

IAF SPACE EXPLORATION SYMPOSIUM (A3)  
Mars Exploration – Science, Instruments and Technologies (3B)

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## SEIS ON HIS WAY TO MARS

**Abstract**

SEIS on his way to Mars SEIS (Seismic Experiment for Interior Structure) is an instrument integrated on the INSIGHT (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) lander. It 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 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.

In order to reach the required level of performances, the 3 VBBs are accommodated inside a vacuum container. Unfortunately, after the environments tests at instrument level in 2015, one of the container's feedthroughs was found to be leaky, inducing non-conformances on some of the major science requirements. The SEIS instrument could then not be delivered and the INSIGHT launch was reported to 2018.

A new development plan had to be conducted and led to a successful delivery of the Flight Model to Lockheed Martin in July 2017. Then, the instrument started the ATLO (Assembly, Test, and Launch Operations) campaign and was first 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. This integration was followed by a test campaign where SEIS successfully went through various testing.

INSIGHT will soon be moved to Vandenberg Air Force Base where the launch window opens on May 05th 2018, and, by the time of the IAC 2018, the instrument will be on its way to Mars, where the landing window opens on Nov 26th 2018.

After giving an outline of the INSIGHT mission, this paper will give a presentation of the SEIS instrument, a summary of the ATLO campaign, as well as an overview of the deployment and commissioning

activities that will be performed right after landing on Mars.