DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

Prepared in Cooperation with the
JET PROPULSION LABORATORY, CALIFORNIA INSTITUTE OF TECHNOLOGY
FOR THE LANGLEY RESEARCH CENTER
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ATLAS OF MARS
1:5,000,000 TOPOGRAPHIC SERIES
AMENTHES QUADRANGLE
M 5M 15/248 RMC, 1977
I-1024 (MC-14)

TOPOGRAPHIC MAP OF THE AMENTHES QUADRANGLE OF MARS

MC-14
M 5M 15/248 RMC
1977

NOTES ON BASE

This map is one in a series of topographic map sheets covering the entire surface of Mars at nominal scales of 1:25,000,000 and 1:5,000,000 (Batson 1973, Batson, 1976). The major source of map data was the Mariner 9 television experiment (Masursky and others, 1970).

ADOPTED FIGURE

The figure of Mars used for the computation of the map projection is an oblate spheroid (flattening of 1/192) with an equatorial radius of 3393.4 km and a polar radius of 3375.7 km.

PROJECTON

The Mercator projection is used for this sheet, with a scale of 1:5,000,000 at the equator and 1:4,336,000 at lat 30°. Longitudes increase to the west in accordance with usage of the International Astronomical Union (IAU, 1971). Latitudes are areographic (de Vaucouleurs and others, 1973).

CONTROL

Planimetric control is provided by photogrammetric triangulation using Mariner 9 pictures (Davies, 1973; Davies and Arthur, 1973) and the radio-tracked position of the spacecraft. The first meridian passes through the crater Airy-O (lat 5.1° S) within the crater Airy. No simple statement is possible for the precision, but local consistency is 5-10 km.

MAPPING TECHNIQUE

A series of mosaics of Mercator projections of Mariner 9 pictures was assembled at 1:5,000,000.

Shaded relief was copied from the mosaics and portrayed with uniform illumination with the sun to the west. Many Mariner 9 pictures besides those in the base mosaic were examined to improve the portrayal (Levinthal and others, 1973, Inge and Bridges, 1976). The shading is not generalized and may be interpreted with nearly photographic reliability (Inge, 1972).

Shaded relief analysis and representation were made by Anthony G. Sanchez.

ALBEDO MARKINGS

The markings superimposed on the shaded relief were hand copied from pictures that were computer enhanced especially to show low-frequency tone variation (Batson and Inge, 1976). The surface in these pictures is illuminated from a variety of angles from the camera line of sight. The markings therefore delineate boundaries of local brightness variations only and should not be considered as a true measure of albedo. No attempt was made to use Earth-based telescopic albedo data.

Airbrush portrayal of albedo markings was done by Jay L. Inge.

CONTOURS

Since Mars has no seas and hence no sea level, the datum (the 0-km contour line) for altitudes is defined by a gravity field described by spherical harmonics of fourth order and fourth degree (Jordan and Lorell, 1973) combined with a 6.1 millibar atmospheric pressure surface derived from radio-occultation data (Kliore and others, 1973; Christensen 1975). This datum is a triaxial ellipsoid with semi-major axes of A=3394.6 km, B=3393.3 km, and a semi-minor axis of C=3376.3 km. The semi-major axis A intersects the Martian surface at long 105°.

The contour lines (Wu, 1975) were compiled from Earth-based radar determinations (Downs and others, 1971; Pettengill and others, 1971) and measurements made by Mariner 9 instrumentation, including the ultraviolet spectrometer (Hord and others, 1974), infrared interferometer spectrometer (Conrath and others, 1973), and stereoscopic Mariner 9 television pictures (Wu and others, 1973).

Formal analysis of contour-line accuracy has not been made. The estimated vertical accuracy of each source of data indicates a probable error of 1-2 km.

COLOR

No attempt was made on the map precisely to duplicate the color of the Martian surface, although the color used does approximate it.

NOMENCLATURE

All names on this sheet are approved by the International Astronomical Union (IAU, 1974; 1977). Double and triple letter designations refer to position on the map and are derived from a grid based on equidistant meridians and parallels; the alphabet (I and O omitted) runs in the direction of increasing longitude (W) and latitude (N). The complete designation of a crater is the name of the quadrangle following by a double or triple letter. The prefix AME (identifying the Amenthes sheet) is part of the complete designation but, for brevity, is not shown on most craters. Some craters have commemorative names; letter designations for these craters are shown in parentheses. Where craters lie mostly on an adjoining map, their letters are derived from the other map; where craters lie exactly on the boundary of two maps, their letters are derived from the eastern or southern map.

MC-14: Abbreviation for Mars Chart 14.
M 5M 15/248 RMC: Abbreviation for Mars 1:5,000,000 series; center of sheet, 15° N latitude, 248° longitude; shaded relief map, R, with albedo markings, M, and contours, C.

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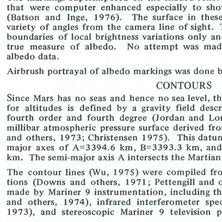
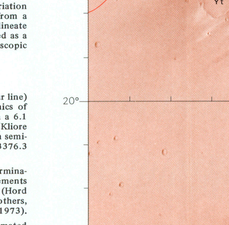
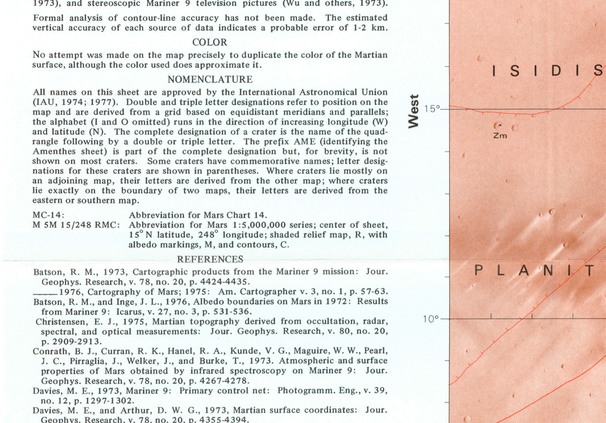




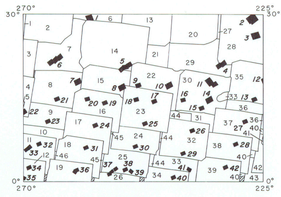


Albedo features from International Planetary Patrol photographs, Lowell Observatory, Flagstaff, Ariz.

QUADRANGLE LOCATION
Number preceded by I refers to published topographic map

SCALE 1:5 000 000 AT 0° LATITUDE
MERCATOR PROJECTION

CONTOUR INTERVAL 1 KILOMETRE



A-camera pictures

Index No.	DAS No.	Index No.	DAS No.
1	8550889	24	7435223
2	8622849	25	7435153
3	7219763	26	7435083
4	7219413	27	8910894
5	7219348	28	7507748
6	8694879	29	7507603
7	7291793	30	7507253
8	7291443	31	7507538
9	7291373	32	7507113
10	7291303	33	7507043
11	7291233	34	7506973
12	7291163	35	7579213
13	8766839	36	7579148
14	7363753	37	7579073
15	7363403	38	7579003
16	7363333	39	7578933
17	7363263	40	7579428
18	7363193	41	7650968
19	7363123	42	7650893
20	8838799	43	7650823
21	7435713	44	7435573
22	7435363	45	7363613
23	7435293	46	7291653

High resolution B-camera pictures

Index No.	DAS No.	Index No.	DAS No.	Index No.	DAS No.
1	*11349780*	*11*	*10241214*	*29*	*7507078*
2	*10313874*	*12*	*7579928*	*30*	*7435188*
3	*10313804*	*13*	*7579178*	*31*	*7363228*
4	*7435888*	*14*	*7507568*	*32*	*7291268*
5	*12902043*	*15*	*7507218*	*33*	*12685953*
6	*12902113*	*16*	*6104138*		*12686023*
7	*11975079*	*17*	*7435328*	*34*	*7291198*
8	*11975289*	*18*	*6032248*	*35*	*8693724*
9	*11975149*	*19*	*7363368*	*36*	*7363158*
10	*12686303*	*20*	*5960288*		*8765684*
11	*12686233*	*21*	*7291408*	*37*	*11974869*
	12686373	*22*	*10169394*		*11974659*
7	*7291758*	*23*	*7291338*		*11974729*
8	*7363718*	*24*	*7363298*	*38*	*7435118*
9	*6032388*	*25*	*7435258*	*39*	*8837644*
10	*7435678*	*26*	*7507148*	*40*	*7507008*
11	*10241354*	*27*	*7579108*	*41*	*8981494*
	10241294	*28*	*7579038*	*42*	*7578968*

INDEX TO MARINER 9 PICTURES

The mosaic used to control the positioning of features on this map was made with the Mariner 9 A-camera pictures outlined above, identified by vertical numbers. The albedo markings overlay was made with the same pictures specially processed to accentuate albedo markings. Useful coverage is not available in cross-hatched areas. Also shown (by solid black rectangles) are the high-resolution B-camera pictures, identified by italic numbers. The DAS numbers may differ slightly (usually by 5) among various versions of the same picture.

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