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Mars MetNet Mission Payload Overview

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A new kind of planetary exploration mission for Mars is being developed in collaboration between the Finnish Meteorological Institute (FMI), Lavochkin Association (LA), Space Research Institute (IKI) and Institutio Nacional de Tecnica Aerospacial (INTA). The Mars MetNet mission is based on a new semi-hard landing vehicle called MetNet Lander (MNL).

The main idea behind the MetNet landing vehicles is to use a state-of-the-art inflatable entry and descent system instead of rigid heat shields and parachutes as earlier semi-hard landing devices have used. This way the ratio of the payload mass to the overall mass is optimized and more mass and volume resources are spared for the science payload. The vehicle decelerates its entry speed using the inflatable structure and final landing sequence includes a cone headed body penetrating the Martian soil. It is planned to deploy several tens of MNLs on the Martian surface operating at least partly at the same time to allow meteorological network science.

The payload of the two MNL precursor models includes the following instruments:
Atmospheric instruments:
- Pressure device (MetBaro): mass 100g, measurement range 0..1015 hPa.
- Humidity device (MetHumi): mass 15g, measurement range 0..100%RH.
- Temperature sensors (MetTemp): mass 2g each, measurement range -110C..+30C.
Optical devices:
- Panoramic camera (PanCam): mass 100g, FOV 4 lenses mounted at 90 deg
- Solar irradiance sensor (MetSIS) with optical wireless system (OWLS) for data transfer: mass 115g (MetSIS) and 7g (OWLS module), wavelength range 190..1100nm. MetSIS equipped with 28 optical detectors, two temperature sensors and two solar incidence angle detectors.
- Dust sensor (DS): mass 42g, resolution: 10 particles / cm3.
Composition and structure device:
- Magnetometer (MOURA): mass 80g, measurement range: $\pm$30uT.

MetNet Mission payload instruments are specially designed to operate in very low power conditions. MNL flexible solar panels provides a total of approximately 0.7-0.8 W of electric power during the daylight time. As the provided power output is insufficient to operate all instruments simultaneously they are activated sequentially according to a specially designed cyclogram table which adapts itself to the different environmental constraints.