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Mars Exploration – missions current and future (3A)

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SEIS ON MARS

Abstract

SEIS (Seismic Experiment for Interior Structure) is an instrument integrated on the INSIGHT (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) lander. It has been developed to characterize 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 a thermal blanket and WTS (Wind and Thermal Shield) and connected by a flexible cable tether to the E-box, a set of electronic cards located inside the Lander thermal enclosure.

INSIGHT was launched from Vandenberg Air Force Base on May 05th 2018, and landed on Mars on Nov 26th 2018.

After a first checkout and some characterization of the seismic signal on the deck of the lander, SEIS

Sensor Assembly was deployed on the ground of Mars, thanks to the lander's arm, on Dec 19th 2018. The WTS was deployed on Feb 2nd 2019.

After the deployment period of time, during which SEIS already gathered a large amount of data, the commissioning started and the instrument could be finely tuned and characterized. All the subsystems are perfectly working and the behaviour of the instrument is above expectations.

After giving an outline of the INSIGHT mission and a presentation of the SEIS instrument, the paper will present the deployment and commissioning sequences, as well as some of the results obtained so far.