



## The 2009 ESA/Danish Mars Simulation Wind Tunnel Facility

P. Nornberg, J.P. Merrison, and H.P. Gunnlaugsson

Mars Simulation Laboratory, University of Aarhus, Ny Munkegade, Build. 1520, DK-8000 Aarhus C, Denmark  
(geopn@phys.au.dk)

Simulation of the dynamic environment in immediate proximity to the surface of Mars requires access to simulation facilities which can reproduce the atmospheric properties (pressure, temperature, gas composition, UV-VIS light conditions, wind flow etc.). It also requires access to analogue Martian surface material (soil and dust). Simulations can be carried out in a wind tunnel placed in a tank which can be pumped out, like the 400 mm Ø, 1500 mm long wind tunnel that has operated in the Mars Simulation Laboratory at University of Aarhus, Denmark since 2000 (1). A wide range of applications have taken place, from development, test and calibration of instruments, over tests of solar panels, and aerodynamic studies of granular transport to studies of physical properties of dust materials such as grain electrification, aggregation and magnetic properties (2,3). The Salten Skov I analogue (4) and other Martian regoliths and dust analogues have been used in the wind tunnel experiments.

With the view to future instrument development, solar panel optimization and future research on Martian surface processes a new ESA supported wind tunnel has been constructed at University of Aarhus, Denmark and is now under building. This wind tunnel will have a cross section of close to 1 x 2 m and be able to reach a wind speed of close to 30 m/s under Martian pressure conditions and with samples cooled down to Martian temperatures. The facility is planned to be finally tested and ready for use in July 2009.

ESA, ExoMars use of this facility will have priority. However, research projects in collaboration with external users will also be welcome in the future. Later this year information on access possibilities will be announced at the Mars Simulation Laboratory home page: [www.marslab.dk](http://www.marslab.dk).

### References:

- (1) Merrison, J., Bertelsen, P., Frandsen, C., Gunnlaugsson, H.P., Knudsen, J.M., Madsen, M.B., Mossin, L., Nielsen, J., Nørnberg, P., Rasmussen, K.R., Uggerhøj, E. and Weyer, G. 2002: Simulation of the Martian Aerosol at Low Wind Speeds, *J. Geophysical Research Letters*, 107 (E12): Art. No. 5133.
- (2) Merrison, J.P., Bechtold, H., Gunnlaugsson, H., Jensen, A., Kinch, K., Nornberg, P., Rasmussen, K. 2008: An environmental simulation wind tunnel for studying Aeolian transport on Mars. *Planetary and Space Science*, 56, 426-437.
- (3) Merrison, J.P., Gunnlaugsson, H.P., Nørnberg, P., Jensen, A.E., Rasmussen, K.R. 2007: Determination of the Wind Induced Detachment Threshold for Granular Material on Mars using Wind Tunnel Simulations. *Icarus*, 191, 568-580.
- (4) Nørnberg, P., Gunnlaugsson, H.P., Merrison, J.P., Vendelboe, A.L. 2008: Salten Skov I: A Martian dust analogue. *Planetary and Space Science* (in press).