The Seismic Experiment for Interior Structure (SEIS): Experiment Data Distribution

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Like all NASA missions, InSight's data will be archived at the Planetary Data System (PDS), a long-term digital data archive. This includes data from SEIS, the first seismometer deployed on the Martian ground (40 years after the Viking deck-mounted instruments), as well as those of the Auxiliary Payload Sensors Suite (APSS). For SEIS, the distributed data are those of the very broad-band (VBB), short-period (SP) sensors, SEIS electronics, leveling system, and selected lander telemetry channels.

The SEIS Data

The six sensors of SEIS [1] cover a broad range of the seismic bandwidth, from 0.01 Hz to 50 Hz, with possible extension to longer periods. Data are transmitted in the form of three continuous VBB components at 2 sample per second (sps), an estimation of the short period energy content from the SP at 1 sps, and a continuous compound VBB/SP vertical axis at 10 sps. The continuous streams are augmented by requested event data with sample rates from 20 to 100 sps.

SEIS data products are downlinked from the spacecraft in raw CCSDS packets and converted to both the Standard for the Exchange of Earthquake Data (SEED) format files and ASCII tables (GeoCSV) for analysis and archiving. Metadata are available in dataless SEED and StationXML. Time series data (waveforms) are available in miniseed and GeoCSV. Data are distributed according FDSN (http://www.fdsn.org) formats and interfaces.

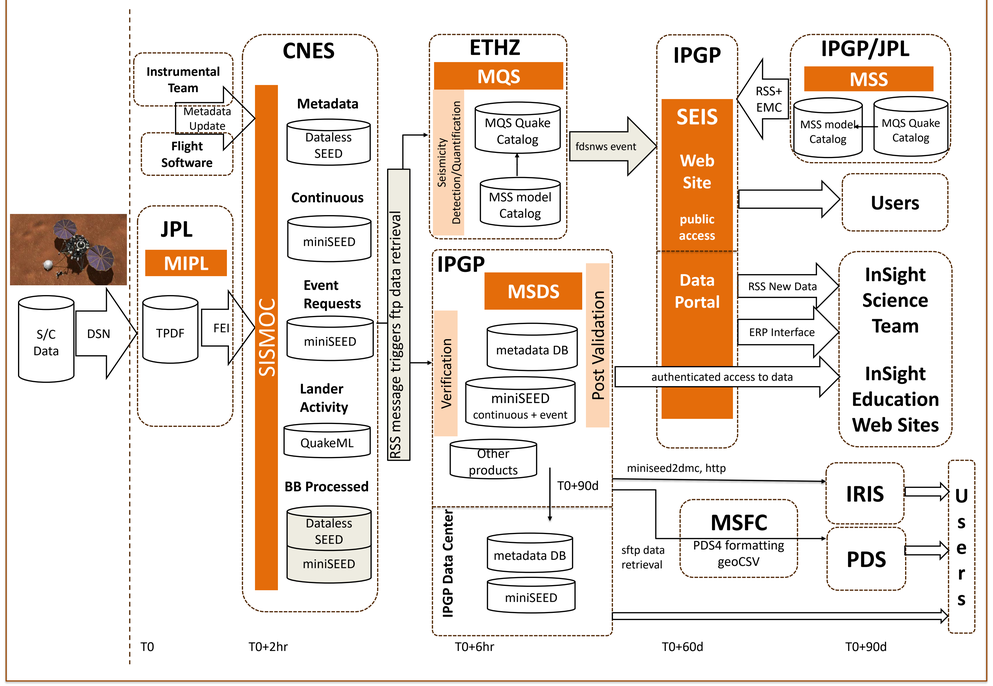
Wind, pressure, and temperature data from the Auxiliary Payload Sensor Suite (APSS) will also be available in SEED format, and can be used for decorrelation and diagnostic purposes on SEIS.

InSight Mission Data at FDSN

http://www.fdsn.org/networks/detail/XB_2016/

Temporary Network Code: XB (2016 – 2022)
Station Codes:
ELYSE scientific data from final configuration (Dec 20, 2018)
ELYHK housekeeping data from final configuration
ELYS0 scientific data from post-landing before instrument deployment (Nov 26, 2018 – Dec 20, 2018)
ELYH0 housekeeping data from post-landing before instrument deployment

SEIS Data Flow



Accessing SEIS Data

Accessing data from Planetary Data System

SEIS data will be archived at the Geosciences Node of NASA's Planetary Data System (PDS):

https://pds-geosciences.wustl.edu/

The Planetary Data System (PDS) is a long-term archive of digital data products returned from NASA's planetary missions. But it is more than just a facility - the archive is actively managed by planetary scientists to help ensure its usefulness and usability by the planetary science community.

SEIS archive submissions are prepared by the team under the guidance of PDS personnel. All products are peer-reviewed, well-documented, and easily accessible via a system of online catalogs that are organized by planetary disciplines. When needed, PDS provides users access to staff to help with data selection. PDS also provides a variety of tools useful in producing, obtaining and using archived data. There is no cost associated with acquiring PDS archived data or tools or in getting reasonable amounts of PDS help. All PDS archived data may be exported outside of the United States under the U.S. Government's Technology and Software Publicly Available (TSPA) classification.

The initial release of SEIS raw data archive products by the PDS to the public is scheduled to occur in May 2019, four months after receipt of the first raw science data from the spacecraft. The corresponding calibrated products and SPICE kernels will be released one month later. Following these initial releases, the raw, calibrated and SPICE data will be released together by the PDS every three months beginning in October 2019. Each release will contain documentation and notes to guide users through each archive volume.

Accessing data through the fdsn webservices (IRIS and IPGP)

After the PDS release, SEIS and APSS will be available through the FDSN Web Services at the Incorporated Research Institutions for Seismology (IRIS) and IPGP Data Centers.

http://service.iris.edu/fdsnws

http://ws.ipgp.fr/fdsnws

FDSN web services: *station* to get station information metadata and *dataselect* to get time series, according user criteria.

Restricted access to SEIS and APSS for InSight Science Team

The SEIS Data Portal provides restricted access to several datasets collected and archived by the Mars SEIS Data Service (MSDS), an Event Request Proposal interface connected to the SISMOC, Mars Quake Service products (MQS), data availability and SEIS documents.

SEIS Data Delivery

Date	Release	Description	Period
26 Nov 2018		Start of commissioning phase	
1 Apr 2019		Start of science monitoring phase	
24 May 2019	1a	Raw data	Nov 26,18 – Feb 28, 19
26 June 2019	1b	Calibrated data	Nov 26, 18 – Mar 31, 19
1 October 2019	2	Raw + Calibrated data	1 Apr 19 – 30 Jun 19
Every 3 months	Subsequent releases	Raw + Calibrated data	Subsequent 3 months

References:
[1] Lognonné et al. (2019) Space Science Review 215:12

SEIS & Education

SEIS Public Website

The public part of the SEIS portal offers a complete, understandable overview of the SEIS experiment and the InSight mission, through four sections. The first section explains some basic principles in seismology and presents previous planetary seismology experiments. The second section is dedicated to SEIS, and presents not only the instrument itself, but also the legacy of the development behind it, as well as lot of information related to tests. The third section focuses on the InSight mission itself, including the lander.

Finally, the last section deals with Martian science: after a short presentation of the internal structure of rocky planets, several articles introduce the reader to the many scientific goals of the InSight mission.

www.seis-insight.eu

IRIS Outreach Program

In addition to data distribution, the Incorporated Research Institutions for Seismology will develop an outreach program around InSight.

www.iris.edu

Geoazur Website

Suitable content (hands-on, software, data) for teenagers and students is available at this website dedicated to education.

insight.oca.eu

Mars@School

Dedicated for teenager, student and all public. It s an interactive website for museum and school.

marsatschool.ethz.ch

In comparison with astronomy or others branches of geosciences, such as volcanology, seismology is a domain more difficult to popularize, and for us earthlings, linked to negative connotations. In order to make the almost 200 pages of text of the general public section more pleasant to read, a lot of work was also been put into the visuals.

A set of didactic colorful original illustrations and animations were thereby created, mainly for the science section of the SEIS Public Website, including some stunning artist's concepts. Several more sophisticated graphical products were also developed, such as a fully textured cutaway of the SEIS instrument at the surface of Mars, a real-time interactive 3-D model of the VBB pendulum, 360° cylindric view of hardware or 3-D models of meteorites, etc.