

ISRO's AstroSat Gamma Ray Burst Detection

Why In News

- **India's AstroSat space telescope** has achieved a significant milestone by detecting its 600th Gamma-Ray Burst. GRBs are highly **energetic explosions** that represent the death of a massive star or the merger of neutron stars. These bursts release an enormous amount of energy in just a matter of seconds, surpassing the energy output of the sun over its entire lifetime.



- They are often referred to as mini big-bangs due to their immense power. This latest detection highlights the exceptional performance of the **Cadmium Zinc Telluride Imager (CZTI)**, which has far surpassed its design lifespan.

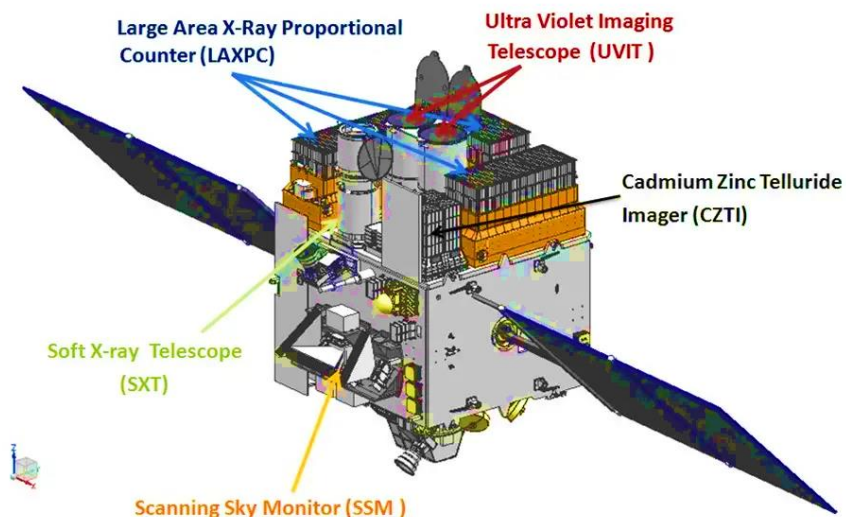
What is Gamma Ray Burst?

- **Gamma-Ray Bursts**, often referred to as “**mini big-bangs**,” are the most energetic explosions known to the universe.
- GRBs pack a **massive punch** as they contain huge amount of energy that represent the death of a massive star or the merger of neutron stars.
- All this energy is emitted in a **matter of seconds**, and it can be greater than what the sun would emit over its entire lifetime. They are also accompanied by **birth of a black hole**.
- All this energy is emitted in a **matter of seconds**, and it can be greater than what the sun would emit over its entire lifetime. They may last from a fraction of a second to several minutes. They are also accompanied by birth of a black hole.



What is AstroSat?

- Launched by the **Indian Space Research Organisation (ISRO)** in 2015, AstroSat was initially designed to operate for five years.
- However, the telescope has surpassed its **expected lifespan and continues** to function remarkably well, making critical observations of celestial objects.
- AstroSat is the **first dedicated multi-wavelength space** observatory launched by India.
- It has a suite of payloads that enables it to observe celestial objects simultaneously across multiple wavelengths, like from ultraviolet to X-Rays.



Recent Detection

- The recent detection of the **600th GRB** by AstroSat's CZTI detector is a remarkable achievement.
- The **Cadmium Zinc Telluride Imager (CZTI)** is a detector onboard AstroSat that is responsible for detecting Gamma-Ray Bursts. It has demonstrated remarkable performance, surpassing its expected lifespan.



- The astounding success of **AstroSat** has motivated several institutes to propose the development of a next-generation GRB space telescope called Daksha.
- If approved, Daksha aims to surpass the capabilities of any existing satellite worldwide.
- He stated, "**Daksha will be sensitive enough** to detect in just over a year what CZTI did in eight."
- The observation data will contribute to a deeper understanding of these explosive events that occurred billions of years ago.



- **AstroSat's ongoing success** serves as a testament to India's advancements in space technology and its contributions to astronomical research.
- As the mission continues to make groundbreaking discoveries, the future looks promising for India's space exploration endeavors.