DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

Prepared for the
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ATLAS OF MARS
1:5,000,000 TOPOGRAPHIC SERIES
SYRTIS MAJOR QUADRANGLE
M 5M 15/292 RMC, 1976
I-967 (MC-13)

NOTES ON BASE

This is one map 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). 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.

PROJECTION

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 5.19° S) within the crater Airy. No simple statement is possible for the precision, but local consistency is 5-15 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). The shading is not generalized and may be interpreted with photographic reliability (Inge, 1972).

Shaded relief analysis and representation were made by Patricia M. Bridges.

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, 1975). 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 Patricia M. Bridges.

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 to precisely 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; Millman, written communication, 1975), except the following name which is provisional: Locras Valles. Double and triple letter designations for craters refer to position on the map. 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-13: Abbreviation for Mars Chart 13.
M 5M 15/292 RMC: Abbreviation for Mars 1:5,000,000 series; center of sheet, 15° latitude, 292° longitude; shaded relief map, R, with albedo markings, M, and contours, C.

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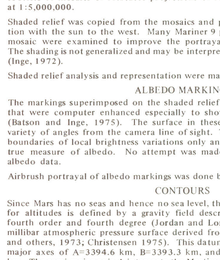
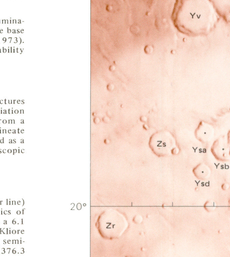
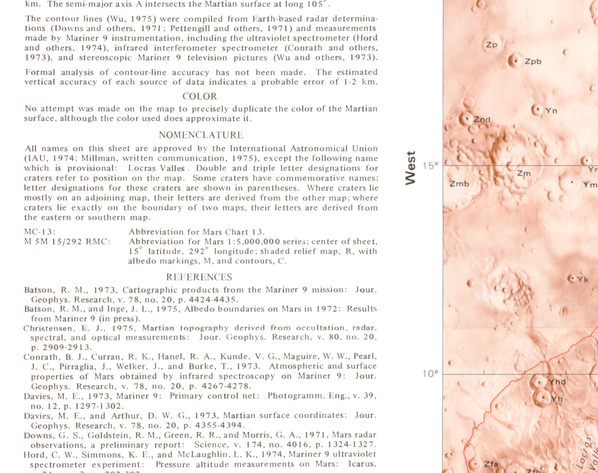






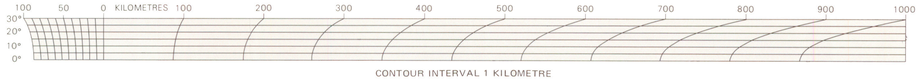
Albedo features from International Planetary Patrol photographic Lowell Observatory, Flagstaff, Ariz.

QUADRANGLE LOCATION
Number preceded by I refers to published topographic map

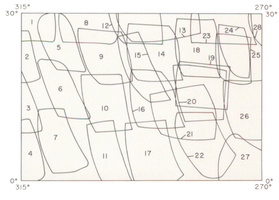
Interior—Geological Survey, Reston, VA.—1976—G76060

Prepared on behalf of the Planetology Programs Office, National Aeronautics and Space Administration under contract W-13,709.

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



CONTOUR INTERVAL 1 KILOMETRE



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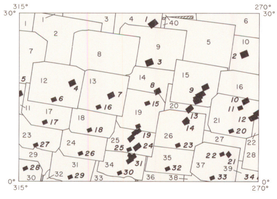
2	6859753	16	7075703
3	6859683	17	7075653
4	6859613	18	7147803
5	6931783	19	11798186
6	6931713	20	7147733
7	6931643	21	9953549
8	8354869	22	7147663
9	7003743	23	8550889
10	7003673	24	7147943
11	7003603	25	7219763
12	8406829	26	7219693
13	9953829	27	7219623
14	7075773	28	8622849

INDEX TO MARINER 9 PICTURES USED TO MAKE THE ALBEDO MARKINGS OVERPRINT

Most of the pictures indexed above were specially processed to accentuate albedo markings. Only the useful image areas of the pictures are outlined.



A-camera pictures				High-resolution B-camera pictures			
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2	6931783	22	7281083	*2*	*7147978*	*16*	*7003358*
3	8334869	23	6931293	*3*	*7003918*	*17*	*6931328*
4	9953879	24	7003253	*4*	*6931748*	*18*	*7002288*
5	7147803	25	7075283	*5*	*6859718*	*19*	*7075318*
6	8506889	26	7147313	*6*	*6931398*		*9881274*
7	6859753	27	7219273	*7*	*7003708*		*9881344*
8	7003743	28	7291233	*8*	*7075738*		*9881414*
9	7075773	29	6931253	*9*	*7147768*	*20*	*7219308*
10	7219763	30	6931153		*10097424*	*21*	*8621694*
11	6859403	31	7003983		*10097364*	*22*	*7219238*
12	6931433	32	7003113		*10097294*	*23*	*7147278*
13	7003393	33	7075143		*11798151*	*24*	*9953374*
14	7075423	34	7075213		*7147418*	*25*	*7075248*
15	7147453	35	7147243	*10*	*7219728*	*26*	*7003218*
16	7219413	36	7147173	*11*	*7219378*	*27*	*6931258*
17	6931363	37	7219203	*12*	*10169394*	*28*	*6931188*
18	7003323	38	7219133		*10169324*	*29*	*7003148*
19	7075353	39	7291163		*10169254*	*30*	*7075178*
20	7147383	40	8406829	*13*	*11798011*	*31*	*8549734*
					9953584		*9953304*
				14	*9953514*		*9953234*
					7147348	*32*	*7147208*
					11179741	*33*	*7219168*
						34	*8693724*

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. 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.

TOPOGRAPHIC MAP OF THE SYRTIS MAJOR QUADRANGLE OF MARS

MC-13
M 5M 15/292 RMC
1976

For sale by U.S. Geological Survey,
Denver, CO. 80225; and Reston, VA. 22092