



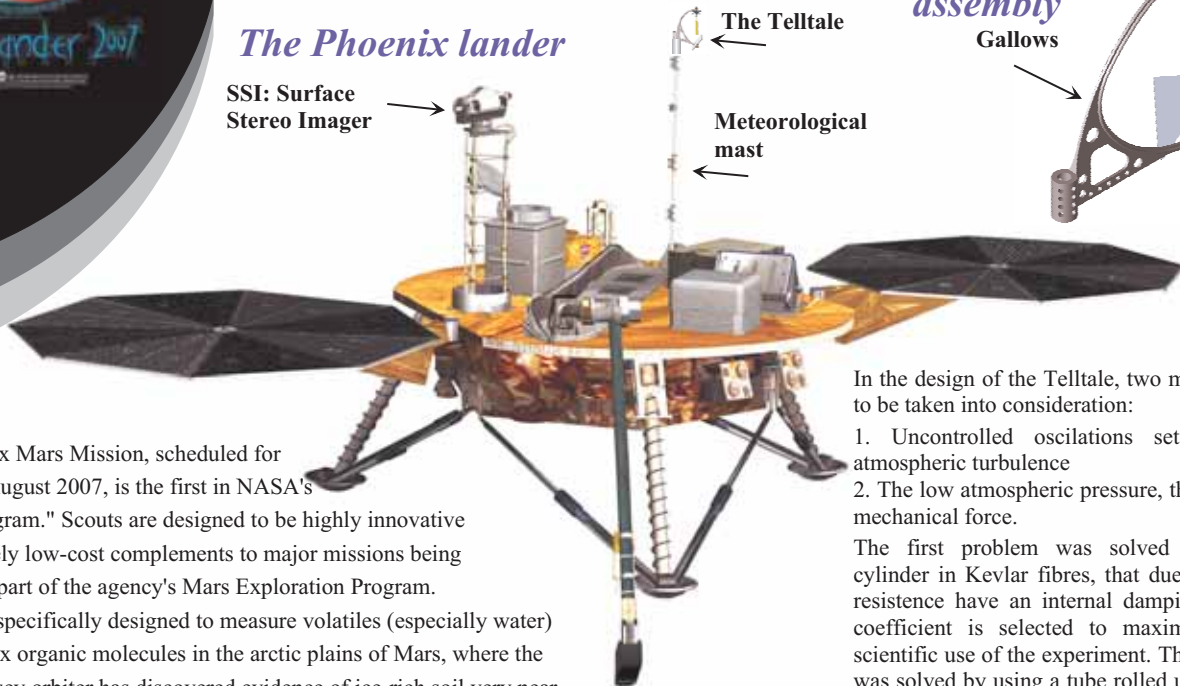
# The Telltale Wind Experiment for the NASA Phoenix Mars Lander 2007

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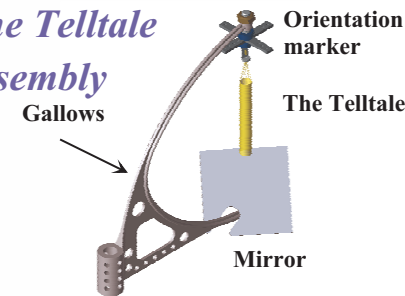
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## The Phoenix lander



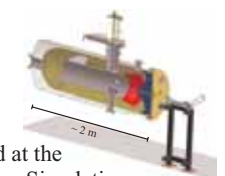
## The Telltale assembly



The Telltale will be mounted on top of the meteorological mast and a mirror will help in determining wind directions.

The Telltale experiment consists of a light-weight cylinder that will swing out due to wind action. Images taken of the experiment will give information on wind speeds and direction.

The Telltale has been developed at the Århus Mars Simulation Wind tunnel facilities



## Science with the telltale

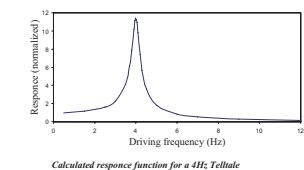
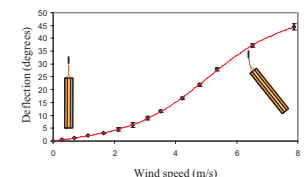
In the design of the Telltale, two main problems had to be taken into consideration:

1. Uncontrolled oscillations set in motion by atmospheric turbulence
2. The low atmospheric pressure, that gives very low mechanical force.

The first problem was solved by hanging the cylinder in Kevlar fibres, that due to there bending resistance have an internal damping. The damping coefficient is selected to maximise the possible scientific use of the experiment. The second problem was solved by using a tube rolled up from extremely thin Kapton (8  $\mu\text{m}$ ) foil.

The wind will tilt the Telltale, and the tilt will be proportional to the wind velocity. Deflection data will be analytically transformed to Mars gravity. Wind speed determination will be better than 20% in the 2-10 m/s range.

The Telltale has a response function that shows a sharp resonance at the natural frequency  $\sim 3$  Hz on Mars. Images taken with  $\sim 1$  sec. exposure time will reveal turbulence in this frequency range.



The Phoenix Mars Mission, scheduled for launch in August 2007, is the first in NASA's "Scout Program." Scouts are designed to be highly innovative and relatively low-cost complements to major missions being planned as part of the agency's Mars Exploration Program. Phoenix is specifically designed to measure volatiles (especially water) and complex organic molecules in the arctic plains of Mars, where the Mars Odyssey orbiter has discovered evidence of ice-rich soil very near the surface