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# DARK ENERGY DILEMMA

**Why NASA's planet-hunting astrophysics telescope is an easy budget target, and what defeat would mean** PAGE 24

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# InSight digs for Mars secrets

## InSight lander

**Length:** 6 meters from left to right below (each solar panel measures 2.2 meters)

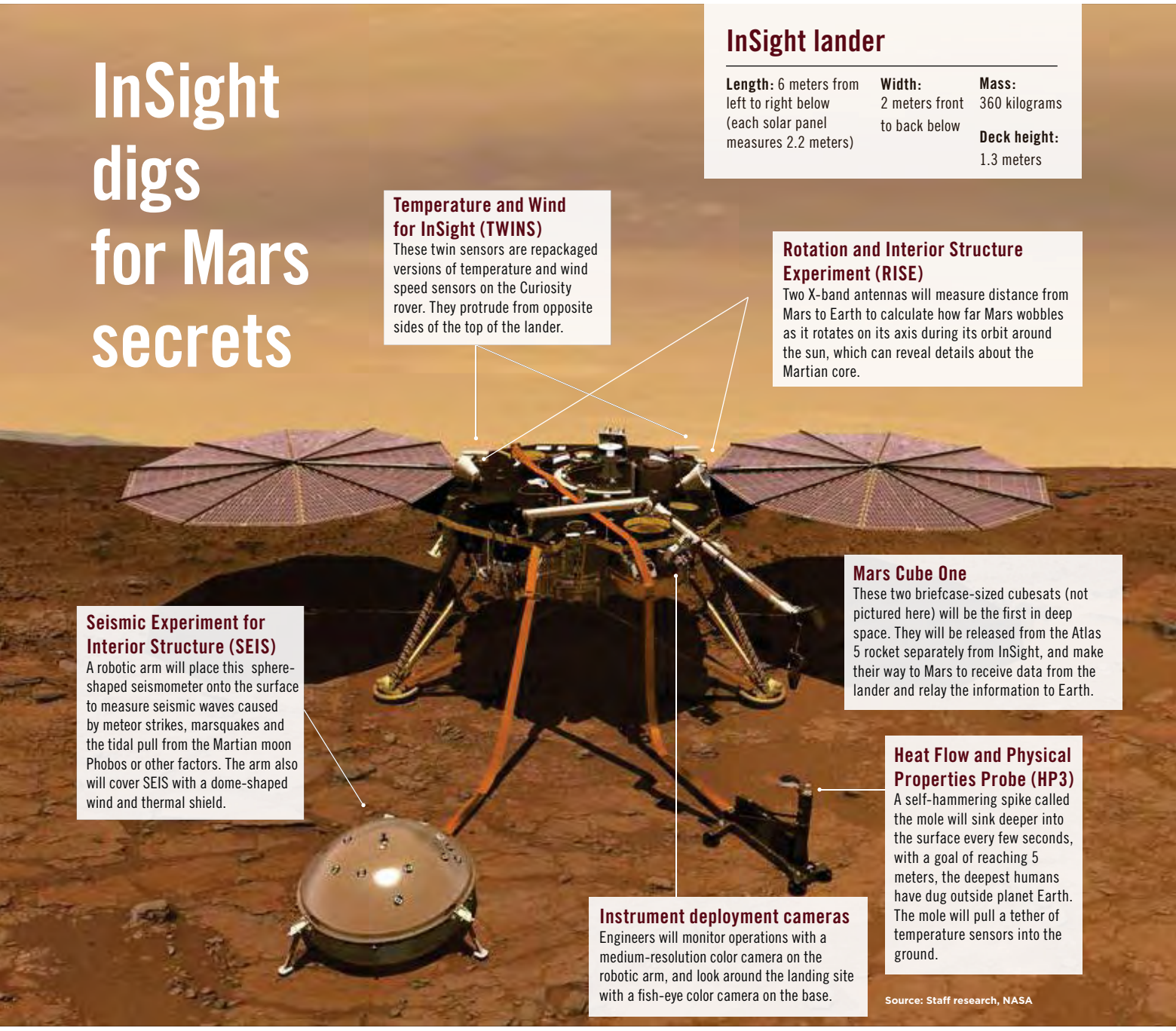
**Width:** 2 meters front to back below

**Mass:** 360 kilograms

**Deck height:** 1.3 meters

**Temperature and Wind for InSight (TWINS)**
These twin sensors are repackaged versions of temperature and wind speed sensors on the Curiosity rover. They protrude from opposite sides of the top of the lander.

**Rotation and Interior Structure Experiment (RISE)**
Two X-band antennas will measure distance from Mars to Earth to calculate how far Mars wobbles as it rotates on its axis during its orbit around the sun, which can reveal details about the Martian core.



**Seismic Experiment for Interior Structure (SEIS)**
A robotic arm will place this sphere-shaped seismometer onto the surface to measure seismic waves caused by meteor strikes, marsquakes and the tidal pull from the Martian moon Phobos or other factors. The arm also will cover SEIS with a dome-shaped wind and thermal shield.

**Mars Cube One**
These two briefcase-sized cubesats (not pictured here) will be the first in deep space. They will be released from the Atlas 5 rocket separately from InSight, and make their way to Mars to receive data from the lander and relay the information to Earth.

**Heat Flow and Physical Properties Probe (HP3)**
A self-hammering spike called the mole will sink deeper into the surface every few seconds, with a goal of reaching 5 meters, the deepest humans have dug outside planet Earth. The mole will pull a tether of temperature sensors into the ground.

**Instrument deployment cameras**
Engineers will monitor operations with a medium-resolution color camera on the robotic arm, and look around the landing site with a fish-eye color camera on the base.

Source: Staff research, NASA

## The lander will measure heat beneath the planet's surface for answers about why its core cooled, unlike Earth's.

Scientists don't know why the core of Mars cooled, causing it to stop generating plate tectonics and the type of magnetic field that protects the atmosphere of Earth from being stripped away by solar winds. NASA theorizes that without that magnetic protection Mars lost its atmosphere and possibly oceans over the eons. NASA-funded Jet Propulsion Laboratory plans to launch a probe between May 5 and June 8 to land on Mars and take the first comprehensive measurements of the planet's interior that could determine how other rocky planets including Earth are formed. The InSight probe, which is short for Interior Exploration using Seismic Investigations, Geodesy and Heat Transport, built by Lockheed Martin, will launch on an Atlas 5 rocket from Vandenberg Air Force Base in California on a six-month journey to the red planet. InSight aims to dig deeper into Mars than humans have ever dug on another world, so JPL chose a landing site that is relatively rock free. InSight is the first mission with the goal of measuring the heat flow within Mars, and the first deep space mission to be accompanied by orbiting cubesats. — *Tom Risen*