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 ±65°. Standard parallels for the Lambert Conformal Conic projection are at lat ±35.8° and ±59.2°. 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 (Pettengill 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 photointerpretive 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 and subsequent revisions were made by Patricia M. Bridges.

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, 1980, 1983, 1986, 1992, 1996).

MC–28: Abbreviation for Mars Chart 28.

M 5M –48/270 RN: Abbreviation for Mars; 1:5,000,000 series; center of sheet, lat 48° S., long 270°; shaded relief map (R) with nomenclature (N).

REFERENCES

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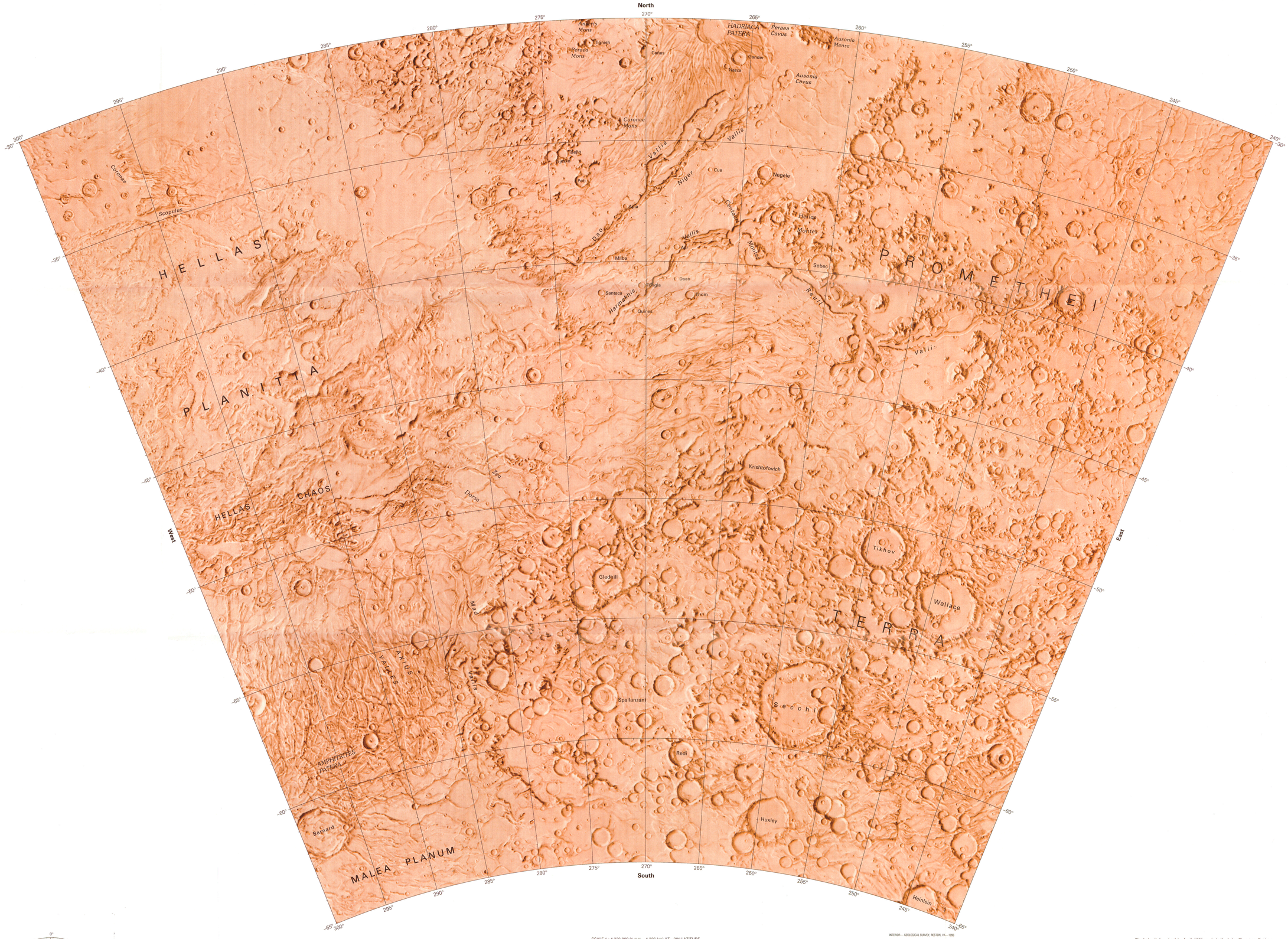
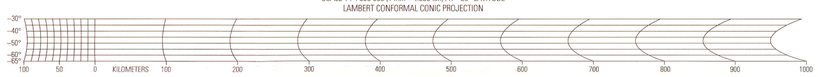


SCALE 1 : 4 336 000 (1 mm = 4.336 km) AT –30° LATITUDE
LAMBERT CONFORMAL CONIC PROJECTION



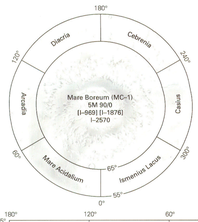
INTERIOR—GEOLOGICAL SURVEY, RESTON, VA—1996

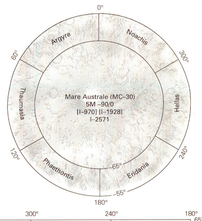
Shaded relief revised in April 1991 on behalf of the Planetary Geology Program, Solar System Exploration Division, Office of Space Science, National Aeronautics and Space Administration.

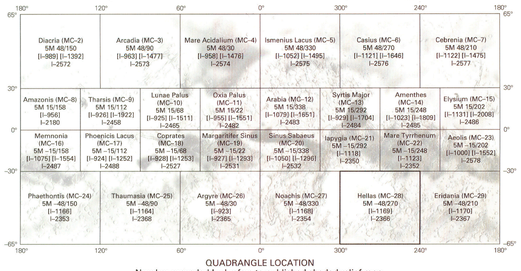
This map supersedes I–1169

Edited by Derrick D. Hirsch; cartography by Roger D. Carroll, Darlene A. Casebier, Sandra K. Castro, and Hugh F. Thomas

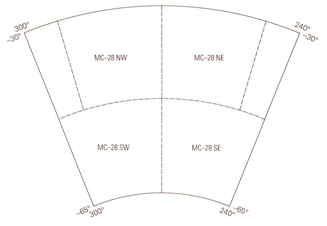
Manuscript approved for publication May 12, 1992





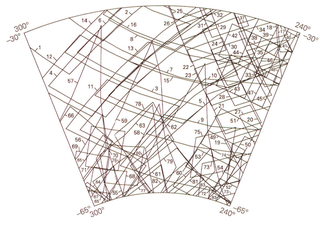


QUADRANGLE LOCATION
Number preceded by I refers to published shaded relief map.
(Number in brackets refers to earlier map superseded by revised version.)



1:2,000,000-SCALE CONTROLLED PHOTOMOSAICS

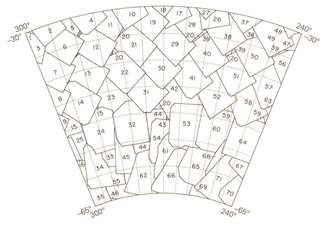
I-Series	Quadrangle
I–1452	MC–28 NW
I–1451	MC–28 NE
I–1454	MC–28 SW
I–1453	MC–28 SE



VIKING 1

Index No.	Picture No.	Index No.	Picture No.	Index No.	Picture No.	Index No.	Picture No.
1	85A21	22	109A14	43	350A32	64	358B16
2	85A23	23	109A15	44	350A33	65	358B23
3	85A31	24	109A19	45	350A34	66	358B24
4	85A32	25	109A20	46	350A35	67	431B39
5	85A33	26	109A21	47	350A36	68	431B41
6	85A34	27	109A36	48	350A37	69	431B42
7	85A35	28	109A43	49	426S94	70	431B43
8	85A36	29	109A44	50	426S95	71	431B44
9	85A42	30	109A45	51	426S96	72	431B60
10	85A44	31	109A49	52	426S97	73	431B62
11	85A51	32	109A51	53	426S98	74	431B63
12	85A52	33	109A71	54	426S99	75	431B64
13	85A53	34	109A72	55	56B31	76	47ZB6
14	85A54	35	109A73	56	56B33	77	47ZB8
15	85A55	36	109A77	57	56B35	78	47ZB20
16	85A56	37	109A79	58	56B46	79	47ZB21
17	101A17	38	350A2	59	56B49	80	47ZB22
18	101A19	39	350A4	60	79B7	81	47ZB23
19	109A6	40	350A5	61	79B8	82	47ZB24
20	109A8	41	350A6	62	79B9	83	47ZB25
21	109A10	42	350A31	63	79B10	84	47ZB26

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.



A-camera pictures

Index No.	DAS No.	Index No.	DAS No.	Index No.	DAS No.
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2	8621244	26	8909984	50	6175018
3	5743328	27	6031308	51	6174948
4	8693274	28	6031238	52	6174878
5	5815358	29	6031168	53	6174528
6	5815288	30	6031098	54	6174458
7	5815218	31	6031028	55	6174318
8	5815148	32	6030678	56	6246908
9	5815078	33	6030608	57	6246838
10	8169234	34	6030538	58	6246768
11	5887318	35	6030468	59	5488598
12	5887248	36	8991044	60	6246418
13	5887178	37	6103198	61	6246278
14	5887108	38	6103128	62	6246208
15	6531878	39	5416708	63	6318608
16	5886688	40	6103058	64	6318308
17	8837194	41	6102988	65	6318168
18	5959348	42	6102918	66	6318088
19	5959278	43	5344748	67	6390128
20	5272788	44	6102568	68	6390058
21	5959208	45	6102498	69	6389988
22	5959138	46	6102358	70	6533768
23	5959068	47	9052934	71	6461878
24	6958718	48	6175158		

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 454, 2255 North Gemini Drive, Flagstaff, Arizona 86001. A replacement copy will be returned.

REVISED SHADED RELIEF MAP OF THE HELLAS QUADRANGLE (MC–28) OF MARS

1996

For sale by U.S. Geological Survey, Information Services, Box 25286, Federal Center, Denver, CO 80225