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DEVELOPMENT OF A SEISMOLOGY INSTRUMENT FOR THE INSIGHT MISSION

Abstract

In the frame of the INSIGHT (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) mission, to be launched to Mars in 2016, CNES is in charge of the development of the SEIS instrument. SEIS stands for Seismic Experiment for Interior Structure. This instrument will allow for a characterization of the deep interior structure of Mars, including the thickness and structure of the crust, the composition and structure of the mantle, and the size of the core. It accommodates two independent, 3 axis seismometers: an ultra-sensitive Very Broad Band (VBB) oblique seismometer and a miniature, Short Period (SP) seismometer. Both seismometers, and their respective signal preamplifier stages, are mounted on a common structure which can be precisely leveled thanks to 3 tunable length legs. They are isolated from weather by an aerogel thermal blanket and WTS (wind shield) and connected by a flexible cable tether to the E-box, a set of electronic cards located inside the Lander thermal enclosure.

By the time of the IAC 2015, the instrument will have been delivered to Lockheed Martin, and integrated to the INSIGHT lander which reuses extensively the cruise bus and the Entry-Descent and Landing System of PHOENIX, which performed a successful mission on Mars Northern terrains in 2008.

After giving an outline of the InSight mission, with a focus on the SEIS activities on Mars, this paper will give a detailed presentation of the SEIS instrument, as well as an overview of the integration activities and tests.