



The Telltale Wind Experiment for the NASA Phoenix Mars Lander 2007

H. P. Gunnlaugsson (1), O. Akinlade (2), M. A. Gross (3), S. K. Jensen (1), C. F. Lange (2), K. Leer (4), M. T. Lemmon (5), F. Lyckegaard (1), M. B. Madsen (4), J. Merrison (1), P. Nørnberg (1), M. Olsen (4), C. Shinohara (6), P. Smith (6)

(1) Mars Simulation Laboratory, Aarhus University, Denmark, (2) Dept. of Mechanical Engineering, University of Alberta, Canada, (3) Jet Propulsion Laboratory, California, USA, (4) Niels Bohr Institute, University of Copenhagen, Denmark, (5) Texas AM University, Texas, USA, (6) University of Arizona, Tucson, USA. (hpg@phys.au.dk)

The Telltale experiment for The Mars Phoenix Lander, to be launched in 2007, is a lightweight passive wind experiment designed to measure wind velocities and wind direction at the landing site. It consists of a lightweight Kapton tube hanging in Kevlar fibres (total mass of the active part is less than 1 g) that will deflect as a result of wind forces. Images of the Telltale obtained by the onboard camera (SSI) using short and intermediate exposure times will give information on the deflection and dynamics that can be related to wind velocities and direction.

The Phoenix mission will explore the Martian Arctic (exact landing site yet to be determined) to investigate interaction between the atmosphere and volatiles in the surface material. The mission will also try to uncover any possible clues in the Martian Arctic soils about the history of water and potential for habitability. Phoenix is a stationary lander with a scoop that will be used to deliver selected ice/soil samples to onboard experimental equipment in order to determine the physical, chemical and biological characteristics of the sampled material, e.g. the amount of ice in the soil. To ensure an efficient and unbiased delivery of samples to the instruments, some knowledge of daily wind patterns are essential. Wind speed and direction will also allow the analysis of diurnal wind cycle and weather patterns.

We will describe the difficulties involved in the design and construction of a passive wind experiment for Mars applications, and how these have been resolved. Character-

isation data obtained at the wind tunnel of the Mars Simulation Laboratory, Aarhus, are presented as well as predictions of the behaviour of the telltale on Mars. The scientific importance of having wind measurement on the lander will be addressed and also how this will benefit both scientific and operational tasks.