

Mobile Geochemistry Instrument Package Facility (MGIPF) for In Situ Mineralogical and Chemical Analysis of Planetary Surface Material

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A first order requirement for any spacecraft mission to land on a solid planetary or moon surface is instrumentation for in-situ mineralogical and chemical analysis [2]. Such analysis provide data needed for primary classification and characterization of surface materials present. We will discuss a mobile instrument package we have developed for in-situ investigations under harsh environmental conditions like on Mercury or Mars.

This Geochemistry Instrument Package Facility is a compact box (also called payload cab) containing three small, advanced geochemistry / mineralogy instruments: the chemical spectrometer APXS, the mineralogical Mössbauer spectrometer MIMOS II [3], and a textural imager (close-up camera). The payload cab is equipped with two actuating arms with two degrees of freedom permitting precision placement of all instruments at a chosen sample. This payload cab is the central part of the small rover *Nanokhod* which has the size of a shoebox [1]. The *Nanokhod* rover is a tethered system with a typical operational range of ~ 100 m.

Of course the payload cab itself can be attached by means of its arms to any deployment device of any other rover or deployment device.

[1] Andre Schiele, Jens Romstedt, Chris Lee, Sabine Klinkner, Rudi Rieder, Ralf Gellert, Göstar Klingelhöfer, Bodo Bernhardt, Harald Michaelis, *The new NANOKHOD: Engineering model for extreme cold environments*, 8th International symposium on Artificial Intelligence, Robotics and Automation in Space, 5 - 9 September 2005, München, Germany

[2] R.V. Morris, G. Klingelhöfer, R.L. Korotev, T.D. Shelfer, *Mössbauer Mineralogy on the Moon*, in: *Hyperfine Interactions* 117 (1998) 405.

[3] Klingelhöfer et al., *J. Geophys. Res.* 108 (2003), doi 10.1029/2003JE002138.