

## SPACE EXPLORATION SYMPOSIUM (A3)

## Mars Exploration – Part 1 (3A)

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## OVERVIEW OF REMS FIRST YEAR ON MARS

### Abstract

The Rover Environmental Monitoring Station (REMS) is one the instrument of the Mars Science Laboratory (Curiosity) payload. REMS is a suite of sensors distributed at four different locations: two small booms at the Remote Sensor Mast with a wind sensor and air temperature sensor at each one, and relative humidity sensor in one of them and a ground temperature sensor in the other; the ultraviolet sensor is on the rover deck , and inside the rover body and connected with the atmosphere by a duct, the pressure sensor. Data acquisition strategy is based on regularity. Every hour, REMS is awakened by its own clock and collects data for, at least, 5 minutes. In addition to those, the MSL environment working group schedules, every day, extended observation periods distributed along the following sols. REMS has recorded several Gbits of data so far. Curiosity has spent more than half Martian year on Mars and has followed the evolution of the different atmospheric parameters along all seasons. The daily pressure oscillations are greater that those seen with the Viking sensors, which is consistent with the differences of their surrounding conditions: a plain vs a crater with a huge mountain at its center. Ground and air temperature sensors are showing the day-night cycle of the ground-air system. The daily oscillations of ground temperature depend mainly of the ground properties and the season, with variation of around 90 K at the first sols (spring - summer) and circa 60 K in winter. The ultraviolet (UV) radiation is being measured in the Martian surface for the first time in history. UV sensor provides data about the radiation level and is a good tool to identify obscuration events, including the detection of a transit of Phobos. From landing, the Martian dust is covering the sensor and its performances are degrading. The relative

humidity sensor shown some inconsistencies in its reading, but after some new tests done by the FMI with a similar unit to which is in Mars, the sensor is now fully operative. The daily maximum RH had a minimum around sol 120 and maximum values in the winter period.