

# Solar Orbiter mission

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**Context:** Solar Orbiter, a new collaborative mission between ESA (European Space Agency) and NASA to study the Sun was launched recently

- Solar Orbiter is on a unique trajectory that will allow its comprehensive set of instruments to provide first-ever images of the Sun's poles.
- This trajectory includes 22 close approaches to the Sun, bringing the spacecraft within the orbit of Mercury to study the Sun and its influence on space.
- Following its Earth gravity assist, Solar Orbiter will begin the primary phase of its mission – leading up to its first close pass by the Sun in 2022 – at about a third the distance from the Sun to Earth. Throughout its mission, Solar Orbiter will use successive Venus gravity assists to draw its orbit closer to the Sun and lift it out of the ecliptic plane.
- Solar Orbiter's unique orbit will bring the spacecraft out of the plane that roughly aligns with the Sun's equator where Earth and the other planets orbit. Spacecraft launched from Earth naturally stay in this plane, which means that telescopes on Earth and telescopes on satellites have limited views of the Sun's north and south poles.
- The spacecraft contains 10 instruments. Nine were provided by ESA member states and ESA. NASA provided one instrument, the Solar Orbiter Heliospheric Imager (SoloHI), and an additional sensor, the Heavy Ion Sensor, which is part of the Solar Wind Analyzer instrument suite.
- Orbiter will take pictures using telescopes through a heat shield to help it withstand temperatures of up to 600 degree Celsius.

- By understanding the behaviour of the sun, the Orbiter aims to provide information on how the former would affect technology such as satellites, navigation systems, power grids, and telecommunication services.
- The Orbiter will help scientists understand the sun's dynamic behaviour, and solve mysteries such as the sunspot cycle, or why the star spews out high velocity charged particles through the solar system. With more data on the global magnetic field of the star, scientists would be able to forecast space weather events.

## **Other**

- A previous ESA-NASA mission, Ulysses, launched in 1990, achieved an inclined orbit giving scientists their first measurements of the space around the Sun in this critical region. Unlike Ulysses, Solar Orbiter carries cameras that will provide the first-ever images of the Sun's poles. This vital information will help scientists fill in the gaps in models of the Sun's magnetic field, which drives the Sun's activity.
- Solar Orbiter complements a fleet of NASA Heliophysics spacecraft observing the star we live with and its effects on the space we travel through.