

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared for the
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NOTES ON BASE

This map is one in a series covering the entire surface of Mars at a nominal scale of 1:5,000,000. The series was originally compiled from Mariner 9 data (Batson and others, 1979). The original shaded relief base was revised and augmented with image data from Viking Orbiter, but feature positions were not shifted to fit controls derived from Viking.

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 3,393.4 km and a polar radius of 3,375.7 km.

PROJECTION

The Mercator, Lambert Conformal Conic, and Polar Stereographic projections are used for this map series. The scale of the series is 1:5,000,000 at the equator. The projections have common scales of 1:4,336,000 at lat 30° and 1:4,306,000 at lat 165°. Standard parallels for the Lambert Conformal Conic projection are at lat 135.8° and 159.2°. Longitude increases to the west in accordance with astronomical convention for Mars. Latitude is planetographic.

CONTROL

Planimetric control of the shaded relief is provided by photogrammetric triangulation using Mariner 9 images (Davies, 1973; Davies and Arthur, 1973) and the radio-tracked position of the Mariner 9 spacecraft. The first meridian passes through the center of a small crater, Airy-O (lat 5.19° S., long 0°), within the crater Airy.

Primary controls used in the network include the Viking Orbiter Secondary Experiment Data Record, radio-occultation measurements from both Mariner 9 and Viking Missions (Lorell and others, 1972; Kliore and others, 1973; Lindal and others, 1979), Earth-based radar observations (Pettenigll and others, 1971; Downs and others, 1975), and the Mars primary control network of the Rand Corporation (Davies and others, 1978).

MAPPING TECHNIQUE

Shaded relief was portrayed by photogrammetric methods described by Inge and Bridges (1976). Uniform sun illumination from the west was used throughout. The original rendition of feature positions, sizes, and shapes was taken from a controlled base mosaic of Mariner 9 images. Various computer enhancements of many Mariner 9 and Viking Orbiter images besides those in the base mosaic were examined in an attempt to portray the surface as accurately as possible.

Initial shaded relief analysis and representation were made by Anthony G. Sanchez; revisions were made by Barbara J. Hall.

COLOR

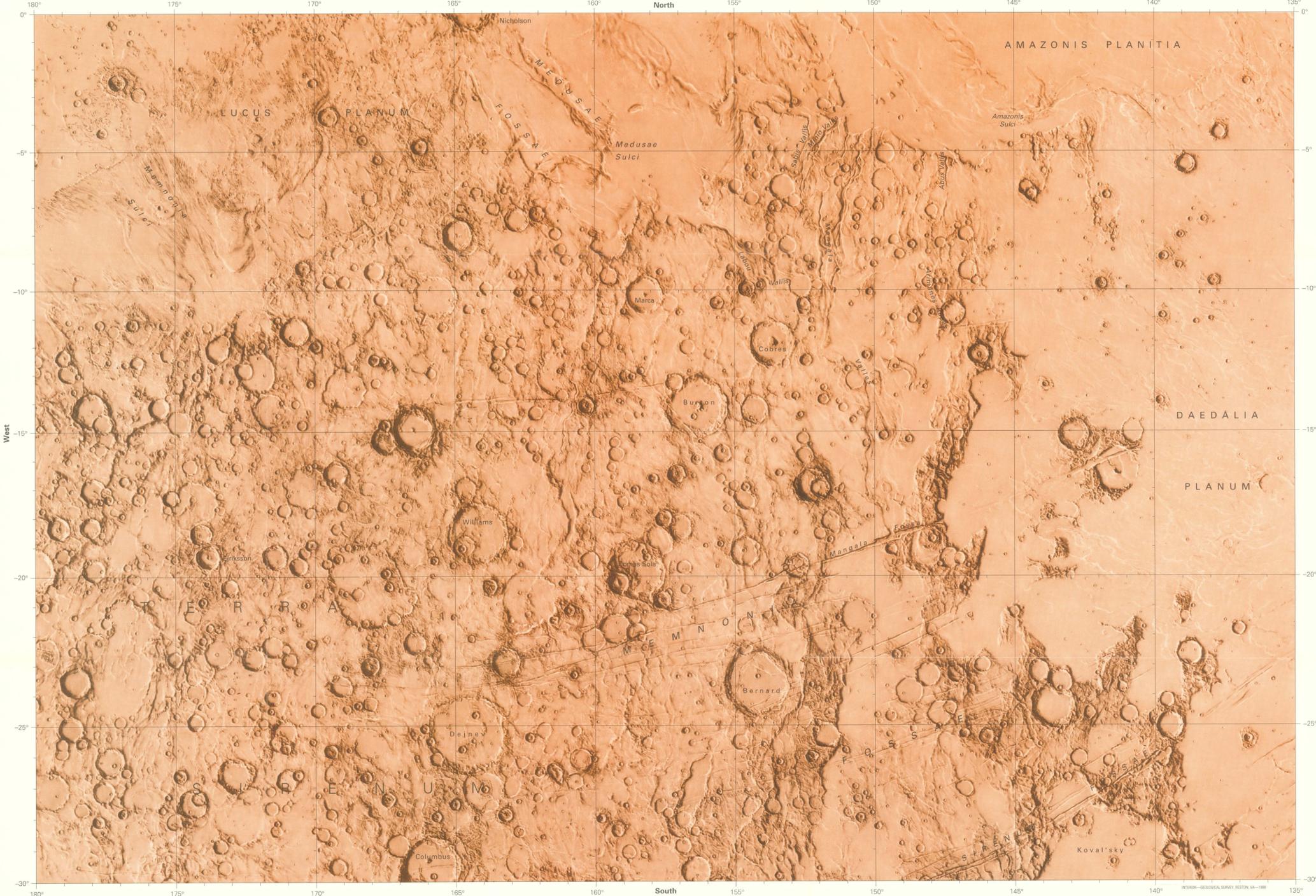
No attempt was made on the map to duplicate precisely the color of the martian surface, although the color used may approximate it.

NOMENCLATURE

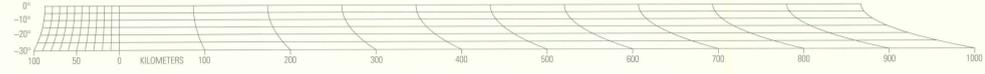
Names on this sheet are approved by the International Astronomical Union (IAU, 1974, 1977, 1983, 1986, 1992, 1998).
MC-16: Abbreviation for Mars Chart 16.
M 5M-15/158 RN: Abbreviation for Mars, 1:5,000,000 series; center of sheet, lat 15° S., long 158°; shaded relief map (R) with nomenclature (N).

REFERENCES

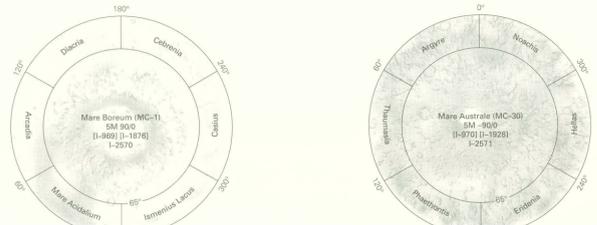
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SCALE 1:5,000,000 (1 mm = 5 km) AT 0° LATITUDE
MERCATOR PROJECTION



Shaded relief revised in January 1987 on behalf of the Planetary Geology Program, Solar System Exploration Division, Office of Space Science, National Aeronautics and Space Administration.
This map supersedes map I-1554.
Edited by Doris Weir and Derrick D. Hirsch; cartography by Darlene A. Casebeer.
Manuscript approved for publication April 18, 1994.

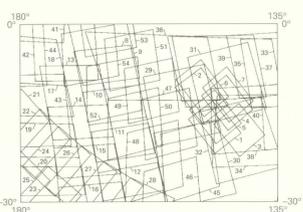


Quadrangle	Center	Scale	Series
Diacia (MC-2)	SM 48150 (I-988) (I-1302) I-2572		I-2572
Arcadia (MC-3)	SM 48150 (I-926) (I-1477) I-2573		I-2573
Mare Acidalius (MC-4)	SM 48270 (I-992) (I-1476) I-2574		I-2574
Imenus Lacus (MC-5)	SM 48270 (I-1023) (I-1666) I-2575		I-2575
Cassia (MC-6)	SM 48270 (I-1121) (I-1666) I-2576		I-2576
Cebrenia (MC-7)	SM 48270 (I-1121) (I-1666) I-2577		I-2577
Amazonis (MC-8)	SM 15112 (I-946) (I-1822) I-2487		I-2487
Tharsis (MC-9)	SM 15112 (I-926) (I-1811) I-2488		I-2488
Lunar Palus (MC-10)	SM 15112 (I-950) (I-1651) I-2489		I-2489
Diya Palus (MC-11)	SM 15112 (I-950) (I-1651) I-2490		I-2490
Arabia (MC-12)	SM 15292 (I-1079) (I-1661) I-2491		I-2491
Syrtis Major (MC-13)	SM 15292 (I-929) (I-1704) I-2492		I-2492
Aethiops (MC-14)	SM 15292 (I-1023) (I-1809) I-2493		I-2493
Elvium (MC-15)	SM 15292 (I-1131) (I-2008) I-2494		I-2494
Memnonia (MC-16)	SM 15112 (I-946) (I-1822) I-2487		I-2487
Phoenicia Lacus (MC-17)	SM 15112 (I-946) (I-1822) I-2488		I-2488
Phoenicia Lacus (MC-18)	SM 15112 (I-946) (I-1822) I-2489		I-2489
Diya Palus (MC-19)	SM 15112 (I-950) (I-1651) I-2490		I-2490
Arabia (MC-20)	SM 15292 (I-1079) (I-1661) I-2491		I-2491
Syrtis Major (MC-21)	SM 15292 (I-929) (I-1704) I-2492		I-2492
Aethiops (MC-22)	SM 15292 (I-1023) (I-1809) I-2493		I-2493
Elvium (MC-23)	SM 15292 (I-1131) (I-2008) I-2494		I-2494
Phoenicia Lacus (MC-24)	SM 15112 (I-946) (I-1822) I-2487		I-2487
Tharsis (MC-25)	SM 15112 (I-926) (I-1811) I-2488		I-2488
Lunar Palus (MC-26)	SM 15112 (I-950) (I-1651) I-2489		I-2489
Diya Palus (MC-27)	SM 15112 (I-950) (I-1651) I-2490		I-2490
Arabia (MC-28)	SM 15292 (I-1079) (I-1661) I-2491		I-2491
Syrtis Major (MC-29)	SM 15292 (I-929) (I-1704) I-2492		I-2492
Aethiops (MC-30)	SM 15292 (I-1023) (I-1809) I-2493		I-2493

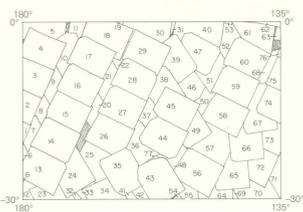
QUADRANGLE LOCATION
Number preceded by I refers to published shaded relief map.
(Number in brackets refers to earlier map superseded by revised version.)

1:2,000,000 SCALE
CONTROLLED PHOTOMOSAICS

I-Series Quadrangle
I-1185 MC-16 NW
I-1185 MC-16 NE
I-2110 MC-16 SW
I-1187 MC-16 SE



Index No.	Picture No.	Index No.	Picture No.
1	34851	19	312496
2	34852	20	312498
3	34853	21	409A11
4	34854	22	409A13
5	34855	23	409A14
6	34856	24	409A15
7	34857	25	409A16
8	312456	26	409A17
9	312457	27	409A19
10	312458	28	409A21
11	312460	29	433A49
12	312462	30	433A50
13	312468	31	433A49
14	312470	32	433A70
15	312472	33	433A21
16	312474	34	433A22
17	312482	35	433A23
18	312483	36	433A37
19	433A38	37	433A40
20	433A41	38	433A41
21	433A42	39	433A42
22	433A43	40	433A43
23	433A44	41	433A44
24	433A45	42	433A45
25	433A46	43	433A46
26	433A47	44	433A47
27	433A48	45	433A48
28	433A49	46	433A49
29	433A50	47	433A50
30	433A51	48	433A51
31	433A52	49	433A52
32	433A53	50	433A53
33	433A54	51	433A54
34	433A55	52	433A55
35	433A56	53	433A56
36	433A57	54	433A57



Index No.	DAS No.	Index No.	DAS No.
1	6008779	21	6153863
2	6008943	22	6153863
3	6008913	23	6153863
4	6008983	24	6153863
5	6007233	25	6150563
6	8081393	26	6150623
7	8081463	27	6150623
8	8081533	28	6150763
9	8081603	29	6150833
10	8081673	30	6151183
11	6678223	31	6225279
12	3275372	32	6347263
13	6678693	33	6347333
14	6678863	34	6150623
15	6678733	35	6225219
16	6678803	36	6225289
17	6678873	37	6225459
18	6153913	38	6225529
19	6678923	39	6225599
20	6153483	40	6623143
41	5418223	61	6895103
42	5419253	62	6895173
43	6297279	63	6399449
44	6225263	64	6399509
45	6225263	65	6399169
46	6227223	66	6399229
47	6227293	67	6399289
48	6297349	68	6399379
49	6297419	69	6399479
50	6297469	70	6399579
51	6297579	71	6441338
52	6297629	72	6896503
53	6225213	73	6896573
54	5481183	74	6896643
55	5481253	75	6896713
56	6894473	76	6896783
57	6894543	77	6822513
58	6894613	78	6894683
59	6894753	79	6894833
60	6894753	80	6894753

INDEX OF VIKING SOURCES
This shaded relief map has been revised by utilizing 1:2,000,000-scale controlled photomosaics and supplementary Viking pictures outlined above. Copies of various enhancements of these pictures are available from National Space Science Data Center, Code 601, Goddard Space Flight Center, Greenbelt, MD 20771.

INDEX OF 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 the crosshatched areas. The DAS number may vary slightly (usually by 5) among different versions of the same picture.

NOTE TO USERS
Users noting errors or omissions are urged to indicate them on the map and to forward it to U.S. Geological Survey, Building 4, Room 450, 2255 North Gemini Drive, Flagstaff, Arizona 86001. A replacement copy will be returned.

REVISED SHADED RELIEF MAP OF THE MEMNONIA QUADRANGLE (MC-16) OF MARS



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