and well defined by the five bandpasses from 0.86 to 1.0 µm. For an optically thin frost layer the 0.95-µm band can be difficult to see, depending on the substrate, even though the effect on visual slope and albedo is still large [8].

True Color Imaging: Accurate visual color rendition is important to the mission, for public distribution as well as science. Human color vision is a complicated and apparently not fully understood topic. After extensive research we have concluded that there is no single set of three bandpasses that is accepted as "best" at reproducing the colors that most people see most of the time. (MIPS at JPL has apparently reached a similar conclusion.) One common published system uses primaries of 436, 546, and 700 nm [e.g., 9], while another standardizes on 444, 526, and 645 nm [10]. We propose to use the IMP bandpasses at 440, 530, and 670 nm for standard "true color" imaging.

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GOLDSTONE RADAR CONTRIBUTIONS TO MARS PATHFINDER LANDING SAFETY. M. A. Slade and R. F. Jurgens, Jet Propulsion Laboratory, California Institute of Technology, Pasadena CA 91109-8099, USA.

Goldstone radar can provide topography "profiles," statistical surface roughness, and radar images within a few degrees of the sub-Earth point. Goldstone/Very Large Array (VLA) bistatic radar observations can image the whole disk of Mars with integration times on the order of 10 min before pixel smearing occurs. Data from all these radar techniques can be useful for observing the local surface conditions relating to landing safety issues for Mars Pathfinder. Topographic profiles will be presented from the 1978 opposition (subradar latitude ~10°N), and the 1980–1982 oppositions (subradar latitudes ~20°–22°N) at 13 cm wavelength with a radar "footprint" of ~8 km (longitude) by 80 km (latitude). The 1992–1993 opposition (subradar latitudes ~4°–10°N) has both Goldstone/VLA images and topographic profiles at 3.5 cm wavelength (many of the latter have yet to be reduced).

During the 1995 opposition, additional opportunities exist for obtaining the data types described above at latitudes between 17°N to 22°N (see Fig. 1). Upgrades to the radar system at Goldstone since 1982 will permit higher accuracy for the same distance with a reduced footprint size at 3.5 cm. Since the Arecibo radar will still be in the midst of their upgrade for this upcoming opposition (which starts ~November 1994, with closest approach in February 1995), the Goldstone radar will be the only source of refined radar landing site information before the Mars Pathfinder landing.

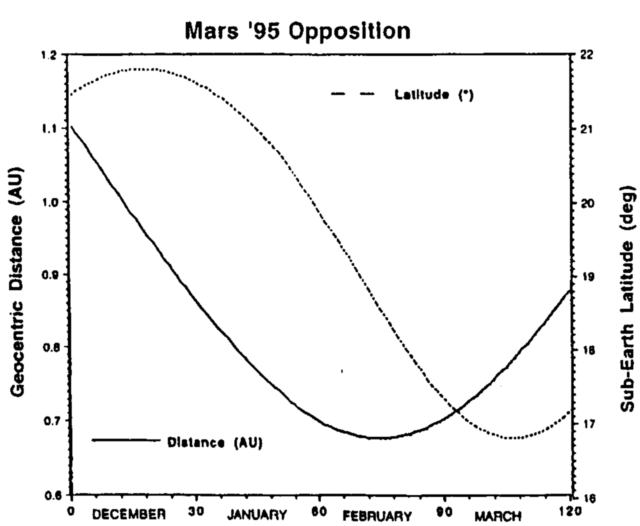

Fig. 1.

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IMAGER FOR MARS PATHFINDER (IMP). P. H. Smith, Lunar and Planetary Laboratory, University of Arizona, Tucson AZ 85721, USA.

The IMP camera is a near-surface remote sensing experiment with many capabilities beyond those normally associated with an imager. The camera is fully pointable in both elevation and azimuth with a protected, stowed position looking straight down. Stereo separation is provided with two (left and right) optical paths; each path has a 12-position filter wheel. The two light paths converge onto a single CCD detector that divides its 512 × 256 active pixels evenly between them. The CCD is a frame transfer device that can transfer a frame in 0.5 ms, avoiding the need for a shutter. Because the detector has a high quantum efficiency (QE) and our filters are relatively broad (40 nm FWHM), the camera optics are stopped down to f/18, giving a large depth of field; objects between 0.6 m and infinity are in focus, no active focusing is available. A jack-in-the-box mast elevates the camera about 75 cm above its stowed position on top of the lander electronics housing; the camera is fully functional in its stowed position so that pictures taken of the same object in each position can be compared to give accurate ranging information. The camera is designed, built, and tested at Martin Marietta. Laboratory testing of flightlike CCDs has been done at the Max-Planck-Institut für Aeronomie in Lindau, Germany, under the direction of co-investigator Dr. H. Uwe Keller, who is providing the focal plane array, the pre-amp board, and the CCD readout electronics with a 12-bit ADC. The important specifications for the IMP camera from the point of view of the scientists using the camera are given in Table 1. For comparison the same quantities are also provided from the Viking camera system.

Science Objectives: The primary function of the camera, strongly tied to mission success, is to take a color panorama of the surrounding terrain. IMP requires approximately 120 images to give a complete downward hemisphere from the deployed position. The local horizon would be about 3 km away on a flat plain, so that one can hope to have some information over a 28 km^2 area. At the horizon a pixel covers 3 m, but the resolution improves at closer distances; just outside the lander edge a pixel is 1.6 mm. Therefore,