

SPACE EXPLORATION SYMPOSIUM (A3)  
Mars Exploration – Part 3 (3C)

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DREAMS - AN INTEGRATED MULTISENSOR SCIENTIFIC PAYLOAD FOR MARS EXPLORATION

**Abstract**

The DREAMS package is an integrated multi-sensor scientific payload mainly devoted to characterizing the landing site environment in dusty conditions (dust properties/abundance, potential electric activity, meteorological state such as environmental parameters). DREAMS architecture is conceived with a modular approach to provide interfaces and resources to several sensors. The current baseline is composed by the following units: primary battery holding an electrode mast and a Common Electronic Unit (CEU) holding an Environmental mast to which anemometer, thermometer, optical sensor, pressure and humidity sensor are connected. The CEU shows a multi-stack configuration in which the following functionalities are implemented: Power distribution, data acquisition (both analog and digital sensors), DataHandling, data compression and data storage, thermal control and I/Fs to EDM, CanBUS for data

exchange, and Power interfaces both redundant. In addition a timer functionality is implemented to manage the switch on-Switch off of the CEU and the Sensors according to signal received from EDM via CanBus. The extreme temperature range to which DREAMS is exposed, forces to a demanding thermal design and a robust thermal control to guarantee in particular for the battery operational temperature range in which its efficiency is compliant to provide 300-400 [Wh] for Martian operations and thermal conditioning. The DREAMS modular approach meets EDM Surface Payload accommodation constraints (total mass 3 [kg] including maturity margins, data volume 50 [Mbit], data transmission two times per sol) as well as options offering significant increase of science return. The DREAMS package gathers a wide consortium of institutions led by Italy, reflecting the current involvement of European countries in the ExoMars program.