

## SPACE EXPLORATION SYMPOSIUM (A3)

## Poster Session (P)

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## THE HEAT-FLOW AND PHYSICAL PROPERTIES PROBE (HP3 ) MARS INSTRUMENT

**Abstract**

InSight is a Discovery-class mission to study the geophysical state of the interior of Mars scheduled for launch in 2016. The main goals of the mission are the determination of the size, physical state, and composition of the core, the thickness of the crust, and the thermal state of the martian interior. HP3 is an instrument aboard the InSight lander, designed and built by the German aerospace agency, Deutsches Zentrum für Luft- und Raumfahrt (DLR), to determine the geothermal heat flux by penetrating down into the surface of Mars to at least 3 meters. Heat flow is a major constraint on models of the current state of Mars' interior and is key to understanding the evolution of terrestrial planets in general. HP3 consists of an electro-mechanical hammering mechanism, the Mole, that penetrates below the martian surface and contains resistive heaters and thermometers, for the active measurement of the thermal conductivity of the soil, as well as tilt sensors to determine its trajectory through the ground. It pulls behind it the Science Tether, with highly calibrated, equally spaced, temperature sensors that monitor the thermal gradient in the soil over the greater part of a Martian year. A Radiometer mounted on the Lander will contribute to the temperature monitoring by providing the temperature of the surface surrounding the lander.