The Geopolitics of Satellite Net

Prelims: Current events of national and international importance.

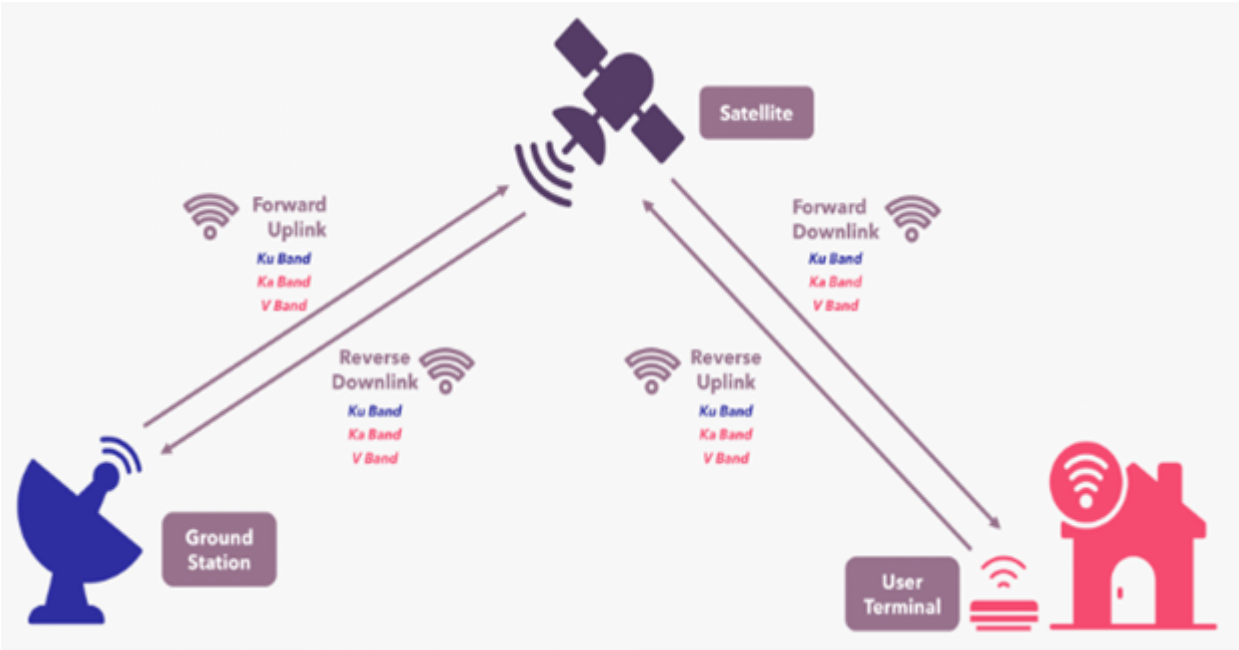
Mains: GS III - Science and Technology developments and their applications and effects in everyday life.

Why in news?

Recently, SpaceX partnered with Airtel and Jio to expand Starlink services across India.

What is satellite net?

- **Satellite broadband technology** – It is also known as satellite telephony, a satellite communication technology using satellite constellations in the Low Earth Orbit (LEO).
- It is a *high-speed wireless communication* to bring internet traffic to a consumer's home/office via a satellite network in space.
- **Data speeds** – It can go *beyond 300 Mbps*, but initial peak speeds likely 100 Mbps.
- **Working** – A satellite network involves *geostationary or low-earth orbit (LEO) satellites*.
- The heart of the network operation is an *earth station gateway* located in a particular region that links satellite network to the Net.
- Consumer needs a device, called a *user access terminal* (UT) and antenna to connect to a satellite network.



Satellite Constellation Project	Owning Agency
BlueBird satellites	AST SpaceMobile.

Starlink network	SpaceX
Project Kuiper	Amazon
OneWeb	ISRO & Uk's OneWeb Group

What are the aspects of satellite internet with regard to economic and geopolitical conditions?

- **Digital Sovereignty** – It refers to a country's or organization's ability to control its own digital assets, data, and infrastructure, encompassing both
  - **Data sovereignty** – Governing data within its borders
  - **Technological sovereignty** – Controlling its digital environment.
- Here, the nations have both profitable telecommunications and strategic independence.
  - **Example**: *China's GuoWang constellation*, where China has high economic value and high geopolitical control.
- **Market Dominance** – It refers to a situation where a company holds a significant share of the market, potentially leading to a monopolistic structure whereby, the host nation depends on a single private entity for essential connectivity services.
  - **Example**: *Starlink*, which currently offers commercial potential but placing control largely outside the host nation's hands.
- It is a scenario of high economic value but low geopolitical control for the host nation.
- **Strategic Asset** – It refers to a satellite capability or infrastructure that is crucial for national security and strategic independence, even if it's not economically viable on its own.
  - **Example**: *India limited indigenous satellites*, like NAVIC System prioritizes strategic independence over immediate economic returns.
  - It is of low economic value and high geopolitical control.

NavIC (Navigation with Indian Constellation) *is a regional navigation satellite system of India, designed with a constellation of 7 satellites providing Standard Position Service (SPS) for civilian users and Restricted Service (RS) for military purposes.*

- **Marginal Presence** – It is the scenario of having limited economic value and strategic influence due to being in a developmental phase or lacking significant global impact.
  - **Example**, *Amazon's Kuiper project*

What are the significances of Starlink-Airtel & Jio partnership?

Starlink

• It is a satellite internet network, the *world's 1st and largest satellite constellation,* a constellation of many satellites that orbit the Earth, at about 550 km, and cover the entire globe.
• **Launched in** – 2019, by SpaceX, an American company.
• **Coverage** – Over 70 countries
• **Objective** – To provide *high-speed internet coverage* to every part of the world and to provide global mobile phone service.
• Working – It involves beaming *internet data via radio signals* through the vacuum of space.
• Ground stations then broadcast those signals to orbiting satellites, which relay the data back to Earth-side users.

- It could act as a fundamental shift in the conceptions of connectivity, national sovereignty, and economic power in the digital age.
- **Economic benefits**

For Airtel and Jio	Starlink allows them to provide high-speed Internet to India's most remote regions without the infrastructure costs of terrestrial networks.
For SpaceX	It opens up a huge market in India.

- **Administrative advantage** – It also *takes care of India's complex regulatory landscape* by channelling Starlink's technology through domestic players.
- **Geopolitical significance** – This partnership indicates a geopolitical realignment in the Indo-Pacific region.
- It gives the *U.S. an advantage* in the competition for digital influence, particularly as China develops its rival GuoWang constellation.
- **Digital sovereignty** - The partnership model adopted by Airtel and Jio creates a buffer that preserves some measure of sovereignty.
- *Technology transfer provisions and local data storage* requirements could protect India's concerns and also enhance India's long-term capabilities.

What are the challenges in this partnership?

- **Monopolistic concerns** – With around 7,000 satellites already in orbit, SpaceX enjoys first-mover advantages in the low earth orbit internet market.

  ***OneWeb**, another constellation and closest competitor to starlink, operates fewer than 650 satellites, while Amazon's Project Kuiper remains very small.*

- **Economic problems** – There are problems of *competition, pricing, and dependency*.
- **Security concerns** – It runs the risk of having *private companies influencing nation-state* over critical infrastructure.
  - SpaceX briefly cut Ukraine's Starlink access during critical military operations in 2022.
- **Absence of the Bharat Sanchar Nigam Limited (BSNL)** - BSNL could have helped reduce some of India's strategic concerns as it is a state-owned enterprise with

extensive rural presence.
- Non-inclusion of it resulted in *losing of more direct government oversight* and broader reach.
- **Governance challenges** – It will include *orbital debris management, and space traffic control*.
- Their transnational nature will require international governance cooperation even amid strategic competition

What lies ahead?

- **Developing indigenous solutions** – Continuing *investment in ISRO's satellite internet* projects to reduce long-term dependency.
- **Following Hybrid model** – It can try to balance technological pragmatism with strategic autonomy.
- **Inclusion of BSNL –** Partnering with BSNL can ensure digital sovereignty of India.
- **Encouraging competition** – Opening up for multiple satellite providers (like OneWeb, Amazon Kuiper) to prevent monopoly.
- **Enhancing accessibility** – Involving some *innovative sales techniques,* such as tiered pricing models and package deals, would be needed.

> ***Tiered pricing models*** *offer customers different levels of service or features at varying price points, allowing them to choose options that best suit their needs and budgets.*

Reference

The Hindu| Partnership of Starlink with Airtel and Jio

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