IAF SPACE EXPLORATION SYMPOSIUM (A3)
Small Bodies Missions and Technologies (Part 1) (4A)

Author: Prof. Maria Antonietta Barucci
LIRA, Paris Observatory-PSL, France

Dr. Jean-Michel Reess
LIRA, Paris Observatory-PSL, France
Mrs. Pernelle Bernardi
LIRA, Paris Observatory-PSL, France
Prof. Sonia Fornasier
LIRA, Paris Observatory-PSL, France
Dr. Alain Doressoundiram
LIRA, Paris Observatory-PSL, France
Mr. Michel Le Du
Centre National d'Etudes Spatiales (CNES), France
Mrs. Veronique Tyrou
Centre National d'Etudes Spatiales (CNES), France
Mr. Eris Sawyer
Centre National d'Etudes Spatiales (CNES), France
Prof. Takahiro Iwata
ISAS, JAXA, Japan
Dr. Hiromu Nakagawa
Tohoku University, Japan
Prof. Tomoki Nakamura
Tohoku University, Japan

# MIRS SPECTROMETER ON BOARD OF MMX MISSION

**Abstract**

MIRS (MMX InfraRed Spectrometer) is an imaging spectrometer on board of the JAXA sample return mission MMX (Martian Moon eXploration).

MIRS is an imaging spectrometer working in the spectral range 0.9 – 3.6 m with spectral resolution of about 20 nm. MIRS will allow to characterize all present absorption features and their variations on the Phobos and Deimos surfaces as well to investigate Mars atmosphere. The different orbit altitudes will allow to characterize with an unprecedented spatial resolution the surface of Phobos up to the selection of the landing sites. The high SNR achieved by MIRS will permit a detailed characterization of the absorption bands detected to well constrain the mineralogy, species abundances and composition of Phobos. To constrain the surface composition of Deimos during multiple fly-bys, MIRS will spectroscopically map major regions at a spatial resolution better than 100 m and detect the same major absorption bands as observed in Phobos. The high spatial resolved spectra of MIRS, will provide new insights into space weathering processes thanks to observations of small fresh craters and their ejecta. MIRS observations together with all the others on board instruments will give new insights on the surface characterization of these two moons.

The equatorial orbit of MMX (on the same orbit as Phobos around Mars, at altitudes of about 6000 km) will allow us to obtain global mapping of the Martian atmosphere and, in close collaboration with

the on-board cameras, to investigate short lifespan events in Martian atmosphere. MIRS observation will provide the first opportunity to follow the temporal evolution of the atmospheric species as well as of dust and clouds.

MIRS instrument as well the science objectives will be presented.

Acknowledgements: MMX is under developed and built by JAXA, with contributions from CNES, DLR and NASA. We thank the MMX JAXA teams for their efforts in defining and building the mission. MIRS is built at LESIA-Paris Observatory in collaboration with four other French laboratories and CNES with close collaboration with JAXA and MELCO.