ICRA

INDIAN TELECOM INDUSTRY

Satellite Communication to be the next (r)evolution in the broadband space

AUGUST 2021

Highlights

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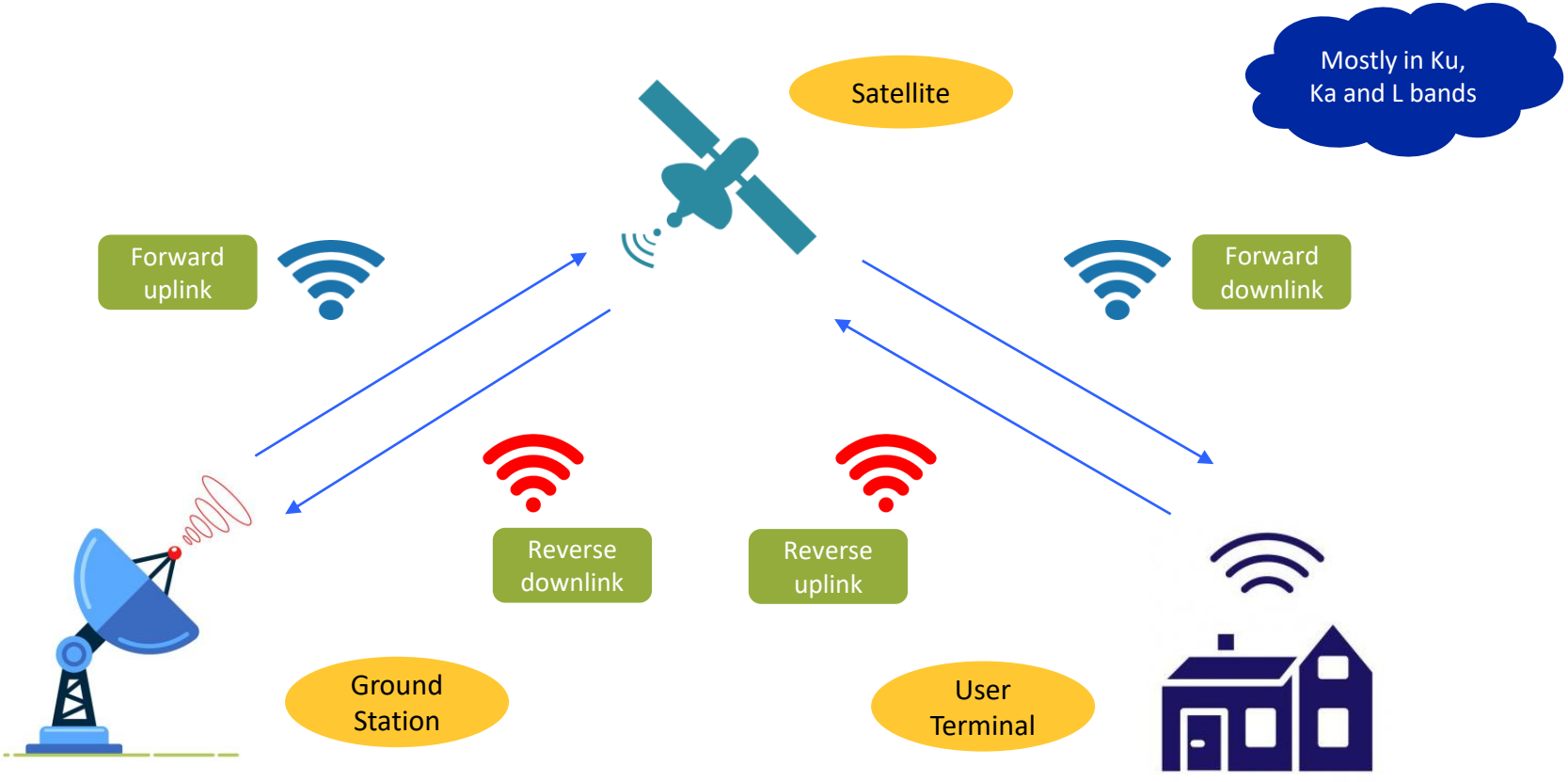
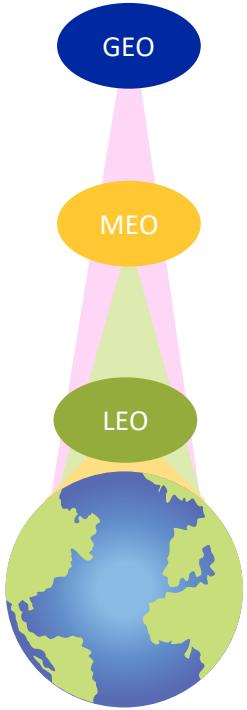
Satellite communication is likely to be expensive for consumers and thus the pace of adoption of the same is expected to be slow. It will be beneficial to areas which are deprived of the traditional terrestrial network and has the potential to act as the backhaul network

- Satellite communication proves useful in inaccessible terrains, has wide geographical coverage, and good broadcasting capabilities. Additionally, once the satellites are in place, it is easy to install ground infrastructure
- Notwithstanding the advantages, satellite manufacturing and placing them on the orbit is expensive and requires a lot of approvals. Apart from having latency issues, these are prone to weather disturbances as well
- Several new players have scheduled launches of a constellation of LEO satellites – One Web (648), Starlink (~12,000) and Amazon (~3,000), along with the China Satellite Network Group (~13,000)
- India has to catch up with other nations in terms of satellite broadband. Majority of the policies including licensing framework and allotment of spectrum are vague and act as deterrents for entry of foreign players. Further, this is an expensive proposition for customers
- Satcom has the potential to complement the existing terrestrial network by providing a redundant network, creating a backhaul and is significant for remote and inaccessible terrains
- If the operating environment is made conducive, it is expected that the satellite user base will increase to 1.5-2 million by 2025 with revenue potential of around Rs. 5,000-6,000 crore

How Satellite Communication Works



Types of Satellites



	Earth distance/ orbit period	No. of satellites needed	Density of coverage	Cost per satellite
Geosynchronous Equatorial Orbit Satellite	~36,000 km/ 24 hours	Less *(3 high altitude satellites needed to span globe)*	Very high	~ 200-400 million USD
Medium Earth Orbit Satellite	5000-12000 km/ 2-8 hours	More than GEO, less than MEO *(5-30 satellites needed to span globe)*	Medium	~ 80-100 million USD
Low Earth Orbit Satellite	500-1500 km/ 10-40 minutes	Many *(hundreds/ thousands depending on altitude)*	Low	~ 5-45 million USD

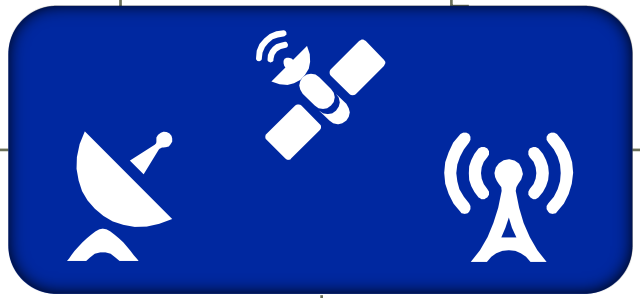
Various Bands in Use for Satellite Communication

L-Band (1GHz-2GHz)

- Traditionally a preferred band for small amounts of data transfer
- Offers lowest latency

Ka-Band (26GHz-40GHz)

- Primarily used for maritime VSAT services
- More economical and flexible and offers high throughput on smaller reflector dishes



S-Band (2GHz-4GHz)

- Advantage of easy communication even during adverse weather conditions
- Relatively cost effective frequency band

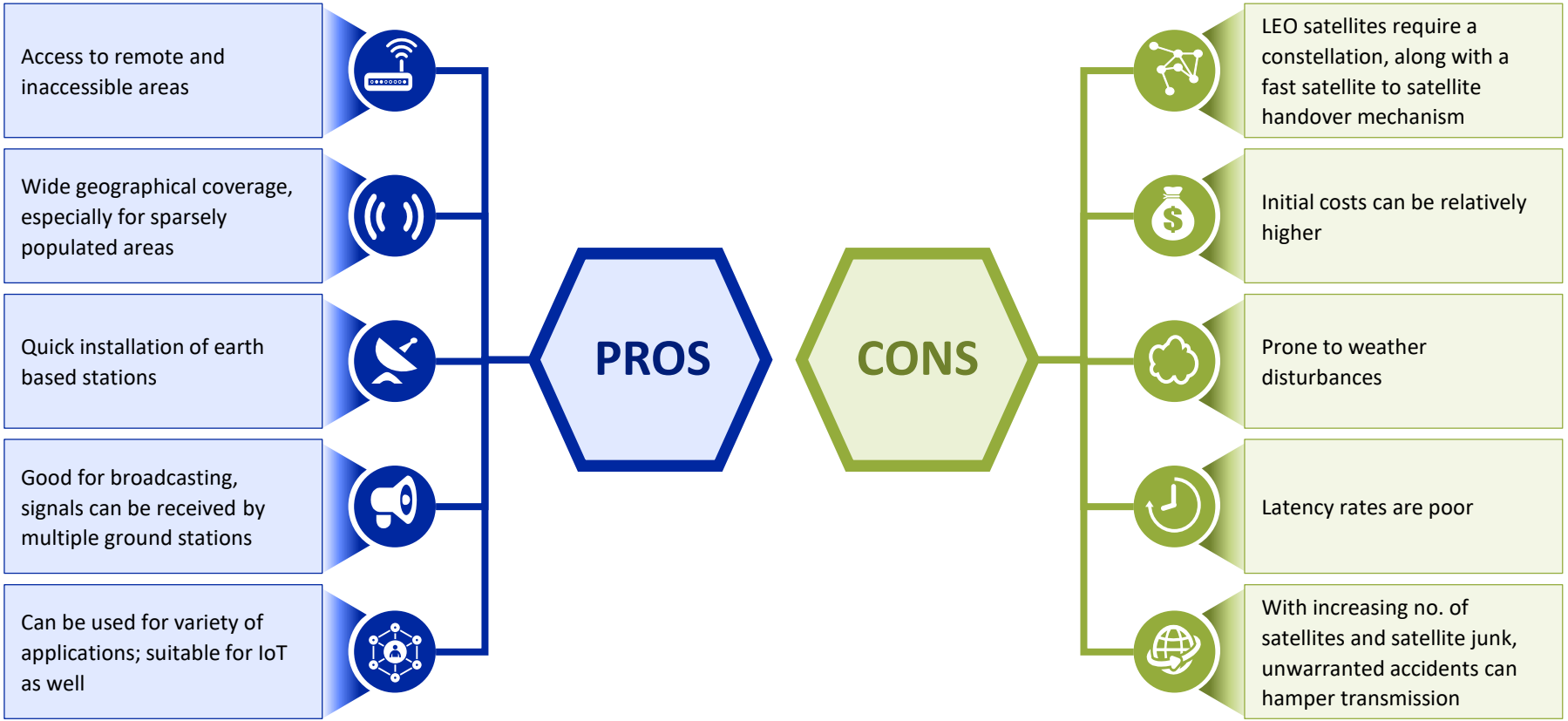
Ku-Band (12GHz-18GHz)

- More susceptible to rain fade and moisture and humidity can interfere with the signals
- Can be operated using small antennas

C-Band (4GHz-8GHz)

- Optimal for satcom as it offers lowest cost per megabit, and offers less signal susceptibility to rain and other factors

Satcom – Advantages and Disadvantages



Key Players and Their Network

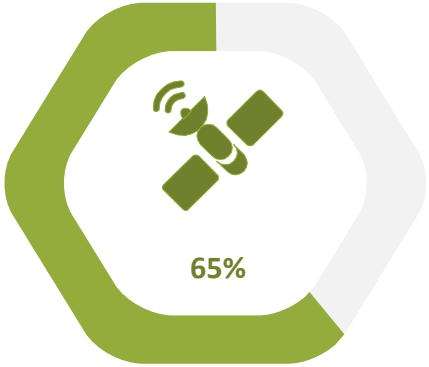
EXHIBIT: Key International Players in Satellite Communications

	Inmarsat	Intelsat	One Web	Starlink	Iridium	O3B	Globalstar	Orbcomm	Thuraya
Orbit	GEO	GEO	LEO	LEO	LEO	MEO	LEO	LEO	GEO
No. of satellites	14 (deployed) 150 LEO (planned)	50 (deployed)	254 (deployed) 648 (planned)	1730 (deployed) 12000 (planned)	66 (deployed)	20 (deployed)	48 (deployed)	36 (deployed)	2 (deployed)
Transmission Frequency	L-band	C/Ku-band	Ku-band	Ka/Ku-band	L-band	Ka-band	S-band	VHF band	L-band
Year of incorporation	1979	1964	2019	2020	1998	2013	1991	1993	1997
User data speed	~500 kbps	~2-5 mbps	50-100 mbps	50-200 mbps	~500-700 kbps	~2 mbps	~500 kbps		~500-700 kbps
IoT subscribers	~1.5 million			~70,000	~ 1 million		~0.8 million	~ 2.2 million	

Other major planned satellites – China Satellite Network Group (~13,000 satellites), Amazon (~3,000 satellites)

Source: ICRA Research

Number of Satellites and Space Junk



Of total satellites launched till date, 65% are still in space

Of the total satellites in space, only 55% are active

Of the total around 11,200 satellites launched till date, only 7,400 are in space, of which only 4,100 are active

Space Junk

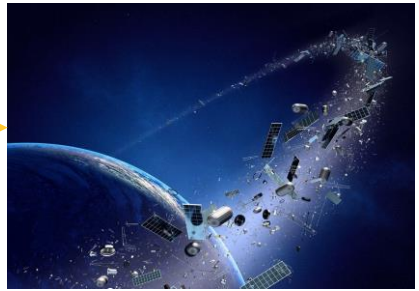
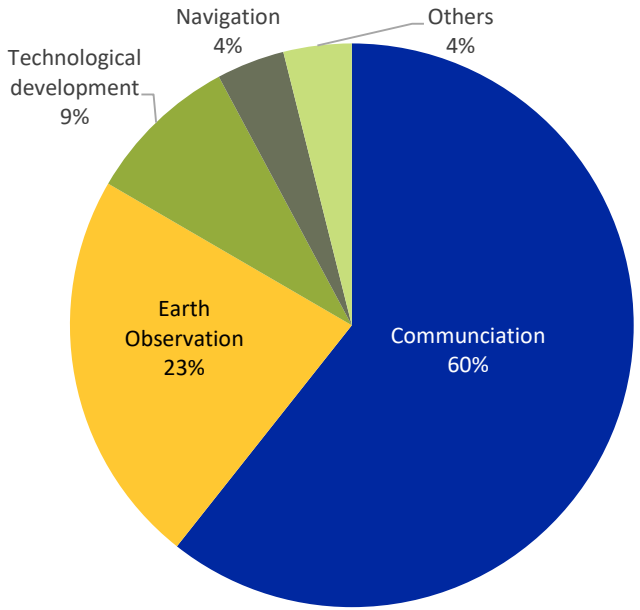


EXHIBIT: Break-up of active satellites by purpose



Where India Stands

	US	Europe	Asia	India
Licensing framework	Clear and open	Clear and open	Somewhat restricted	Unclear and restricted
Satellite ownership	Liberal, open sky policy	Liberal, open sky policy	Somewhat restricted	Restricted
No. of subscribers	2.1 million	1.0 million	1.4 million	NIL
Enterprise subscribers	2.6 million	1.1 million	1.6 million	0.3 million

Key Impediments in SatCom Penetration in India

01 Vague licensing framework – Charges, licence fees, etc

02 Uncertainty around spectrum frequency and mode of allotment

03 Last mile B2C satellite communication not allowed

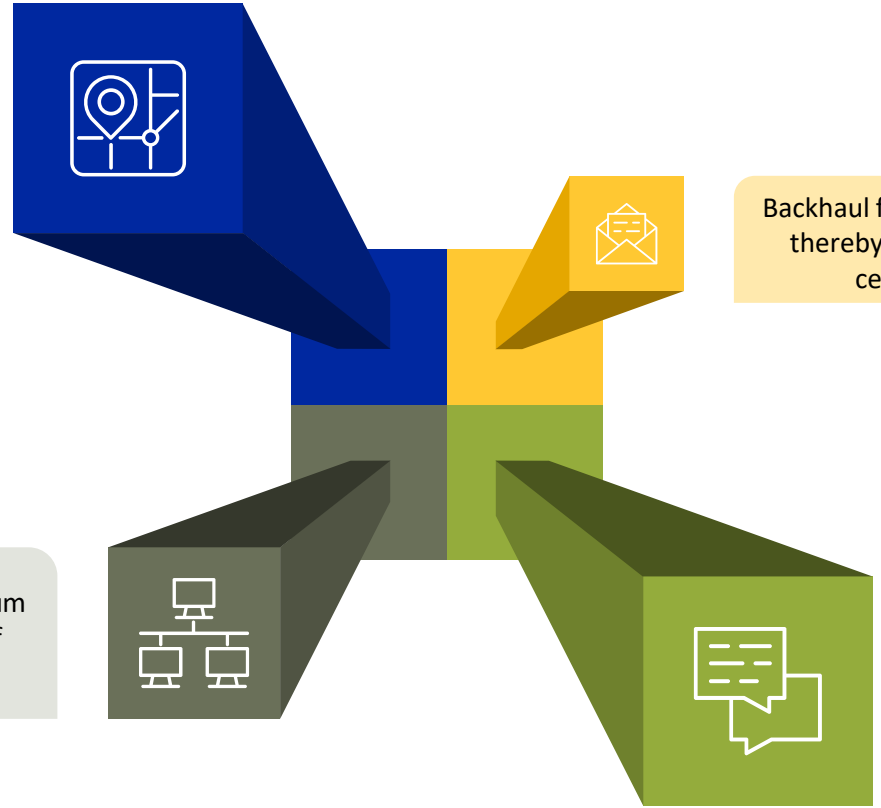
04 Very low available capacity

05 High cost of bandwidth and dearth of affordable handheld devices

06 Inflight and maritime licences, although awarded, yet to be commercialised

How SatCom Complements Existing Infrastructure

Bridge the country's digital divide by providing broadband in hilly and inaccessible areas, where cost of network expansion and tower deployment is high



Backhaul for terrestrial network, thereby complementing the cellular coverage

Satcom can be only the medium of communication in case of disasters

Enterprise use cases for remote healthcare, smart agritech, supply chain management, transportation industry

Way Forward

Subscribers expected to reach 1.5-2 million and revenues to grow to Rs. 5,000-6,000 crore by 2025, if operating environment is made conducive

Expected revenues from Satcom to touch around Rs. 5,000-6,000 crore annually by 2025

Healthy revenue generation prospects in long term

Enterprise usage to improve, followed by retail subscriber base. Users expected to grow to 1.5-2 million by 2025

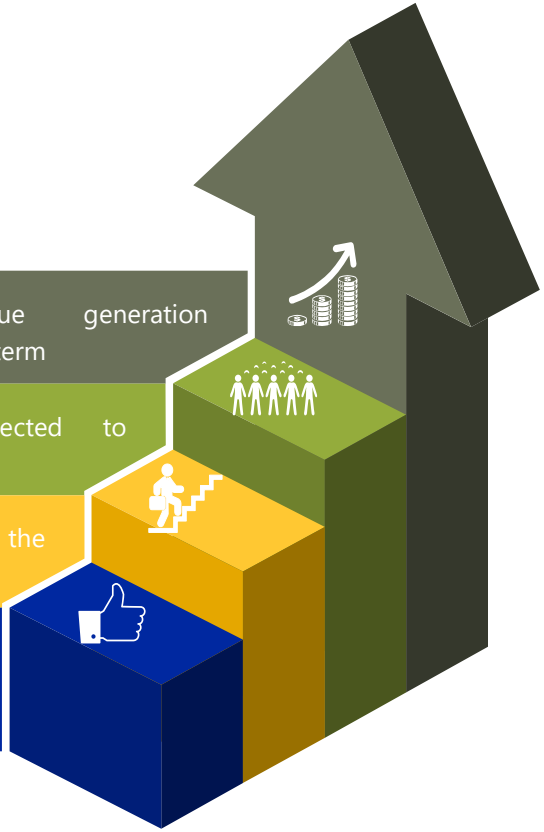
Subscriber base expected to increase

Players like Starlink and One Web are eyeing the Indian market given the huge potential

Lot of foreign players to enter the market

Government to clarify on the licensing and operating regime, and provide better policies for the satcom providers

Liberal operating environment to promote satellite broadband



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Thank You!