ATLAS OF MARS
1:5,000,000 TOPOGRAPHIC SERIES
PHOENICIS LACUS QUADRANGLE
M 5M –15/112 RMC, 1976
I-984 (MC-17)

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

Prepared for the
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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-0 (lat 5.19° S) within the crater Airy. No simple statement is possible for the precision, but local consistency is 10-20 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, 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 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 commun., 1975). 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-17: Abbreviation for Mars Chart.
M 5M –15/112 RMC: Abbreviation for Mars 1:5,000,000 series: center of sheet, 15° S latitude, 112° longitude; shaded relief map, R, with albedo markings, M, and contours, C.

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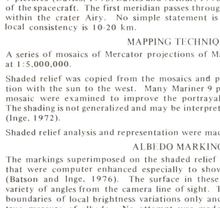
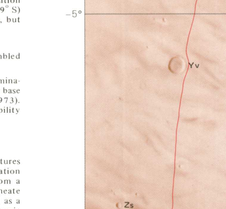
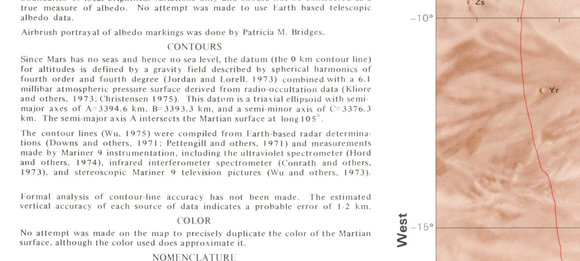
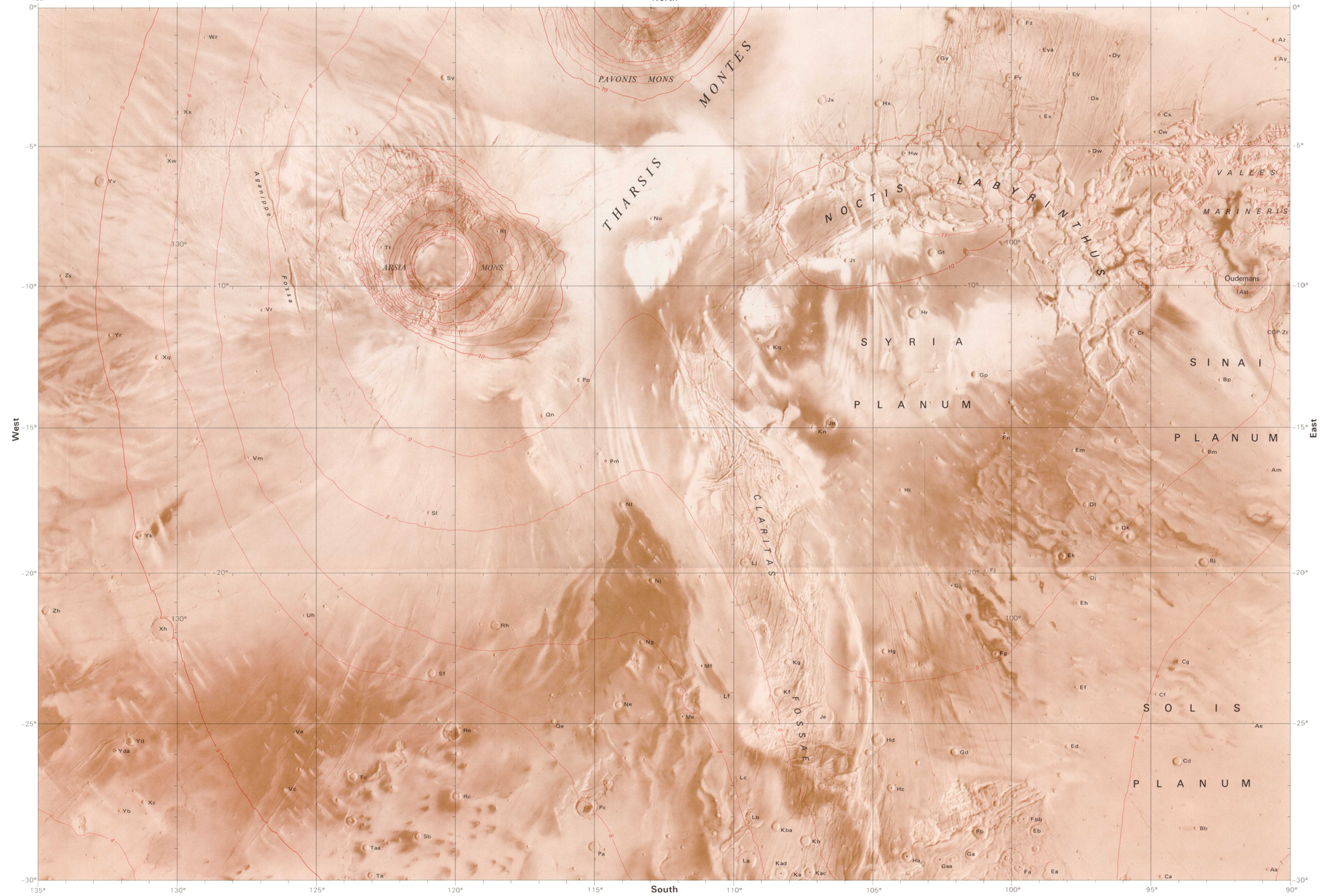




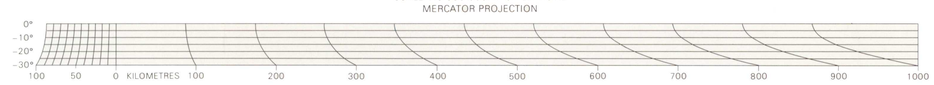


Albedo features from International Planetary Patrol photographs Lowell Observatory, Flagstaff, Ariz.

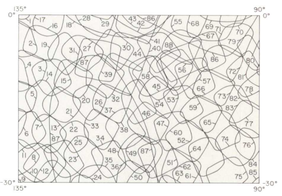
QUADRANGLE LOCATION
Number preceded by I refers to published topographic map

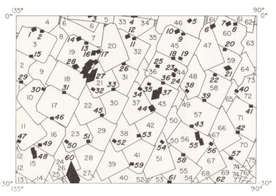


SCALE 1:5 000 000 AT 0° LATITUDE
MERCATOR PROJECTION



CONTOUR INTERVAL 1 KILOMETRE





INDEX OF MARINER 9 PICTURES USED TO MAKE THE ALBEDO MARKINGS OVERLAY

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

Index No.	DAS No.	Index No.	DAS No.	Index No.	DAS No.	Index No.	DAS No.
1	6895173	23	8513299	45	8585539	67	8657569
2	8369449	24	5707273	46	8585469	68	10061069
3	6966713	25	7110493	47	7182593	69	7183643
4	8369379	26	8513439	48	7182523	70	7255183
5	6966643	27	7038743	49	5779443	71	7254833
6	6966573	28	7039093	50	8657219	72	7254763
7	8441409	29	7039163	51	8657289	73	7254693
8	8441339	30	8513579	52	8657359	74	8729389
9	8441269	31	8441899	53	7182663	75	5923363
10	5635313	32	8513509	54	9988619	76	7326513
11	7038463	33	7110563	55	7183153	77	8729459
12	8513229	34	8585329	56	7182803	78	8729529
13	7038533	35	8585259	57	10060579	79	8729599
14	8441479	36	5779373	58	7182733	80	7326723
15	8441549	37	8585399	59	8657429	81	10204919
16	6966783	38	7110633	60	7254553	82	7326653
17	6967133	39	7110703	61	5851403	83	7326583
18	7039583	40	7110773	62	8729249	84	5923453
19	8441619	41	7111123	63	5851333	85	5995253
20	7038673	42	8585889	64	8729319	86	12994382
21	7038603	43	9916589	65	7254623	87	5164983
22	8513369	44	8585609	66	8657499	88	11833536

A-camera pictures

Index No.	DAS No.	Index No.	DAS No.	Index No.	DAS No.	Index No.	DAS No.
1	6966643	23	8513369	45	7182803	67	8729319
2	6966713	24	8513299	46	7183153	68	5923293
3	6966783	25	5707293	47	8657569	69	5923363
4	6967133	26	5707273	48	8657499	70	7326513
5	7039163	27	8585259	49	8657429	71	7326583
6	8513859	28	7110493	50	8657359	72	7326653
7	7039093	29	7110563	51	8657289	73	7326723
8	8441619	30	7110633	52	8657219	74	8891209
9	8441549	31	7110703	53	5851333	75	5923439
10	8441479	32	7110773	54	8729249	76	5995323
11	8441409	33	7111123	55	5851403	77	5995253
12	8441339	34	7111193	56	5851473		
13	5635243	35	8585609	57	7254623		
14	8513229	36	8585539	58	7254693		
15	7038463	37	8585469	59	7254763		
16	7038533	38	8585399	60	7254833		
17	7038603	39	8585329	61	7255183		
18	7038673	40	5779373	62	7327143		
19	8441619	41	7182523	63	8729389		
20	8513579	42	7182593	64	8729529		
21	8513509	43	7182663	65	8729459		
22	8513439	44	7182733	66	8729389		

High-resolution B-camera pictures

Index No.	DAS No.	Index No.	DAS No.	Index No.	DAS No.	Index No.	DAS No.
1	*6967098*	*18*	*7182768*	*31*	*7038638*	*49*	*7038498*
2	*6966818*	*19*	*10060614*	*32*	*8513474*	*50*	*8513334*
3	*7039128*	*20*	*7254798*	*33*	*7110668*	*51*	*7110528*
4	*5563948*	*21*	*5707938*	*34*	*8585504*	*52*	*8585364*
	9917254	*22*	*7254228*	*35*	*9988584*	*53*	*7182558*
	9917394	*23*	*11833501*	*36*	*7182698*	*54*	*8657324*
	9916554	*24*	*10060544*	*37*	*9988164*	*55*	*8800894*
	5779968	*25*	*9988654*		*9988094*		*8800964*
5	*11833711*	*26*	*7110738*	*38*	*8657464*	*56*	*8729354*
6	*10061034*	*27*	*8369904*	*39*	*7254658*	*57*	*5923398*
7	*7255148*		*5708534*	*40*	*8729494*	*58*	*5851438*
8	*7254868*		*9772424*	*41*	*7326618*	*59*	*5779408*
9	*7182838*		*9709464*	*42*	*7326548*	*60*	*9087754*
10	*7183118*		*9700394*	*43*	*7254588*	*61*	*9087824*
11	*7110808*		*9844174*	*44*	*5635978*	*62*	*5851368*
12	*7111088*		*9844104*		*7182628*		*5923328*
13	*7038718*		*9844034*	*45*	*7110598*		
14	*7039058*	*28*	*5491918*	*46*	*7038568*		
15	*6966748*		*7038708*	*47*	*8441374*		
16	*9772494*	*29*	*6966678*	*48*	*8512984*		
17	*8441934*	*30*	*8441514*		*8512914*		

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. Pictures other than those shown in the mosaic were used for portrayal in the cross-hatched areas. Also shown (by solid black rectangles) are the high-resolution B-camera pictures, identified by italic numbers.

Interior—Geological Survey, Reston, Va. —1976—G76138

Prepared on behalf of the Jet Propulsion Laboratory, California Institute of Technology under contract WO-8122, and the Planetology Programs Office, NASA, under contract W-13,709

TOPOGRAPHIC MAP OF THE PHOENICIS LACUS QUADRANGLE OF MARS

MC-17

M 5M –15/112 RMC

1976

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