



MetBaro - Pressure Instrument for Mars MetNet Lander

H. Haukka, J. Polkko, A.-M. Harri, W. Schmidt, J. Leinonen, M. Genzer, and T. Mäkinen
 Finnish Meteorological Institute, Helsinki, Finland (harri.haukka@fmi.fi)

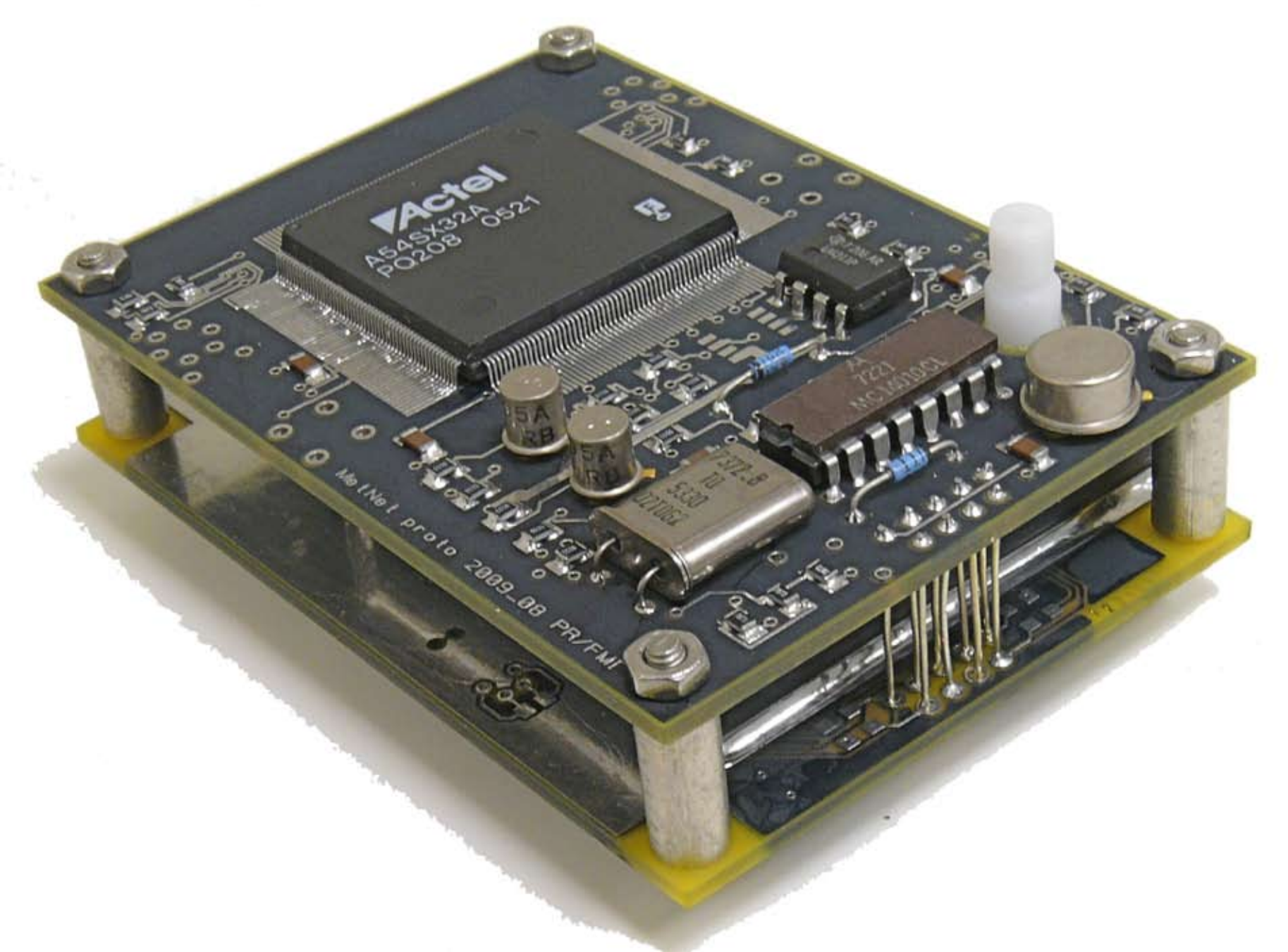
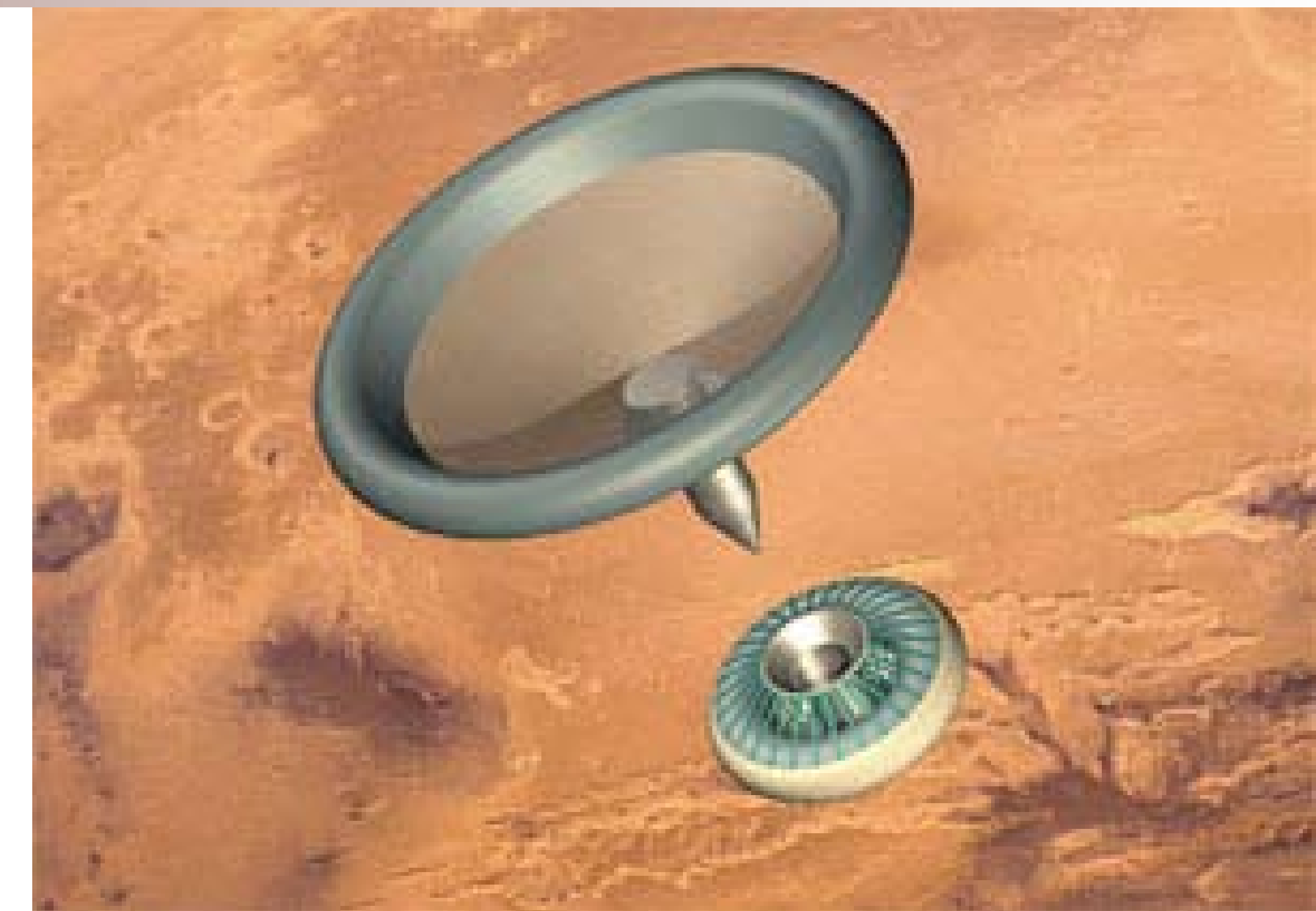
The MetNet Mission

The Mars MetNet Mission focused on the Martian atmospheric science is based on a new semihard landing vehicle called the MetNet Lander (MNL). The scientific payload of the MetNet Mission encompasses separate instrument packages for the atmospheric entry and descent phase and for the surface operation phase.

MetBaro Pressure Instrument

MetBaro is the pressure instrument of the MetNet Lander designed to operate at the Martian surface.

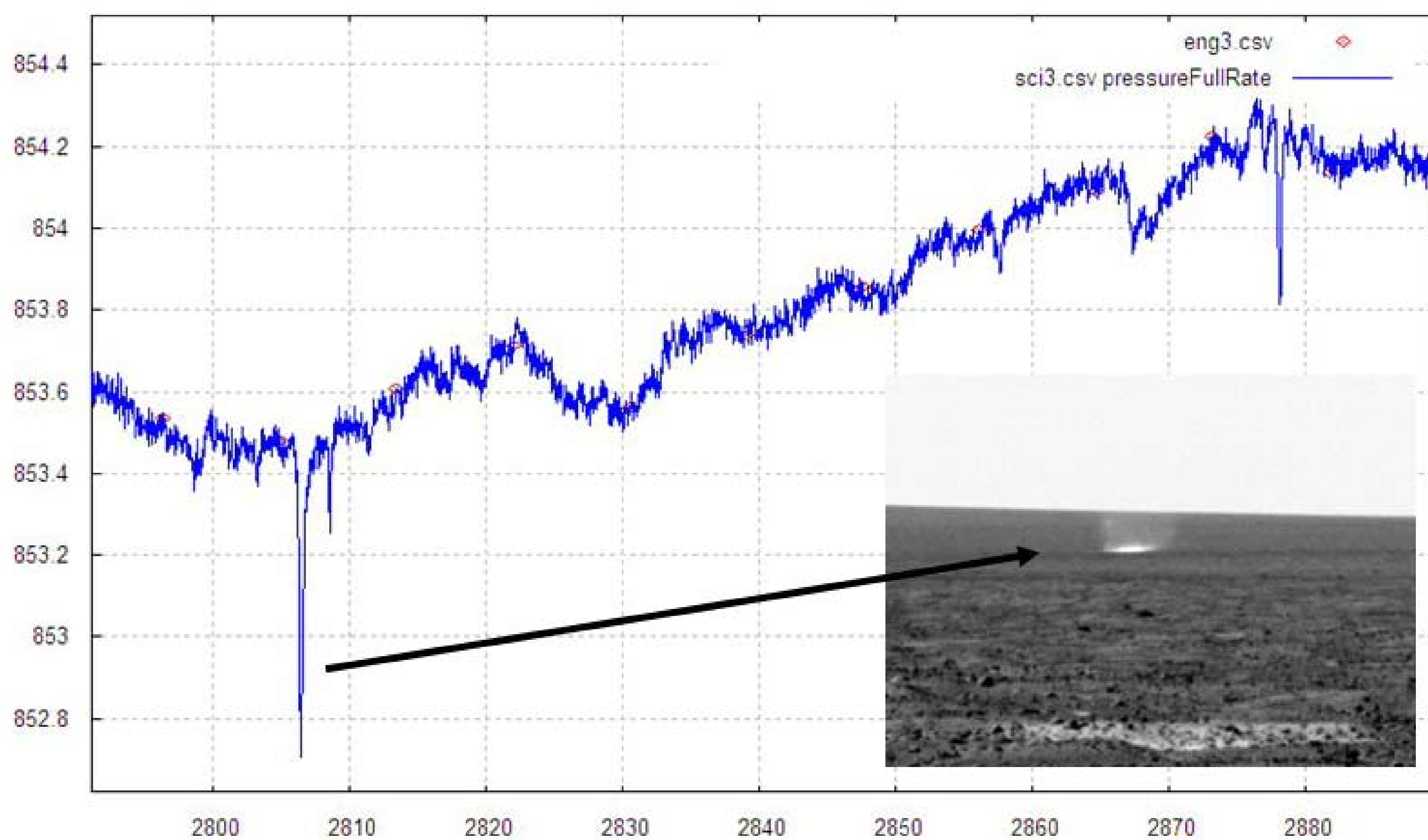
- The MetBaro pressure device instrument is based on Vaisala Inc. Barocap[®] micromachined capacitive silicon sensor and Vaisala transducer technology.
- MetBaro device consists of two pressure transducers accommodating a total of four Barocap[®] sensor heads. Transducer and sensor components are qualified and screened by FMI.
- Several hundreds of Barocaps have been manufactured for these applications. The Barocaps for Flight Models are handpicked through an intensive testing and screening process.
- The long-term stability of MetBaro is within the range of 20...50 μ Bar and resolution of the order of few μ Bar.
- MetBaro is small, lightweight (50 grams, without wires and controlling FPGA) and has low power consumption (15 mW).



MetNet MPPM Mission pressure instrument prototype. Photo: Markku Mäkelä



Barocap[®] pressure sensor elements

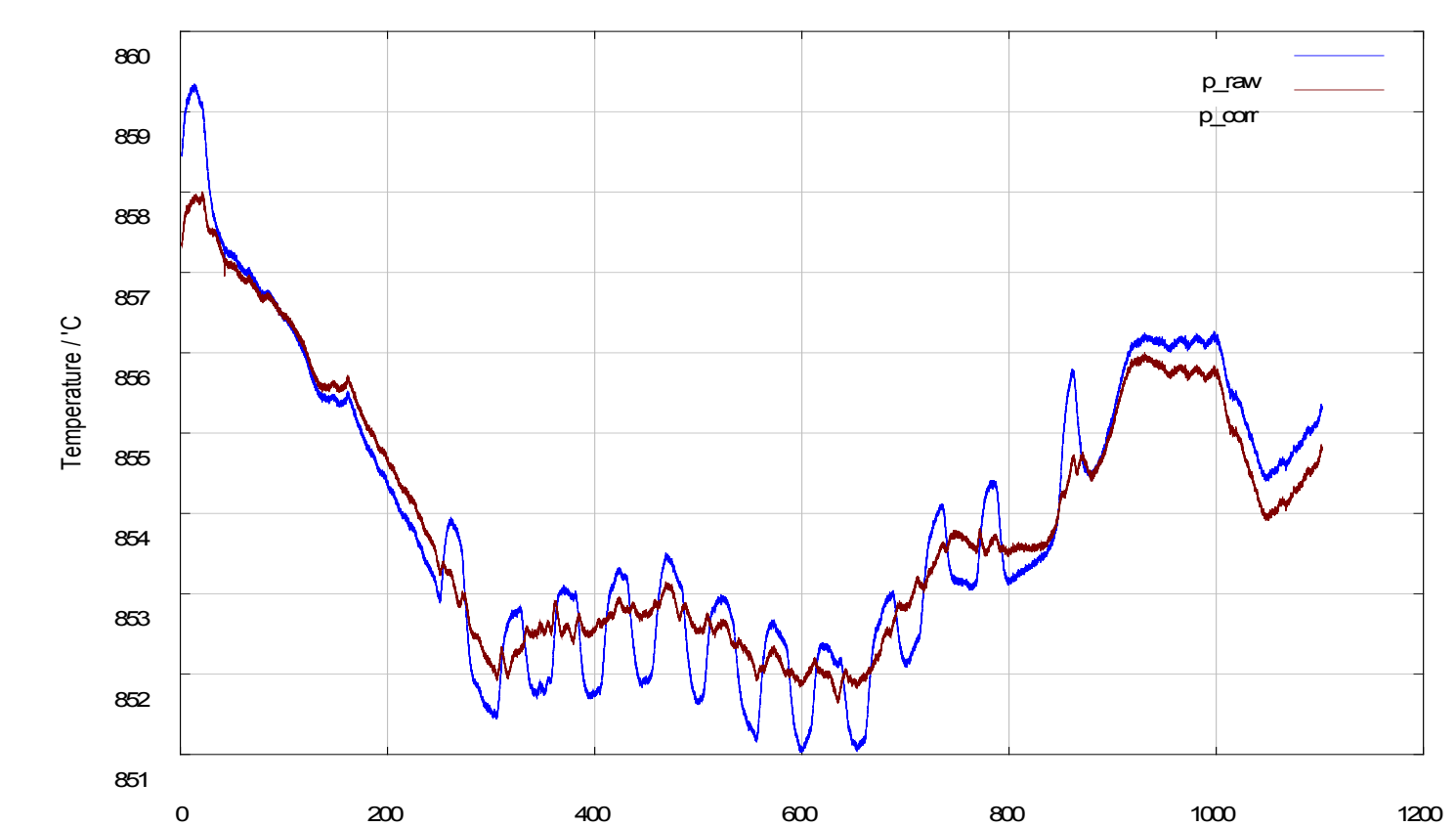


Pressure drops caused by dust devils detected by the FMI Phoenix Pressure device in Autumn 2008.

Heritage and Future

A similar device has successfully flown in NASA's Mars Phoenix 2007 mission, where it performed months of measurements on Martian ground. Another device is also part of the Mars Science Laboratory REMS instrument (to be launched in 2011). Earlier missions where similar pressure devices have been delivered are:

- Huygens (landed on Titan 2005)
- Beagle - 2 (2003)
- Mars Polar Lander (1999)
- Mars -96 (1996)



First pressure measurements made by the FMI Phoenix pressure device

Specifications

- Mass: ~100 grams with FPGA card
- Power: 15 mW
- Accuracy (BOL): Less than 10 Pa
- Resolution 0.2 Pa
- Technology Readiness Level: 9



ILMATIETEEN LAITOS
 METEOROLOGISKA INSTITUTET
 FINNISH METEOROLOGICAL INSTITUTE

More information from the Mars MetNet Mission website <http://metnet.fmi.fi>