	25.30	25.99	24.90	26.62	26.07	30.92	25.02
34.21	41.84	55.84	-90.95	-82.48	-77.67	-70.77	-64.31	-58.28	-51.04	-44.76	-38.73	-29.49	-24.94
86.33	85.40	86.30	59.82	61.90	59.29	59.79	59.16	60.11	58.79	60.49	60.38	65.51	59.34
-87.99	-81.36	-67.40	-76.08	-65.28	-63.00	-55.09	-49.41	-44.45	-36.39	-29.36	-25.36	-12.04	-10.93

TABLE 2.—Photographic

Plate number-----	93	97	101	105	109	113	117	121	125
Frame number-----	IV-122	IV-115	IV-110	IV-103	IV-98	IV-91	IV-86	IV-79	IV-74
<i>Spacecraft</i>									
Position:									
Spacecraft radius (km)-----	4631.14	4641.26	4651.94	4662.67	4673.62	4683.37	4692.20	4699.90	4705.93
Spacecraft altitude (km)-----	2895.04	2905.16	2915.84	2926.57	2937.52	2947.27	2956.10	2963.80	2969.83
Latitude of nadir point (deg)-----	42.76	42.76	42.77	42.76	42.81	42.80	42.80	42.79	42.76
Longitude of nadir point (deg)-----	-12.27	-5.70	0.86	7.57	14.21	20.90	27.61	34.33	41.06
Orientation:									
Mean altitude rate (km/sec)-----	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.18
Horizontal velocity (km/sec)-----	1.14	1.13	1.13	1.13	1.13	1.13	1.12	1.12	1.12
Tilt azimuth (med. res.)-----	105.82	101.17	94.58	107.67	118.18	100.50	122.01	103.75	119.81
Tilt azimuth (high res.)-----	105.86	101.24	94.67	107.72	118.22	100.54	122.05	103.79	119.84
Emission angle (deg)-----	3.74	3.65	2.93	4.62	5.89	5.78	5.13	5.73	6.24
Tilt angle (deg)-----	1.40	1.36	1.09	1.72	2.18	2.14	1.90	2.11	2.30
Swing angle (deg) (med. res.)-----	270.24	266.48	258.78	272.32	282.24	265.16	285.69	268.03	282.96
Swing angle (deg) (high res.)-----	270.31	266.55	258.87	272.38	282.28	265.21	285.73	268.07	282.99
North deviation angle (deg)-----	342.41	343.29	342.52	342.22	341.30	341.48	341.36	341.18	340.30
<i>Photography</i>									
Time of exposure (GMT):									
Year-----	1967	1967	1967	1967	1967	1967	1967	1967	1967
Month-----	5	5	5	5	5	5	5	5	5
Day-----	19	19	18	18	17	17	16	16	15
Hour-----	18	6	18	6	18	6	18	6	18
Minute-----	24	22	20	18	16	14	13	11	10
Second (med. res.)-----	11.43	12.43	12.83	15.53	25.53	38.93	0.43	30.63	8.33
Second (high res.)-----	11.31	12.31	12.71	15.41	25.41	38.81	0.31	30.51	8.21
Illumination (deg):									
Sun angle at nadir-----	71.63	71.33	71.03	70.63	70.29	69.90	69.50	69.10	68.67
Phase angle-----	73.03	72.68	72.10	72.35	72.44	72.01	71.35	71.20	70.94
Sun azimuth at principal ground point-----	109.10	109.53	109.58	110.71	111.27	112.55	111.68	113.35	113.20
Sun arc at nadir-----	2170.53	2161.25	2152.29	2140.02	2129.80	2117.94	2105.92	2093.64	2080.83
Alpha-----	-3.74	-3.63	-2.86	-4.62	-5.81	-5.72	-5.01	-5.70	-6.16
Incidence angle-----	69.29	69.06	69.24	67.72	66.64	66.30	66.34	65.50	64.78
<i>Photographs</i>									
Tilt distance (mm) (film scale):									
Med. res.-----	1.95	1.90	1.53	2.40	3.05	2.98	2.65	2.95	3.21
High res.-----	14.94	14.55	11.66	18.34	23.30	22.82	20.23	22.55	24.53
Resolution constant (m)-----	479.40	481.06	482.70	484.83	487.00	488.58	489.85	491.30	492.47
Principal ground point:									
Latitude (deg)-----	42.08	42.28	42.60	41.82	40.98	42.04	41.02	41.83	40.70
Longitude (deg)-----	-9.24	-2.67	3.35	11.28	18.53	25.73	31.25	39.05	45.57
Slant distance (km)-----	2897.35	2907.36	2917.26	2930.11	2943.28	2952.83	2960.49	2969.28	2976.33
Corner coordinates (med. res.):									
1 Latitude (deg)-----	24.61	25.10	25.72	20.79	14.86	16.30	17.26	15.46	12.92
1 Longitude (deg)-----	52.76	60.36	65.11	77.76	86.44	80.32	99.23	93.85	99.98
2 Latitude (deg)-----	2.35	3.00	4.33	-3.08	7.58	9.07	-5.81	8.05	4.28
2 Longitude (deg)-----	30.78	37.97	42.44	55.14	64.83	72.72	78.02	86.33	93.51
3 Latitude (deg)-----	0.88	1.44	14.44	1.96	1.82	0.84	13.28	2.04	0.45
3 Longitude (deg)-----	-69.76	-62.09	-50.69	-47.89	-40.41	-33.73	-22.66	-20.30	-15.76
4 Latitude (deg)-----	55.12	58.35	57.92	56.42	58.50	56.28	57.54	57.82	58.22
4 Longitude (deg)-----	-122.37	-88.63	-87.78	-100.98	-95.47	-91.63	-80.98	-74.42	-71.81
Corner coordinates (high res.):									
1 Latitude (deg)-----	56.67	57.14	57.36	56.50	55.41	56.67	55.56	56.45	55.03
1 Longitude (deg)-----	8.92	15.34	21.89	29.78	37.09	45.11	49.84	58.55	64.71
2 Latitude (deg)-----	23.43	23.58	23.91	22.89	21.77	23.00	21.71	22.65	21.24
2 Longitude (deg)-----	-10.25	-3.38	2.33	10.24	17.22	24.49	29.89	37.69	43.90
3 Latitude (deg)-----	25.77	25.81	26.20	25.33	24.43	25.58	24.34	25.30	24.09
3 Longitude (deg)-----	-19.71	-12.90	-7.22	0.71	7.71	14.90	20.33	28.08	34.36
4 Latitude (deg)-----	60.44	60.77	61.20	60.35	59.41	60.72	59.59	60.59	59.28
4 Longitude (deg)-----	-6.62	-0.59	5.92	14.13	21.96	29.28	34.59	42.79	49.69

Support Data—Continued

129	133	137	141	142	143	147	151	155	159	163	167	171	175
IV-67	IV-62	IV-55	IV-23	IV-24	IV-196	IV-188	IV-182	IV-174	IV-169	IV-162	IV-157	IV-150	IV-144
4711.67	4715.44	4718.22	4718.79	4720.53	4411.66	4411.56	4410.54	4409.20	4408.21	4406.05	4404.95	4404.51	4405.09
2975.57	2979.34	2982.12	2982.69	2984.45	2675.56	2675.46	2674.44	2673.10	2672.11	2669.95	2668.85	2668.41	2668.99
42.81	42.82	42.84	43.16	43.29	13.88	13.92	13.88	13.91	14.14	13.93	13.91	13.91	13.90
47.79	54.52	61.25	94.60	94.62	-93.82	-87.19	-80.57	-73.95	-67.33	-60.75	-54.17	-47.59	-41.01
0.18	0.18	0.18	0.17	0.17	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
1.12	1.12	1.12	1.12	1.12	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
108.06	95.69	101.97	78.57	74.72	224.93	255.11	329.47	255.17	248.55	243.27	255.11	234.07	280.64
108.11	95.74	102.02	78.61	74.76	224.86	255.04	329.42	255.10	248.43	243.18	255.03	234.01	280.42
4.77	5.45	5.18	5.13	5.26	2.36	3.37	2.64	3.40	1.99	2.56	3.49	3.38	1.23
1.76	2.00	1.91	1.88	1.93	0.93	1.32	1.04	1.34	0.78	1.01	1.37	1.33	0.48
271.68	260.01	265.83	241.06	237.19	38.30	68.78	143.49	68.67	62.13	57.10	69.48	48.16	94.59
71.73	260.06	265.87	241.10	237.24	38.23	68.70	143.43	68.59	62.01	57.01	69.40	48.10	94.37
341.09	341.21	340.99	339.43	339.33	353.59	354.12	354.26	353.95	353.85	354.14	354.84	354.44	354.13
1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967
5	5	5	5	5	5	5	5	5	5	5	5	5	5
15	14	14	11	11	25	25	24	24	23	23	22	22	21
6	18	6	18	18	18	6	18	6	18	6	18	6	17
9	7	7	3	4	4	4	3	3	3	2	1	0	58
0.93	59.03	6.63	53.93	4.03	30.93	8.73	41.83	17.83	2.13	7.63	16.23	11.93	53.73
0.81	58.91	6.51	53.81	3.91	30.81	8.61	41.71	17.71	2.01	7.51	16.11	11.81	53.61
68.28	67.88	67.48	65.81	65.85	74.06	73.55	73.04	72.54	72.04	71.57	71.10	70.64	70.19
70.03	69.80	69.36	67.34	67.34	73.44	72.29	72.46	71.27	71.34	70.71	69.80	69.63	69.71
113.64	115.04	115.15	118.29	118.53	92.70	92.74	93.72	93.02	93.49	93.42	93.43	93.45	94.27
2068.94	2056.66	2044.69	1994.09	1995.34	2244.12	2228.74	2213.13	2197.99	2182.99	2168.67	2154.48	2140.55	2126.82
-4.77	-5.25	-5.11	-4.19	-4.08	1.57	3.19	1.47	3.22	1.80	2.20	3.30	2.57	1.22
65.27	64.57	64.25	63.19	63.31	75.02	75.48	73.94	74.49	73.14	72.91	73.10	72.21	70.93
2.45	2.70	2.66	2.63	2.69	1.30	1.85	1.45	1.86	1.09	1.41	1.92	1.86	0.67
18.74	21.35	20.32	20.09	20.59	9.93	14.12	11.07	14.26	8.37	10.76	14.67	14.22	5.16
492.97	493.79	494.17	494.25	494.58	442.85	442.99	442.71	442.60	442.24	441.95	441.92	441.82	441.66
41.81	42.38	42.08	43.72	44.08	12.86	13.39	15.26	13.37	13.70	13.23	13.36	12.70	14.04
51.64	59.16	65.57	99.00	99.09	-94.86	-89.22	-81.41	-76.00	-68.48	-62.17	-56.27	-49.29	-41.76
2979.38	2984.30	2986.61	2987.09	2989.07	2676.46	2677.28	2675.56	2674.95	2672.75	2671.00	2670.81	2670.24	2669.23
16.20	16.19	16.17	17.71	17.97	35.02	37.53	35.21	37.33	35.75	36.42	38.61	37.22	34.78
120.42	114.25	119.73	152.48	152.76	-25.58	-19.93	-13.63	-7.87	2.91	6.59	15.62	18.88	24.15
-6.26	-5.03	-5.35	-1.43	-0.45	-29.90	-32.26	-31.26	-32.03	-30.90	-30.90	-32.52	-31.16	-30.02
98.50	107.79	113.57	141.28	140.95	-47.59	-41.71	-32.70	-29.15	-20.42	-14.49	-7.76	-1.37	6.27
14.48	2.24	2.44	4.01	3.06	-13.02	-14.41	-17.46	-14.28	-11.75	-13.43	-15.16	-16.63	-10.07
-2.58	-0.80	5.06	36.94	36.02	-145.29	-145.19	-136.72	-132.01	-117.74	-113.63	-112.41	-106.54	-88.05
59.88	60.08	60.12	59.62	59.12	42.51	36.92	39.74	37.02	37.13	36.42	36.28	35.43	37.58
-35.86	-30.30	-22.95	-2.22	-4.81	-162.97	-146.18	-141.40	-132.80	-121.00	-114.77	-113.35	-101.35	-94.44
56.44	57.13	56.74	58.12	58.49	28.52	29.16	31.37	29.11	29.44	28.95	29.17	28.38	29.89
71.08	79.17	85.40	120.68	121.12	-88.28	-82.83	-74.76	-69.57	-61.93	-55.78	-50.12	-43.06	-35.22
22.55	23.20	22.82	24.78	25.18	-4.22	-3.56	-1.38	-3.57	-3.23	-3.72	-3.52	-4.32	-2.76
50.19	57.81	64.12	96.97	97.02	-92.67	-86.95	-79.05	-73.78	-66.24	-59.86	-53.80	-46.90	-39.42
25.18	25.81	25.47	27.51	27.91	-3.37	-2.85	-0.63	-2.84	-2.44	-2.98	-2.91	-3.64	-1.99
40.56	48.12	54.45	87.26	87.28	-100.89	-95.17	-87.15	-82.00	-74.42	-68.06	-62.01	-55.13	-47.55
60.62	61.34	60.98	62.82	63.24	29.57	30.17	32.36	30.15	30.46	29.93	30.06	29.31	30.87
55.34	63.00	69.46	104.31	104.58	-97.52	-92.16	-84.40	-78.88	-71.26	-65.05	-59.45	-52.26	-44.62

TABLE 2.—Photographic

Plate number.....	179	183	187	191	195	199	203	207	211
Frame number.....	IV-138	IV-133	IV-126	IV-121	IV-114	IV-109	IV-102	IV-97	IV-90
<i>Spacecraft</i>									
Position:									
Spacecraft radius (km).....	4406.80	4409.56	4413.38	4417.92	4423.31	4429.14	4435.24	4441.39	4447.37
Spacecraft altitude (km).....	2670.70	2673.46	2677.28	2681.82	2687.21	2693.04	2699.14	2705.29	2711.27
Latitude of nadir point (deg).....	13.92	13.91	13.94	13.87	13.89	13.89	13.89	13.90	13.89
Longitude of nadir point (deg).....	-34.43	-27.86	-21.27	-14.69	-8.09	1.48	5.14	11.76	18.39
Orientation:									
Mean altitude rate (km/sec).....	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.06	0.06
Horizontal velocity (km/sec).....	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
Tilt azimuth (med. res.).....	263.91	340.21	238.44	268.51	261.82	267.45	237.94	245.90	267.03
Tilt azimuth (high res.).....	263.83	340.20	238.37	268.43	261.77	267.37	237.86	245.83	266.96
Emission angle (deg).....	3.25	8.45	3.35	3.37	4.66	3.35	2.85	3.68	4.03
Tilt angle (deg).....	1.28	3.32	1.32	1.32	1.83	1.31	1.11	1.44	1.57
Swing angle (deg) (med. res.).....	78.49	156.02	53.02	82.79	76.72	81.98	52.85	60.27	82.03
Swing angle (deg) (high res.).....	78.41	156.00	52.95	82.71	76.67	81.90	52.77	60.21	81.96
North deviation angle (deg).....	355.05	356.53	354.95	354.78	355.56	355.02	355.23	354.82	355.59
<i>Photography</i>									
Time of exposure (GMT):									
Year.....	1967	1967	1967	1967	1967	1967	1967	1967	1967
Month.....	5	5	5	5	5	5	5	5	5
Day.....	21	20	20	19	19	18	18	17	17
Hour.....	5	17	5	17	5	17	5	17	5
Minute.....	57	55	53	51	49	47	45	43	41
Second (med. res.).....	23.93	39.83	47.83	42.93	38.33	31.83	27.43	28.13	34.73
Second (high res.).....	23.81	39.71	47.71	42.81	38.21	31.71	27.31	28.01	34.61
Illumination (deg):									
Sun angle at nadir.....	69.74	69.29	68.84	68.39	67.92	67.46	66.97	66.49	66.00
Phase angle.....	68.48	67.95	67.78	67.07	66.15	66.16	66.09	65.25	64.44
Sun azimuth at principal ground point.....	93.97	95.86	94.02	94.41	94.23	94.69	94.68	94.67	95.02
Sun arc at nadir.....	2113.17	2099.57	2085.89	2072.12	2058.05	2043.95	2029.33	2014.83	1999.80
Alpha.....	3.20	3.37	2.68	3.35	4.53	3.32	2.25	3.19	3.98
Incidence angle.....	71.68	71.49	70.48	70.42	70.68	69.47	68.35	68.45	68.43
<i>Photographs</i>									
Tilt distance (mm) (film scale):									
Med. res.....	1.79	4.63	1.83	1.85	2.55	1.83	1.55	2.01	2.19
High res.....	13.67	35.40	14.04	14.11	19.47	13.98	11.90	15.35	16.77
Resolution constant (m).....	442.18	444.26	443.29	444.04	445.21	445.90	446.82	447.99	449.05
Principal ground point:									
Latitude (deg).....	13.71	18.74	12.87	13.81	13.47	13.79	12.96	12.98	13.75
Longitude (deg).....	-36.45	-29.69	-23.05	-16.79	-10.97	-3.58	3.63	9.66	15.87
Slant distance (km).....	2672.40	2684.93	2679.08	2683.64	2690.69	2694.84	2700.44	2707.47	2713.89
Corner coordinates (med. res.):									
1 Latitude (deg).....	38.39	36.58	37.51	37.98	39.39	38.28	36.82	37.81	39.30
1 Longitude (deg).....	32.42	28.68	43.74	51.04	53.51	67.53	70.28	79.09	86.85
2 Latitude (deg).....	-32.05	-30.39	-32.16	-31.40	-31.42	-30.63	-30.37	-31.18	-31.59
2 Longitude (deg).....	11.83	16.03	26.92	30.21	35.43	43.26	53.03	57.81	63.97
3 Latitude (deg).....	-15.22	-16.58	-16.12	-14.71	-13.72	-14.72	-16.31	-14.67	-13.99
3 Longitude (deg).....	-92.02	-84.20	-79.19	-72.94	-69.00	-59.75	-51.89	-47.21	-41.47
4 Latitude (deg).....	36.68	32.27	-35.38	37.27	34.91	37.12	35.50	36.00	35.44
4 Longitude (deg).....	-95.12	-84.07	-76.65	-78.72	-75.77	-66.86	-50.68	-48.57	-51.98
Corner coordinates (high res.):									
1 Latitude (deg).....	29.59	35.88	28.67	29.76	29.47	29.83	28.96	28.96	29.96
1 Longitude (deg).....	-30.33	-23.41	-16.94	-10.55	-5.05	2.62	9.74	15.87	21.89
2 Latitude (deg).....	-3.11	2.55	-4.16	-3.07	-3.47	-3.16	-4.18	-4.22	-3.30
2 Longitude (deg).....	-33.92	-26.79	-20.51	-14.34	-8.33	-1.04	6.29	12.16	18.56
3 Latitude (deg).....	-2.53	2.98	-3.55	-2.45	-3.00	-2.57	-3.59	-3.60	-2.81
3 Longitude (deg).....	-42.12	-34.80	-28.77	-22.56	-16.63	-9.31	-2.03	3.81	10.21
4 Latitude (deg).....	30.47	36.67	29.53	30.69	30.30	30.73	29.77	29.86	30.78
4 Longitude (deg).....	-39.72	-33.88	-26.22	-20.00	-14.50	-6.88	0.35	6.45	12.30

Support Data—Continued

215	219	223	227	231	235	239	240	243	247	251	255	259	263
IV-85	IV-78	IV-73	IV-66	IV-61	IV-54	IV-17	IV-18	IV-195	IV-187	IV-181	IV-173	IV-168	IV-161
4453.00	4458.18	4462.63	4466.84	4470.11	4472.76	4475.18	4475.77	4457.54	4458.89	4460.08	4460.13	4458.28	4458.76
2716.90	2722.08	2726.53	2730.74	2734.01	2736.66	2739.08	2739.67	2721.44	2722.79	2723.98	2724.03	2722.18	2722.66
13.89	13.87	13.82	13.87	13.87	13.89	13.89	14.04	-14.40	-14.36	-14.40	-14.37	-14.14	-14.36
25.04	31.68	38.33	44.98	51.63	58.29	91.45	91.46	-96.11	-89.49	-82.86	-76.23	-69.56	-62.94
0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	-0.09	-0.09	-0.09	-0.09	-0.09	-0.09
1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
230.38	248.64	209.42	258.39	278.46	259.32	290.20	302.07	109.31	145.67	26.83	116.46	103.01	129.75
230.29	248.54	209.38	258.31	278.38	259.22	290.04	301.94	109.41	145.81	26.87	116.64	103.13	129.87
2.28	2.51	2.41	3.15	3.11	2.57	1.70	1.85	2.52	1.20	2.40	1.45	2.26	1.96
0.89	0.98	0.94	1.23	1.21	1.00	0.66	0.72	0.98	0.47	0.93	0.56	0.88	0.76
44.37	63.28	23.22	72.52	93.64	73.67	104.11	115.98	294.12	330.26	212.05	301.26	287.94	314.71
44.29	63.19	23.17	72.44	93.56	73.57	103.96	115.85	294.22	330.40	212.10	301.44	288.07	314.83
354.22	354.97	353.94	354.57	355.66	354.72	354.17	354.17	5.21	4.70	5.37	5.01	5.29	5.22
1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967
5	5	5	5	5	5	5	5	5	5	5	5	5	5
16	16	15	15	14	14	11	11	25	25	24	24	23	23
17	5	17	5	17	5	17	17	17	5	17	5	17	5
39	38	36	35	34	33	29	30	33	33	33	32	32	31
49.83	13.43	45.83	33.63	28.33	33.13	56.73	6.83	56.43	33.63	6.83	43.23	28.93	34.23
49.71	13.31	45.7	33.51	28.21	33.01	56.61	6.71	56.31	33.51	6.71	43.11	28.81	34.11
65.50	65.00	64.49	63.98	63.48	62.97	60.53	60.54	76.94	76.42	75.91	75.38	74.81	74.32
64.88	64.13	64.12	62.82	62.27	62.02	59.89	59.89	77.84	76.66	76.40	75.87	75.65	74.86
95.24	95.43	95.44	95.70	96.16	96.18	97.50	97.73	85.25	85.40	85.69	85.08	84.87	84.66
1984.69	1969.45	1954.00	1938.73	1923.34	1907.98	1834.12	1834.32	2331.21	2315.64	2300.21	2284.18	2266.78	2251.82
1.59	2.22	0.93	3.00	3.10	2.45	1.66	1.68	-2.31	-0.60	-1.25	-1.24	-2.15	-1.40
66.48	66.36	65.07	65.82	65.37	64.47	61.55	61.57	75.52	76.06	75.16	74.63	73.50	73.46
1.24	1.36	1.31	1.71	1.68	1.39	0.92	1.00	1.37	0.65	1.30	0.79	1.22	1.07
9.47	10.43	10.00	13.07	12.85	10.64	7.04	7.62	10.48	4.99	9.93	6.02	9.37	8.16
449.68	450.57	451.29	452.10	452.63	452.99	453.29	453.40	450.47	450.56	450.87	450.78	450.55	450.60
13.00	13.30	12.54	13.47	14.14	13.60	14.25	14.64	-14.91	-14.96	-13.09	-14.76	-14.44	-15.13
23.94	30.21	37.59	43.04	49.69	56.70	90.44	90.47	-94.60	-89.06	-82.18	-75.41	-68.18	-61.98
2717.73	2723.10	2727.47	2732.35	2735.57	2737.73	2739.55	2740.22	2722.47	2723.02	2724.90	2724.37	2723.00	2723.29
34.87	36.43	33.63	36.76	37.50	35.84	34.33	34.36	18.87	16.37	23.81	17.74	19.49	17.07
91.80	100.67	105.37	112.20	117.59	123.59	159.29	159.62	-48.90	-47.23	-33.15	-32.04	-22.34	-19.14
-18.84	-30.07	-20.88	-30.49	-30.29	-30.69	-29.76	-29.65	-29.42	-30.50	-27.53	-29.95	-29.33	-30.22
63.86	79.42	79.48	90.82	98.46	106.20	139.38	139.23	-28.63	-31.38	-28.34	-16.00	-4.06	0.17
-14.93	-15.63	-15.09	-14.54	-15.31	-14.98	-11.76	-11.07	-45.12	-37.86	-44.82	-44.16	-45.40	-38.37
-29.76	-25.40	-15.53	-14.49	-7.50	0.39	39.92	40.60	-160.95	-142.22	-151.68	-147.00	-137.38	-113.73
36.39	36.46	41.94	37.26	36.15	37.28	38.71	39.21	23.32	20.27	12.19	20.32	21.63	22.04
-29.37	-26.99	-30.39	-20.67	-15.48	-4.46	29.69	27.68	-150.47	-143.49	-127.98	-128.96	-121.85	-118.04
29.01	29.46	28.53	29.66	30.57	29.86	30.57	31.01	2.18	2.07	4.35	2.34	2.68	1.91
30.45	36.50	44.20	49.46	55.85	63.13	97.18	97.25	-91.85	-86.24	-79.51	-72.65	-65.46	-59.28
-4.30	-3.93	-4.93	-3.81	-2.98	-3.70	-2.98	-2.55	-31.31	-31.41	-29.18	-31.16	-30.80	-31.57
26.34	32.81	39.95	45.49	52.46	59.22	92.83	92.86	-87.80	-82.53	-75.63	-68.76	-61.40	-55.21
-3.54	-3.30	-4.10	3.14	-2.46	-3.03	-2.20	-1.78	-32.10	-32.17	-30.01	-31.95	-31.61	-32.39
17.99	24.45	31.55	37.10	44.09	50.82	84.48	84.53	-97.60	-92.33	-85.11	-78.53	-71.14	-65.04
29.97	30.34	29.52	30.62	31.38	30.79	31.59	32.03	1.39	1.40	3.54	1.60	1.88	1.15
21.01	26.97	34.79	39.87	46.10	53.49	87.44	87.45	-100.13	-94.52	-87.89	-80.94	-73.74	-67.55

TABLE 2.—Photographic

Plate number	267	271	275	279	283	287	291	295	299
Frame number	IV-156	IV-149	IV-143	IV-137	IV-132	IV-125	IV-120	IV-113	IV-108
<i>Spacecraft</i>									
Position:									
Spacecraft radius (km)	4457.67	4456.36	4455.19	4454.10	4453.48	4453.06	4453.59	4454.11	4455.10
Spacecraft altitude (km)	2721.57	2720.26	2719.09	2718.00	2717.38	2716.96	2717.49	2718.01	2719.00
Latitude of nadir point (deg)	-14.39	-14.40	-14.41	-14.40	-14.42	-14.40	-14.46	-14.45	-14.45
Longitude of nadir point (deg)	-56.29	-49.64	-42.98	-36.34	-29.69	-23.06	-16.43	-9.81	-3.17
Orientation:									
Mean altitude rate (km/sec)	-0.09	-0.09	-0.09	-0.09	-0.09	-0.09	-0.08	-0.08	-0.08
Horizontal velocity (km/sec)	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
Tilt azimuth (med. res.)	135.84	127.65	85.68	119.40	1.12	170.53	77.15	123.33	76.79
Tilt azimuth (high res.)	136.02	127.78	85.79	119.53	1.12	170.61	77.36	123.75	77.00
Emission angle (deg)	1.10	1.75	2.50	1.91	8.63	0.82	1.28	0.56	1.32
Tilt angle (deg)	0.43	0.68	0.98	0.74	3.35	0.32	0.50	0.22	0.52
Swing angle (deg) (med. res.)	321.19	312.82	271.05	304.90	188.01	356.09	262.78	309.15	262.30
Swing angle (deg) (high res.)	321.38	312.96	271.16	305.02	188.01	356.17	262.99	309.56	262.50
North deviation angle (deg)	5.48	5.41	5.76	5.77	6.90	5.58	5.82	5.89	5.71
<i>Photography</i>									
Time of exposure (GMT):									
Year	1967	1967	1967	1967	1967	1967	1967	1967	1967
Month	5	5	5	5	5	5	5	5	5
Day	22	22	21	21	20	20	19	19	18
Hour	17	5	17	5	17	5	17	5	17
Minute	30	29	28	26	25	23	21	19	16
Second (med. res.)	43.23	39.63	21.73	51.33	6.83	13.53	6.83	0.13	51.13
Second (high res.)	43.11	39.51	21.61	51.21	6.71	13.41	6.71	0.01	51.01
Illumination (deg.):									
Sun angle at nadir	73.78	73.24	72.71	72.18	71.67	71.15	70.66	70.17	69.66
Phase angle	74.05	73.75	73.69	72.80	72.09	71.17	71.16	70.34	70.18
Sun azimuth at principal ground point	84.73	84.43	84.34	84.12	86.22	84.15	84.03	83.92	83.78
Sun arc at nadir	2235.57	2219.37	2203.25	2187.22	2171.51	2155.98	2141.11	2126.13	2110.88
Alpha	-0.70	-1.29	-2.50	-1.57	-1.17	-0.06	-1.27	-0.43	-1.31
Incidence angle	73.36	72.46	71.18	71.23	71.13	71.12	69.89	69.90	68.86
<i>Photographs</i>									
Tilt distance (mm) (film scale):									
Med. res.	0.60	0.95	1.36	1.04	4.68	0.45	0.70	0.31	0.72
High res.	4.59	7.27	10.40	7.94	35.78	3.42	5.33	2.34	5.49
Resolution constant (m)	450.35	450.18	450.07	449.82	451.62	449.57	449.69	449.74	449.94
Principal ground point:									
Latitude (deg)	-14.87	-15.05	-14.29	-14.97	-9.14	-14.89	-14.28	-14.63	-14.26
Longitude (deg)	-55.80	-48.76	-41.41	-35.28	-29.59	-22.97	-15.64	-9.51	-2.36
Slant distance (km)	2721.77	2720.76	2720.10	2718.59	2729.42	2717.07	2717.75	2718.06	2719.29
Corner coordinates (med. res.):									
1 Latitude (deg)	17.17	17.27	21.80	17.93	15.52	29.29	19.57	17.75	19.64
1 Longitude (deg)	-14.04	-6.15	7.04	7.80	12.11	29.47	28.30	31.90	41.86
2 Latitude (deg)	-29.72	-29.94	-28.47	-29.50	-30.68	-29.66	-28.60	-29.05	-28.67
2 Longitude (deg)	1.73	11.87	21.94	26.24	35.60	32.38	41.27	46.05	54.72
3 Latitude (deg)	-38.27	-38.37	-46.57	-44.96	-47.16	-38.44	-44.61	-38.18	-44.48
3 Longitude (deg)	-108.18	-100.29	-111.20	-102.74	-97.58	-76.65	-81.61	-61.39	-68.10
4 Latitude (deg)	19.88	20.99	22.21	21.58	18.72	19.15	21.37	19.21	21.53
4 Longitude (deg)	-110.72	-103.69	-96.11	-91.04	-85.16	-78.42	-72.26	-64.75	-58.99
Corner coordinates (high res.):									
1 Latitude (deg)	2.21	2.00	2.91	2.09	9.42	2.16	2.91	2.49	2.94
1 Longitude (deg)	-53.21	-46.12	-38.81	-32.74	-27.33	-20.44	-13.12	-7.06	0.20
2 Latitude (deg)	-31.21	-31.42	-30.51	-31.29	-24.65	-31.17	-30.45	-30.84	-30.45
2 Longitude (deg)	-49.03	-41.95	-34.51	-28.35	-23.00	-16.22	-8.81	-2.67	4.44
3 Latitude (deg)	-32.09	-32.28	-31.39	-32.19	-25.69	-32.09	-31.37	-31.80	-31.35
3 Longitude (deg)	-58.79	-51.75	-44.18	-38.12	-31.89	-25.95	-18.45	-12.36	-5.21
4 Latitude (deg)	1.42	1.21	2.02	1.24	8.32	1.38	2.05	1.65	2.09
4 Longitude (deg)	-61.48	-54.38	-47.10	-40.99	-35.99	-28.70	-21.41	-15.33	-8.10

Support Data—Continued

303	307	311	315	319	323	327	331	335	339	344	348	351	355
IV-101	IV-96	IV-89	IV-84	IV-77	IV-72	IV-65	IV-60	IV-53	IV-46	IV-39	IV-27	IV-94	IV-186
4456.53	4458.35	4460.50	4462.88	4465.64	4468.52	4471.16	4473.86	4476.32	4478.70	4480.67	4483.27	4738.89	4741.62
2720.43	2722.25	2724.40	2726.78	2729.54	2732.42	2735.06	2737.76	2740.22	2742.60	2744.57	2747.17	3002.79	3005.57
-14.45	-14.45	-14.45	-14.45	-14.46	-14.50	-14.44	-14.43	-14.41	-14.40	-14.39	-14.34	-42.01	-41.96
3.38	9.99	16.59	23.18	29.77	36.35	42.95	49.54	56.14	62.75	69.36	82.59	-99.09	-92.48
-0.08	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.19	-0.20
1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.11	1.11
150.02	138.06	154.23	124.83	140.94	131.14	143.11	319.43	122.15	122.41	134.94	175.05	100.17	95.85
150.14	138.19	154.35	124.94	141.14	131.21	143.31	319.32	122.34	122.61	135.12	175.08	100.19	95.87
1.41	1.59	1.16	2.12	0.97	3.15	0.93	1.84	1.26	1.23	1.16	1.43	14.63	12.99
0.55	0.62	0.45	0.82	0.38	1.22	0.36	0.71	0.49	0.48	0.45	0.55	5.31	4.72
336.00	323.74	340.00	310.27	326.64	316.15	328.59	145.48	307.60	307.08	319.89	0.00	297.38	292.93
336.12	323.87	340.12	310.39	326.83	316.22	328.79	145.38	307.79	307.28	320.06	0.04	297.40	292.95
6.10	5.86	5.85	5.74	5.79	5.45	5.57	5.89	5.63	4.84	5.08	4.98	25.78	24.52
1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967
5	5	5	5	5	5	5	5	5	5	5	5	5	5
18	17	17	16	16	15	15	14	14	13	13	12	25	25
5	17	5	17	5	17	5	17	5	17	5	4	17	5
14	12	10	8	7	5	4	3	2	1	0	59	1	1
44.03	40.63	44.43	56.93	17.63	47.63	33.13	25.63	28.63	37.13	52.33	32.53	47.43	23.03
43.91	40.51	44.31	56.81	17.51	47.51	33.01	25.51	28.51	37.01	52.21	32.41	47.31	22.91
69.24	68.77	68.31	67.85	67.40	66.95	66.49	66.03	65.56	65.10	64.62	63.66	82.77	82.38
69.46	69.13	68.46	68.47	67.60	67.78	66.67	65.64	65.94	65.46	64.90	63.64	87.83	86.97
83.42	83.22	83.23	82.82	83.02	82.17	82.78	83.55	82.45	82.32	82.18	81.87	73.29	74.18
2098.04	2083.71	2069.81	2055.96	2042.28	2028.75	2014.62	2000.70	1986.56	1972.45	1958.10	1928.97	2508.06	2496.19
-0.57	-0.93	-0.39	-1.59	-0.52	-2.13	-0.47	1.01	-0.97	-0.95	-0.71	-0.06	-13.97	-12.63
68.90	68.20	68.08	66.88	67.08	65.67	66.20	66.65	64.97	64.52	64.19	63.71	73.91	74.36
0.76	0.87	0.63	1.15	0.53	1.71	0.50	0.99	0.68	0.66	0.63	0.77	7.43	6.60
5.86	6.63	4.82	8.79	4.05	13.07	3.87	7.58	5.20	5.09	4.82	5.90	56.77	50.42
450.18	450.50	450.82	451.30	451.66	452.38	452.57	453.09	453.45	453.84	454.16	454.61	502.80	502.00
-15.19	-15.17	-15.09	-15.18	-14.92	-15.76	-14.90	-13.58	-14.81	-14.80	-14.89	-15.21	-42.97	-42.26
3.83	10.67	16.90	24.28	30.15	37.86	43.30	48.79	56.82	63.40	69.88	82.67	-86.50	-81.34
2720.75	2722.66	2724.62	2727.51	2729.70	2734.03	2735.20	2738.30	2740.47	2742.85	2744.79	2747.50	3038.76	3033.90
16.79	17.06	16.82	17.77	17.43	17.04	17.42	19.43	18.27	17.83	17.55	26.92	-44.77	-43.41
44.62	52.33	57.82	67.56	71.80	81.85	85.20	90.11	100.03	107.11	112.86	133.28	-137.83	-132.27
-29.58	-29.73	-29.67	-29.72	-29.50	-29.15	-29.68	-33.88	-29.53	-30.18	-30.12	-30.70	-51.88	-50.53
61.94	70.29	74.24	88.43	87.65	105.20	100.95	117.65	116.60	123.23	129.34	140.95	-140.88	-135.18
39.21	-38.94	-38.92	-45.21	-38.63	-39.35	-38.50	-36.97	-38.40	-37.80	-38.20	-38.83	-65.34	-63.77
-49.50	-41.86	-36.80	-47.27	-22.95	-14.19	-10.25	-4.67	4.36	10.67	16.24	25.33	141.15	147.71
19.81	20.10	18.53	20.82	19.62	22.77	18.90	13.95	20.69	19.87	20.27	19.23	6.80	3.27
-59.29	-44.56	-37.39	-30.33	-25.65	-17.95	-11.30	-3.47	0.37	9.52	14.34	26.98	-150.05	-142.44
1.87	1.89	2.00	1.91	2.22	1.28	2.28	3.86	2.41	2.41	2.32	1.94	-24.04	-23.17
6.23	13.15	19.37	26.84	32.65	40.54	45.87	51.21	59.40	66.22	72.61	85.40	-89.94	-84.38
-31.49	-31.51	-31.42	-31.59	-31.26	-32.36	-31.29	-29.72	-31.24	-31.33	-31.42	-31.82	-56.15	-55.77
10.83	17.62	23.81	31.26	37.05	44.89	50.14	55.47	63.71	70.04	76.60	89.36	-60.00	-56.56
-32.48	-32.46	-32.37	-32.49	-32.21	-33.20	-32.21	-30.71	-32.15	-32.11	-32.25	-32.66	-62.06	-61.32
1.04	7.81	14.02	21.41	27.25	34.89	40.32	45.89	53.8	60.18	66.72	79.41	-75.82	-72.21
1.00	1.05	1.17	1.06	1.40	0.47	1.48	3.06	1.59	1.69	1.58	1.24	-27.68	-26.70
-2.02	4.90	11.10	18.57	24.36	32.27	37.55	42.80	51.07	57.87	64.26	77.05	-99.59	-94.00

TABLE 2.—Photographic

Plate number.....	359	363	367	371	375	379	383	387	391
Frame number.....	IV-180	IV-172	IV-167	IV-160	IV-155	IV-148	IV-142	IV-136	IV-131
<i>Spacecraft</i>									
Position:									
Spacecraft radius (km).....	4745.09	4746.81	4745.14	4748.14	4747.18	4745.46	4742.67	4739.04	4735.10
Spacecraft altitude (km).....	3008.99	3010.71	3009.04	3012.04	3011.08	3009.36	3006.57	3002.94	2999.00
Latitude of nadir point (deg).....	-41.99	-41.98	-41.82	-42.03	-42.07	-42.11	-42.14	-42.16	-42.20
Longitude of nadir point (deg).....	-85.86	-79.20	-72.48	-65.80	-59.07	-52.33	-45.58	-38.84	-32.12
Orientation:									
Mean altitude rate (km/sec).....	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
Horizontal velocity (km/sec).....	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Tilt azimuth (med. res.).....	85.22	100.32	95.15	99.01	95.97	99.61	93.44	97.11	52.40
Tilt azimuth (high res.).....	85.24	100.34	95.16	99.03	95.99	99.63	93.46	97.13	52.41
Emission angle (deg).....	12.65	13.12	13.75	13.12	11.84	12.73	14.21	13.29	13.79
Tilt angle (deg).....	4.60	4.76	4.99	4.76	4.30	4.62	5.16	4.83	5.01
Swing angle (deg) (med. res.).....	282.67	297.25	292.42	296.32	293.51	297.24	291.29	295.38	251.03
Swing angle (deg) (high res.).....	282.69	297.27	292.44	296.34	293.53	297.26	291.31	295.40	251.05
North deviation angle (deg).....	24.22	24.62	25.08	24.97	24.37	25.10	25.91	25.98	23.30
<i>Photography</i>									
Time of exposure (GMT):									
Year.....	1967	1967	1967	1967	1967	1967	1967	1967	1967
Month.....	5	5	5	5	5	5	5	5	5
Day.....	24	24	23	23	22	22	21	21	20
Hour.....	17	5	17	4	16	4	16	4	16
Minute.....	0	0	0	59	58	57	56	54	52
Second (med. res.).....	54.43	29.23	11.63	16.83	26.53	22.33	5.33	35.43	51.93
Second (high res.).....	54.31	29.11	11.51	16.71	26.41	22.21	5.21	35.31	51.81
Illumination (deg):									
Sun angle at nadir.....	81.99	81.56	81.06	80.66	80.19	79.72	79.24	78.77	78.32
Phase angle.....	86.58	86.06	85.90	85.18	84.33	84.07	84.24	83.36	82.84
Sun azimuth at principal ground point.....	74.57	73.13	72.56	72.28	72.76	71.55	70.41	70.32	73.97
Sun arc at nadir.....	2484.27	2471.23	2456.22	2444.01	2429.69	2415.46	2401.07	2386.88	2373.17
Alpha.....	-12.63	-12.44	-13.35	-12.48	-11.41	-12.00	-13.81	-12.66	-12.48
Incidence angle.....	73.95	73.67	72.58	72.74	72.94	72.11	70.47	70.76	70.47
<i>Photographs</i>									
Tilt distance (mm) (film scale):									
Med. res.....	6.42	6.66	6.97	6.65	6.01	6.46	7.21	6.75	7.01
High res.....	49.11	50.88	53.32	50.87	45.96	49.39	55.12	51.62	53.57
Resolution constant (m).....	502.33	502.95	503.14	503.17	502.12	502.44	503.09	501.78	501.50
Principal ground point:									
Latitude (deg).....	-40.83	-42.93	-42.01	-42.79	-42.40	-42.94	-42.03	-42.64	-36.50
Longitude (deg).....	-75.22	-67.94	-60.70	-54.52	-48.89	-41.38	-33.37	-27.40	-23.47
Slant distance (km).....	3035.90	3039.64	3040.82	3040.98	3034.64	3036.57	3040.52	3032.60	3030.92
Corner coordinates (med. res.):									
1 Latitude (deg).....	-42.17	-43.91	-43.63	-44.02	-43.27	-44.16	-44.18	-44.56	-38.14
1 Longitude (deg).....	-124.96	-119.63	-111.34	-106.18	-100.47	-93.33	-83.97	-78.89	-70.07
2 Latitude (deg).....	-49.32	-51.03	-50.76	-51.15	-50.42	-51.30	-51.31	-51.70	-45.42
2 Longitude (deg).....	-127.28	-122.89	-114.09	-109.33	-103.54	-96.56	-86.57	-81.83	-70.91
3 Latitude (deg).....	-63.98	-63.01	-64.53	-61.86	-63.30	-62.25	-65.96	-63.74	-65.75
3 Longitude (deg).....	151.58	161.23	166.33	170.49	-176.79	-174.60	-167.17	-162.53	-159.67
4 Latitude (deg).....	-6.43	3.01	2.64	3.79	2.70	1.69	3.22	1.53	3.78
4 Longitude (deg).....	-130.46	-129.22	-121.16	-116.73	-110.93	-102.74	-94.63	-88.77	-83.76
Corner coordinates (high res.):									
1 Latitude (deg).....	-21.41	-23.92	-22.88	-23.76	-23.30	-23.97	-22.92	-23.69	-15.79
1 Longitude (deg).....	-78.15	-71.02	-63.90	-57.73	-51.93	-44.66	-36.85	-30.96	-26.10
2 Latitude (deg).....	-54.26	-56.51	-55.35	-56.24	-55.98	-56.36	-55.05	-55.72	-49.81
2 Longitude (deg).....	-51.95	-42.37	-35.59	-28.96	-24.39	-15.83	-7.91	-1.72	-4.00
3 Latitude (deg).....	-59.63	-62.15	-61.02	-61.94	-61.49	-62.08	-60.90	-61.58	-54.71
3 Longitude (deg).....	-66.96	-58.38	-51.10	-44.77	-40.01	-31.58	-23.17	-17.05	-17.29
4 Latitude (deg).....	-25.07	-27.39	-26.53	-27.29	-26.77	-27.49	-26.70	-27.36	-19.89
4 Longitude (deg).....	-87.72	-80.69	-73.52	-67.38	-61.55	-54.30	-46.45	-40.53	-35.52

Support Data—Continued

395	399	403	407	411	415	419	423	427	431	435	439	443	447
IV-124	IV-119	IV-112	IV-107	IV-100	IV-95	IV-88	IV-83	IV-76	IV-71	IV-64	IV-59	IV-52	IV-45
4730.55	4726.63	4722.11	4717.92	4714.28	4711.59	4709.42	4707.94	4707.64	4708.37	4708.95	4710.63	4712.52	4715.14
2994.45	2990.53	2986.01	2981.82	2978.18	2975.49	2973.32	2971.84	2971.54	2972.27	2972.85	2974.53	2976.42	2979.04
-42.20	-42.26	-42.26	-42.26	-42.25	-42.27	-42.26	-42.23	-42.21	-42.22	-42.14	-42.11	-42.06	-42.04
-25.42	-18.74	-12.09	-5.42	1.05	7.64	14.18	20.71	27.23	33.74	40.27	46.79	53.33	59.88
-0.19	-0.19	-0.19	-0.19	-0.18	-0.18	-0.18	-0.18	-0.18	-0.18	-0.17	-0.17	-0.17	-0.17
1.11	1.11	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
99.25	97.39	95.87	94.92	96.95	95.61	96.79	98.68	97.66	103.17	96.58	89.39	99.73	96.43
99.27	97.41	95.89	94.93	96.97	95.63	96.81	98.70	97.68	103.19	96.60	89.42	99.75	96.45
13.18	13.12	12.50	13.80	13.07	12.87	12.53	14.08	12.40	15.07	12.00	9.73	12.25	13.91
4.80	4.78	4.56	5.04	4.78	4.71	4.59	5.15	4.54	5.50	4.40	3.57	4.48	5.08
297.49	295.40	294.33	292.87	295.34	293.88	295.30	297.04	295.70	301.10	294.30	286.90	297.18	293.27
297.51	295.42	294.35	292.89	295.36	293.90	295.32	297.06	295.72	301.12	294.32	286.93	297.20	293.28
25.96	25.65	25.68	25.87	25.98	25.69	25.77	26.58	25.25	26.92	24.65	22.95	24.59	24.82
1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967
5	5	5	5	5	5	5	5	5	5	5	5	5	5
20	19	19	18	18	17	17	16	16	15	15	14	14	13
4	16	4	16	4	16	4	16	4	16	4	16	4	16
50	48	46	44	42	40	38	36	35	33	32	31	30	29
59.33	55.13	49.63	42.43	36.73	33.53	38.33	52.23	13.93	44.23	29.83	21.93	24.33	31.83
59.21	55.01	49.51	42.31	36.61	33.41	38.21	52.11	13.81	44.11	29.71	21.81	24.21	31.71
77.88	77.48	77.08	76.67	76.40	76.06	75.75	75.43	75.14	74.85	74.53	74.23	73.91	73.59
82.36	81.98	81.41	81.46	80.89	80.50	80.04	80.18	79.35	79.72	78.62	77.68	77.97	78.29
69.38	69.07	69.17	67.93	68.05	67.90	67.75	66.27	67.21	64.69	66.96	68.54	66.03	64.71
2359.93	2347.61	2335.60	2323.06	2315.07	2304.58	2295.13	2285.71	2276.66	2268.07	2258.35	2249.09	2239.47	2229.72
-12.33	-12.39	-11.88	-13.16	-12.30	-12.19	-11.76	-13.04	-11.53	-13.44	-11.21	-9.42	-11.14	-12.94
70.10	69.65	69.58	68.35	68.65	68.38	68.34	67.24	67.89	66.46	67.49	68.28	66.92	65.46
6.71	6.68	6.38	7.04	6.68	6.58	6.41	7.20	6.35	7.70	6.14	4.98	6.27	7.10
51.29	51.10	48.75	53.82	51.05	50.30	49.01	55.03	48.52	58.84	46.97	38.10	47.90	54.26
500.29	499.60	498.40	498.66	497.51	496.92	496.32	497.22	495.93	498.09	495.88	494.79	496.64	498.28
-43.00	-42.78	-42.57	-42.40	-42.71	-42.53	-42.69	-42.94	-42.77	-43.68	-42.55	-41.75	-42.90	-42.41
-14.08	-7.44	-1.35	6.45	12.29	18.70	24.94	32.82	37.87	46.67	50.55	55.05	63.81	71.80
3023.59	3019.39	3012.18	3013.73	3006.78	3003.21	2999.59	3005.03	2997.25	3010.30	2996.95	2990.35	3001.54	3011.42
-44.81	-44.49	-44.33	-44.45	-44.68	-44.38	-44.51	-45.29	-44.25	23.54	-43.71	-41.85	-43.92	-43.86
-65.81	-58.78	-52.63	-44.13	-38.84	-32.18	-26.22	-18.22	-13.27	42.45	-0.40	4.32	12.51	21.53
-51.93	-51.59	-51.43	-51.53	-51.76	-51.46	-51.59	-52.36	-51.32	-53.09	-50.78	-48.96	-50.99	-50.91
-68.90	-61.74	-55.51	-46.80	-41.70	-34.97	-29.11	-21.06	-16.23	-8.08	-3.35	1.49	9.36	18.75
-62.52	-64.56	-61.95	-64.80	-63.55	-63.31	-65.22	-63.58	-64.24	-65.14	-62.21	-61.64	-62.70	-64.13
-150.79	-139.61	-138.72	-129.53	-123.92	-117.58	-105.13	-106.78	-92.79	-89.88	-82.86	-71.20	-67.32	-62.72
2.86	1.26	2.01	5.25	3.22	2.07	3.04	1.20	4.08	2.03	1.07	-3.44	1.19	3.95
-79.50	-68.26	-63.25	-56.36	-50.10	-42.62	-37.61	-27.78	-25.00	-14.20	-9.83	-2.81	3.44	11.34
-24.16	-23.90	-23.71	-23.51	-23.93	-23.72	-23.94	-24.26	-24.02	-25.11	-23.74	-22.73	-24.13	-23.50
-17.64	-10.88	-4.82	2.97	8.74	15.25	21.44	29.09	34.55	42.84	47.44	52.46	60.72	68.71
-56.08	-55.91	-55.66	-55.37	-55.69	-55.57	-55.72	-55.74	-55.96	-56.46	-55.91	-55.49	-56.35	-55.73
11.78	18.01	23.64	31.75	37.62	43.65	49.93	58.88	62.69	74.02	74.86	77.37	88.56	96.81
-61.95	-61.68	-61.38	-61.15	-61.48	-61.27	-61.44	-61.68	-61.57	-62.58	-61.38	-60.52	-61.86	-61.29
-3.65	2.61	8.48	16.55	22.45	28.52	34.82	43.69	47.39	58.42	59.50	62.17	72.95	81.22
-27.78	-27.51	-27.32	-27.21	-27.57	-27.34	-27.54	-27.96	-27.54	-28.78	-27.20	-26.00	-27.54	-27.06
-27.21	-20.45	-14.34	-6.56	-0.77	5.75	11.96	19.59	25.05	33.28	37.92	42.95	51.17	59.13

TABLE 2.—Photographic

Plate number.....	449	453	457	461	465	469	473	477	481
Frame number.....	IV-38	IV-9	IV-193	IV-179	IV-166	IV-154	IV-130	IV-118	IV-106
<i>Spacecraft</i>									
Position:									
Spacecraft radius (km).....	4717.67	4725.22	5255.27	5327.89	5328.66	5349.48	5310.89	5291.03	5270.57
Spacecraft altitude (km).....	2981.57	2989.12	3519.17	3591.79	3592.56	3613.38	3574.79	3554.93	3534.47
Latitude of nadir point (deg).....	-42.01	-42.02	-68.87	-71.38	-71.19	-72.07	-71.62	-71.67	-71.71
Longitude of nadir point (deg).....	66.45	86.28	-107.44	-96.22	-82.44	-69.24	-40.64	-26.89	-13.37
Orientation:									
Mean altitude rate (km/sec).....	-0.17	-0.18	-0.26	-0.26	-0.26	-0.26	-0.26	-0.26	-0.25
Horizontal velocity (km/sec).....	1.12	1.12	1.00	0.99	0.99	0.98	0.99	0.99	1.00
Tilt azimuth (med. res.).....	98.04	91.54	70.08	86.51	101.41	105.15	46.67	107.05	104.45
Tilt azimuth (high res.).....	98.06	91.57	70.10	86.54	101.44	105.17	46.68	107.08	104.47
Emission angle (deg).....	13.21	11.63	14.66	11.24	10.51	16.12	12.62	9.14	10.49
Tilt angle (deg).....	4.82	4.25	4.80	3.64	3.41	5.17	4.10	2.99	3.44
Swing angle (deg) (med. res.).....	295.22	288.59	231.90	246.39	264.00	267.78	211.09	274.58	271.96
Swing angle (deg) (high res.).....	295.24	288.62	231.91	246.41	264.03	267.80	211.11	274.61	271.98
North deviation angle (deg).....	24.82	23.58	0.60	0.37	3.49	15.99	357.56	6.46	9.12
<i>Photography</i>									
Time of exposure (GMT):									
Year.....	1967	1967	1967	1967	1967	1967	1967	1967	1967
Month.....	5	5	5	5	5	5	5	5	5
Day.....	13	11	25	24	23	22	20	19	18
Hour.....	4	16	16	16	16	16	16	16	16
Minute.....	28	26	24	19	18	15	11	8	4
Second (med. res.).....	45.93	38.03	27.63	23.93	43.83	55.43	43.23	5.03	5.83
Second (high res.).....	45.81	37.91	27.51	23.81	43.71	55.31	43.11	4.91	5.71
Illumination (deg):									
Sun angle at nadir.....	73.25	72.19	90.07	90.44	89.90	89.59	88.19	87.69	87.26
Phase angle.....	77.66	76.22	94.63	94.08	93.20	94.49	91.50	90.37	90.39
Sun azimuth at principal ground point.....	64.76	65.09	68.60	68.16	66.38	52.21	69.34	62.02	57.96
Sun arc at nadir.....	2219.55	2187.45	2729.05	2740.48	2723.91	2714.77	2672.14	2656.95	2644.10
Alpha.....	-12.12	-11.05	-13.97	-11.23	-10.21	-15.32	-10.27	-8.24	-9.57
Incidence angle.....	65.65	65.22	89.69	82.85	83.00	79.22	81.31	82.16	80.85
<i>Photographs</i>									
Tilt distance (mm) (film scale):									
Med. res.....	6.74	5.93	6.70	5.08	4.75	7.23	5.72	4.17	4.80
High res.....	51.55	45.37	51.24	38.86	36.35	55.25	43.72	31.87	36.69
Resolution constant (m).....	498.18	498.34	588.60	598.04	597.69	605.57	596.19	590.66	588.05
Principal ground point:									
Latitude (deg).....	-42.63	-41.79	-63.88	-69.51	-71.30	-71.70	-65.02	-72.49	-72.16
Longitude (deg).....	77.77	96.20	-85.98	-74.07	-60.23	-33.52	-25.85	-6.99	9.45
Slant distance (km).....	3010.80	3011.79	3557.30	3614.33	3612.25	3659.87	3603.18	3569.77	3554.00
Corner coordinates (med. res.):									
1 Latitude (deg).....	-43.95	-42.44	-35.04	-36.38	-38.76	-45.37	-27.79	-40.08	-41.99
1 Longitude (deg).....	26.96	45.79	-147.49	-140.73	-131.39	-115.08	-87.91	-82.21	-67.07
2 Latitude (deg).....	-51.01	-49.54	-41.24	-41.21	-42.79	-49.35	-35.39	-43.61	-45.69
2 Longitude (deg).....	24.01	43.02	-156.16	-150.87	-142.25	-126.76	-96.45	-93.52	-78.39
3 Latitude (deg).....	-63.24	-63.01	-28.34	-35.30	-28.44	-43.24	-34.55	-26.22	-29.65
3 Longitude (deg).....	-55.95	-32.87	150.47	173.75	178.41	-165.87	-128.40	-131.00	-119.04
4 Latitude (deg).....	3.52	-7.21	-21.32	-24.53	-5.44	-21.23	-26.82	-7.81	-12.75
4 Longitude (deg).....	16.69	41.18	-139.56	-131.03	-116.75	-96.65	-87.28	-66.93	-50.40
Corner coordinates (high res.):									
1 Latitude (deg).....	-23.78	-22.69	-37.95	-44.68	-47.19	-46.61	-38.65	-49.05	-48.61
1 Longitude (deg).....	74.65	93.46	-77.24	-64.62	-52.42	-32.55	-15.98	-1.13	13.83
2 Latitude (deg).....	-56.00	-55.44	-81.89	-83.09	-81.09	-75.94	-84.03	-79.86	-79.22
2 Longitude (deg).....	102.78	119.53	-31.48	31.86	55.67	66.38	31.66	110.61	119.97
3 Latitude (deg).....	-61.57	-60.67	-83.58	-85.11	-84.69	-84.73	-83.16	-84.11	-84.92
3 Longitude (deg).....	87.17	104.14	-128.50	176.15	159.69	123.46	-83.59	-164.01	-157.46
4 Latitude (deg).....	-27.28	-26.10	-39.54	-45.77	-48.37	-49.55	-39.36	-50.26	-50.19
4 Longitude (deg).....	65.08	83.90	-92.40	-81.21	-69.53	-50.17	-31.21	-18.40	-3.34

Support Data—Continued

485	489	493	497	501	505	506	509	510	513	517	521	525	529
IV-94	IV-82	IV-70	IV-58	IV-44	IV-8	IV-5	IV-192	IV-191	IV-177	IV-165	IV-184	IV-178	V-53
5252.98	5239.01	5232.59	5229.71	5233.65	5241.15	5248.59	7240.10	7239.51	7227.97	7222.63	7526.26	7532.35	2926.53
3516.88	3502.91	3496.49	3493.61	3497.55	3505.05	3512.49	5504.00	5503.41	5491.87	5486.53	5790.16	5796.25	1190.53
-71.70	-71.62	-71.56	-71.36	-71.27	-70.91	-71.23	33.93	33.95	33.96	33.96	-34.03	-33.98	42.56
-0.67	12.04	24.60	37.31	50.06	76.54	76.27	86.05	86.05	99.33	112.70	97.52	104.14	-147.00
-0.25	-0.25	-0.25	-0.25	-0.24	-0.24	-0.25	0.17	0.17	0.17	0.17	-0.13	-0.13	0.28
1.00	1.01	1.01	1.01	1.01	1.01	1.01	0.73	0.73	0.73	0.73	0.70	0.70	1.16
103.48	106.42	109.75	100.34	106.98	92.09	100.25	288.75	288.89	290.06	290.12	259.11	264.17	297.71
103.51	106.45	109.77	100.37	107.01	92.12	100.28	288.76	288.89	290.06	290.13	259.11	264.16	297.39
9.62	9.44	11.25	8.10	8.97	7.32	7.17	33.94	33.98	33.22	33.33	29.73	23.42	46.75
3.17	3.12	3.71	2.68	2.96	2.42	2.36	7.69	7.70	7.56	7.59	6.57	5.26	25.60
270.51	272.96	276.02	268.69	274.66	259.55	267.46	281.73	281.86	282.31	281.67	269.51	274.97	107.30
270.53	272.99	276.05	268.72	274.69	259.58	267.49	281.73	281.87	282.31	281.67	269.51	274.97	106.97
6.78	5.94	9.51	4.51	5.72	1.36	1.44	192.19	192.26	191.42	190.78	174.87	178.99	12.78
1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967	1967
5	5	5	5	5	5	5	5	5	5	5	5	5	8
17	16	15	14	13	11	11	25	25	24	23	25	24	11
16	15	15	15	15	15	15	9	9	9	9	1	13	18
0	56	53	51	49	46	46	47	47	45	43	30	29	40
8.23	38.03	35.33	18.33	23.83	48.33	17.93	9.13	5.63	28.53	51.03	32.13	33.33	5.83
8.11	37.91	35.21	18.21	23.71	48.21	17.81	9.01	5.51	28.41	50.91	32.01	33.21	5.71
87.09	86.90	86.76	86.56	86.36	85.60	85.77	99.43	99.43	100.33	101.31	106.22	106.64	101.25
89.98	89.67	89.95	89.04	88.95	87.93	87.93	106.97	106.97	107.72	108.75	112.78	111.88	125.81
59.44	59.38	55.08	61.98	59.57	61.94	61.85	257.70	257.65	258.73	259.41	275.83	271.85	261.56
2638.82	2633.10	2628.97	2622.70	2616.65	2593.81	2598.77	3012.79	3012.65	3040.19	3069.88	3218.44	3231.25	3067.84
-8.81	-8.41	-9.69	-7.52	-7.86	-7.04	-6.56	-33.38	-33.40	-32.59	-32.76	-29.72	-23.34	-45.25
81.19	81.28	80.31	81.53	81.12	80.89	81.38	73.70	73.68	75.24	76.08	83.06	88.54	80.82
4.42	4.35	5.18	3.74	4.14	3.38	3.30	10.79	10.81	10.61	10.65	9.20	7.35	38.25
33.80	33.25	39.63	28.60	31.62	25.80	25.22	82.52	82.61	81.09	81.39	70.32	56.19	291.40
584.63	582.21	582.24	579.98	581.07	581.52	582.69	948.86	948.85	945.25	944.60	987.68	977.48	239.88
-72.11	-72.37	-72.64	-71.57	-72.11	-70.49	-71.50	38.22	38.29	38.81	38.83	-35.18	-33.87	48.97
20.19	32.47	49.06	54.40	69.06	91.36	91.31	53.84	53.79	67.86	81.13	69.32	82.21	176.11
3533.29	3518.68	3518.89	3505.20	3511.77	3514.53	3521.59	5734.62	5734.55	5712.80	5708.84	5969.23	5907.59	1449.77
-41.01	-41.01	-43.35	-39.51	-40.69	-37.02	-37.42	17.90	17.99	17.24	16.76	-16.18	0.00	68.29
-54.28	-41.47	-27.76	-17.94	-4.66	22.27	21.11	132.69	132.69	146.49	159.14	159.64	0.00	-145.57
-44.72	-44.60	-46.86	-43.32	-44.28	-41.19	-41.23	28.53	28.60	27.70	27.23	-3.97	0.00	33.43
-65.43	-52.64	-39.20	-28.84	-15.80	11.78	10.34	142.38	142.42	156.43	168.91	150.98	0.00	-153.90
-28.24	-28.24	-33.95	-28.61	-27.52	-26.09	-26.92	30.72	32.11	30.76	29.38	-2.54	0.00	16.77
-105.27	-91.86	-78.97	-65.96	-54.48	-24.73	-24.02	178.70	175.62	-172.21	-156.33	150.66	0.00	162.64
-9.55	-9.94	-19.16	-9.04	-7.25	-7.21	-8.79	-0.32	-0.19	-1.00	-1.49	-16.97	0.00	74.29
-38.48	-25.27	-9.95	-3.83	10.73	34.08	34.11	128.32	128.28	141.99	154.61	160.95	0.00	156.39
-48.77	-49.25	-49.47	-48.54	-49.13	-47.34	-48.49	-6.44	-6.28	-4.74	-4.99	-54.62	-67.04	58.15
25.84	38.62	53.30	61.10	75.23	99.66	99.73	40.06	40.10	54.41	66.84	-18.71	20.49	-176.97
-80.17	-80.35	-78.92	-81.40	-80.58	-82.94	-82.34	53.54	53.43	55.37	55.86	19.76	18.22	41.04
133.55	148.64	160.96	167.78	-175.64	-157.49	-149.16	-8.76	-9.33	6.67	20.71	42.17	58.90	-169.93
-84.86	-84.55	-84.62	-85.07	-84.72	-84.99	-84.30	77.04	77.07	78.13	78.34	4.85	7.38	39.91
-135.37	-120.73	-121.01	-86.75	-81.76	-28.31	-39.02	10.24	9.39	25.47	41.92	76.07	86.97	-177.51
-50.07	-50.43	-51.06	-49.53	-50.24	-48.02	-49.13	3.55	3.66	4.17	4.04	-75.91	-72.86	57.83
8.77	21.50	36.01	44.35	58.24	83.24	82.97	65.44	65.44	78.98	91.79	65.11	94.71	168.15

TABLE 2.—Photographic

Plate number	533	537	541	545	549	553	557	561	565
Frame number	V-28	V-181	V-163	V-158	V-124	V-79	V-103	V-85	V-39
<i>Spacecraft</i>									
Position:									
Spacecraft radius (km)	6751.49	2917.33	2966.77	2969.01	2972.61	2980.92	2972.57	2975.46	2988.46
Spacecraft altitude (km)	5015.49	1181.33	1230.77	1233.01	1236.61	1244.92	1236.57	1239.46	1252.46
Latitude of nadir point (deg)	24.16	41.61	37.62	37.69	37.82	37.72	37.85	37.80	37.14
Longitude of nadir point (deg)	-103.16	134.27	147.19	152.57	170.09	-163.64	178.75	-172.42	-128.86
Orientation:									
Mean altitude rate (km/sec)	0.34	0.28	0.26	0.26	0.26	0.25	0.26	0.26	0.25
Horizontal velocity (km/sec)	0.57	1.16	1.14	1.14	1.14	1.14	1.14	1.14	1.13
Tilt azimuth (med. res.)	282.05	279.41	279.54	278.68	280.54	281.65	281.31	281.63	283.48
Tilt azimuth (high res.)	281.13	279.06	279.20	278.35	280.20	281.34	280.99	281.32	283.18
Emission angle (deg)	35.73	41.89	44.74	44.49	44.92	48.31	47.20	48.27	50.79
Tilt angle (deg)	8.64	23.41	24.32	24.19	24.36	25.78	25.37	25.81	26.75
Swing angle (deg) (med. res.)	90.67	90.24	89.72	89.58	90.23	89.54	89.94	89.79	89.71
Swing angle (deg) (high res.)	89.71	89.88	89.37	89.22	89.87	89.21	89.61	89.46	89.39
North deviation angle (deg)	1.55	5.69	4.40	4.79	4.41	3.80	4.18	4.07	3.27
<i>Photography</i>									
Time of exposure (GMT):									
Year	1967	1967	1967	1967	1967	1967	1967	1967	1967
Month	8	8	8	8	8	8	8	8	8
Day	8	17	16	16	15	13	14	13	10
Hour	14	17	19	10	2	2	10	18	10
Minute	52	56	42	10	20	34	24	29	52
Second (med. res.)	30.13	42.43	58.53	5.73	3.93	32.33	50.73	40.33	51.53
Second (high res.)	30.01	42.31	58.41	5.61	3.81	32.21	50.61	40.21	51.41
Illumination (deg):									
Sun angle at nadir	109.30	97.15	98.99	99.39	100.41	101.96	100.84	101.42	103.89
Phase angle	117.93	120.55	123.31	123.58	124.76	127.73	126.21	127.22	130.63
Sun azimuth at principal ground point	267.70	261.60	262.73	263.22	263.63	263.27	262.90	262.86	263.63
Sun arc at nadir	3311.54	2943.54	2999.24	3011.35	3042.20	3089.15	3055.31	3072.83	3147.64
Alpha	-35.72	-41.88	-44.74	-44.49	-44.92	-48.31	-47.20	-48.26	-50.79
Incidence angle	82.21	76.68	78.57	79.09	79.84	79.43	79.01	78.96	79.85
<i>Photographs</i>									
Tilt distance (mm) (film scale):									
Med. res.	12.13	34.57	36.09	35.86	36.14	38.56	37.87	38.61	40.24
High res.	92.71	263.84	275.48	273.75	275.88	294.31	289.01	294.72	307.16
Resolution constant (m)	871.28	229.13	243.29	243.21	244.70	253.09	249.24	252.00	259.97
Principal ground point:									
Latitude (deg)	26.81	41.96	38.16	37.94	38.67	38.78	38.84	38.85	38.84
Longitude (deg)	-133.10	109.41	121.24	126.79	143.83	167.58	150.83	158.87	-159.43
Slant distance (km)	5265.72	1384.79	1470.37	1469.88	1478.87	1529.62	1506.34	1523.02	1571.18
Corner coordinates (med. res.):									
1 Latitude (deg)	38.73	58.19	54.92	54.92	55.45	55.52	55.59	55.63	55.44
1 Longitude (deg)	-17.61	133.15	145.21	150.37	168.35	-166.42	176.18	-175.34	-132.02
2 Latitude (deg)	-35.06	26.05	21.22	21.13	21.61	21.31	21.64	21.55	20.94
2 Longitude (deg)	-65.49	127.94	139.83	145.52	162.53	-173.04	170.00	178.29	-139.62
3 Latitude (deg)	8.48	10.64	11.92	11.66	12.49	8.51	10.70	9.23	0.00
3 Longitude (deg)	-70.71	94.57	114.63	120.50	137.18	157.01	142.33	148.97	0.00
4 Latitude (deg)	19.40	59.54	60.06	59.64	60.86	61.47	61.29	61.40	61.30
4 Longitude (deg)	-65.83	59.38	97.66	103.47	118.54	134.98	120.95	125.89	150.82
Corner coordinates (high res.):									
1 Latitude (deg)	60.89	50.12	46.78	46.58	47.35	47.71	47.65	47.76	47.97
1 Longitude (deg)	-129.42	111.11	123.30	128.72	145.92	169.98	153.07	161.18	-156.71
2 Latitude (deg)	-8.15	34.05	29.71	29.52	30.18	30.00	30.21	30.13	29.81
2 Longitude (deg)	-129.55	113.25	124.93	130.55	147.56	171.42	154.68	162.77	-155.52
3 Latitude (deg)	-17.18	32.58	28.08	27.84	28.57	28.09	28.41	28.22	27.73
3 Longitude (deg)	-161.96	106.42	117.53	123.21	140.06	163.01	146.63	154.42	-164.75
4 Latitude (deg)	55.11	49.88	46.70	46.42	47.30	47.68	47.60	47.70	48.05
4 Longitude (deg)	164.94	101.95	113.64	119.16	136.01	158.87	142.40	150.10	-169.02

Support Data—Continued

569	573	577	581	585	589	590	593	594	597	601	602	603	607
V-32	V-31	V-29	V-25	V-24	V-8	V-6	V-14	V-15	II-196	IV-146	IV-123	I-136	I-30
3132.84	3099.55	4284.26	4287.55	6744.76	4388.00	4384.44	7491.79	7492.24	3255.03	7883.99	7887.43	3063.80	3034.76
1396.84	1363.55	2548.26	2551.55	5008.76	2652.00	2648.44	5755.79	5756.24	1519.03	6147.89	6151.33	1327.80	1298.76
22.60	26.12	59.08	58.75	24.01	58.88	58.94	11.14	11.13	-8.77	0.16	0.00	-8.11	-9.41
-116.73	-113.59	-113.56	-99.81	-89.35	-81.13	-81.15	-74.61	-74.61	100.68	134.86	161.26	129.35	-161.18
0.16	0.19	0.69	0.69	0.34	0.66	0.66	0.17	0.17	0.29	0.03	0.02	0.35	0.34
1.08	1.09	0.89	0.89	0.57	0.89	0.89	0.52	0.52	1.05	0.67	0.67	1.11	1.16
281.07	280.57	285.39	284.92	282.67	286.17	286.48	280.63	280.55	218.57	25.14	44.82	359.70	240.02
280.70	280.21	284.66	284.12	281.77	285.34	285.66	279.58	279.50	236.57	25.12	44.76		
40.97	41.58	28.01	25.24	36.67	25.03	25.09	34.79	34.78	0.47	3.73	2.04	6.23	4.04
21.30	21.82	10.97	9.94	8.84	9.64	9.66	7.60	7.59	0.25	0.82	0.45	3.52	2.31
90.48	89.53	90.98	89.62	90.93	90.57	90.91	93.52	93.44	215.85	44.84	64.07	353.76	235.06
90.08	89.14	90.22	88.79	89.99	89.71	90.05	92.43	92.35	233.86	44.82	64.01		
358.68	359.23	13.16	9.52	1.59	9.75	9.93	359.98	359.95	177.26	199.62	199.22	174.06	174.72
1967	1967	1967	1967	1967	1967	1967	1967	1967	1966	1967	1967	1966	1966
8	8	8	8	8	8	8	8	8	11	5	5	8	8
9	9	8	7	7	6	6	6	6	25	21	19	26	20
15	9	21	20	13	11	11	13	13	4	23	23	3	7
57	32	51	50	50	22	22	33	33	58	30	27	48	35
41.33	18.93	31.43	19.03	51.43	10.84	5.44	27.84	30.54	5.03	25.03	53.73	35.83	0.83
41.21	18.81	31.31	18.91	51.31	10.72	5.32	27.72	30.42	4.91	24.91	53.61		
108.88	108.12	96.43	96.99	110.25	97.75	97.72	114.50	114.50	70.27	108.94	110.94	69.56	67.81
130.18	129.94	107.40	106.93	119.09	107.39	107.39	122.08	122.08	70.42	108.60	110.63	69.91	69.70
271.25	270.79	254.65	258.77	267.80	259.75	259.60	270.84	270.85	272.80	271.70	271.07	273.67	276.20
3298.88	3275.97	2921.68	2938.84	3340.55	2961.77	2960.93	3469.28	3469.35	2129.21	3300.96	3361.68	2107.57	2054.63
-40.96	-41.58	-28.00	-25.24	-36.66	-25.03	-25.09	-34.72	-34.71	-0.28	1.56	1.42	-0.68	-3.31
89.22	88.36	79.39	81.70	82.43	82.36	82.30	87.36	87.37	70.14	110.12	112.05	69.35	66.41
31.13	31.97	15.48	13.99	12.42	13.56	13.60	10.65	10.65	0.35	1.14	0.63	4.93	3.23
237.65	244.06	118.26	106.97	94.95	103.62	103.92	81.38	81.35	1.63	8.75	4.79		
266.05	261.25	442.34	438.95	872.35	455.54	455.02	992.83	992.88	251.35	1017.72	1017.96	220.44	215.20
24.94	28.04	59.34	59.30	26.96	59.72	59.85	14.75	14.70	-8.94	2.79	1.13	-5.40	-10.27
-138.09	-135.71	-147.20	-129.76	-120.08	-111.50	-111.66	-102.28	-102.27	100.54	136.09	162.38	129.34	-162.70
1607.94	1578.91	2673.36	2652.86	5272.21	2753.15	2749.99	6000.34	6000.61	1519.06	6150.76	6152.19	1332.25	1300.61
42.23	44.92	61.93	59.66	39.81	52.36	52.12	26.53	26.50	-32.35	0.00	0.00	-22.45	-29.72
-114.58	-111.91	1.70	12.05	-6.09	38.58	39.05	1.38	1.20	73.54	0.00	0.00	109.03	173.10
4.04	7.73	12.08	7.88	-40.38	2.79	3.76	-25.51	-25.61	17.76	0.00	0.00	21.25	12.05
-122.17	-119.56	-109.30	-94.39	-49.43	-74.96	-75.04	-21.71	-21.59	79.69	0.00	0.00	111.21	-178.79
-2.24	0.69	0.00	0.00	8.69	-2.15	0.00	-2.97	-3.02	15.56	0.00	0.00	16.63	7.81
-148.15	-145.61	0.00	0.00	-57.86	-111.79	0.00	-28.58	-28.56	123.48	0.00	0.00	151.72	-144.81
52.39	54.15	69.59	0.00	19.55	67.39	66.99	10.73	10.69	-34.55	0.00	0.00	-25.98	-31.96
-152.55	-150.56	65.18	0.00	-52.98	88.79	89.02	-24.58	-24.58	124.80	0.00	0.00	145.33	-145.24
34.11	37.06	75.62	75.48	61.14	76.58	76.70	56.04	55.97	-17.90	-40.04	-42.89	-13.02	-18.01
-134.84	-132.52	-150.67	-128.17	-116.75	-110.21	-110.61	-99.39	-99.33	97.68	141.69	167.87	126.48	-165.60
15.30	18.60	43.78	43.44	-7.97	43.25	43.43	-25.92	-25.99	0.45	40.44	38.00	3.11	-2.32
-135.96	-133.42	-137.14	-121.32	-116.62	-102.73	-102.80	-100.49	-100.51	98.70	105.28	133.27	128.13	-163.98
14.62	17.76	40.86	41.15	-17.88	40.89	41.07	-26.90	-27.05	0.23	50.60	47.20	2.68	-2.71
-142.96	-140.51	-149.67	-133.58	-151.60	-115.40	-115.47	-136.91	-137.18	103.29	130.62	157.63	132.23	-160.08
35.15	37.93	71.18	72.38	53.92	73.05	73.10	48.94	48.89	-18.13	-32.16	-34.76	-13.43	-18.33
-143.03	-140.91	178.47	-160.31	176.01	-145.29	-145.82	-152.41	-151.54	102.52	164.12	-168.77	130.51	-161.43

TABLE 2.—Photographic

Plate number.....	611	615	619	623	624	625	629	633	637
Frame number.....	III-121	I-102	I-115	I-116	IV-99	I-117	II-34	II-33	II-75
<i>Spacecraft</i>									
Position:									
Spacecraft radius (km).....	3199. 19	2934. 28	3117. 14	3192. 24	7878. 33	3313. 27	3188. 58	3190. 69	3204. 69
Spacecraft altitude (km).....	1463. 19	1198. 28	1381. 14	1456. 24	6142. 23	1581. 27	1452. 58	1454. 69	1468. 69
Latitude of nadir point (deg).....	-12. 92	-9. 76	-8. 27	-7. 54	0. 107	-6. 07	-9. 94	-9. 92	-9. 74
Longitude of nadir point (deg).....	127. 09	150. 38	144. 23	148. 62	-172. 38	152. 84	172. 30	174. 29	158. 42
Orientation:									
Mean altitude rate (km/sec).....	0. 32	0. 40	0. 35	0. 32	0. 01	0. 27	0. 32	0. 32	0. 32
Horizontal velocity (km/sec).....	1. 07	1. 17	1. 10	1. 07	0. 67	1. 03	1. 07	1. 07	1. 07
Tilt azimuth (med. res.).....	181. 32	258. 94	10. 89	36. 86	293. 93	0. 00	4. 82	205. 19	181. 99
Tilt azimuth (high res.).....	181. 76				293. 95		4. 94	207. 50	181. 91
Emission angle (deg).....	23. 91	80. 92	12. 23	17. 27	10. 77	90. 00	30. 74	1. 12	24. 42
Tilt angle (deg).....	12. 71	35. 75	6. 77	9. 29	2. 36	90. 00	16. 16	0. 61	12. 94
Swing angle (deg) (med. res.).....	182. 69	253. 73	3. 93	30. 75	293. 85	270. 00	355. 34	201. 94	183. 37
Swing angle (deg) (high res.).....	183. 09				293. 86		355. 47	204. 25	183. 30
North deviation angle (deg).....	181. 15	163. 86	172. 89	172. 98	180. 53	90. 00	169. 81	176. 70	181. 06
<i>Photography</i>									
Time of exposure (GMT):									
Year.....	1967	1966	1966	1966	1967	1966	1966	1966	1966
Month.....	2	8	8	8	5	8	11	11	11
Day.....	19	23	25	25	17	25	19	19	20
Hour.....	19	16	0	0	23	7	6	2	10
Minute.....	22	36	5	9	24	15	22	54	12
Second (med. res.).....	0. 33	23. 63	55. 03	40. 93	21. 33	0. 93	53. 63	26. 33	18. 03
Second (high res.).....	0. 21				21. 21		53. 51	26. 21	17. 91
Illumination (deg):									
Sun angle at nadir.....	69. 86	60. 81	70. 35	74. 68	112. 87	82. 35	69. 77	69. 99	69. 98
Phase angle.....	69. 96	95. 07	69. 75	69. 75	115. 04	90. 00	70. 20	70. 22	70. 23
Sun azimuth at principal ground point.....	277. 35	318. 26	272. 60	271. 76	271. 47	272. 36	268. 09	273. 55	277. 47
Sun arc at nadir.....	2116. 77	1842. 50	2131. 62	2262. 60	3420. 09	2498. 06	2113. 81	2120. 69	2120. 21
Alpha.....	-1. 22	-80. 56	0. 83	9. 01	-9. 88	-90. 00	-2. 67	-0. 42	-1. 57
Incidence angle.....	70. 63	21. 32	71. 04	79. 14	105. 12	75. 28	70. 80	69. 80	70. 64
<i>Photographs</i>									
Tilt distance (mm) (film scale):									
Med. res.....	18. 00	57. 60	9. 51	13. 09	3. 29	1. 07	23. 15	0. 85	18. 35
High res.....	136. 89				25. 18		177. 94	5. 26	138. 77
Resolution constant (m).....	253. 80	348. 72	231. 44	246. 97	1020. 26	0. 00	259. 87	240. 72	255. 24
Principal ground point:									
Latitude (deg).....	-24. 13	-14. 68	-2. 92	-1. 14	3. 51	-11. 66	4. 59	-10. 39	-21. 21
Longitude (deg).....	126. 81	104. 35	145. 26	153. 40	179. 92	152. 84	173. 51	174. 07	157. 99
Slant distance (km).....	1533. 85	2107. 55	1398. 77	1492. 62	6166. 14	0. 00	1570. 57	1454. 84	1542. 58
Corner coordinates (med. res.):									
1 Latitude (deg).....	-50. 80	-46. 57	-19. 44	-18. 40	0. 00	0. 00	-11. 92	-32. 48	-48. 59
1 Longitude (deg).....	78. 65	113. 57	125. 39	134. 30	0. 00	0. 00	153. 27	148. 02	111. 79
2 Latitude (deg).....	-4. 04	0. 00	32. 87	35. 49	0. 00	0. 00	35. 80	14. 72	-1. 17
2 Longitude (deg).....	109. 27	0. 00	122. 27	131. 32	0. 00	0. 00	143. 25	155. 06	140. 42
3 Latitude (deg).....	-3. 52	-0. 07	29. 48	25. 37	0. 00	0. 00	24. 49	12. 26	-0. 68
3 Longitude (deg).....	143. 13	139. 64	-179. 83	-166. 39	0. 00	0. 00	-153. 77	-164. 61	174. 27
4 Latitude (deg).....	-50. 39	-41. 08	-23. 83	-23. 91	0. 00	0. 00	-17. 24	-34. 95	-48. 27
4 Longitude (deg).....	174. 86	127. 43	160. 99	172. 83	0. 00	0. 00	-173. 11	-163. 11	-156. 88
Corner coordinates (high res.):									
1 Latitude (deg).....	-35. 85	-16. 04	-10. 79	-9. 58	-38. 26	0. 00	-4. 36	-18. 96	-33. 02
1 Longitude (deg).....	123. 77	114. 41	142. 20	150. 26	163. 83	0. 00	169. 92	171. 22	155. 15
2 Latitude (deg).....	-15. 05	-0. 78	6. 48	9. 01	52. 69	0. 00	18. 92	-1. 42	-12. 02
2 Longitude (deg).....	124. 31	98. 80	144. 17	152. 33	154. 23	0. 00	172. 84	172. 39	155. 62
3 Latitude (deg).....	-14. 96	-5. 12	5. 97	8. 81	49. 97	0. 00	17. 79	-1. 67	-11. 92
3 Longitude (deg).....	128. 77	119. 74	148. 59	157. 25	-169. 72	0. 00	178. 48	176. 78	160. 04
4 Latitude (deg).....	-35. 66	-25. 29	-11. 29	-10. 06	-37. 21	0. 00	-5. 08	-19. 22	-32. 82
4 Longitude (deg).....	130. 06	99. 41	146. 32	154. 66	-170. 50	0. 00	174. 19	175. 98	161. 27

Support Data—Concluded

641	645	649	650	651	655	656	657	658	659	663	667	671	675
I-40	I-38	I-37	I-35	I-36	I-28	I-39	V-65	V-43	V-30	V-26	V-22	V-21	IV-51
3189.91	3121.15	3116.99	3075.45	3079.77	3040.38	3187.45	2927.95	2926.54	6804.56	6805.02	6842.23	5077.46	7850.08
1453.91	1385.15	1380.99	1339.45	1343.77	1304.38	1451.45	1191.95	1190.54	5068.56	5069.02	5106.23	3341.46	6113.98
-7.86	-8.59	-8.63	-9.03	-8.99	-9.39	-7.89	-44.72	-44.90	-25.33	-25.62	-25.65	-50.72	-0.19
-155.01	-159.54	-159.81	-162.51	-162.23	-152.92	-155.17	-147.27	-129.44	-104.74	-90.85	-77.04	-69.07	-119.45
0.29	0.31	0.32	0.33	0.33	0.34	0.29	-0.28	-0.28	-0.33	-0.33	-0.31	-0.58	0.00
1.10	1.13	1.13	1.14	1.14	1.16	1.10	1.16	1.16	0.56	0.56	0.57	0.77	0.67
77.48	73.28	72.51	343.47	20.03	225.44	77.43	246.87	252.69	262.37	259.30	260.48	187.20	39.98
13.89	5.29	4.80	0.58	0.70	2.79	13.57	35.00	35.55	40.56	39.86	41.31	56.94	14.53
7.51	2.95	2.68	0.42	0.47	1.59	7.35	19.88	20.18	9.55	9.41	9.64	16.65	3.18
73.33	68.46	67.65	338.19	14.79	220.61	73.26	82.93	90.73	93.03	90.42	92.07	25.71	40.95
176.26	175.44	175.38	174.70	174.78	174.99	176.24	82.52	90.31	92.15	89.53	91.20	25.53	40.94
359.08							359.08	1.84	357.33	356.71	357.22	287.35	179.51
1966	1966	1966	1966	1966	1966	1966	1967	1967	1967	1967	1967	1967	1967
8	8	8	8	8	8	8	8	8	8	8	8	8	5
20	20	20	20	20	19	20	12	11	9	8	7	6	13
14	14	14	14	14	17	14	11	3	2	1	0	17	23
58	54	54	52	52	5	58	49	58	43	42	34	17	18
9.53	23.13	9.93	1.03	14.23	21.03	1.13	21.83	21.33	35.03	5.13	59.73	6.43	4.93
							21.71	21.21	34.91	5.01	59.61	6.31	4.81
77.49	73.03	72.76	70.12	70.39	68.67	77.33	108.68	109.72	114.39	115.33	116.21	111.27	116.88
70.27	70.27	70.27	70.27	70.27	69.70	70.27	128.44	129.89	123.92	124.74	125.84	119.48	114.83
272.23	273.65	273.75	274.81	274.69	275.84	272.27	268.04	267.41	274.78	274.31	274.39	336.74	276.19
2347.88	2212.61	2204.54	2124.59	2132.88	2080.56	2342.96	3292.91	3324.26	3465.78	3494.40	3520.95	3371.27	3541.53
13.35	4.95	4.46	-0.27	0.21	-1.82	13.04	-34.79	-35.54	-40.52	-39.86	-41.28	-33.82	9.61
83.64	75.23	74.75	70.00	70.49	67.90	83.33	93.64	94.34	83.41	84.88	84.56	87.15	123.73
10.55	4.13	3.75	0.58	0.65	2.23	10.32	28.87	29.34	13.43	13.23	13.56	23.88	4.44
							220.61	223.96	102.60	101.14	103.63	183.62	33.95
244.43	229.72	228.93	221.62	222.34	215.97	243.84	220.29	220.82	892.08	890.33	900.38	648.20	1018.82
-6.44	-7.90	-7.98	-8.72	-8.65	-10.23	-6.49	-48.77	-47.43	-25.37	-27.23	-26.53	-85.28	8.48
-148.73	-157.26	-157.76	-162.60	-162.10	-153.78	-149.05	-168.61	-151.42	-139.16	-124.91	-112.40	-168.61	-112.11
1477.23	1388.34	1383.59	1339.39	1343.73	1305.26	1473.67	1331.39	1334.59	5391.42	5380.83	5441.61	3917.49	6157.42
-25.34	-26.52	-26.59	-27.32	-27.24	-29.50	-25.38	-31.31	-29.28	38.82	35.83	38.73	-27.95	0.00
-168.32	-178.11	-178.72	175.11	175.77	-177.15	-168.67	-152.47	-136.14	-68.73	-56.81	-42.73	-49.77	0.00
17.58	15.73	15.64	14.88	14.95	11.84	17.50	-62.49	-60.13	-44.44	-42.99	-43.97	0.00	0.00
-165.36	-173.68	-174.18	-179.11	-178.60	-169.64	-165.67	-137.09	-121.25	-31.60	-6.34	-0.75	0.00	0.00
22.16	15.64	15.17	11.43	11.76	8.27	23.99	-70.41	-64.05	-20.44	-21.42	-20.75	0.00	0.00
-110.44	-133.00	-133.99	-142.33	-141.55	-135.48	-108.39	145.47	136.64	-71.33	-56.26	-43.59	0.00	0.00
-33.92	-31.57	-31.49	-30.85	-30.91	-32.21	-33.76	-22.50	-13.35	-9.33	-10.46	-9.68	-15.35	0.00
-117.48	-135.85	-136.70	-144.39	-143.64	-135.68	-118.42	171.52	-178.41	-75.68	-61.04	-48.24	-142.12	0.00
-15.01	-16.00	-16.05	-16.56	-16.51	-17.99	-15.05	-41.10	-39.61	10.18	7.40	9.14	-62.45	-30.06
-151.49	-160.06	-160.56	-165.48	-164.98	-156.63	-151.81	-165.83	-149.22	-135.27	-120.26	-108.52	-81.28	-120.93
2.70	0.68	0.57	-0.44	-0.34	-2.27	2.62	-56.79	-55.22	-60.80	-63.24	-62.56	-75.75	66.68
-150.26	-158.65	-159.13	-163.88	-163.40	-155.08	-150.58	-165.29	-147.44	-139.83	-126.97	-114.07	96.14	-127.01
2.68	0.43	0.30	-0.82	-0.71	-2.62	2.59	-57.43	-55.92	-48.74	-49.12	-47.76	-73.49	64.14
-145.56	-154.40	-154.91	-159.84	-159.33	-151.17	-145.90	-174.81	-156.39	165.72	174.40	-170.96	149.48	-69.68
-15.44	-16.40	-16.45	-16.94	-16.89	-18.32	-15.48	-40.71	-39.16	7.98	12.78	7.49	-62.50	-30.34
-146.79	-155.71	-156.23	-161.28	-160.76	-152.45	-147.12	-172.29	-155.82	-161.91	-152.59	-136.50	-105.31	-98.41

TABLE 3.—Lunar Features

Crater	Plate number	Photo number	LAC chart	Crater	Plate number	Photo number	LAC chart
Abenezra.....	310	IV-96-H1	96	Bailly.....	457	IV-193-M	125
Abulfeda.....	309	IV-96-H2	78		461	IV-179-M	
	313	IV-89-H2			463	IV-179-H2	
Adams.....	346	IV-39-H1	98	Baily.....	114	IV-91-H3	13
	450	IV-38-H3		Ball.....	404	IV-112-H3	112
	523	IV-184-H2		Balmer.....	345	IV-39-H2	97
Agatharchides.....	286	IV-132-H1	93		346	IV-39-H1	
Agrippa.....	210	IV-97-H1	59, 60		522	IV-184-H1	
Albategnius.....	305	IV-101-H2	77	Barocius.....	413	IV-100-H2	113
	309	IV-96-H2			417	IV-95-H2	
Alfraganus.....	312	IV-89-H3	78	Barrow.....	510	IV-191-H1	
	316	IV-84-H3		Bayer.....	378	IV-155-H1	125
Aliacencis.....	306	IV-101-H1	95, 112	Beaumont.....	321	IV-77-H2	96
	408	IV-107-H3		Behaim.....	526	IV-178-H1	
	412	IV-100-H3		Beila.....	498	IV-58-H3	
Almanon.....	309	IV-96-H2	96	Berosus.....	519	IV-165-H2	
	313	IV-89-H2		Bessel.....	212	IV-90-H3	42
Alpetragius.....	301	IV-108-H2	77, 95	Bianchini.....	16	IV-152-H1	11
Alphonsus.....	301	IV-108-H2	77		74	IV-151-H3	
Amundsen.....	484	IV-106-H1			78	IV-145-H3	
	488	IV-94-H1		Biela.....	426	IV-83-H1	
	496	IV-70-H1			430	IV-76-H1	
	504	IV-44-H1			434	IV-71-H1	
Anaxagoras.....	23	IV-128-H2		Billy.....	273	IV-149-H2	74, 75
	27	IV-116-H2		Birmingham.....	23	IV-128-H2	12
Anaximander.....	7	IV-176-H2		Birt.....	298	IV-113-H1	95
	11	IV-164-H2		Blagg.....	206	IV-102-H1	59
Anaximenes.....	7	IV-176-H2		Blancanus.....	478	IV-118-H3	125
	11	IV-164-H2		Blanchinus.....	302	IV-108-H1	95
	15	IV-152-H2			306	IV-101-H1	
Angström.....	76	IV-151-H1	39		408	IV-107-H3	
	80	IV-145-H1		Boguslawsky.....	491	IV-82-H2	
	176	IV-144-H3			495	IV-170-H2	
Ansgarius.....	239	IV-17-M		Bohnenberger.....	325	IV-72-H2	79, 97
	349	IV-27-H2		Bonpland.....	292	IV-120-H3	76
	525	IV-178-M		Borda.....	326	IV-72-H1	97
	526	IV-178-H1			330	IV-65-H1	
Apianus.....	306	IV-101-H1	95	Boscovich.....	209	IV-97-H2	60
	310	IV-96-H1		Boss.....	519	IV-165-H2	
	412	IV-100-H3		Bouguer.....	16	IV-152-H1	11
Arago.....	218	IV-85-H1	60		78	IV-145-H3	
Aratus.....	204	IV-102-H3	41		503	IV-44-H2	
Archimedes.....	100	IV-115-H1	41	Boussingault.....	485	IV-94-M	
	167	IV-157-M			499	IV-58-H2	
	199	IV-109-M			524	IV-184-H3	
	200	IV-109-H3		Brenner.....	429	IV-76-H2	114
Archytas.....	28	IV-116-H1	12		432	IV-71-H3	
	32	IV-104-H1			433	IV-71-H2	
Aristarchus.....	76	IV-151-H1	39	Breislak.....	410	IV-107-H1	113, 127
	167	IV-157-M			414	IV-100-H1	
Aristoteles.....	32	IV-104-H1	13		417	IV-95-H2	
	36	IV-92-H1		Brisbane.....	524	IV-184-H3	
Arnold.....	35	IV-92-H2			528	IV-178-H3	
	43	IV-68-H2		Buch.....	417	IV-95-H2	113
	510	IV-191-H1			420	IV-88-H3	
	514	IV-177-H1			421	IV-88-H2	
Arzachel.....	301	IV-108-H2	95	Bullialdus.....	289	IV-125-H2	94
Asclepi.....	410	IV-107-H1	127	Burckhardt.....	237	IV-54-H2	44
	414	IV-100-H1			511	IV-191-H2	
	418	IV-95-H1			515	IV-177-H2	
	422	IV-88-H1		Bürg.....	115	IV-91-H2	26
Atlas.....	122	IV-79-H3	27		116	IV-91-H1	
	123	IV-79-H2		Büsching.....	417	IV-95-H2	113
	511	IV-191-H2			420	IV-88-H3	
Azophi.....	310	IV-96-H1	96		421	IV-88-H2	
	314	IV-89-H1		Byrd.....	6	IV-176-H3	
Babbage.....	8	IV-176-H1			26	IV-116-H3	
Baco.....	410	IV-107-H1	127		34	IV-92-H3	
	414	IV-100-H1		Byrgius.....	262	IV-168-H1	92
	418	IV-95-H1			266	IV-161-H1	
	486	IV-94-H3			368	IV-167-H3	
Baillaud.....	35	IV-92-H2		Campanus.....	286	IV-132-H1	93, 94
	39	IV-80-H2			392	IV-131-H3	
	43	IV-68-H2		Capella.....	324	IV-72-H3	79
	514	IV-177-H1					

TABLE 3.—*Lunar Features*—Continued

Crater	Plate number	Photo number	LAC chart	Crater	Plate number	Photo number	LAC chart
Capuanus	388	IV-136-H3	111	Eratosthenes	195	IV-114-M	58, 76
	392	IV-131-H3			197	IV-114-H2	
Cardanus	161	IV-169-H2		Euclides	284	IV-132-H3	76
Carpenter	1	IV-190-M		Euler	184	IV-133-H3	39, 40
Catharina	317	IV-84-H2	96	Fabricius	429	IV-76-H2	114
Cauchy	225	IV-73-H2	61		433	IV-71-H2	
	229	IV-66-H2		Faraday	409	IV-107-H2	112, 113
Cavalerius	162	IV-169-H1	56		413	IV-100-H2	
	166	IV-162-H1		Fermat	314	IV-89-H1	96
Celsius	420	IV-88-H3	113	Fernelius	409	IV-107-H2	112
Chacornac	220	IV-78-H3	42, 43		412	IV-100-H3	
Chevallier	515	IV-177-H2	27	Firmicus	512	IV-191-H3	62
Cichus	392	IV-131-H3	111	Flammariion	300	IV-108-H3	77
	396	IV-124-H3		Flamsteed	276	IV-143-H3	75
Clairaut	410	IV-107-H1	113, 127	Fontenelle	23	IV-128-H2	11, 12
	413	IV-100-H2			24	IV-128-H1	
Clavius	386	IV-142-H1	125, 126	Foucault	12	IV-164-H1	11
	407	IV-107-M			16	IV-152-H1	
	457	IV-193-M			74	IV-151-H3	
Cleomedes	232	IV-61-H3	43, 44	Fracastorius	322	IV-77-H1	97
	237	IV-54-H2		Fra Mauro	292	IV-120-H3	76
	512	IV-191-H3		Franklin	511	IV-191-H2	27
Colombo	329	IV-65-H2	79	Fraunhofer	441	IV-59-H2	114
	333	IV-60-H2		Furnerius	445	IV-52-H2	114
Conon	204	IV-102-H3	41	Galilaei	165	IV-162-H2	56
Cook	333	IV-60-H2	97	Gambart	194	IV-121-H1	58
Copernicus	189	IV-126-H2	58		198	IV-114-H1	
	193	IV-121-H2			292	IV-120-H3	
Crüger	261	IV-168-H2	74, 92	Gärtner	36	IV-92-H1	13
	265	IV-161-H2			40	IV-80-H1	
Curtius	479	IV-118-H2	126		510	IV-191-H1	
Cuvier	406	IV-112-H1	126, 127		514	IV-177-H1	
	410	IV-107-H1		Gassendi	277	IV-143-H2	93
	482	IV-106-H3			281	IV-137-H2	
Cyrillus	317	IV-84-H2	78	Gauricus	404	IV-112-H3	111, 112
Damoiseau	264	IV-161-H3	74	Gauss	515	IV-177-H3	
Darney	221	IV-125-H2	76		519	IV-165-H2	
Darwin	261	IV-168-H2	92	Gay-Lussac	189	IV-126-H2	58
Davy	297	IV-113-H2	77		193	IV-121-H2	
Dawes	217	IV-85-H2	42	Geber	309	IV-96-H2	96
	221	IV-78-H2			313	IV-89-H2	
De Gasparis	274	IV-149-H1	92	Geminus	511	IV-191-H2	27
Delambre	214	IV-90-H1	78		515	IV-177-H2	
	312	IV-89-H3		Gemma Frisius	416	IV-95-H3	112, 113
De la Rue	44	IV-68-H1		Gibbs	526	IV-178-H1	
	510	IV-191-H1		Gilbert	526	IV-178-H1	
	514	IV-177-H1		Goelenius	333	IV-60-H2	79
Delaunay	306	IV-101-H1	55	Goddard	241	IV-181-H2	
Delisle	80	IV-145-H1	39		520	IV-165-H3	
	84	IV-139-H1		Godin	210	IV-97-H1	59, 60
Delmotte	515	IV-177-H2	44	Goldschmidt	23	IV-128-H2	
Deluc	394	IV-131-H1	126		27	IV-116-H2	
	402	IV-119-H1			510	IV-191-H1	
	478	IV-118-H3		Goodacre	416	IV-95-H3	113
Democritus	515	IV-177-H1	13		420	IV-88-H3	
Descartes	313	IV-89-H2	78	Grimaldi	260	IV-168-H3	94
Deslandres	298	IV-113-H1	95		264	IV-161-H3	
	404	IV-112-H3		Gruemberger	479	IV-118-H2	
Diophantus	84	IV-139-H1	39	Gruithuisen	76	IV-151-H1	23
Dollond	313	IV-89-H2	78		80	IV-145-H1	
Doppelmayr	278	IV-143-H1	93	Guericke	293	IV-120-H2	76
	384	IV-142-H3			297	IV-113-H2	
Drygalski	460	IV-193-H1		Gutenberg	324	IV-72-H3	79
Eddington	160	IV-169-H3			325	IV-72-H2	
Eichstadt	254	IV-181-H1			328	IV-65-H3	
	258	IV-173-H1		Hagecius	422	IV-88-H1	127
Eimmart	512	IV-191-H3	44		426	IV-83-H1	
	516	IV-177-H3			430	IV-76-H1	
Endymion	44	IV-68-H1		Hahn	519	IV-165-H2	
	510	IV-191-H1		Hainzel	385	IV-142-H2	110, 111
	514	IV-177-H1			389	IV-136-H2	
	518	IV-165-H1		Hale	501	IV-44-M	
Epigenes	23	IV-128-H2		Halley	304	IV-101-H3	77
	27	IV-116-H2			308	IV-96-H3	

TABLE 3.—Lunar Features—Continued

Crater	Plate number	Photo number	LAC chart	Crater	Plate number	Photo number	LAC chart
Hansteen.....	273	IV-149-H2	74	Julius Caesar.....	213	IV-90-H2	60
Hanno.....	524	IV-184-H3		Kaiser.....	409	IV-107-H2	112
	528	IV-178-H3			412	IV-100-H3	
Harpalus.....	16	IV-152-H1	11	Kant.....	317	IV-84-H2	78
	66	IV-163-H3		Kapteyn.....	522	IV-184-H1	80
	70	IV-158-H3		Kästner.....	239	IV-17-M	
Hase.....	338	IV-53-H1	98		348	IV-27-H3	
	523	IV-184-H2			526	IV-178-H1	
Hausen.....	459	IV-193-H2		Kepler.....	181	IV-138-H2	57
Hayn.....	518	IV-165-H1		Kies.....	290	IV-125-H1	94
Hecataeus.....	239	IV-17-M		Kirch.....	95	IV-122-H2	25
	350	IV-27-H2			99	IV-115-H2	
	526	IV-178-H1		Klaproth.....	479	IV-118-H2	
Helicon.....	83	IV-139-H2	24	Klein.....	305	IV-101-H2	77
	87	IV-134-H2		Krafft.....	161	IV-169-H2	
Hell.....	400	IV-119-H3	112	Krusenstern.....	412	IV-100-H3	95
	404	IV-112-H3		Kunowsky.....	186	IV-133-H1	57
Helmholtz.....	503	IV-44-H2		Lalande.....	198	IV-114-H1	77
	525	IV-178-M			296	IV-113-H3	
	528	IV-178-H3		Lambert.....	92	IV-127-H1	40
Heraclitus.....	402	IV-119-H1	126		188	IV-126-H3	
	406	IV-112-H1		Lamé.....	522	IV-184-H1	80
	409	IV-107-H2		Langrenus.....	336	IV-53-H3	80
	410	IV-107-H1			337	IV-53-H2	
Hercules.....	122	IV-79-H3	27		522	IV-184-H1	
	123	IV-79-H2		Lansberg.....	190	IV-126-H1	58, 76
	511	IV-191-H2			284	IV-132-H3	
Herigonius.....	281	IV-137-H2	75		287	IV-125-H3	
Herodotus.....	167	IV-157-M	38, 39	La Pérouse.....	239	IV-17-M	
	168	IV-157-H3			522	IV-184-H1	
Herschel.....	300	IV-108-H3	77		526	IV-178-H1	
Herschel, J.....	11	IV-164-H2	11	Lassell.....	297	IV-113-H2	77, 95
	12	IV-164-H1		Lee.....	278	IV-143-H1	93
	16	IV-152-H1			384	IV-142-H3	
Hesiodus.....	294	IV-120-H1	94	Legendre.....	346	IV-39-H1	98
	400	IV-119-H3			450	IV-38-H3	
Hevelius.....	162	IV-169-H1	56		523	IV-184-H2	
	163	IV-162-M		Legentil.....	463	IV-179-H2	
	166	IV-162-H1			467	IV-166-H2	
Hippalus.....	282	IV-137-H1	93, 94	Lehmann.....	373	IV-160-H2	110
	286	IV-132-H1		Letronne.....	277	IV-143-H2	75
Hipparchus.....	304	IV-101-H3	77	Le Verrier.....	87	IV-134-H2	24
	308	IV-96-H3			91	IV-127-H2	
Hommel.....	414	IV-100-H1	127	Lexell.....	404	IV-112-H3	112
	418	IV-95-H1			408	IV-107-H3	
	422	IV-88-H1		Liapunov.....	520	IV-165-H3	
Hooke.....	515	IV-177-H2	27	Licetus.....	405	IV-112-H2	112, 126
Horrebow.....	12	IV-164-H1	11		406	IV-112-H1	
	16	IV-152-H1			409	IV-107-H2	
	70	IV-158-H3		Lick.....	512	IV-191-H3	62
Horrocks.....	206	IV-102-H1	77	Lilius.....	396	IV-124-H1	126
	304	IV-101-H3			402	IV-119-H1	
Hortensius.....	186	IV-133-H1	58		406	IV-112-H1	
	190	IV-126-H1			482	IV-106-H3	
Hubble.....	520	IV-165-H3		Lindenau.....	318	IV-84-H1	96
Huggins.....	401	IV-119-H2	112		420	IV-88-H3	
	405	IV-112-H2			424	IV-83-H3	
Humboldt.....	525	IV-178-M		Linné.....	208	IV-97-H3	42
	527	IV-178-H2		Littrow.....	220	IV-78-H3	43
Ideler.....	414	IV-100-H1	127	Lockyer.....	429	IV-76-H2	114
	418	IV-95-H1		Lohrmann.....	166	IV-162-H1	74
	421	IV-88-H2			264	IV-161-H3	
Inghirami.....	361	IV-180-H2		Longomontanus.....	386	IV-142-H1	125, 126
	362	IV-180-H1			394	IV-131-H1	
Jacobi.....	402	IV-119-H1	126, 127	Lubniezky.....	289	IV-125-H2	94
	406	IV-112-H1		Lyot.....	526	IV-178-H3	
	410	IV-107-H1		Maclear.....	213	IV-90-H2	60
	486	IV-94-H3			217	IV-85-H2	
Jansen.....	221	IV-78-H2	60, 127	Macrobius.....	228	IV-66-H3	43
Jansky.....	242	IV-18-H1			232	IV-61-H3	
	520	IV-165-H3			512	IV-191-H3	
Janssen.....	433	IV-71-H2	113, 114	Mädler.....	321	IV-77-H2	78, 79
Joliot-Curie.....	240	IV-18-H3		Magelhaens.....	329	IV-65-H2	79
	520	IV-165-H3			333	IV-60-H2	
Jules Verne.....	637	II-75-M					

TABLE 3.—Lunar Features—Continued

Crater	Plate number	Photo number	LAC chart	Crater	Plate number	Photo number	LAC chart
Maginus	401	IV-119-H2	112, 126	Peary	22	IV-128-H3	
	402	IV-119-H1			26	IV-116-H3	
	405	IV-112-H2			34	IV-92-H3	
	481	IV-106-M		Peirce	236	IV-54-H3	44
Mairan	71	IV-158-H2	23, 60		512	IV-191-H3	
Mallet	437	IV-64-H2	114	Peirescius	445	IV-52-H2	
Manilius	209	IV-97-H2	59		524	IV-184-H3	
Manzinus	485	IV-94-M		Petavius	338	IV-53-H1	98
	487	IV-94-H2			523	IV-184-H2	
	491	IV-82-H2		Philolaus	1	IV-190-M	
Maraldi	220	IV-78-H3	43		11	IV-164-H2	
	224	IV-73-H3			15	IV-152-H2	
Marco Polo	201	IV-109-H2	59	Phillips	523	IV-184-H2	
Marinus	527	IV-178-H2			527	IV-178-H2	
Markov	4	IV-190-H1		Picard	236	IV-54-H3	62
Maskelyne	222	IV-78-H1	60, 61		512	IV-191-H3	
Maupertius	78	IV-145-H3	11	Piccolomini	322	IV-77-H1	96, 97
	82	IV-139-H3			428	IV-76-H3	
Maurolycus	409	IV-107-H2	112, 113	Pickering	210	IV-97-H1	77
	413	IV-100-H2			308	IV-96-H3	
	417	IV-95-H2		Pictet	401	IV-119-H2	112
Mercator	213	IV-90-H2	94		405	IV-112-H2	
	286	IV-132-H1		Pitatus	294	IV-120-H1	94
	396	IV-124-H3			400	IV-119-H3	
Mercurius	515	IV-177-H2			404	IV-112-H3	
Mersenius	274	IV-149-H1	93	Pitiscus	418	IV-95-H1	113, 127
Messala	511	IV-191-H2	27		422	IV-88-H1	
	515	IV-177-H2		Plana	115	IV-91-H2	26
Messier	332	IV-60-H3	79		116	IV-91-H1	
Metius	433	IV-71-H2	114	Plato	24	IV-128-H1	12
	437	IV-64-H2			86	IV-134-H3	
Meton	31	IV-104-H2			94	IV-122-H3	
	35	IV-92-H2			187	IV-126-M	
	510	IV-191-H1		Playfair	306	IV-101-H1	95
Milichius	185	IV-133-H2	57		310	IV-96-H1	
Miller	304	IV-101-H3	112	Plinius	217	IV-85-H2	60
	405	IV-112-H2		Plutarch	516	IV-177-H3	
	409	IV-107-H2			520	IV-165-H3	
Monge	329	IV-65-H2	97	Poisson	416	IV-95-H3	95
	333	IV-60-H2		Polybius	318	IV-84-H1	96
Moretus	479	IV-118-H2		Pontanus	310	IV-96-H1	96
	481	IV-106-M			314	IV-89-H1	
	525	IV-178-H1		Poncelet	2	IV-190-H3	
Mösting	202	IV-109-H1	77		3	IV-190-H2	
	296	IV-113-H3			7	IV-176-H2	
	300	IV-108-H3		Pontécoulant	438	IV-64-H1	
Mutus	490	IV-82-H3	127		524	IV-184-H3	
Nasireddin	405	IV-112-H2	112		528	IV-178-H3	
	409	IV-107-H2			637	IV-184-H3	
Neander	432	IV-71-H3	97	Prinz	76	IV-151-H1	39
Nearch	422	IV-88-H1	127		176	IV-144-H3	
Neper	520	IV-165-H3		Proclus	229	IV-66-H2	43, 61
Neumayer	503	IV-44-H2			233	IV-61-H2	
Newton	479	IV-118-H2		Proctor	401	IV-119-H2	112
Nicolai	417	IV-95-H2	113		405	IV-112-H2	
	421	IV-88-H2		Protagoras	28	IV-116-H1	12
	425	IV-83-H2			32	IV-104-H1	
Nöggerath	374	IV-160-H1	110, 125	Ptolemaeus	98	IV-115-H3	
	378	IV-155-H1			300	IV-108-H3	77
Nonius	408	IV-107-H3	112		301	IV-108-H2	
	412	IV-100-H3			304	IV-101-H3	
Oenopides	4	IV-190-H1		Purbach	302	IV-108-H1	95
	54	IV-183-H3			408	IV-107-H3	
	58	IV-175-H3		Pythagoras	3	IV-190-H2	
Oken	523	IV-184-H2			7	IV-176-H2	
	527	IV-178-H2			8	IV-176-H1	
Orontius	401	IV-119-H2	112	Pytheas	188	IV-126-H3	40
	405	IV-112-H2		Rabbi Levi	420	IV-88-H3	113
Pallas	202	IV-109-H1	59		424	IV-83-H3	
Parrot	305	IV-101-H2	77	Regiomontanus	302	IV-108-H1	95
Parry	194	IV-120-H3	76		408	IV-107-H3	
Pascal	3	IV-190-H2		Reichenbach	330	IV-65-H1	97
	7	IV-176-H2			334	IV-60-H1	

TABLE 3.—Lunar Features—Continued

Crater	Plate number	Photo number	LAC chart	Crater	Plate number	Photo number	LAC chart
Reiner	170	IV-157-H1	56	Street	401	IV-119-H2	112
Reinhold	190	IV-126-H1	58	Struve	153	IV-182-H2	
Repsold	50	IV-189-H3		Tannerus	410	IV-107-H1	127
Rhaeticus	206	IV-102-H1	59, 77		414	IV-100-H1	
	210	IV-97-H1		Taruntius	512	IV-191-H3	61
Rheita	433	IV-71-H2	114	Thales	514	IV-177-H1	
	436	IV-64-H3		Thebit	298	IV-113-H1	95
Riccioli	256	IV-173-H3			302	IV-108-H1	
	260	IV-168-H3		Theophilus	317	IV-84-H2	78
Riccus	421	IV-88-H2	113		321	IV-77-H2	
	424	IV-83-H3		Timaeus	28	IV-116-H1	12
Römer	224	IV-73-H3	43	Timocharis	96	IV-122-H1	40
Rosenberger	422	IV-88-H1	127		192	IV-121-H3	
	430	IV-76-H1			196	IV-114-H3	
	494	IV-70-H3		Tobias Mayer	185	IV-133-H2	57, 58
Ross	217	IV-85-H2	60	Torricelli	320	IV-77-H3	78
Rothmann	318	IV-84-H1	96	Triesnecker	206	IV-102-H1	59
	424	IV-83-H3		Tsiolkovsky	603	I-136-M	
	428	IV-76-H3			612	III-121-H1	
Rutherford	474	IV-130-H3	126		613	III-121-H2	
	478	IV-118-H3			625	I-117-M	
Sabine	218	IV-85-H1	60	Tycho	397	IV-124-H2	111, 112
Sacrobosco	310	IV-96-H1	96		401	IV-119-H2	
	314	IV-89-H1		Ukert	205	IV-102-H2	59
Santbech	329	IV-65-H2	97		206	IV-102-H1	
	330	IV-65-H1		Ulugh Beigh	52	IV-189-H1	
Sasserides	401	IV-119-H2	112		56	IV-183-H1	
	405	IV-112-H2		Vega	441	IV-59-H2	
Saussure	401	IV-119-H2	112		445	IV-52-H2	
	405	IV-112-H2			523	IV-184-H2	
Scheiner	386	IV-142-H2	125		524	IV-184-H3	
Schickard	369	IV-167-H2	110	Vendelinus	337	IV-53-H2	98
	377	IV-155-H2			522	IV-184-H1	
	461	IV-179-M		Vieta	266	IV-161-H1	92
Schiller	374	IV-160-H1	125		372	IV-160-H3	
	378	IV-155-H1			376	IV-155-H3	
	461	IV-179-M		Vitello	278	IV-143-H1	93, 110
Schlüter	252	IV-181-H3	59		384	IV-142-H3	
Schomberger	483	IV-106-H2			388	IV-136-H3	
	491	IV-82-H2		Vitruvius	221	IV-78-H2	43
Schröter	202	IV-109-H1	59	Vlacq	422	IV-88-H1	127
Schumacher	515	IV-177-H3			426	IV-83-H1	
Scoresby	22	IV-128-H3			430	IV-76-H1	
	30	IV-104-H3			494	IV-70-H3	
	34	IV-92-H3		Walter	408	IV-107-H3	95, 112
Scott	484	IV-106-H1			412	IV-100-H3	
	496	IV-70-H1		Watt	430	IV-76-H1	
Seleucus	160	IV-169-H3	38		433	IV-71-H2	
Seneca	516	IV-177-H3			434	IV-71-H1	
	520	IV-165-H3		Webb	522	IV-184-H1	80
Sharp	71	IV-158-H2	23	Werner	408	IV-107-H3	95, 112
Simpelius	428	IV-141-H2			412	IV-100-H3	
	487	IV-94-H2		Whewell	214	IV-90-H1	60
Snellius	334	IV-60-H1	98	Wilhelm	389	IV-136-H2	111
	338	IV-53-H1			393	IV-131-H2	
	440	IV-59-H3		Wohler	425	IV-83-H2	113
Sosigenes	213	IV-90-H2	60	Yerkes	233	IV-61-H2	62
Spallanzani	417	IV-95-H2	113		512	IV-191-H3	
	421	IV-88-H2		Young	441	IV-59-H2	62, 114
Stadius	193	IV-121-H2	58	Zach	402	IV-119-H1	126
	197	IV-114-H2			406	IV-112-H1	
Steinheil	430	IV-76-H1			482	IV-106-H3	
	433	IV-71-H2		Zagut	318	IV-84-H1	96, 113
Stevinus	440	IV-59-H3	98, 114		420	IV-88-H3	
Stiborius	424	IV-83-H3	113		424	IV-83-H3	
Stöfler	409	IV-107-H2	112	Zeno	515	IV-177-H2	
	413	IV-100-H2		Zöllner	312	IV-89-H3	78
Strabo	44	IV-68-H1			316	IV-84-H3	
	510	IV-191-H1		Zucchius	370	IV-167-H1	125
	514	IV-177-H1					

