

THE INFRARED OBSERVATION OF MARS AND PHOBOS.

J-P Bibring (1), S. Cazes (2), M. Combes (3), G. Guyot (2),
B. Gondet (2), Y. Langevin (1), P. Puget (3), F. Rocard (1), A. Soufflot (2)

(1) CSNSM, Orsay, France;

(2) LPSP, Verrières-Le-Buisson, France;

(3) DESPA, Observatoire de Meudon, France

The ISM instrument is a spectrophotometer, operating in the spectral range 0.8 - 3 μm . Two models will fly, on board the two soviet space probes, named "PHOBOS", which will be launched in july 88. These probes will first orbit elliptically around Mars a few months starting february 89, with minimum altitudes varying from a few hundreds up to several thousands of kilometers. Then the orbits will be circularized at an altitude corresponding to the orbit of Phobos. Each of the probes will then operate a rendez-vous with Phobos, remaining at a distance of the order of 50 m and a relative velocity smaller than 5 m/s.

The main scientific objectives concern the mineralogical mapping of Mars and Phobos, the detection of water either in the atmosphere or in the surface soil, and eventually of organic frosts.

ISM is a grating spectrograph (type Ebert-Fastie). The detector consists in 128 elements, 64 covering the range 0.8 - 1.6 μm , 64 the range 1.6 - 3 μm . The optical system gives an image of 12 arcmin on the detectors. It leads to a spatial resolution on Mars varying from 2 to 20 km at the equator, depending upon the orbits. A scanning mirror allows to cover all regions up to latitudes higher than 50°, where the resolution will be 60 km. On Phobos, the resolution will be better than 50 cm during the close fly-by.

We have performed a variety of calibrations of the instrument, using an external blackbody, a Perkin Elmer spectrometer and a Xe lamp simulating the solar spectrum. We have thus evaluated the absolute and relative and spectral responses of the instrument. Furthermore, we have obtain reference spectra for a large number of minerals and mixtures, proposed as possible constituent of the surface of Mars and Phobos.