Geophysical Research Abstracts
Vol. 19, EGU2017-9978-2, 2017
EGU General Assembly 2017

SEIS/INSIGHT: One year prior launch for Seismic Discovery on Mars

Philippe Lognonne (1), W. Bruce Banerdt (2), Domenico Giardini (3), W. Tom Pike (4), Ulli Christensen (5), Brigitte Knapmeyer-Endrun (5), Sebastien de Raucourt (1), Jeff Umland (2), Ken Hurst (2), Peter Zweifel (3), Simon Calcutt (7), Marco Bierwirth (5), David Mimoun (6), Gabriel Pont (7), Nicolas Verdier (7), Philippe Laudet (7), Sue Smrekar (2), Tom Hoffman (2), and the SEIS/InSight Team

(1) IPGP-Sorbonne Paris Cité, Univ. Paris, France Diderot, (2) JPL-Caltech, USA USA, (3) ETHZ, Switzerland, (4) Imperial College, UK, (5) MPS, univ. Gottingen, Germany, (7) CNES, Toulouse, France, (6) ISAE, Toulouse, France

InSight (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) is the next NASA Discovery mission due to launch in May 2018 for a landing by the end of November 2018. The payload is a complete geophysical observatory, with a seismometer (SEIS, F), a heat flux experiment (HP3, D), a geodesy experiment (RISE, US), a magnetometer and the APSS (US) suite of atmospheric sensors measuring wind (TWINS, Spain), atmospheric temperature, pressure and magnetic field. SEIS is the primary instrument of the mission and consists of a 3-axis very-broad-band (VBB, F) instrument and a 3-axis short period (SP, UK) instrument mounted on a Leveling system (LVL, D) protected and connected by a Wind and Thermal Shield (WTS, US) and a Tether (US). The 3 axis VBBs are enclosed in a vacuum thermal enclosure (EC, US). A leak detected in the EC-2016 during the final integration forced to postponement of the launch from 2016 to 2018 and to redesign a new EC under JPL, US responsibility.
SEIS is expected to provide the very first seismic records of Mars. Thus implementation of the science goals is very challenging due to the almost complete lack of information on the deep seismic interior structure of Mars, as well as its level of seismic activity and surface seismic noise. In parallel to the hardware technical developments made by the SEIS hardware team, efforts of the SEIS science team were concentrated in three areas, associated with the challenges of single-station seismic analysis methodology, prelaunch estimation of the seismic and station-generated noise and amplitude of seismic and gravity signals generated not only by quakes but also by other non-seismic sources (for example, impacts, seismic waves generated by the atmosphere or Phobos tide), including in 3D Mars interior configurations.
We present the status of the SEIS experiment as well as the performances of the seismic payload, following its characterization in the 2017 Flight Model deliveries activities. We then summarize and review the most recent analysis made by the SEIS team, predicting the seismic performances of the SEIS experiment in the Martian environment, as well as update the estimations of seismic signals.