



MetHumi - Humidity Instrument for Mars MetNet Lander

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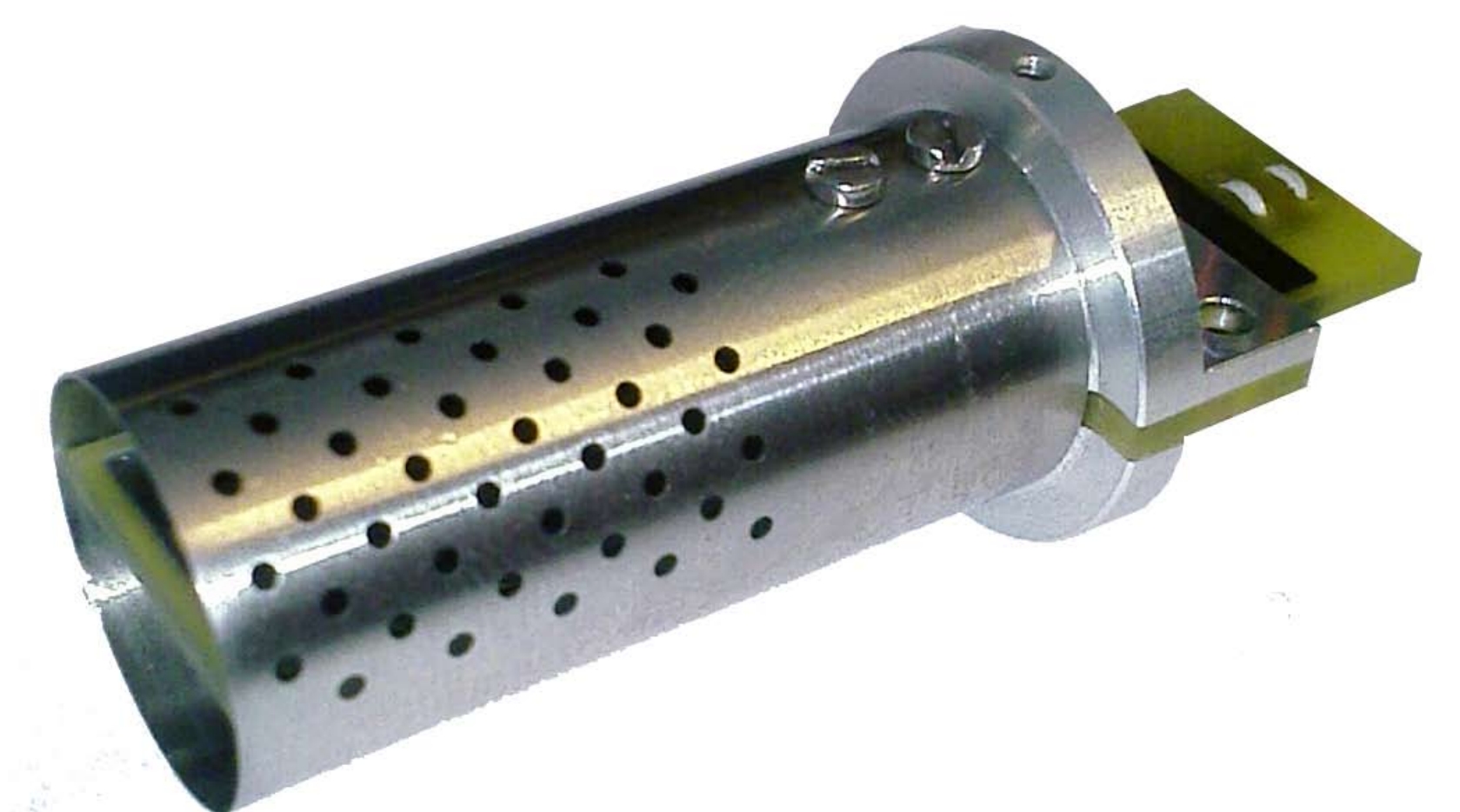
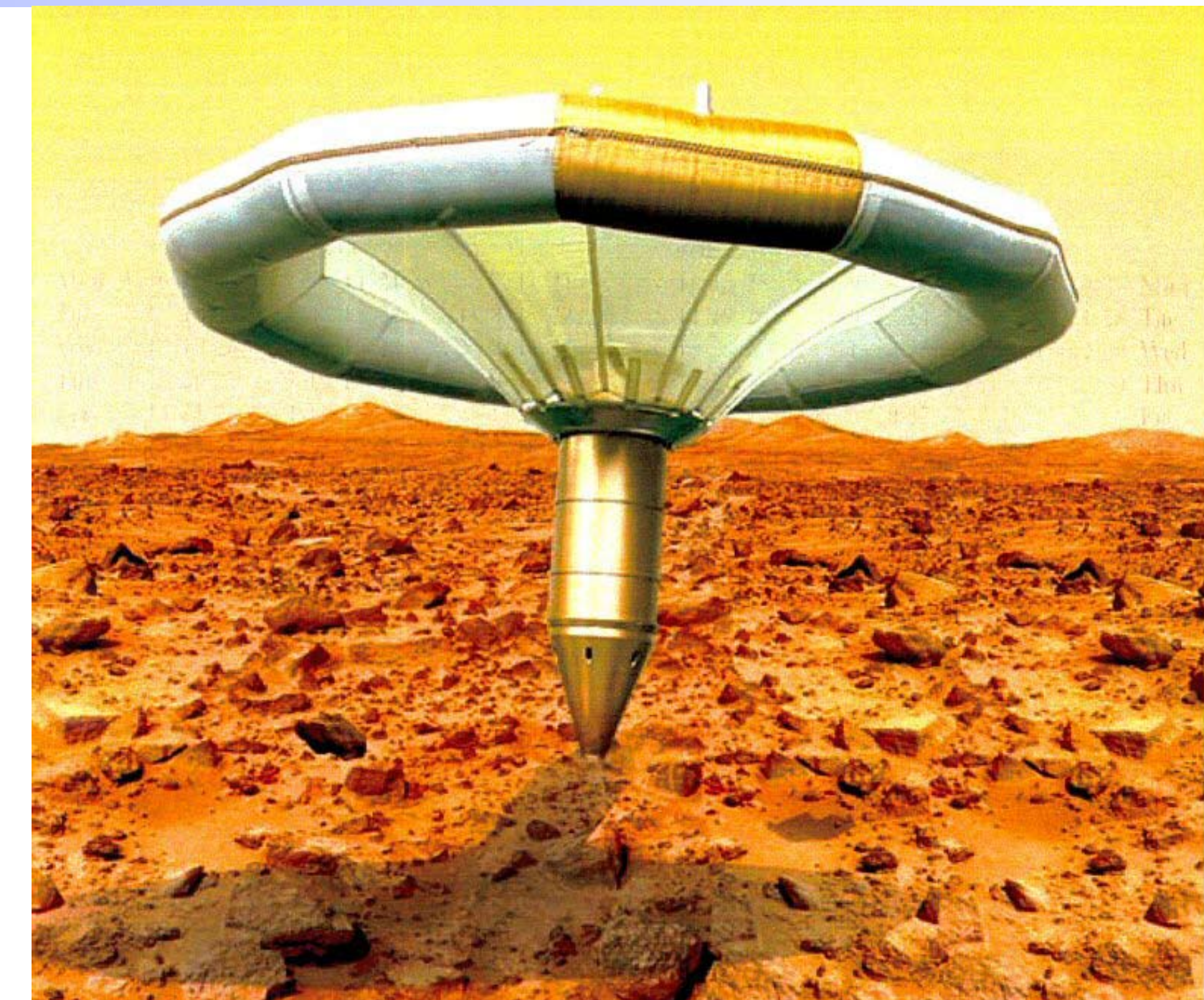
The MetNet Mission

The 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.

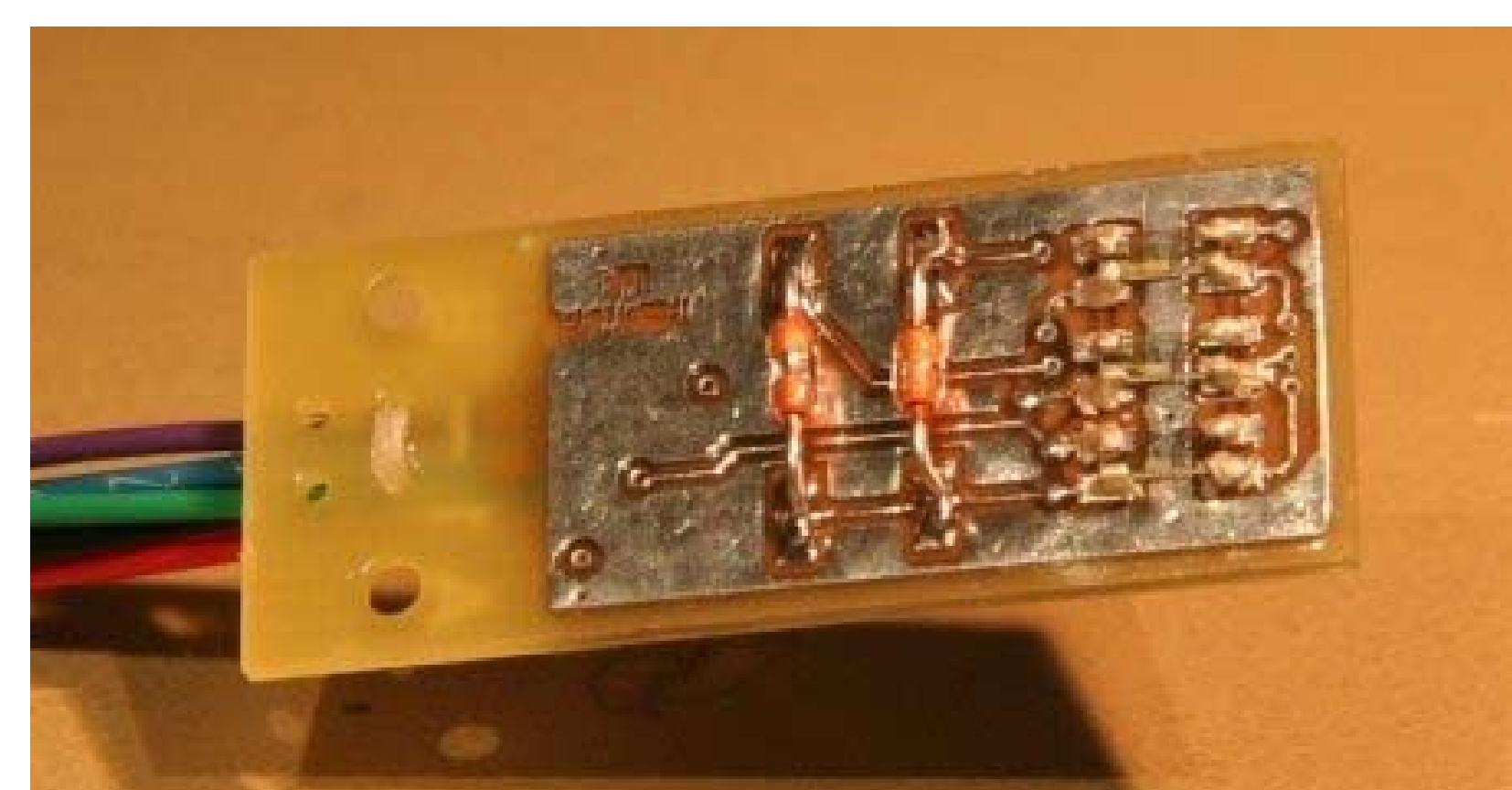
MetHumi Humidity Instrument

Miniature MetNet Humidity Instrument is based on MSL/REMS design and Vaisala Inc. Humicap[®] sensor and transducer electronics that have been used in Vaisala radiosondes. MetHumi is specially designed to work on the Martian surface.

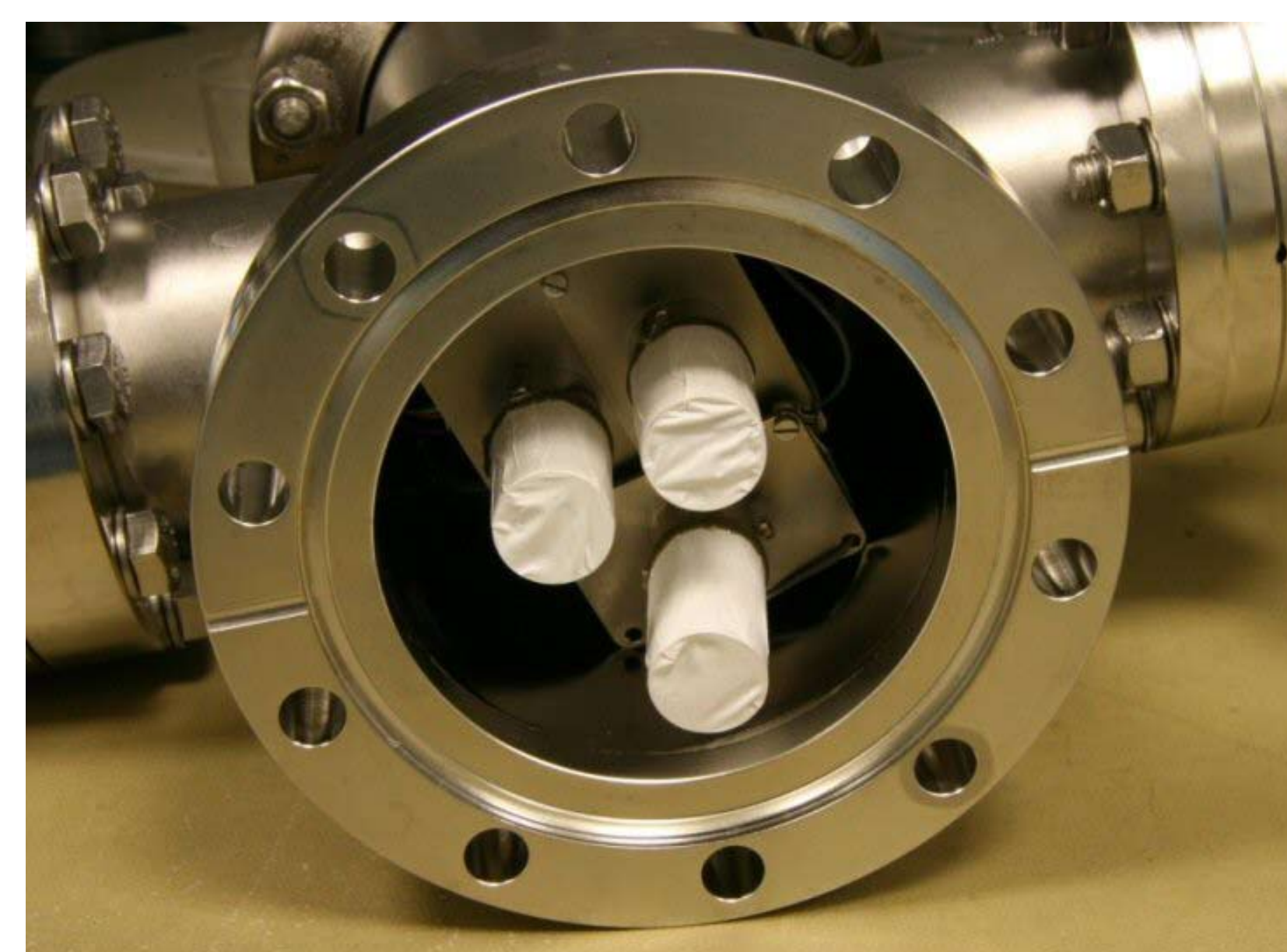
- MetHumi is a capacitive type of sensing device where an active polymer film changes capacitance as function of relative humidity.
- One MetHumi device package consists of one humidity transducer including three Humicap[®] sensor heads, an accurate temperature sensor head (Thermocap[®] by Vaisala, Inc.) and constant reference channels.
- MetHumi is small, lightweight (15 grams) and has low power consumption (15 mW)
- MetHumi performs relative humidity measurements in range of 0 – 100%RH down to -70°C ambient temperature and it survives even -135°C ambient temperature.
- Humicap[®] sensor heads are temperature dependent, they require accurate temperature measurement by a temperature sensor (MetHumi uses Vaisala Thermocaps[®])
- MetHumi instrument can be regenerated to remove contamination off the Humicap[®] chip surface by a heating treatment using an integrated heating resistor.



MetNet Mission humidity instrument design



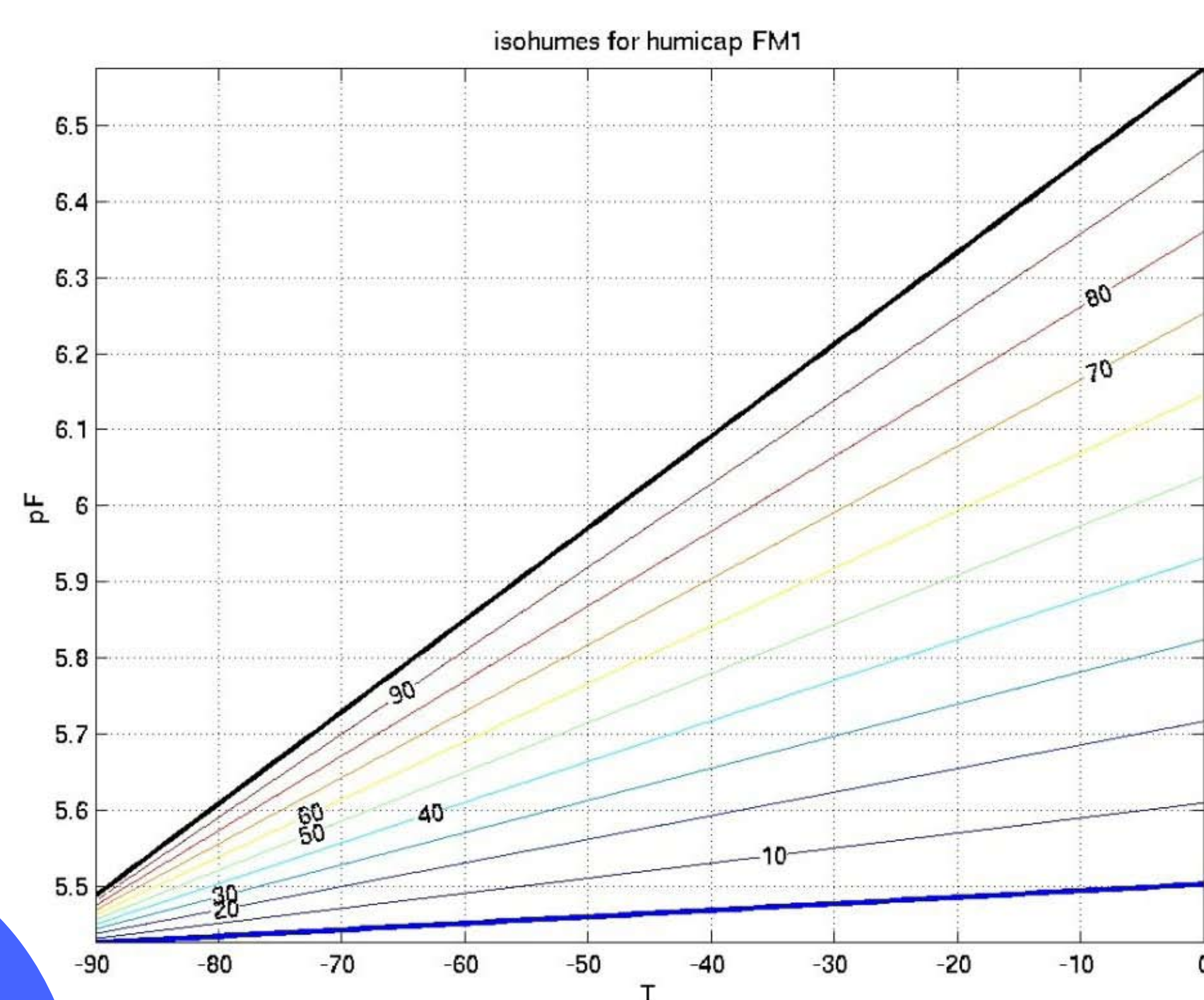
Humicap[®] humidity sensor elements



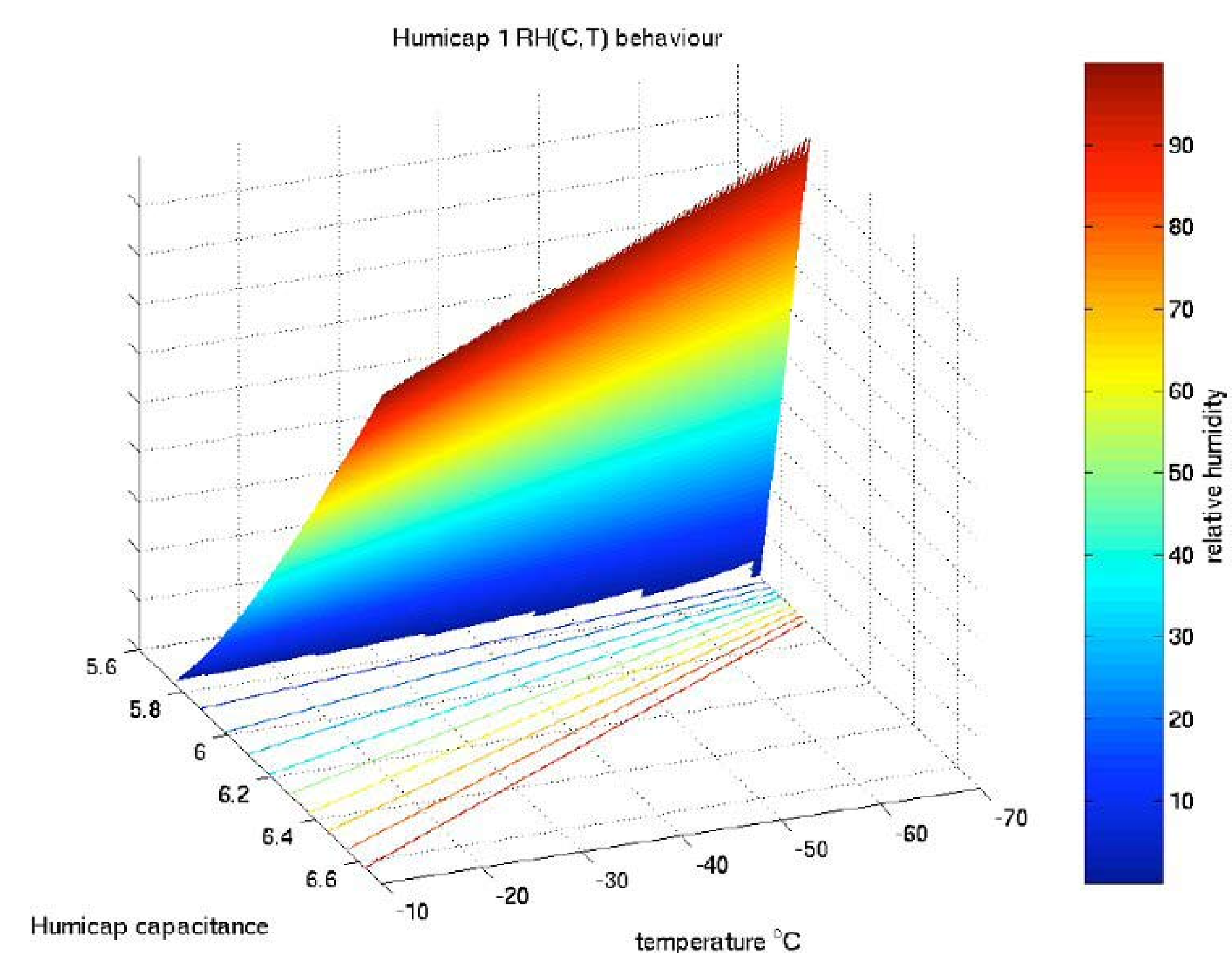
MSL Humidity device testing

Heritage and Future

- Earlier version of the device and sensors was used in the Mars-96 landers.
- MSL/REMS Humidity sensor Flight Model was delivered in 2008 (to be launched in 2011).



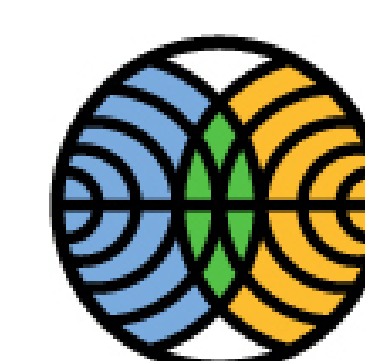
MSL Humidity sensor calibration



Humicap[®] test data fitting

Specifications

- Accuracy: 8 % RH at -70°C, 6 % RH or better at -50°C to 0°C
- Operational temperature range: +25°C to -70°C
- Survival temperature: -135°C
- Technology Readiness Level: 8



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