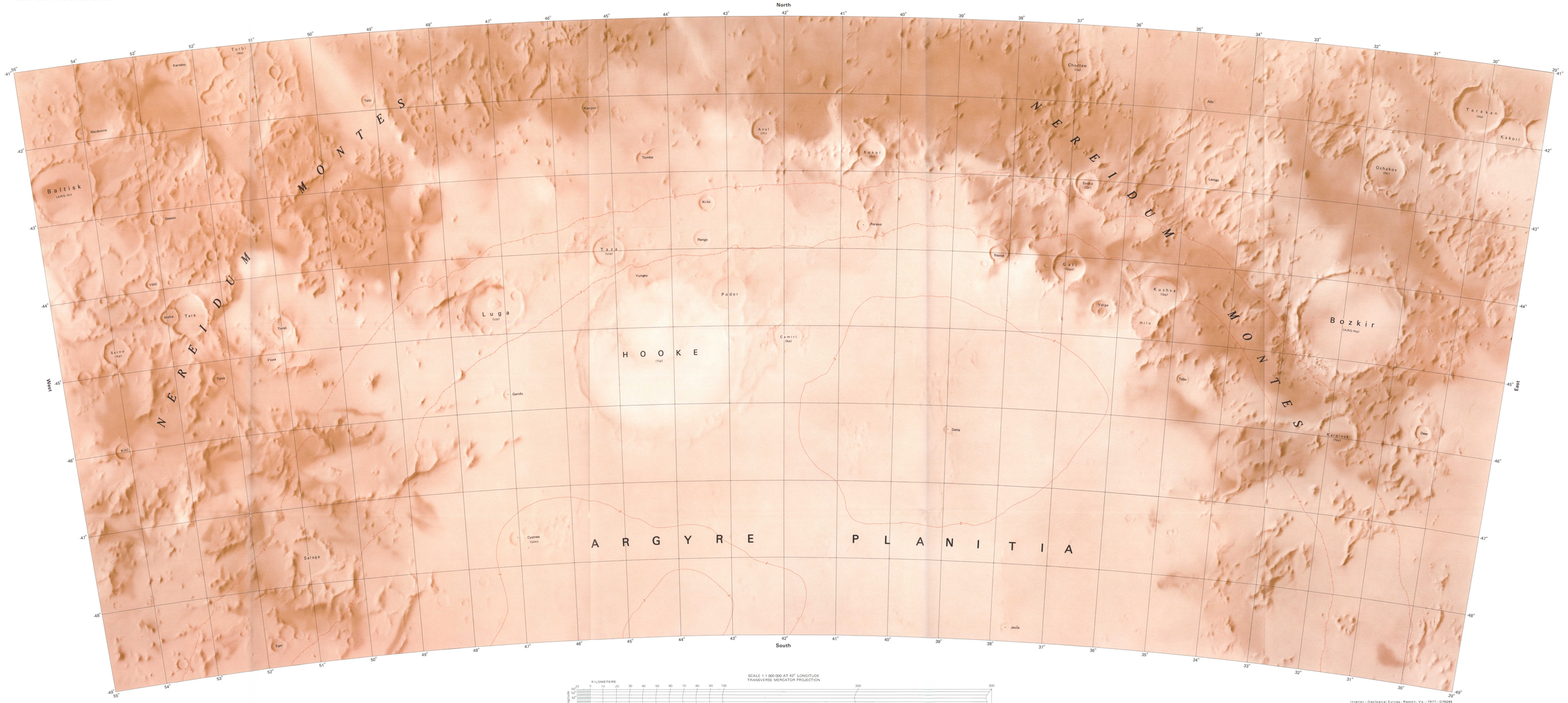
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

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

ATLAS OF MARS
1:1,000,000 TOPOGRAPHIC SERIES
NEREIDUM MONTES REGION
M 1M –45/42 RMC, 1977
I-1002



SCALE 1:1 000 000 AT 42° LONGITUDE
TRANSVERSE MERCATOR PROJECTION

CONTOUR INTERVAL 1 KILOMETER

NOTES ON BASE

This is one map in a set of topographic map sheets covering areas of special interest on Mars at nominal scales of 1:1,000,000 and 1:250,000 (Batson, 1973). The major source of map data was the Mariner 9 television experiment (Masursky and others, 1976).

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 transverse Mercator projection is used for this sheet, with a scale of 1:1,000,000 at 42° longitude. 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 2 km.

MAPPING TECHNIQUE

A mosaic of rectified Mariner 9 pictures was assembled at 1:1,000,000.

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 (Leventhal 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 Jay L. Inge.

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, 1972). Albedo markings are shown regardless of variation in 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; Fjeldbo and others, 1971). The 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, 1973; 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, 1975).

Formal estimates 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; 1973). Named craters bearing double letters in parentheses are designated by the same letters on the 1:1,000,000 Argyre sheet which covers this area. The prefix ARG–(identifying the Argyre sheet) is part of the complete designation but, for brevity, is not shown on most craters.

M 1M –45/42 RMC: Abbreviation for Mars, 1:1,000,000 scale, Transverse Mercator projection, 45° latitude, 42° longitude; shaded relief map, lettering, albedo markings, M, and contours, C.

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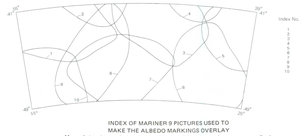
INDEX TO MARINER 9 PICTURES

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

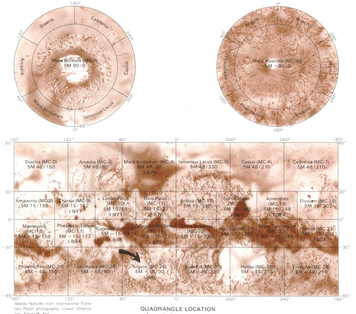


INDEX OF MARINER 9 PICTURES USED TO MAKE THE ALBEDO MARKINGS OVERLAY

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

MAP OF THE ARGYRE QUADRANGLE SHOWING LOCATION OF THE NEREIDUM MONTES REGION.

Interior—Geological Survey, Reston, Va.—1977—G76245
Prepared on behalf of the Planetary Programs Office, National Aeronautics and Space Administration under order no. W-13,687.



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

QUADRANGLE LOCATION
Arrow indicates map area
Number preceded by I refers to published topographic map

TOPOGRAPHIC MAP OF THE NEREIDUM MONTES REGION OF MARS

M 1M –45/42 RMC

1977

For sale by Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202, and Branch of Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, CO 80225.