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A European Mars Simulation Wind Tunnel Facility

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Abstract

A new and unique European Mars Simulator Facility is in the final stages of construction at Aarhus University in Denmark. Its aim is to reproduce conditions at the Martian surface, specifically atmospheric composition, pressure, temperature, wind-flow and importantly dust aerosol suspension using Mars analogue materials. It is due for completion mid 2009.

Specifically the facility will be used for the multi-disciplinary scientific study of aerosol formation and transport (on Mars and earth), granular electrification, magnetic properties, erosion, cohesion/adhesion, water transport, UV induced mineralogy, bacterial survival and many others.

In addition to this scientific role this facility will also be accessible to national and international collaborators and space agencies for instrument testing, calibration and qualification. It is intended to help deal with the hazardous environment on Mars and aid instrument development and manned exploration.

The wind tunnel facility consists of a 2×1m cross-section re-circulating wind tunnel housed within a 50m^3 environmental chamber capable of low pressure (0.02-1000mbar) and cryogenic temperatures (-120ºC). The design is based on a prototype Aarhus Wind Tunnel Simulator which has been in operation since 2000 [1,2,3,4]. Specially designed and constructed (laser based) instrumentation has been developed at Aarhus University for quantifying dust deposition and dust properties under Martian environmental conditions [5].

Most recently the Aarhus Mars Simulation Laboratory has been responsible for the development, construction and testing/calibration of a wind sensor (called a Telltale) flown to Mars on the Phoenix mission 2008, this was in collaboration with NASA and CSA [6].

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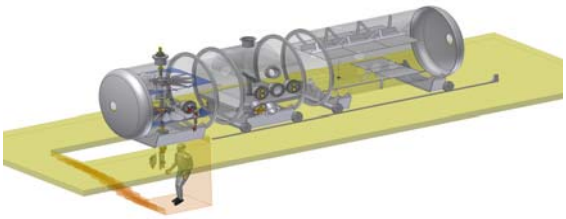

Figure 1: Schematic of the new Mars simulation wind tunnel facility at Aarhus University.

References

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