Geophysical Research Abstracts
Vol. 14, EGU2012-13616, 2012
EGU General Assembly 2012

CLUPI, a high-performance imaging system on the ESA-NASA rover of the 2018 ExoMars mission to discover biofabrics on Mars

J.-L. Josset (1), F. Westall (2), B.A. Hofmann (3), J.G. Spray (4), C. Cockell (5), S. Kempe (6), A.D. Griffiths (7), M.C. De Sanctis (8), L. Colangeli (10), D. Koschny (10), D. Pullan (11), K. Föllmi (12), L. Diamond (13), M. Josset (1), E. Javaux (14), F. Esposito (9), and D. Barnes (15)

(1) Space Exploration Institute, Neuchatel, Switzerland (jean-luc.josset@space-x.ch), (2) Centre de Biophysique Moléculaire, Orléans, France, (3) Natural History Museum, Bern, Switzerland, (4) Planetary and Space Science Centre, University of New Brunswick, Canada, (5) Open University, Milton Keynes, United Kingdom, (6) Geosciences University of Technology Darmstadt, Germany, (7) University College London, MSSL, United Kingdom, (8) Istituto di Fisica dello Spazio Interplanetario, Roma, Italy, (9) Osservatorio Astronomico di Capodimonte, Napoli, Italy, (10) ESA, RSSD, The Netherlands, (11) Department of Physics and Astronomy, University of Leicester, United Kingdom, (12) Institute of Geology and Paleontology, University of Lausanne, Switzerland, (13) Institute for Geological sciences, University of Bern, Switzerland, (14) Departement de Géologie, Unité PPM, University of Liège, Belgium, (15) Aberystwyth University, United Kingdom

*Corresponding author: Dr Jean-Luc Josset, email address: jean-luc.josset@space-x.ch, telephone: + 41 32 889 68 69,

The scientific objectives of the ESA-NASA rover of the 2018 mission of the ExoMars Programme are to search for traces of past or present life and to characterise the near-sub surface. Both objectives require study of the rock/regolith materials in terms of structure, textures, mineralogy, and elemental and organic composition. The 2018 rover ExoMars payload consists of a suite of complementary instruments designed to reach these objectives.

CLUPI, the high-performance colour close up imager, on board the 2018 ESA-NASA Rover plays an important role in attaining the mission objectives: it is the equivalent of the hand lens that no geologist is without when undertaking field work. CLUPI is a powerful, highly integrated miniaturized (<700g) low-power robust imaging system, able to operate at very low temperatures (–120°C). CLUPI has a working distance from 10cm to infinite providing outstanding pictures with a color detector of 2652x1768. At 10cm, the resolution is 7 micrometer/pixel in color. The focus mechanism and the optical-mechanical interface are a smart assembly in titanium that can sustain a wide temperature range. The concept benefits from well-proven heritage: Proba, Rosetta, MarsExpress and Smart-1 missions...
Because the main science objective of ExoMars concerns the search for life, whose traces on Mars are likely to be cryptic, close up observation of the rocks and granular regolith will be critical to the decision as whether to drill and sample the nearby underlying materials. Thus, CLUPI is the essential final step in the choice of drill site. But not only are CLUPI's observations of the rock outcrops important, but they also serve other purposes. CLUPI, could observe the placement of the drill head. It will also be able to observe the fines that come out of the drill hole, including any colour stratification linked to lithological changes with depth. Finally, CLUPI will provide detailed observation of the surface of the core drilled materials when they are in the sample drawer at a spatial resolution of 15 micrometer/pixel in color.
The close-up imager CLUPI on the ESA-NASA rover of the 2018 mission will be described together with its capabilities to provide important information significantly contributing to the understanding of the geological environment and could identify outstanding potential biofabrics (stromatolites...) of past life on Mars.