

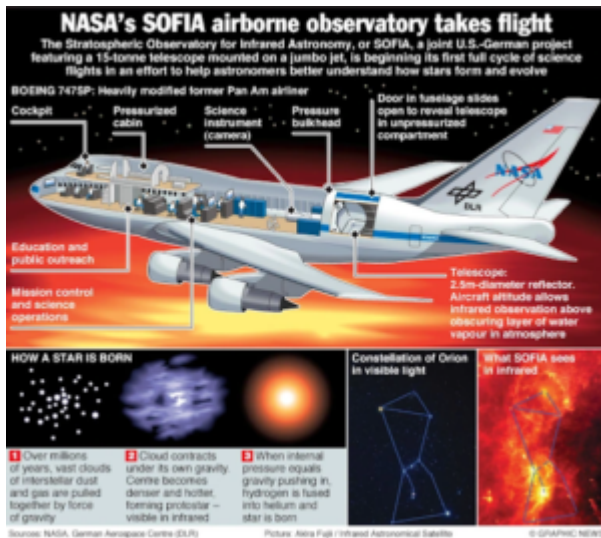
Stratospheric Observatory for Infrared Astronomy (SOFIA) mission

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In news— Recently, National Aeronautics and Space Administration (NASA) has said that it would shut down the operations of Stratospheric Observatory for Infrared Astronomy (SOFIA) mission by September 30, 2022.

About SOFIA mission-

- **SOFIA is a 2.7-meter infrared telescope sitting inside a Boeing 747SP airplane**, flying at an altitude of 38,000-45,000 feet above the surface.
- **Flying into the stratosphere at 38,000-45,000 feet puts SOFIA above 99 percent of Earth's infrared-blocking atmosphere**, allowing astronomers to study the solar system and beyond in ways that are not possible with ground-based telescopes.
- It is the world's largest flying telescope that confirmed the presence of water on the Moon.
- It's the **second-most expensive astrophysics mission**, according to the NASA's Financial Year 2023 budget estimates report.
- **SOFIA is a collaboration between NASA and the German Space Agency (DLR)** (the German Space Agency contributed 20 percent of the costs).
- **Since its inception in 2014, SOFIA has been collecting data to understand star birth and death and the formation of new solar systems.**



- It has also been keeping a close **eye on planets, comets and asteroids** in our solar system, nebulas and galaxies, celestial magnetic fields and black holes at the centre of galaxies.
- It was **designed to observe cosmic objects in far-infrared wavelengths**. This allows researchers to watch star formation by looking through huge, cold clouds of gas.
- **NASA's decision to shut down SOFIA closely follows the White House's 2023 federal budget request released in March 2022, which did not allocate money to SOFIA.**
- Its annual operations Budget is the second-most expensive operating mission in Astrophysics, yet the science productivity of the mission is not commensurate with other large science missions.

Important discoveries of the mission-

- The project has generated 309 scientific studies.
- In **2020, NASA announced that SOFIA discovered water molecules (H₂O) on the sun-facing side of the Moon.**
- The site is the Clavius Crater, located in the Moon's southern hemisphere. The telescope's data suggested that the site contained water in concentrations of 100 to 412 parts per million – roughly equivalent to a 12-ounce bottle [355 millilitres] of water.

- In 2019, **SOFIA also discovered helium hydride – the first molecule formed in the Universe almost 14 billion years ago.**
- Many crucial processes in the history of the universe leave their signatures in the far-infrared and SOFIA is the only observatory that can probe this important wavelength range for the next decade.
- **SOFIA is the only instrument after Herschel that has the capability of observing singly ionized carbon,** which is now understood to be an important tracer of the molecular gas in the local universe.
- It has also **identified atmospheric circulation patterns in Jupiter.**
- It also **mapped the magnetic field within G47, one of Milky Way's spiral arms.**
- Magnetic fields can potentially set the rate at which stars form in a cloud.