TRACER –Twin Satellites

Prelims – *Importance of national and international importance, General science.*

Why in News?

Recently, NASA launched the twin satellite on SpaceX Falcon 9 at Vandenberg Space Force Station in California.

- **TRACERS -** Tandem Reconnection and Cusp Electrodynamics Reconnaissance Satellites.
- **Aim**
  - To study the constant stream of solar wind and charged particles flowing from the sun, which interacts with Earth's magnetosphere.
- It will observe magnetic reconnection and its effects in Earth's atmosphere.
- **Role -** It will measure magnetic reconnection 3,000 times in a year to help scientists observe how quickly reconnection changes and evolves.

Magnetic Reconnection
• It occurs when material from the Sun interacts with Earth's magnetic field.
• A reconnection event can shoot solar wind particles, normally diverted around our planet, directly into our atmosphere at high speeds.

- **Orbit -** It will be placed in ***Sun-synchronous orbit.***
- Orbiting through Earth's polar cusp region, funnel-like openings in the magnetic field where the solar wind has a direct path into our atmosphere.
- **Mission Duration -** The primary science mission is planned for 12 months.
- **Instruments -** The satellites are equipped with instruments including DC Magnetometers, Search Coil Magnetometers, Electric Field Instruments, and Analyzers for Cusp Electrons and Ions.

Three additional payloads with TRACERS

- **Athena EPIC (Economical Payload Integration Cost) SmallSat -** It is designed to demonstrate an innovative, configurable way to put remote-sensing instruments into orbit faster and more affordably.
- **PExT (Polylingual Experimental Terminal) -** It will showcase new technology that empowers missions to roam between communications networks in space, like cell phones roam between providers on Earth.
- **REAL (Relativistic Electron Atmospheric Loss) CubeSat -** It will use space as a laboratory to understand how high-energy particles within the bands of radiation that surround Earth are naturally scattered into the atmosphere.
- Aiding the development of methods for removing these damaging particles to better protect satellites and the critical ground systems they support.

- **Significance -** Scientists hope to better understand and prepare for impacts of solar activity like interruptions involving communications satellites, GPS systems, and power grids on Earth.

Quick facts

NASA's earlier satellites to study the sun • **PUNCH (Polarimeter to Unify the Corona and Heliosphere)** – It is a constellation of four small satellites making 3D observations to learn about the solar wind • **EZIE (Electrojet Zeeman Imaging Explorer)** – It is a set of three small satellites studying electrical currents flowing above the pole.

References

1. Times of India| TRACER – A Twin Satellites
2. NASA | TRACER