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Proba-3 Mission to Study the Solar Corona

- The European Space Agency (ESA) is launching the Proba-3 spacecraft to study the solar corona, using ISRO's PSLV-XL rocket from Sriharikota, India.
- European and ISRO scientists are collaborating on this mission to examine the solar corona in detail.
- Proba-3 consists of two satellites operating together as a single unit. The 144-meter spacecraft, referred to as a solar coronagraph, will focus on studying the bright outermost layer of the sun, known as the corona.
- For the first time globally, a mission will deploy two satellites to operate as a virtual single system. They will separate in space but maintain precise alignment to function as a unified structure.
- The two satellites, equipped with a coronagraph and an occulter, will orbit with just a few millimeters of separation, creating a virtual giant observatory.

Research Focus

- The solar corona, the outermost layer of the sun's atmosphere, is over a million degrees hotter than the sun's surface.
- Detailed studies will focus on coronal mass ejections (highly charged particle emissions), which can impact satellites, communication systems, and power grids, making this research critical.

Challenges of Solar Eclipse Observations

- Solar eclipses, where the moon blocks the sun, allow only a few minutes to study the corona, making extended observations impossible.
- The newly launched occulter and coronagraph satellites will conduct precise, continuous studies from space.

Why Launch from India?

- The Proba-3 spacecraft weighs 550 kg, and ESA lacks a medium-sized rocket suitable for this mission.
- Using ESA's large Ariane-6 rocket would be prohibitively expensive. Hence, Proba-3 is being launched via ISRO's cost-effective PSLV rocket.
- ESA is paying Rs.271 crore to ISRO's commercial arm, NewSpace India Limited, for this launch.