



## **MUPUS – a thermal and mechanical properties probe for the Rosetta Lander Philae**

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MUPUS, the multi purpose sensor package onboard the Rosetta lander PHILAE, will measure the energy balance and the thermophysical and mechanical parameters in the near-surface layers – up to about 30 cm depth- of the nucleus of Rosetta's target comet Churyumov-Gerasimenko. Moreover it will monitor changes in these parameters over time as the comet approaches the Sun. The data should increase our knowledge of how comets work, and how the coma gases form. The data may also be used to constrain the microstructure of the nucleus material. Changes with time of physical properties will reveal timescales and possibly the nature of processes that modify the material close to the surface. Thereby, the data will indicate how pristine cometary matter sampled and analysed by other experiments on PHILAE really is.

The MUPUS package consists of three major parts, the penetrator MUPUS PEN with its sub-systems, the radiometer MUPUS TM, and the anchor sensors MUPUS ANC. The PEN is equipped with 16 RTD-type sensors along the penetrator tube aimed at measuring the temperature profile. Furthermore, they can also be actively heated in order to be used as a thermal conductivity probe. TM uses 4 thermopile sensors and different filters covering the wavelength range from 6-25  $\mu\text{m}$  to measure the emitted flux from the comets surface. Both anchors are equipped with an accelerometer (ANC-M) and a Pt-100 temperature sensor to determine the hardness profile at the landing site and the thermal diffusivity at the final depth.

An update of the status of the instrument after about 10 years in space with emphasis on the results of the latest tests performed during the post-hibernation commissioning will be given. Furthermore, an overview of related modelling efforts as well as supporting laboratory work in preparation of the data analysis will be provided.