

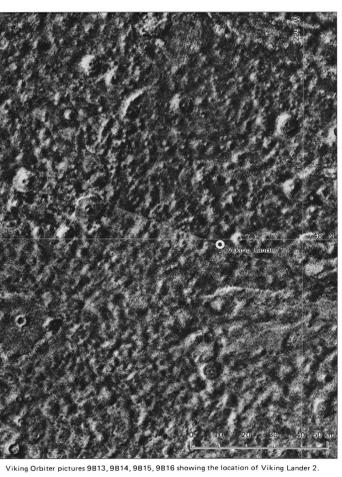
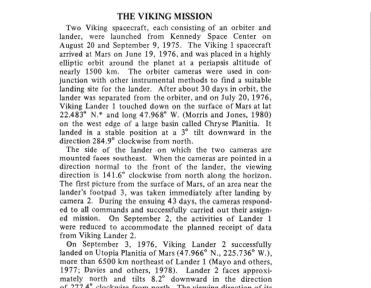
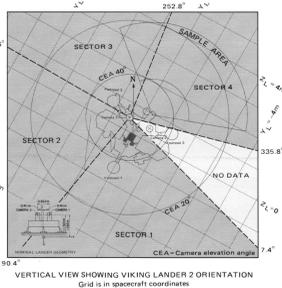
**DESCRIPTION OF SCENE**

This panorama of the Viking 2 landing site on Utopia Planitia shows a flat, boulder-strewn landscape that is part of the vast plains that occupy much of the northern hemisphere of Mars. Large boulders are more numerous than at the Viking 1 site and are almost monotonous in their similarity to one another. Most boulders are sub-angular, equidimensional, and have numerous pits or holes a few millimeters to a few centimeters in diameter that impart a sponge-like appearance. The most obvious interpretation is that these pits are volcanic vesicles formed by solidification from a frothy gas-charged lava. In the interblock areas is a fine-grained material that in some places is banked into small drifts between blocks (line 325, sample 7100), and in other places forms patches of pebbly fragments (line 1000, sample 5600). The surface has a windwept or scoured appearance, and some boulders appear to stand on pedestals of protected fine-grained material (line 330, sample 5200). In many of the interblock areas, the fine material forms a discontinuous crust which breaks into dirty fragments (line 870, sample 6450). A series of intersecting troughs, typically 1 m wide and 10-15 cm deep, are seen at the Lander 2 site and not at the Lander 1 site (line 300, sample 6460; line 550, sample 7450). Several small drifts of fine-grained material occupy the floor of the troughs (line 455, sample 5600) and are relatively free of boulders. The trough form a polygonal network that probably developed from contraction either by cooling of lava or from thermal expansion and contracting of frozen ground. Desiccation of water-saturated soils could also cause similar cracking.

Several flag-topped bluffs or plateaus are barely visible in the far distance just above the horizon (line 125, sample 8500); these features may be parts of ejecta flow lobes from the large impact crater, Mic, that lies about 170 km east of the Lander site.

Parts of the spacecraft visible in the panorama from the left are: the cover of a Radiolabeler Thermoelectric Generator (RTG) (line 200, sample 800); color test chart for calibration of the camera (line 400, sample 900); seismology instrument (line 500, sample 1200); a second color test chart (line 550, sample 1400); tubes and mast of the high gain 58-dB antenna (line 200, sample 1900); the second RTG cover (line 530, sample 2600); support structure (line 1130, sample 4200); stroke arm (line 900, sample 4200) and shock absorber of Leg 2 (line 1250, sample 4600); the boom on which the meteorological instruments are mounted (line 320, sample 5100); sun-brush assembly for closing magnets on the backhoe of the surface sampler (line 1300, sample 6100); the housing used to store the meteorological instruments during transit to Mars (line 1200, sample 7500); and the surface sampler (line 300, sample 7800). Only part of the surface sampler is shown in the mosaic of three pictures. Most picture-taking sequences for the Viking cameras were planned to avoid parts of the Lander and to image as much of the surface as possible.

The bottom edge of the panorama is about 1.7 m from the camera. If the surface were perfectly smooth and level, the horizon would be 38m away.



**VIKING LANDER MOSAICS**

The Viking Lander cameras acquired many high-resolution pictures of the Utopia Planitia and Utopia Planitia landing sites. This representation of the picture data differs from that of a conventional camera having "point perspective" picture geometry, in which rays are projected from object space, through the perspective point in the camera lens, to an image plane in the camera. The geometry of the Lander pictures is complicated by additional factors. Because both landers are tilted with respect to the horizon, on the uncorrected pictures the horizon resembles a sine curve. Computer rectification of the pictures results in a straight horizon along which vertical angles can be measured with respect to the local gravity vector, and horizontal angles can be measured from meridian north. These angles are not related in any simple way to the azimuth and elevation angles given in "camera coordinates" for the uncorrected pictures.

There are other geometric distortions due to the camera's optic path distortion that affects a light ray after it passes the camera windows and camera-system distortions or "roll-down" errors, that are caused by the way the cameras are mounted on the lander. The geometric transformation used in creating the mosaics took into account the optic path distortion but not the "roll-down" errors. However, along the horizon, the error in azimuth angle is equal to the rotational "roll-down" error for each camera to an accuracy of less than 1 pixel. The scale "azimuth angles from Mars north" has been adjusted to take into account this correction.

The residual azimuth angle errors are less than 1 pixel along the horizon and become larger with steeper elevation angles and larger lander tilts. For the worst case, Lander 2, camera 1, this error is a maximum of 5.7 ± 1 pixels at 40° elevation. The somewhat sinusoidal azimuth-dependent residual elevation error is a maximum of 3 ± 1 pixels for Lander 2, camera 1, and approximately 1 pixel for the other cameras.

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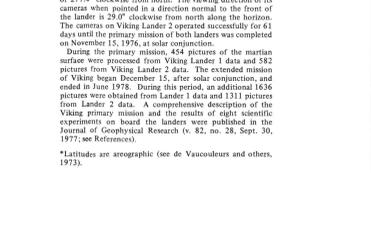
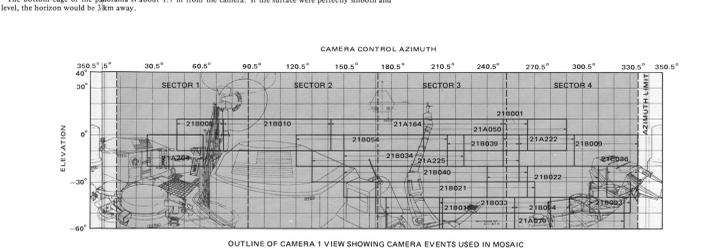
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**VIKING LANDER 2 PHOTOMOSAIC**  
**MORNING SCENE-CAMERA 1**