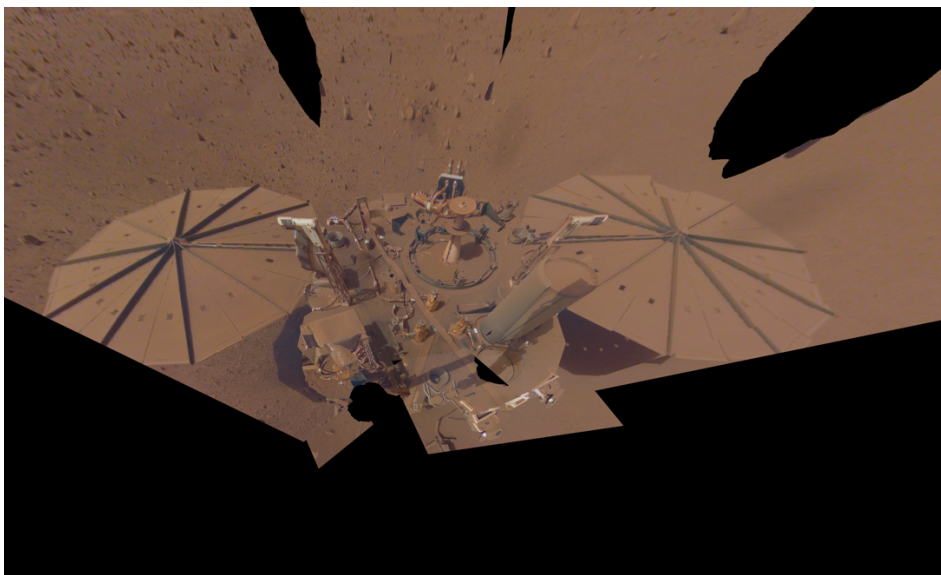


InSight on Mars, 2018-2022: What a single station on Mars was able to reveal about the interior from near-surface to the core

Mark P. Panning, Jet Propulsion Laboratory, California Institute of Technology

InSight landed on Mars in November, 2018, and spent the next few months deploying a sensitive seismometer package and a heat flow probe to the surface. Following that, InSight kept gathering geophysical data from Mars until the end of surface operations in December, 2022, providing for the first time a powerful, detailed view of the interior of another planet based on surface geophysical measurements. The InSight mission was unique in that it was the first landed mission primarily focused on in situ geophysical measurements of another planet. It also constituted the first long-lived stationary lander on Mars since Viking, as well as the first operational planetary seismic experiment of any kind since Viking. Its primary payload, consisting of a very-broad-band seismometer, a precision tracking system, and a heat flow probe, was tightly focused on meeting ten specific scientific objectives related to the deep interior structure and dynamics of Mars. While seismology on Earth strongly relies on network science, InSight demonstrated what could be accomplished with a single high-quality station on a planet with very little previous data. Although the dusty atmosphere of Mars eventually obscured the solar arrays enough to end operations in late 2022, InSight managed to record over 1300 marsquakes, and used the data from that and the other instrumentation aboard the lander to determine key parameters needed to better understand Mars, including its seismic activity level; information about its crust, mantle, and core; and observations of seismic signals from impacts. While the data will undoubtedly continue to be analyzed and reanalyzed in years to come, this presentation will focus on an overview of the major results of the mission during its time operating on the surface of Mars.



InSight's final selfie taken on April 24, 2022, showing the dusty solar arrays. Image credit: NASA/JPL-Caltech