Ground Segment in India
Way forward

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New Trends in the Satellite industry

Launch & Sat Manufacturing

In-orbit Servicing MEV

Virtualization of Ground Segment

IoT & Big Data On Satellite

NGSOs

VSAT BB pepped up for growth
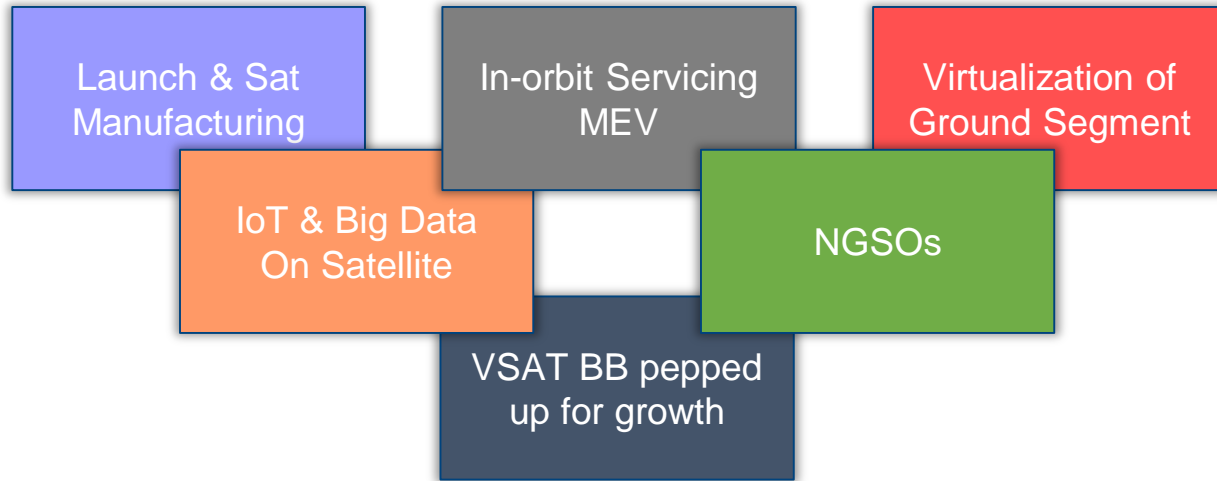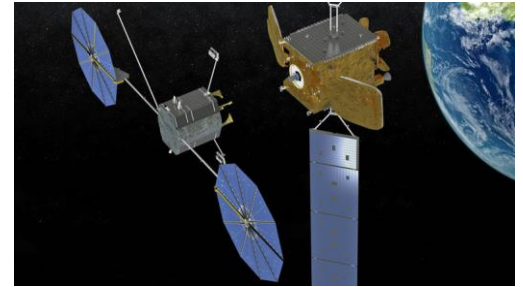
New Trends in the Satellite industry

Launch & Sat Manufacturing

- Launch & Satellite Manufacturing bounces back
    - Driven by HTS (GSO/NGSO), EO & IoT
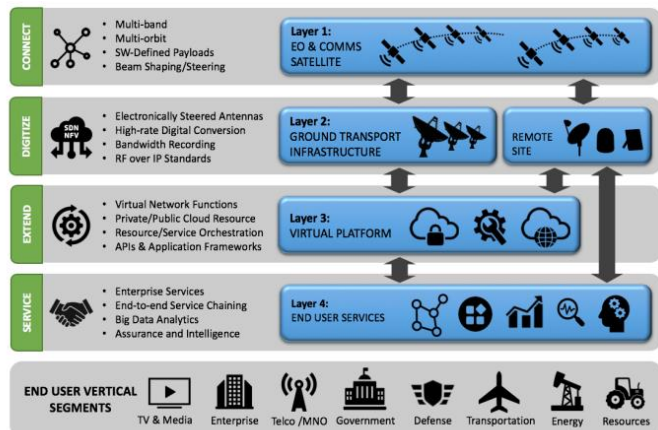   - Diversified launch options - dedicated & rideshare

New Trends in the Satellite industry

In-orbit Servicing
MEV

- In-orbit servicing a reality
  - First MEV successfully tested & demonstrated
  - Can be a game changer for satellite operators
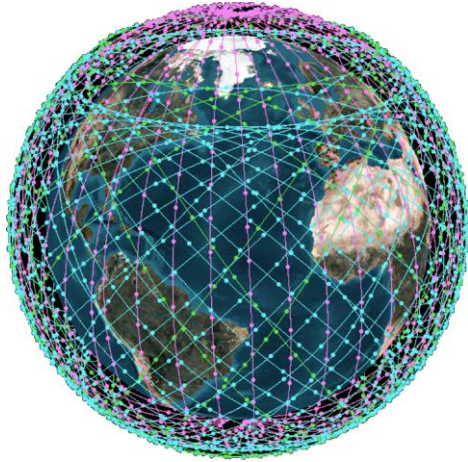
New Trends in the Satellite industry

Source: NSR

Virtualization of Ground Segment

- Virtualization of ground networks
  - Cloud Service Providers enter the game
  - EO & Geo-spatial applications are early adopters
  - Ground Station as a Service beginning to emerge

New Trends in the Satellite industry

NGSOs

- NGSOs are a reality
  - 3 out of 5 constellations will enter into service in 2022
  - The constellations are slowly and steadily getting funded
  - While early movers have an advantage, the late entrants are taking advantage of the fast changing technology

New Trends in the Satellite industry
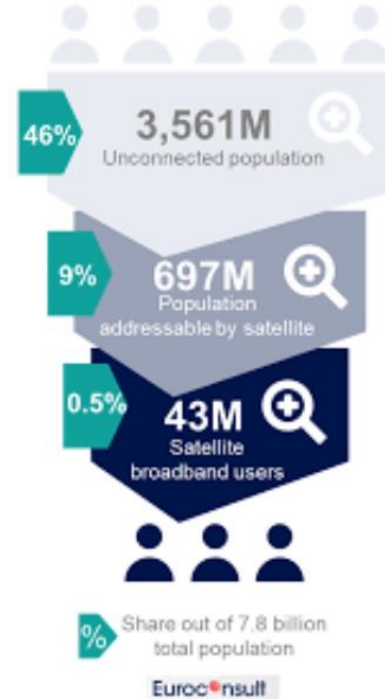
IoT & Big Data
On Satellite

- IoT & Big Data applications driving satellite growth
  - Transportation, military & energy are the key segments driving growth
  - Well established in North America and is fast growing in other regions

New Trends in the Satellite industry

Sat BB pepped up
for growth

- Satellite BB prepped for growth
  - Increased bandwidth requirements from existing sites
  - Wifi hotspots based consumer off-take increasing
  - Backhaul requirements from telcos continue to grow

2020 ADDRESSABLE MARKET

46% **3,561M** Unconnected population

9% **697M** Population addressable by satellite

0.5% **43M** Satellite broadband users

% Share out of 7.8 billion total population

Euroconsult

Source: Universal Broadband Access 2021

1094 × 2144

Where is the Ground Segment growth going to come from?

- COVID-19 had a huge impact on ground station deployment
  - Many capex decisions were put on hold
  - Industry beginning to turn around
- New HTS/VHTS being rolled out
  - Spot beams warrant gateways in many geographies
- LEO systems needs multiples of gateways
  - Regulatory requirements
  - Coverage requirements
  - Need to keep the latency to the minimum
- Cloud and virtualized gateway deployments
  - Most of the data is moving to the cloud and so are the gateways
  - "Software Defined" further aiding this push
- Other applications such as EO, IoT & Navigation further pushing the need for gateways

Dynamics of Gateway Deployments for HTS

- Choice of Gateway location
  - Away from user beams - spectrum reuse
  - Low rain attenuation
  - Good internet backbone (especially the last mile)
  - Robust infrastructure
  - Spectrum coordination with other services
- Resource optimization
  - Cost optimization - single vs multiple gateways
  - Need for gateway diversity further increases cost of deployment - Hence need to share
- Who can deploy
  - Teleport service providers
  - Cloud Service Providers
  - Existing service providers
- Regulatory requirements
  - Size of RFT
  - Lawful interception
  - Licensing requirements
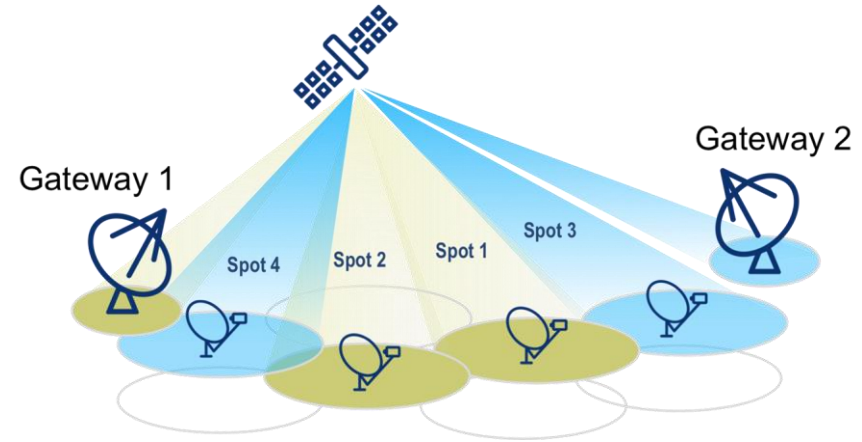
Suggestions for licensing gateway operations

- Treat GSO HTS gateways as infrastructure
  - Common RFT deployment by Gateway Operator
  - Service providers install their own baseband
  - Service & Spectrum licensing requirements to be met by the service providers
  - Enable resource sharing
  - Registration under Section 4 of the ITA
  - Enable existing teleport operators to provide gateway infrastructure
- LEO HTS gateways
  - Includes common baseband in addition to RFT
  - Conversion of MHz to Mbps
  - Enhanced role of provisioning, IP addressing/routing, bandwidth plans, hand-over of traffic at pre-designated POP locations
  - Spectrum assignment limited to gateway spectrum - User spectrum assignment to service providers
  - Needs to be licensed under ITA
- License fee and spectrum charges should not be levied on the gateway operator or should be kept minimum
  - Service providers pay license fees & spectrum usage charges as a percentage of Adjusted Gross Revenues

Thank You!