

Viasat Inc. is a global communications company headquartered in the USA, with business activities and presence throughout the world. Viasat's presence in India includes engineering design centers, sales and support. As a global broadband services and technology company, Viasat offers services and equipment which connect digital communications users and communities by supporting high-bandwidth internet services delivery through its ground and space systems infrastructure to a variety of fixed and mobile platforms users, including: residential consumers, enterprise operations, government agencies, and passengers and crews on commercial and business aircraft, watercraft and terrestrial vehicles, plus significant signal and content back-haul services in support of both fixed and mobile terrestrial service networks and providers.

Viasat thanks the TRAI for this opportunity to share its views, feedback and opinions on the policy inputs required for NTP-2018

## I. Introduction

As TRAI has rightly pointed out, India is one of the leading telecommunications markets in the world and successive NTPs have spurred increasing connectivity to the people and businesses of India. However, as you have also pointed out, there is a digital divide. The digital dividend has primarily benefited core urban areas, and broadband has penetrated only in single digit percentages in non-urban areas.

The NTP-2018 inputs from TRAI clearly address many of the steps to be taken to fill these gaps. From Viasat, we would like to submit the following suggestions for TRAI's considerations.

### **Satellite based broadband should be considered a primary option alongside wireline broadband and mobile broadband**

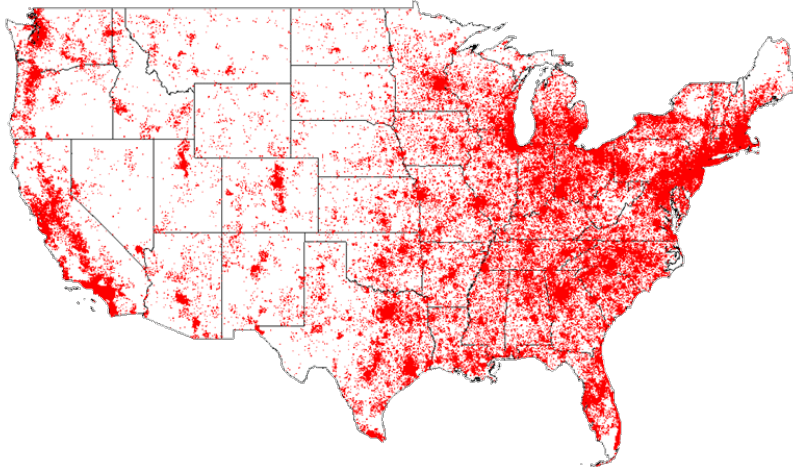
For far too long in India, satellite broadband has been viewed through the prism of older technology (pre Ka-band), policy and regulatory constraints, that have painted a picture of it being low capacity, slow, and expensive. Prior policies and studies, have used older technology examples to relegate satellite-based broadband to only rural and unconnected communities like the Northeast of India, mountainous regions etc. This is not the view of satellite-based broadband in the rest of the world.

Viasat operates a successful competitive satellite-based broadband service in some of the most developed countries in the world – USA, Canada, England, France, Germany etc., The Viasat satellite network is planned to reach a capacity of 3.5Tbps by 2021. Our calculations show that even 1 Terabit of capacity over India, could easily support high speed broadband to crores of Indian subscribers.

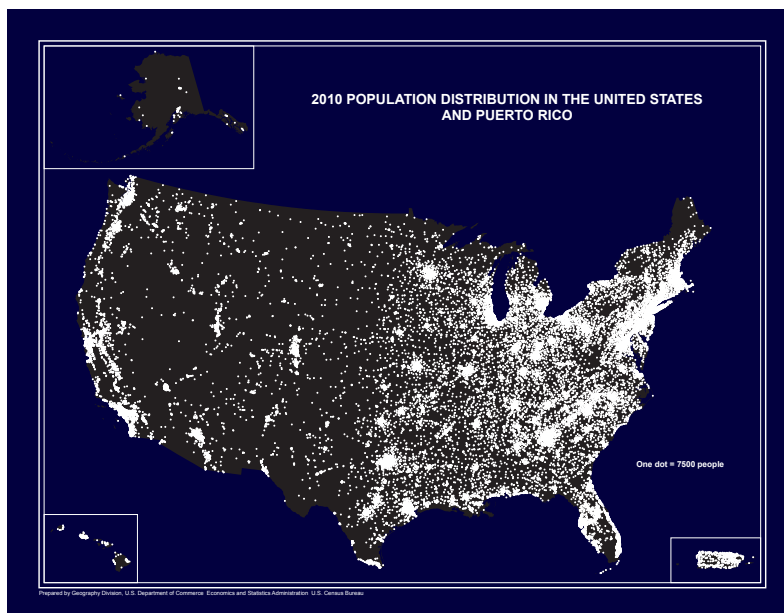
The state of the art in satellite-based broadband service offers speeds of 25Mbps to the user, going up to 100Mbps with plans offering 10s and 100s of Gigabytes at prices competitive with 4G/LTE based mobile data.

Viasat is happy to see that TRAI has identified satellites as a component of the proposed National Broadband Plan. Viasat also recommends TRAI explicitly include Satellite-based broadband as an option to reach the goal of "broadband services to 50% households in the country" rather than specifying only "wireline broadband" as an option.

Viasat has proven that satellites are not just a last-resort solution for rural and remote areas with no other connectivity options. In Figure 1 below, the distribution of Viasat's residential broadband customers in the USA is shown. In Figure 2, is the population distribution of the USA. As can be seen, Viasat's broadband service competes successfully with terrestrial providers even in urban and suburban areas.



*Figure 1 - Viasat-1 consumer broadband subscriber distribution in US*



*Figure 2 - US population distribution (from 2010 US Census Bureau statistics)*

## **Review of policy and regulations to enable Satellite-based broadband**

Viasat is happy to see that new spectrum bands like Ka-band are mentioned in the paper. Viasat further recommends the following:

1. Automatic approval for operation in spectrum bands approved by ITU. Additional bands beyond Ka will become operational for satellites in the near future. Making this automatic will allow faster deployment of technology in India.
2. Comprehensive review of all satellite technology requirements and removal of any barriers that restrain state-of-the-art technology (Ka-band is one example, but there are many others) from being deployed in India.

3. Allow private satellite-based broadband companies like Viasat to easily enter the market, with a simpler policy and regulations regime, and also providing timebound automatic clearances.
4. A thorough review and cleanup of market practices, government regulations and technical requirements which constrain or delay broadband rollout in India.

## **Background – State of the art in Satellite-based broadband**

The world's use of bandwidth is doubling every two or three years. Recognizing this need, Viasat over the past decade has designed, developed, and operates very high-speed and high-capacity satellite systems and associated networks which have been designed and developed specifically to keep up with this increasing demand through vastly improved connection speeds and bandwidth capacity for all its customers whether they terrestrial fixed/mobile, aero or maritime platform based and regardless of the subscriber/end user, i.e. personal/private, enterprise or government.

### **Viasat-1 Satellite System**

In 2012, Viasat launched the new era of multi-beam satellite systems by launching [Viasat-1](#), which began by providing commercial services in North America. Viasat-1, however, is only the first stage of Viasat's multi-generation system of very and ultra high-speed satellites operating in the Ka band (17 GHz/28 GHz). Viasat's business and service objective is a continuing transformation of the economic viability and quality of high-speed satellite services as an alternative to traditional satellite service models, as well as and terrestrial service models including 5G for broadband connectivity and data and content access.

Viasat-1's design enabled the following performance enhancements:

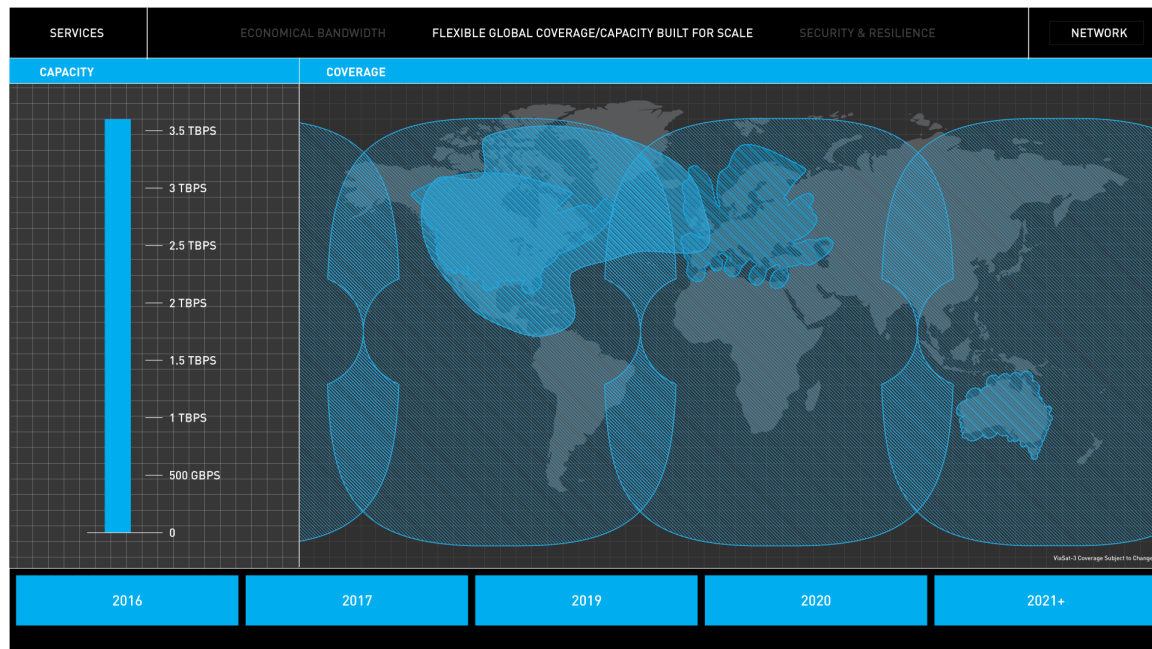
- Over ten times the speed of any satellite previously operating in the Ka band.
- The only such system to provide multimedia Internet.
- The cost per gigabyte of service is a fraction of the cost when such service capacity is provided by other satellites.
- Viable cost and operational competition with terrestrial services – currently about 40% of Viasat's new subscribers have other network solutions, both terrestrial and satellite alternatives, but have chosen Viasat's satellite network to meet their requirements and needs.

### **Viasat-2 Satellite System**

Viasat's second-generation satellite, Viasat-2 was launched on June 1, 2017. In conjunction with Eutelsat's Ka-Sat, the Viasat-2 system provides robust and very high-speed broadband coverage of the Americas, Europe, Africa and Middle East. [Viasat-2](#) was designed to combine high-capacity bandwidth with a vast coverage area footprint. Viasat-2 has the flexibility to dynamically allocate capacity to where demand is at any particular time. In addition to having a coverage area seven times that of Viasat-1 and technological upgrades to increase capacity, Viasat-2 is designed to double the economic advantages of Viasat-1, while also doubling the network speed available to network subscribers/users. Viasat-2's network continues the evolution of customer service capabilities, cost efficiencies and improvements begun by Viasat-1.

### **Viasat-3 Satellite System**

Viasat-3 is Viasat's third generation satellite and will compose Viasat's ultra high-capacity, high-speed global coverage constellation of three satellites, with supporting ground network infrastructure. The first two Viasat -3 satellites will cover the Americas, Europe, the Middle East, Africa and portions of western Asia. Development and construction of these satellites and the system's ground network are currently underway and scheduled for delivery and operations in 2019. The third Viasat-3 satellite, which will complete Viasat's global satellite network and enable end-to end global service, will be introduced into to service in 2021. This third satellite and its associated ground system could provide coverage and service to India, as well as the remainder of the Asia-Pacific region (APAC) in its entirety.



*Figure 3 - Planned coverage of Viasat-3 constellation*

Each Viasat-3 class satellite will deliver over 1 terabit of capacity per second (1,000 Gbit/s). This is more than the combined capacity of the more-than 400 commercial communication satellites in orbit today. This will allow end users 100 Mbit/s average connectivity speeds, with burst speeds in the 1 Gbit/s range.

The Viasat-3 constellation will address growing commercial access and data demands by:

- Delivering Internet service capacity of more than 100+ megabits per second (Mbit/s) to user terminals, making video streaming possible in very high definition (4K).
- Providing reliable connections of hundreds of Mbit/s to residential users, enterprise operations, government agencies, and mobile communication platforms – whether terrestrial (trains, trucks, cars), aircraft (commercial and civil) and maritime (deep-water and costal vessels, including off-shore exploration and production).
- Providing needed digital connectivity to the underserved and underdeveloped areas. Viasat-3 will make possible the offering of affordable Wi-Fi satellite connectivity to thousands of unconnected people in underserved and emerging markets.

The Viasat-3 constellation services will be provided through satellite access nodes (SANs), strategically located around the world, and which will connect Viasat-3 to the Internet backbone. These SANs will use the whole of the 17.7-20.2 GHz (space-to-Earth) and 27.5-30.0 GHz (Earth-to-space) frequency bands. Needless to say the capacity and user demand satisfaction of the Viasat-3 satellites is directly and critically correlated with the amount of spectrum available for this multi-beam satellite system foregoing spectrum bands.

Reasonable, predictable and reliable access and assignments of Ka-band satellite spectrum and other ITU-approved satellite spectrum, is key to providing this kind of efficient and effective global broadband service to all users, whoever they are and where ever they may be.

### **Viasat Community WiFi**

The launch of the Viasat-3 satellite constellation will enable WiFi connectivity in unserved and underserved markets anywhere in the world. Large numbers of towns and villages worldwide have little to no internet access. The European Commission's WiFi4EU program is an example of a European effort to bring the benefit of WiFi connectivity to thousands of villages in the EU – many of which can only be reached economically by HTS.<sup>1</sup>

To address these broadband-challenged locations, the Viasat community WiFi hotspot service can connect the people in small villages and towns to the online world — affordably and reliably. Many people in such underserved areas have mobile smartphones, yet many do not have mobile or internet service. By bringing a satellite-based community WiFi service to these villages, made available through a shared terminal, the residents can gain access to high-speed connectivity.

The equipment for a community WiFi solution is installed at a central location, usually a local business and, in some cases, extended to nearby areas through a point-to-multipoint Wi-Fi connection. Users may connect through a single-click login via the Viasat portal, in areas that do not charge their users for access, or may purchase time-based or data-based access codes from the local business.

Smaller villages typically have a single-site hotspot, while larger villages have multiple sites using a PtMP network. This expands the footprint of the wireless coverage, allowing more people to access the service from anywhere with the community Wi-Fi network.

The figure below illustrates a basic deployment of a Viasat community WiFi hotspot.

---

<sup>1</sup> <https://ec.europa.eu/digital-single-market/en/policies/wifi4eu-free-wi-fi-europeans>

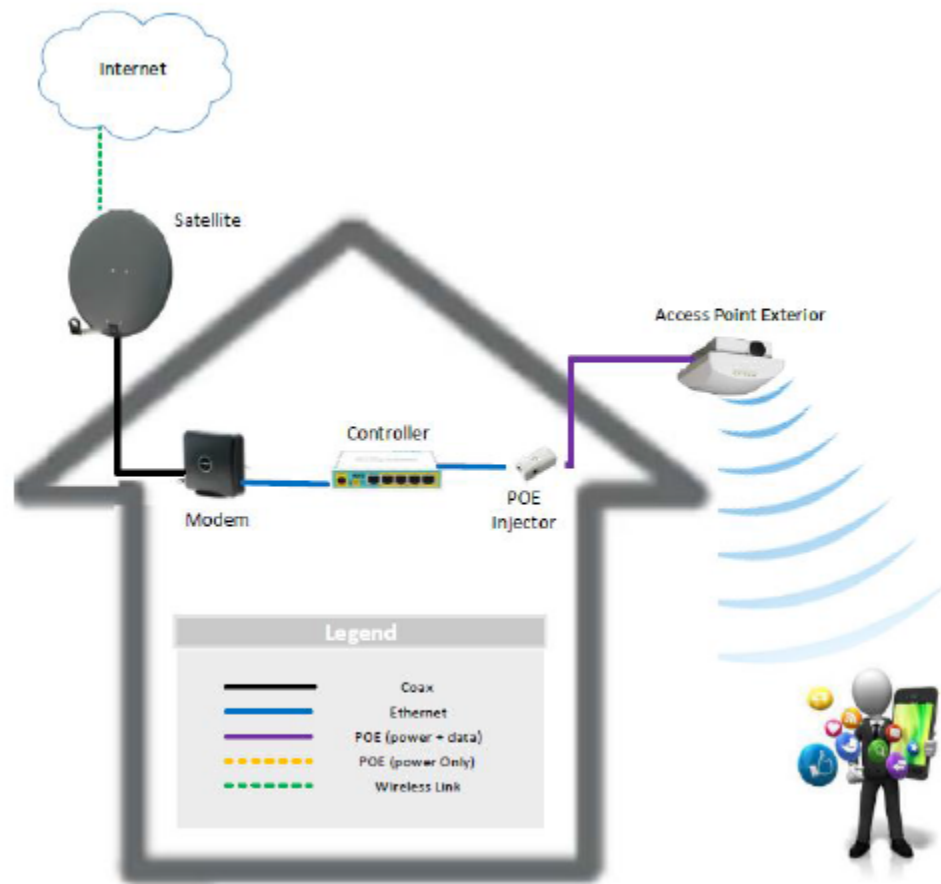


Figure 4 - Viasat Community WiFi