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## Nano-images from Mars

Nanostructures were measured on another planet for the first time on 9th July when the NASA Phoenix Mars Probe recorded images with nanometre resolution using its onboard Swiss-made atomic force microscope, and successfully transmitted them back to Earth.

The first images of the microscope – which was developed by the universities of Neuchâtel and Basel, and by the Swiss company Nanosurf – show the surface of a test grid with unprecedented detail. The successful imaging of this test grid served as a calibration for the nano-microscope and documents full functionality of the instrument.



“The operation of our atomic force microscope under these harsh conditions demonstrates the suitability for daily use of such nano-imaging devices,” said Nanosurf Mars project leader Dominik Braendlin. “We are now anxiously awaiting the upcoming images of Mars surface particles”.

The Phoenix Mars probe is scheduled to investigate the shape and structure of Mars dust and soil particles. Their surfaces – when documented with the proper resolution – harbour a wealth of scientific data. Erosion and scratch marks on these particles, for instance, can give crucial clues as to whether the particles were ever transported by liquid water on Mars.

The resolution required for this task is only attained by the atomic force microscope. In contrast to optical microscopes, this nano-imaging device touches the surface of the particles to be analyzed with a very sharp tip, recording surface height information in a scanning-type motion.

The Nanosurf atomic force microscope is part of the MECA (Microscopy, Electrochemistry, and Conductivity Analysis) unit – one of seven on the Phoenix Mars probe – which has been providing NASA with scientific data from the very start of its deployment. The MECA unit was developed under the supervision of the Jet Propulsion Laboratory of the California Institute of Technology.

The goal of the Phoenix Mars mission is to answer three important questions: Can the Martian arctic support life, what is the history of water at the landing site, and how is the Martian climate affected by polar dynamics?

The atomic force microscope of the MECA unit was developed by a Swiss consortium, consisting of the Institute of Microtechnology of the University of Neuchâtel, the Institute of Physics of the University of Basel, and the Swiss company Nanosurf. Nanosurf, as a leading producer of easy-to-use nano-imaging devices, was founded in 1997 and currently employs some 30 highly talented individuals. It recently established a subsidiary in the US.

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