NASA’s Mars InSight Probe

Why in news?

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NASA’s Mars InSight probe has reached its destination and touched down near the red planet’s equator.

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What is the objective?

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- InSight marks the 21st US-launched Mars mission.
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- InSight (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) is on a 24-month mission.
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- It will not be looking for life on Mars.
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- It will study its insides as to what it is made of, how that material is layered and how much heat seeps out of it.
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Why Mars?

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- Earth and Mars used to be similar - warm, wet and shrouded in thick atmospheres.
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- But this was before they took different paths 3.4 billion years ago.
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- After the event, Mars stopped changing, while Earth continued to evolve.
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- They turned out so different - Mars cold and dry, Venus and Mercury burning hot, and Earth hospitable to life.
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- With InSight, Earth would thus be compared to Mars, to better understand how a planet's starting materials make it more or less likely to support life.
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- It is thus expected to study how Mars and other rocky worlds formed at the dawn of the solar system 4.6bn years ago.
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- But notably, sending a probe to Mars, whether to land, orbit or fly past, is risky; only 40% of missions have succeeded so far.
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How does it work?

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- **Landing site** - The landing site is Elysium Planitia, where InSight can stay still and quiet all through.
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- It is a vast, smooth lava plain that NASA calls "the biggest parking lot on Mars".
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- This featureless, and hopefully quiet, landscape is well-suited for the mission, to map the interior of the planet.
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- **Lander** - The lander (6m × 1.56m, deck height 83-108 cm) carries a robotic arm 1.8 m long.
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- The lander will use a set of instruments to study the makeup and dimensions of the planet's core, mantle and crust.
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- It is powered by two solar panels, and carries a seismometer, heat probe and a radio science experiment.
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- Two complementary engineering cameras help with navigation and hazard avoidance.
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- **Satellites** - Along with the spacecraft, a pair of mini satellites known as Mars Cube One, or MarCO also reached Mars.
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- The satellites provided real-time updates of the spacecraft's supersonic descent.

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- **Observation** - From Earth, NASA team will be monitoring radio signals using a variety of spacecraft and even radio telescopes on Earth.
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- Signals will come from various sources -
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i. the lander during descent
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ii. two experimental briefcase-sized spacecraft called MarCOs that is flying behind InSight
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iii. InSight itself after landing
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iv. the Mars Reconnaissance Orbiter (MRO) spacecraft during descent
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v. the 2001 Mars Odyssey (Mars orbiter) after InSight’s touchdown
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Source: Indian Express, The Guardian

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