



Close-up imaging simulation in the Marslabor of the University of Basel

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Close-up imagers such as MAHLI or CLUPI are often described as the equivalent of a geoscientist's hand lens mounted on a rover. Compared to the use of a hand lens by a geoscientist in the field, the use of such imagers for extracting information, e.g. on rock properties, rock formation or their potential to contain biosignatures, is biased. The difference between is caused by the resolution and spectral recording capacity of the imager, as well as the environmental conditions when an image is taken. During rover missions, ideal conditions to take close-up images are rare or require extra time, energy and data transmission volume. Preparing the use of close-up imagers during a mission is therefore essential for maximizing the scientific output of rover operations. The Marslabor of the University of Basel aims at providing the opportunity to test the operations of close-up imagers in situations that resemble those during a rover mission to another planetary body. The main elements of the Marslabor are a Marsyard with variable surface conditions, in particular surface color and roughness, lighting conditions simulating different positions of the sun shining at various degrees of intensity and atmospheric diffusion, and a small rover carrying a commercial camera with macro-lense offering a field of view similar to the ExoMars Close-up Imager (CLUPI). The aims of the tests conducted in the University of Basel's Marslabor are (i) the identification of the best lighting for the recognition of biosignatures, (ii) rock identification from the furthest possible distance during rover drives, and (iii) integration of close-up imagers in rover exploration cascades.