

Proba-3: A New Era in Solar Research

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Context: Recently, the **Indian Space Research Organisation (ISRO)** successfully launched the **European Space Agency's (ESA) Proba-3 mission** aboard the **Polar Satellite Launch Vehicle (PSLV)-C59** rocket.

Background:

The **PSLV-C59/PROBA-3 Mission** marks the 61st flight of the PSLV and the 26th mission using the PSLV-XL configuration.

Key Takeaways:

- **PROBA-3**, an ESA mission, consists of two satellites designed to study the **solar corona**, the outer layer of the Sun's atmosphere.
- The mission features **precision formation flying**, where the two satellites will fly in tandem and maintain a fixed configuration in space. This is a world-first attempt at such precise formation flying.
- The two satellites—**Occulter Spacecraft** (200 kg) and **Coronagraph Spacecraft** (340 kg)—will simulate a natural **solar eclipse**. They will maneuver in Earth's orbit so that one satellite casts a shadow onto the other.
- A natural solar eclipse allows scientists to observe the Sun's corona for about 10 minutes, occurring approximately 1.5 times per year. However, **Proba-3** will provide a continuous 6-hour observation period, equivalent to 50 solar eclipses annually, significantly enhancing the study of the Sun's corona.
- Both satellites will continuously face the Sun, maintaining a formation of a few millimetres, eventually positioning themselves **150 metres apart** for up to six hours.
- The **Occulter** will cast a shadow onto the **Coronagraph**, acting as a viewing telescope. This precise configuration will enable uninterrupted observations of the Sun's corona.
- If successful, the Occulter will generate an artificial yet stable eclipse, blocking the Sun's blinding light and allowing the Coronagraph to photograph and study previously lesser-known features of the solar corona.