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WALI - Wide Angle Laser Imaging enhancement to ExoMars PanCam: a system for organics and life detection

J.-P. Muller (1), M.C. Storrie-Lombardi (2), M.R. Fisk (3), A.J. Coates (1), A.D. Griffiths (1), K.R. Rees (1), D.M. Walton (1), C. Thoebald (1), A. Rousseau (1), and C. Brockley-Blatt (1)

(1) University College London, Mullard Space Science Laboratory, Dept. of Space & Climate Physics, Holmbury St Mary, RH5 6NT, UK , (2) Kinohi Institute, Altadena, CA 91001 USA, (3) Oregon State University, College of Ocean and Atmospheric Sciences, Corvallis, OR 97331 USA

A scientifically significant enhancement to the ExoMars PanCam has been proposed to ESA and STFC for inclusion in the ExoMars payload. Incorporated into the PanCam optical bench are two eight gram packages, each consisting of an UV laser diode, control electronics and in one case focusing transmissive optics. The Wide Angle Laser Imaging (WALI) system uses a Nichia UV 375nm semiconductor laser diode operating with 0.5W of input power to produce some 20mW of output power in a beam of elliptical shape of 7.5 x 22.5 width. A prototype system has been designed and constructed at UCL-MSSL of both the focused and unfocused WALI. Thermal Vacuum tests indicate that WALI will survive ambient temperature range from -150 C to +50 C. Tests conducted in the laboratory at UCL-MSSL with PAH organics [1] confirm findings from using a 365nm LED 5mW penlight which are described in [2]. UV laser-induced fluorescence address both the mapping of PAH organics for studies in astrochemistry stimulatd by the negative findings from Viking Lander (loc.cit.) and the detection of extant microbial and viral life-forms from NADH signatures. In both cases the primary target will be drill cuttings exuded from the 2m drill as a function of drill-depth, dusk surveillance of overhangs and rocks shielded from harmful UV radiation.

1. Storrie-Lombardi, M.C., Muller, J.-P., et al., Epifluorescence Surveys of Extreme Environments Using PanCam Imaging Systems: Antarctica and the Mars Regolith, in Astrobiology and Planetary Missions XI, SPIE08. 2008, SPIE: San Diego, 10-12.8.08.
2. Storrie-Lombardi, M.C., Muller, J.-P., et al., Potential for non-destructive astrochemistry by the ExoMars PanCam. . Geophysical Research Letters, 2008. 35(L12201).