



Projection of SATCOM capacity over India for next 5 years



**Indian National Space Promotion and Authorization Centre
Department of Space
Government of India**

Disclaimer: *The demand projections presented in this report are based on the inputs provided by the service operators and reasonable assumptions by the Task team at the time of analysis. However, actual demand may differ significantly from the projections due to unforeseen market conditions, economic factors, consumer behaviour, or other variables that could influence demand. Therefore, the projections should not be considered definitive to determine future performances. IN-SPACe or any of the Task team members shall not be liable for any discrepancies between projected and actual demand, whatsoever.*

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DOCUMENT CONTROL SHEET

Title	Projection of SATCOM capacity over India for next 5 years		
Abstract	This document provides additional projected SATCOM capacity demand for Broadcasting and Telecommunications services in India for the next 5 years.		
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A. INTRODUCTION

IN-SPACe Decadal Vision and Strategy for Indian Space Economy has been brought out targeting India Space Sector to capture ~8% of the global space market by 2033; which equates to ~\$44bn at 16% CAGR and an envisaged investment of \$22bn in next 10 years.

With respect to Satellite Communication (SATCOM) vertical, the target is to achieve ~\$14.9bn, out of which \$12.7bn revenue to be earned from domestic market and remaining \$2.2bn from the exports markets. The realistic way to achieve this set mark is to break down the 10 years vision into year-by-year targets, firm action plans to realize the set target and create a conducive eco-system. This effort calls for realistic SATCOM demand assessment in the country. Further, a judicious balance in the demand and supply is desirable for providing stability and fuelling inclusive growth of SATCOM sector involving domestic and global satellite operators and service providers.

In order to undertake the country specific, applications-based demand assessment, a Task team having representations of IN-SPACe, DoT, MI&B and ISRO carried out an extensive exercise to gather the first-hand perspective on the capacity requirement. Multiple one-on-one discussions with various market stakeholders such as Teleport operators, DTH players, VSAT service providers, Satellite Operators and Industry associations (as listed in **Annexure**) were scheduled on July 18 and 19, 2024 at Antriksh Bhavan, DOS, New Delhi. Each of the stakeholders was provided a time slot of 30-40 minutes and the discussion was focused on the following set of discussion points/queries, which were circulated to all the participants in advance:

- i. Sector-wise capacity demand projection – such as Broadcasting (DTH / Teleports / HTS) and Telecommunication (VSAT Segment / Cellular Backhaul/ Broadband-Consumer and Enterprise / IFMC) – for the next 5 years.
- ii. Potentials of Satcom based consumer broadband in India and expected growth/capacity demand. Which type of capacity (HTS/VHTS or NGSO constellation) would be more suitable and commercially viable for consumer broadband in India?
- iii. Projected demand in GSO (traditional bent pipe/HTS/VHTS) and NGSO (MEO/LEO constellation) segment?
- iv. Deviations/predictions/assumption that may have significant impact on the projected demand.

- v. Specific business plans (B2B or B2C or others) of your company, if any, that may have bearing on the projected demand.
- vi. Any major projects (existing or planned) undertaken by your company that would spur the demand for satellite capacity.
- vii. Your plans to add SATCOM capacity over India through new satellite / constellations.

We truly acknowledge the valuable inputs provided by the industry stakeholders during the discussions held. This report brings out the SATCOM capacity demand across various service categories for the next five (5) years over India, based on the inputs provided by industry stakeholders.

Note: The report has not accounted for the demand projections of Defence and strategic sector.

B. BROAD CATEGORIES OF SATCOM CAPACITY

Considering the type of satellite capacity suitable for the specific applications, the SATCOM sector can be categorised under the following two categories for the purpose of assessing the demand:

I. Broadcasting (TV in C-band and DTH in Ku-band):

This involves the services of - a) Teleport; b) DSNG (Digital Satellite News Gathering) or Outdoor Broadcasting or Occasional usage application; c) HITS (Headend In the Sky) platform; and d) DTH (Direct to Home) Television. Most of the demand in these categories except DTH is met by a wide beam C-band bent pipe transponders having either India or beyond or global coverage. Depending on the intended reach out, the channel operators use transponders with suitable coverages.

Further, the DTH requirements are catered to by the traditional bent pipe Ku band transponders with national coverage. A bouquet of channels is uplinked from the DTH teleport and downlinked at each household using 0.6m DTH dish.

II. Telecommunication and broadband services (C, Ext. C, Ku and Ka Band):

Applications such as commercial VSATs (Very Small Aperture Terminal), cellular backhaul, trunking, data backhaul, IFMC (In-Flight and Maritime Connectivity), mobile connectivity, enterprise and consumer broadband etc., fall under this category of services. This demand is normally met through single beam satellites as well as HTS (High-Throughput Satellites) or its variants like UHTS (Ultra High-Throughput Satellites, VHTS (Very High-Throughput Satellites) having multiple spot beams with frequency reuse, operating in GSO. Certain demand will be met by the NGSO constellations – both LEO and MEO satellites having multiple satellites beams providing global coverage.

The industry is exploring usage of higher band segments (Q, V) to cater to high data rate applications.

Further, VSATs in C and Ext. C bands are not commonly preferred for commercial applications. Hence, C and Ext. C bands are not considered in this report for VSAT services.

C. ASSESSMENT BY THE TASK TEAM:

The detailed exercise undertaken by the Task team during July 18-19, 2024 in Delhi was fruitful in gathering important inputs from the major stakeholders of satellite communication service/capacity providers such as Teleport operators, DTH players, VSAT service providers, Satellite Operators and Industry associations.

The SATCOM Capacity demand projection is derived on following categories:

C band Broadcasting Conventional Bent Pipe transponders (36 MHz equivalent)	a) Commercial Teleports b) HITS
Ku-band Broadcasting Conventional Bent Pipe transponders with pan India coverage (36 MHz equivalent)	a) Commercial Teleports b) DTH
Telecommunication and Broadband services - Ku and Ka Band a) GSOs - HTS, UHTS, VHTS etc. b) NGSOs – both LEO and MEO satellites (Capacity in Gbps)	a) Commercial VSATs and Enterprise Broadband b) Cellular Backhaul, Trunking, Data Backhaul and Village Connectivity c) IFMC, Land Mobility and IoT d) Consumer Broadband

1) Broadcasting services:

- a. The C band TV broadcasting demand is expected to remain flat as the number of TV channels has been stagnant for past 4-5 years and the new content is occupying OTT platforms for better reach. Moreover, the terrestrial IMT applications like 5G, 6G etc. continuously demand for more spectrum allocation from C band, presently being used for broadcasting. However, one HITS operator has obtained LOI from MI&B to commence its operations recently, which has generated a definitive demand of 12 C band transponders immediately.

Further, MI&B plans to make India an Up-linking hub, and is working towards increasing ease of doing business in getting permissions. Also, it is expected that ~90 million TV DTH homes would enter the market in coming years. Further, the increase in satellite bandwidth demand shall be driven by conversion of SD channels to HD and picking up of 4K channels in next 5 years.

The inputs received from stakeholders indicate additional demand variation from about 20 Txp. to 34 Txp.

As per the Task team assessment and in view of all above, a demand for **~12-14 additional transponders is foreseen for teleport operations and 24 additional transponders for HITS operations.**

- b. Further, Ku band broadcasting is an alternative to C band broadcasting and it is a trend followed in different countries. The Indian market is not yet ready to adopt this substitute and may vacate C band only in the situation of distress – i.e., harmful interferences from terrestrial networks. Only one teleport operator is planning to make investment in Ku band teleport, hence, the demand projection for next 5 years to be not more than **3-4 Ku band transponders for teleports.**

- c. Most of the participants, including DTH players, stated that the DTH market has become stagnant due to emerging use of OTT platform.

There are around 60 million DTH, 62 million Cable TV and 2.5 million HITS subscribers. DD Free Dish is estimated to be having 45 million subscribers. There is a churn being noted in DTH and cable subscribers with premium users opting for OTT and low premium users going for Free DTH by DD Direct. However, there are 90 million non-TV households in India and as purchasing power increases these households will shift to TV owning households with Cable/DTH subscriptions. This may keep DTH market sustainable for few more years.

Other positives for the satellite bandwidth industry are – changeover from SD to HD, introduction of 4K channels, and scope/demand of FTA DD-Free dish business model. Such emerging services may result in additional demand of few transponders by already existing DTH operators, viz., few transponders in each of the orbital locations. There could be one or two new Free-to-Air-DTH operators interested in launching their operations which could result in demand of 10-12 transponders in a new/existing orbital location.

Further, the inputs received from stakeholders indicate additional demand variation from about 30 Txp. to 53 Txp.

As per the Task team assessment and in view of all above, the additional demand for next 5 years could be [~24-28 Ku band transponders scattered over different orbital locations for DTH services.](#)

2) Telecommunication and Broadband services:

a. Commercial VSAT/Enterprise Broadband segment:

The inputs received from stakeholders indicate additional demand variation from about 5 Gbps to 100 Gbps. It is noted that stakeholders projecting the demand of 5 Gbps have considered continued use of conventional bent pipe Ku band transponders.

Two licenses for GMPCS Service (for fixed satellite service) have been issued by DoT, IN-SPACe authorizations are granted and these operators have indicated to initially provide fixed broadband services. The operations are likely to commence services in 2025 through LEO/MEO satellite constellations. Two more applicants have applied to IN-SPACe seeking its authorization and to DoT for providing GMPCS through LEO satellite constellations, primarily for providing broadband services.

Considering the growing usage of HTS and NGSO capacity for VSAT services, the satellite bandwidth cost is expected to reduce, thus spurring the growth in the capacity demand. In view of this, the [additional capacity demand in this segment may be about ~80 Gbps](#) is expected to be met combinedly through conventional bent pipe transponders and HTS/NGSO satellite capacities.

b. Cellular Backhaul, Trunking, Data Backhaul and Village Connectivity:

- i. A recent RFP by BSNL has projected a definitive demand of 4.7 GHz (~7.5 Gbps) under BSNL's 4G saturation project and BoP/BIP (Border out Post/Border in Post) project.
- ii. Under Amended BharatNet program, approx. 5% of 2.64 lakh Gram Panchayat (GP) sites are to be covered by alternate technology media (radio/satellites). It was discussed during interactions with the stakeholders that about 10,000 sites may use satellite connectivity, though USOF/BSNL has not yet finalized the details including per GP satellite connectivity requirement (say speed, contention ratio etc.). Presently about 5500 GPs and 1400 Digital Satellite Phone Terminals

(DSPT) are connected by satellite media utilizing satellite bandwidth of 5 GHz. The following two scenarios may be considered for Amended BharatNet program:

- a. Presently about 5500 GPs are connected by satellite media with 20 Mbps (DL)/ 10 Mbps (UL) speed and a contention ratio of 1:10. Taking the same speed and contention ratio, the requirement for estimated 10,000 GPs comes to about 30 Gbps for which around 19 GHz bandwidth is required (assuming 1.6 bits per Hz).
- b. Taking a better scenario of 30 Mbps (DL)/ 10 Mbps (UL) with a contention ratio of 1:5, the requirement for estimated 10,000 GPs comes to about 80 Gbps for which around 50 GHz bandwidth is required (assuming 1.6 bits per Hz).
- iii. Inputs by the stakeholders project the additional capacity demand ranging from about 136 Gbps to 463 Gbps. Apparently, this huge variation is on account of different perspectives and anticipation in achieving the affordable SATCOM capacity price points in the country.
- iv. There is an emerging application for providing backhaul connectivity through satellites to data centers as backup or 3rd or 4th level of redundancy to terrestrial links. If embraced by the industry, depending on the affordable cost of the satellite bandwidth, this may result in huge capacity requirement in hundreds of Gbps.
- v. Considering the definitive demand under BSNL's 4G saturation project, amended BharatNet Program and expected high data rate connectivity per BTS of 4G and 5G, the demand is expected to be at least ~400 Gbps in these segments. This projected demand is expected to be mostly met by HTS and NGSO capacities.

c. IFMC, Land Mobility and IoT:

- i. With Maritime market picking up steadily and a few contracts in the offing w.r.t. taking-off of in-flight connectivity in the domestic and international airlines, the satellite capacity demand shall be generated.
- ii. With DoT permitting the Land mobility now, this application is expected to grow significantly, especially for the private and public transport vehicles/railways.
- iii. Inputs by the stakeholders project the additional capacity demand ranging from about 2 Gbps to 52 Gbps. Most of the stakeholders' inputs indicate additional capacity demand in the range of 25-40 Gbps, which looks to be realistic in next 5 years.

d. Consumer Broadband:

- i. Consumer broadband is yet to take off in India. However, going by the indications from the upcoming NGSO satellite and GMPCS operators, who are tailoring their business models to Indian demography, these services are expected to be offered with more affordability in the remote and rural India. Further, these operators are also expected to target Tier-2 and Tier-3 cities for providing broadband along with value added services, at more or less on par terrestrial pricing.
- ii. The demand is expected to grow exponentially even if a small fraction of the Indian population adopts the satellite-based broadband by these operators.
- iii. Subject to the affordability and acceptability, the inputs by the stakeholders project the additional capacity ranging from 200 Gbps to 5.9 Tbps. Going by all these assumptions and taking the optimistic view, additional demand of about 1.5-2 Tbps in this segment is projected.

e. In general, the following important aspects are also brought out:

- i. An important finding of this exercise is that the demand is not uniformly distributed across the country as the mainland demand is mostly met by the optical fibers, and only the difficult terrains such as North East, J&K, LWE infested areas and rural territories may require Satellite connectivity. As not all the satellites serving India have steerable/dynamic/flexible beams or capacity that could be focused over the desired regions, it is expected that at least 3-4 times of the projected capacity in these desirable areas would have to be created through such fixed coverage satellites having the uniform capacity distribution over Indian Territory. This holds good for services such as Cellular Backhaul, Trunking, Data Backhaul & Village Connectivity and Consumer Broadband.

Assuming that a certain portion of the demand is met by the non-Indian satellites / NGSOs having flexible payloads, an appropriate correction is made in the projected demand of 400 Gbps (200 Gbps uniformly distributed plus 200 Gbps in the selected areas). The total capacity requirement in this segment is, therefore, projected to be ~800 Gbps which is expected to be met combinedly through flexible and inflexible payloads.

- ii. VSAT and Broadband industry is inclined towards usage of higher freq. bands like Q and V bands for better throughput and reaching better price points.
- iii. NGSO has an edge over GSO in consumer Broadband segment considering the capability to provide huge capacity and hence influence the prices.
- iv. During the discussions with stakeholders, the task team noted that the availability of excess satellite capacity at affordable price point would eventually result into increase in consumption and rolling out of new applications. For example: under BharatNet, at present the bandwidth consumption is limited to 3 Mbps per site (taking 20/10 Mbps speed with a contention ratio 1:10). This may increase to more than 30/10 Mbps or higher with availability of affordable SATCOM capacity in the market which could be possible with introduction of VHTS, UHTS, NGSOs satellites. Similarly, cellular backhaul bandwidth per link has scope of increasing from the present 7 Mbps to 18-50 Mbps if adequate SATCOM capacity is made available in the country at affordable price.

The following table provides overall summary of the projected capacity demand assessed based on the inputs received from the stakeholders:

Summary of additional projected capacity demand for next 5 years as assessed by the Task Team					
Sl. No	SATCOM Services	Projected Additional Capacity Demand	Type of satellite/s to meet this demand	Projected demand expected to be met by:	
				Indian satellites	non-Indian satellites
1	C band Channel Broadcasting – Commercial Teleport	12-14 transponders	Bent Pipe C band Txp.	X	✓
2	C band Channel Broadcasting – HITS	24 transponders	Bent Pipe C band Txp.	X	✓
3	Ku band - Channel Broadcasting- Commercial Teleport	3-4 transponders	Bent Pipe Ku band Txp.	✓	✓
4	Ku band – DTH	24-28 transponders	Bent Pipe Ku band Txp.	✓	✓
5	Ku/Ka band - Commercial VSAT/ Enterprise Broadband	80 Gbps	-Bent pipe Ku band Txp. -HTS/UHTS/VHTS	✓	✓
6	Ku/Ka band - Cellular Backhaul, Trunking, Data Backhaul and Village Connectivity	800 Gbps	-HTS/UHTS/VHTS -NGSO	✓	✓
7	Ku/Ka band - IFMC, Land Mobility and IoT	25-40 Gbps	-HTS/UHTS/VHTS -NGSO	✓	✓
8	Ku/Ka band - Consumer Broadband	1.5-2 Tbps	-NGSO	X	✓
Total Demand projection if Consumer Broadband picks up		~38 C band Txp. + 27-32 Ku band Txp. + ~2.92 Tbps			
Total Demand projection if Consumer Broadband DOESN'T pick up		~38 C band Txp. + 27-32 Ku band Txp. + ~920 Gbps			

**Annexure - List of attendees in one-to-one discussions with the Task Team
on July 18 and 19, 2024**

List of Participants	
Sl. No.	Company / Organization
1	Amazon Kuiper India
2	APT Satellite Company Ltd.
3	Asiasat Satellite Telecommunications Company Limited
4	Bharti Telemedia Limited
5	Indo Teleports Limited
6	OneWeb India Communications Private Limited
7	Broadband India Forum (BIF)
8	BSNL
9	DD-Direct, Doordarshan
10	Deloitte India
11	GTPL Broadband Pvt. Ltd.
12	Hughes Communications India Pvt. Ltd
13	Indian Broadcasting & Digital Foundation (IBDF)
14	Indian Space Association (ISpA)
15	Indiasign Private Ltd.
16	Intelsat LLC
17	IPSTAR India Private Limited
18	Lamhas Communications Private Limited
19	Measat Satellite Systems Sdn. Bhd., Malaysia
20	Nelco Limited
21	New Space India Limited
22	News Broadcasters & Digital Association (NBDA)
23	Planetcast Media Services Limited
24	Cloudcast Digital Limited
25	Jio Satellite Communications Limited
26	Satellite Industry Association (SIA)
27	Starlink Satellite Communication Private Limited
28	Sun Direct Limited
29	Tata Communication Limited
30	Tata Play (Tata Sky Limited)
31	USOF
32	Viasat India / Inmarsat India Limited