



Globalstar Overview

2017

Table of Contents

- 1) Mobile Satellite Services Business
- 2) Terrestrial Authority for Globalstar's Licensed 2.4GHz Spectrum

1) Mobile Satellite Services Business

Company Overview

Globalstar is a Louisiana-based provider of Mobile Satellite Services (“MSS”) with a full product suite supporting both one-way and two-way communications beyond the range of traditional cellular services

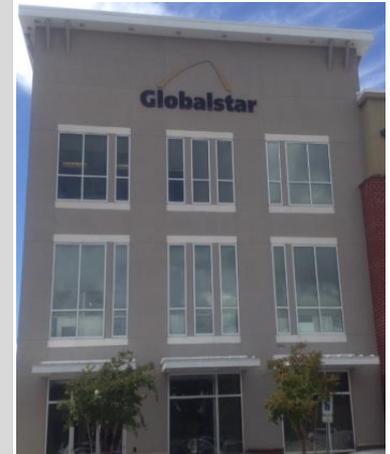
History & facts

- Headquartered: Covington, LA
- Founded in 1991 as a partnership between Loral Space and Qualcomm
- Thermo Companies purchased Globalstar in 2004
 - Thermo has invested over \$600mm over the last 10 years
 - Thermo owns ~65% of Globalstar
- Listed NYSE MKT (GSAT)
- Number of employees: 340
- Operations and network control centers: Milpitas, CA; Covington, LA; Aussaguel, France



Key assets

- Global satellite network
 - New satellite upgrade completed in 2013 (\$1bn investment)
 - Completed ground network upgrades using Hughes & Ericsson equipment – RAN + Core Network
 - Approaching 700k subscribers globally
 - EBITDA positive operations
- 25.225 MHz of global spectrum authorized by ITU
- FCC approved terrestrial usage of 11.5 MHz of licensed S-band spectrum



Globalstar Satellite Constellation

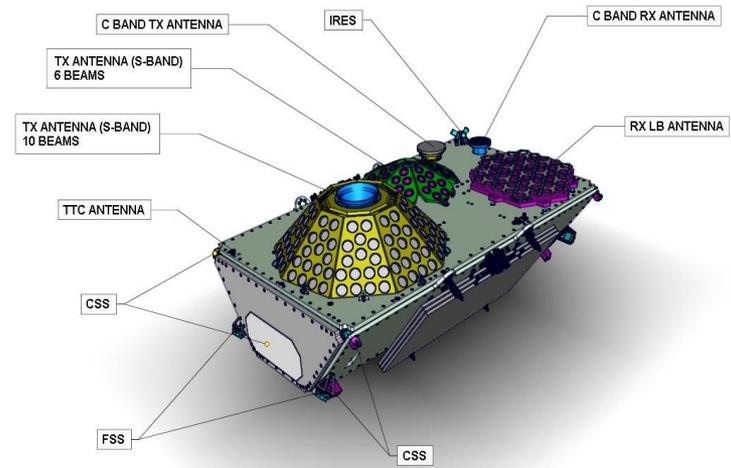
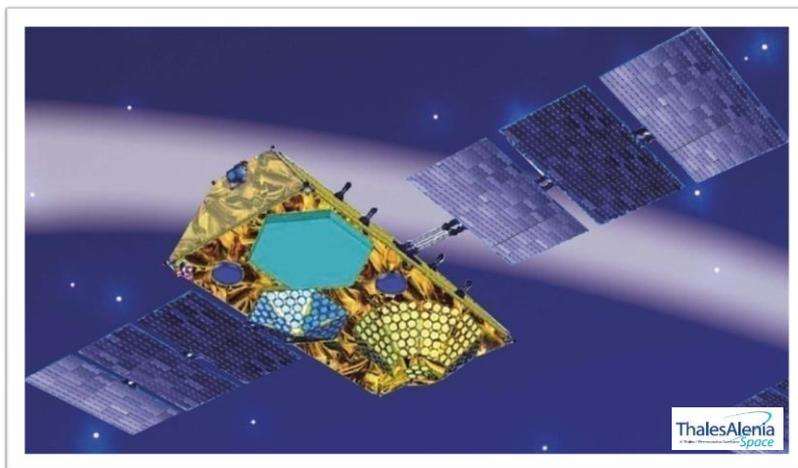
How are satellites configured?

- 8 planes, 3 satellites each; 114-minute orbit period
- 70 S to 70 N latitude coverage; minimum two satellite coverage in temperate zones
- High signal quality and availability – dynamic power control for changing conditions, coherent combining increases signal strength
- Bent-pipe architecture – provides low latency and enhanced service quality

How does the constellation work?

- Satellite constellation communicates by reflecting the signals from user terminals to the gateway antennas for return link and from gateway antennas to user terminals for forward link
- As a satellite acquires a signal from a subscriber, the subscriber is authenticated by the serving gateway and the connection is established by the Public Switched Telephone Network (“PSTN”) or Public Land Mobile Network (“PLMN”) to a terrestrial wired or wireless subscriber
- Data connections are made in a similar manner to voice calls except for Simplex where the data message is established via internet connection

Second-generation satellite diagrams

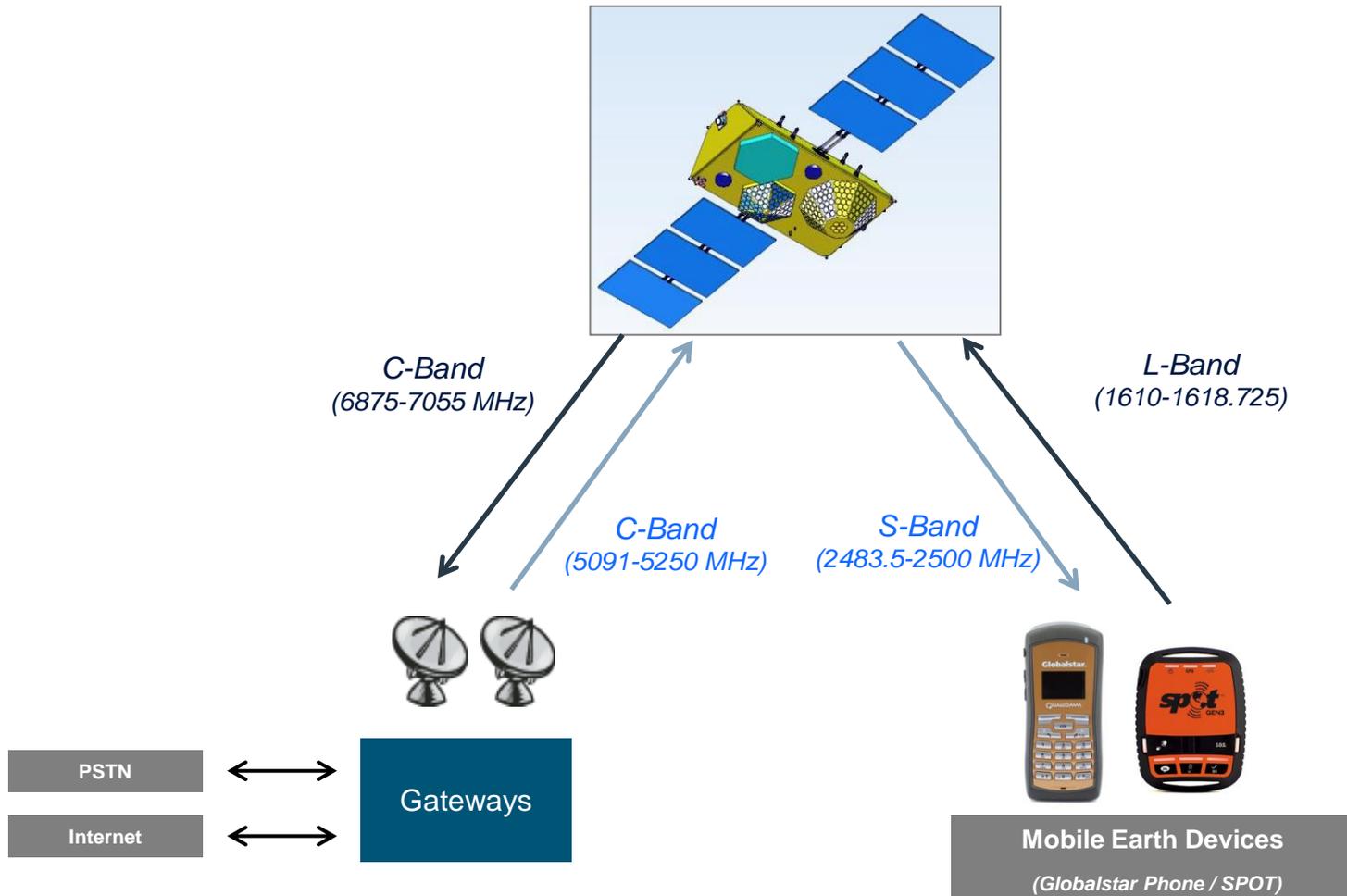


First-Generation vs. Second-Generation Satellites

	First-generation satellites	Second-generation satellites
Satellite life	<ul style="list-style-type: none">• 7.5 Years	<ul style="list-style-type: none">• 15 Years
Data speeds	<ul style="list-style-type: none">• 9.6 kbps (uplink and downlink)	<ul style="list-style-type: none">• Up to 256 kbps (uplink and downlink)
Relative system throughput	<ul style="list-style-type: none">• 100	<ul style="list-style-type: none">• 140+
Supporting network	<ul style="list-style-type: none">• CDMA	<ul style="list-style-type: none">• IP-based WCDMA
Build-out cost	<ul style="list-style-type: none">• Approximately \$5 billion	<ul style="list-style-type: none">• Approximately \$1 billion

Globalstar Bent-pipe Architecture

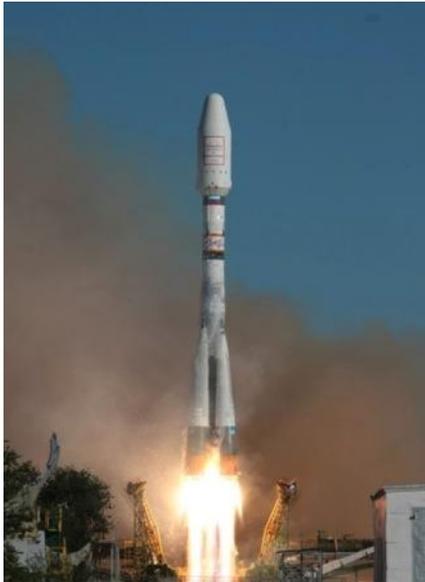
The Globalstar network has a “bent-pipe” architecture with the “brains” of the system located on the ground. Thus, the network can be more easily upgraded to ensure that customers always have the most technologically advanced mobile satellite services.



Globalstar's Successful Launch Campaign

Globalstar is the first MSS provider to successfully launch a second-generation constellation of LEO satellites, years ahead of its competition

Oct '10



July '11



Dec '11



Feb '13

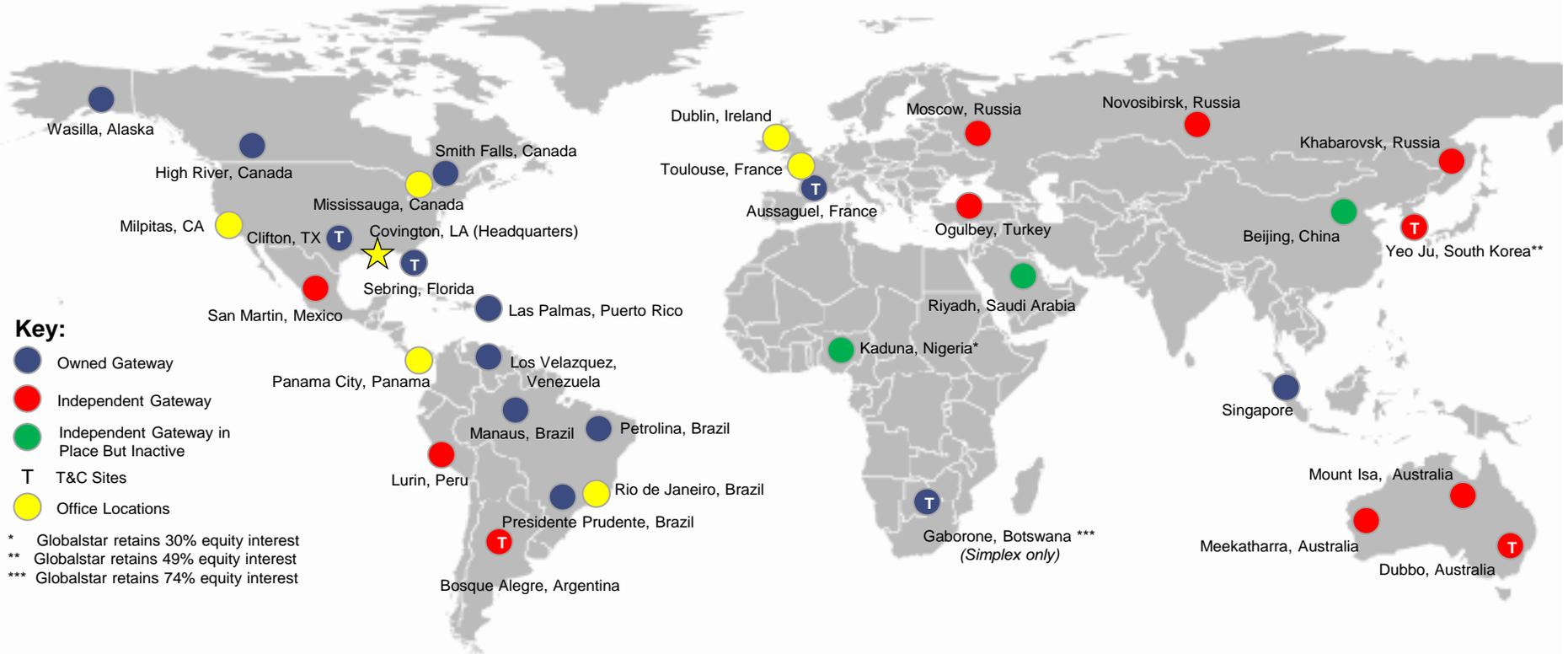


Launch Campaign Highlights

- Four successful launches
- All new satellites providing full commercial service since August 2013
- 15-year design life
- "Land-line quality" voice via satellite

Globalstar Ground Stations and Office Locations

Globalstar's Footprint



* Globalstar retains 30% equity interest
 ** Globalstar retains 49% equity interest
 *** Globalstar retains 74% equity interest



Globalstar's Upgraded Ground Network

Globalstar's upgraded ground network will allow for improved voice and data transfer speeds as well as the development of enhanced new products

	Key vendors	Scope of work	Benefit to Globalstar
Ground network		<ul style="list-style-type: none"> • Design, supply and implement the Radio Access Network ("RAN") ground network • Design second-generation interface chips for new handsets 	<ul style="list-style-type: none"> • New chipsets will significantly lower the cost of Globalstar handsets and other devices <ul style="list-style-type: none"> – Enables Globalstar to release affordable products with a small form factor • Upgrades air interface to modern standards • Enables voice and data transfer rates of up to 256 kbps for uplink and downlink
Core network		<ul style="list-style-type: none"> • Develop, implement and maintain a ground interface, or core network, system • Modern and standard telco core network for maximum flexibility 	<ul style="list-style-type: none"> • Allows additional product functionality and applications

Key Elements of Second-Generation Ground Network

Increased Data Speeds

- Downlink throughput increased from 9.6 to up to 256 kbps
- Enables new applications including web browsing
- 25x current speeds, 100x vs. competition

Gateway Diversity

- Expands coverage footprint
- Increases service quality
- Improves call completion rates



Globalstar

Second-Generation Ground

Enables New Products

- Smaller data boards
- Less expensive components – material reduction in pricing
- Increased ease of integration into other devices / products

Enhanced Capacity

- Voice and data capacity increase materially
- Increased ability to service a large sub base with expanding data demands

Core MSS Addressable Market



No terrestrial network

Areas outside cellular networks

- Connectivity to **two billion people** who live, work and/or play in areas not covered by cellular service
- Over **150 million adventure trips** taken annually ⁽¹⁾
- **75% world's land mass** is without terrestrial coverage ⁽²⁾

Failure of terrestrial network

Critical mobile satellite services during disasters

- Provides alternative network access in areas prone to **natural disasters**
- **Provides public safety** with needed connectivity when cellular service is down due to overloaded / failed infrastructure
- Enables basic services, NGOs, **emergency response** and business continuity

Existing terrestrial network

Asset tracking / low cost alternative to international roaming

- Provides the ability to **track anything, anywhere, anytime** globally
- Provides **low cost alternative to international roaming** when traveling abroad
 - \$2-\$3 per minute with traditional cellular companies vs. \$0.37 per minute on Globalstar's high volume usage plans ⁽³⁾



Source: *Adventure Tourism Market Report* by George Washington University, Adventure Travel Trade Association, Xola Consulting, Informa Telecoms & Media.

(1) *Adventure Tourism Market Report* by George Washington University, Adventure Travel Trade Association, Xola Consulting. Statistic based on survey conducted with participants in Latin America, North America, and Europe.

(2) CIA World Factbook.

(3) Based on plan "Orbit Unlimited" at \$149.99 / month assuming 400 minutes per month of usage.

Globalstar's Select Product Portfolio

Globalstar has a full product suite supporting both one-way and two-way communications beyond the range of traditional cellular services

	Duplex		SPOT		Simplex	
	GSP 1700 / SPOT Global Phone	Sat-Fi	SPOT Gen3	SPOT Trace	STX3	SmartOne B
Image						
Features	<ul style="list-style-type: none"> • Portable two-way satellite phone with full voice and data capabilities • While the GSP-1700 targets the commercial market segment, the SPOT Global phone is consumer-focused 	<ul style="list-style-type: none"> • Connects any Wi-Fi enabled device to Globalstar's satellite network for voice and data services beyond the range of cellular networks • Targets boaters, emergency responders, oil & gas workers, miners, ranchers etc. • Later version will be targeted towards the mass consumer market 	<ul style="list-style-type: none"> • Flexibility to outdoor enthusiasts to send pre-defined messages & GPS coordinates while off the grid • Battery life 2x SPOT 2 – enhanced customization features – smaller form factor • USB for line power eliminates need for battery replacement 	<ul style="list-style-type: none"> • Traces the path of anything, anytime, anywhere for consumer assets • Key applications include theft prevention • Extreme Tracking offered at \$99.99 per year 	<ul style="list-style-type: none"> • World's smallest M2M transmitter • Enables VARs and OEMs to develop smaller, more efficient M2M solutions • Applications include wide range of assets including LPG tanks, water tanks, vehicles, etc. 	<ul style="list-style-type: none"> • Designed for the intelligent management of powered and non-powered fixed and movable assets • Provides solution for engine runtime reporting and major fault monitoring for portable construction equipment as well as tracking intermediate bulk containers, vehicles and boats

Satellite Product Evolution

Existing / Legacy Product Line

New Products: Second-Generation

Duplex

GSP 1600



GSP 1700



Commercial Sat-Fi



Sat-Fi 2

- Inexpensive product that turns any Wi-Fi enabled device into a satellite phone
- Targets the mass market consumers
- Expected release date: 1H 2017

Simplex

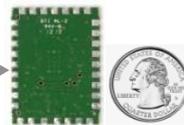
Satellite Transmitter Unit



STX2



STX3



Simplex becomes two-way

- First-of-its-kind, two-way small bit data device
- Provides command and control functionality
- Expected release date: Late 2017 / Early 2018

SPOT

SPOT Personal Tracker



SPOT 2



SPOT 3



Two-way SPOT: SPOT X

- Two-way data communication device targeted towards the mass consumer market
- Tracking and two-way texting capabilities for emergency and off-the-grid communications
- Expected Release date: 1H 2017

Sat-Fi 2

Satellite communications device that turns any smartphone, laptop or tablet into a satellite phone / global data device



Sat-Fi 2 Features and Benefits

- An inexpensive Hughes-based mass market product that connects any Wi-Fi enabled device to Globalstar's satellite network for full voice and data services beyond the range of cellular networks
- Extends wireless beyond cellular and allows for coverage in any targeted territory while providing high quality connectivity for voice and data where the economics do not otherwise support capital deployment for a macro terrestrial network
- Provides alternative to international terrestrial roaming
- Targets the mass market consumer + enterprise market leveraging Globalstar's existing network of retail & wholesale distribution channels with plans for new B2B distribution
- Service pricing to be commensurate with current Duplex offerings
- Leverages Globalstar's second-generation ground infrastructure – higher speeds, enhanced capacity, improved performance

SPOT X

*Two-way messaging device with SPOT Tracking
and SOS functionality*

One-way



SPOT Personal Tracker



SPOT 2



SPOT Gen3

Two-way



Features and Benefits

- First-of-its-kind qwerty keyboard SPOT device that allows subscribers to send and receive SMS messages along with the traditional tracking and SOS functionalities
- SPOT X will leverage Company's existing network of retail + wholesale distribution – targets consumer, enterprise and government markets
- Provides an inexpensive alternative method of communication to users who work, live or play outside the boundaries of terrestrial coverage
- Service pricing will be at a premium to legacy Gen3 products rounding out a “good, better, best” in-store offering for SPOT Gen3, SPOT X and Sat-Fi 2

2) Terrestrial Authority for Globalstar's Licensed 2.4GHz Spectrum

Globalstar Licensed 2.4 GHz Technical Overview

U.S. RESOURCE

11.5 MHz of Nationwide Spectrum within the 2.4 GHz band with superior propagation and throughput characteristics. Represents 3.7 Billion MHz-POPs

PRIMARY USE CASES

High Density Dedicated Non-Macro Cell Deployments (e.g. Pico, Femto, and Related Small Cell Deployments)

PRIMARY STANDARD

TD-LTE – eliminates the need for paired spectrum

ECOSYSTEM

Broad Device and Infrastructure Ecosystem with Existing Chipset Architectures

GLOBAL

Potential for Harmonized Terrestrial Authority Across Many International Regulatory Domains

FCC Report & Order Summary

Report & Order Highlights

- Single nationwide terrestrial authority
- No build out requirements or sharing obligations
- Substantial revisions to gating criteria – must offer satellite service for a fee
- Commercial OOB limits at edges of 11.5 MHz terrestrial band to protect adjacent licensed / unlicensed services
- Flexibility in deploying air interface / wireless protocol for terrestrial service offerings

Representative Proceeding Participants



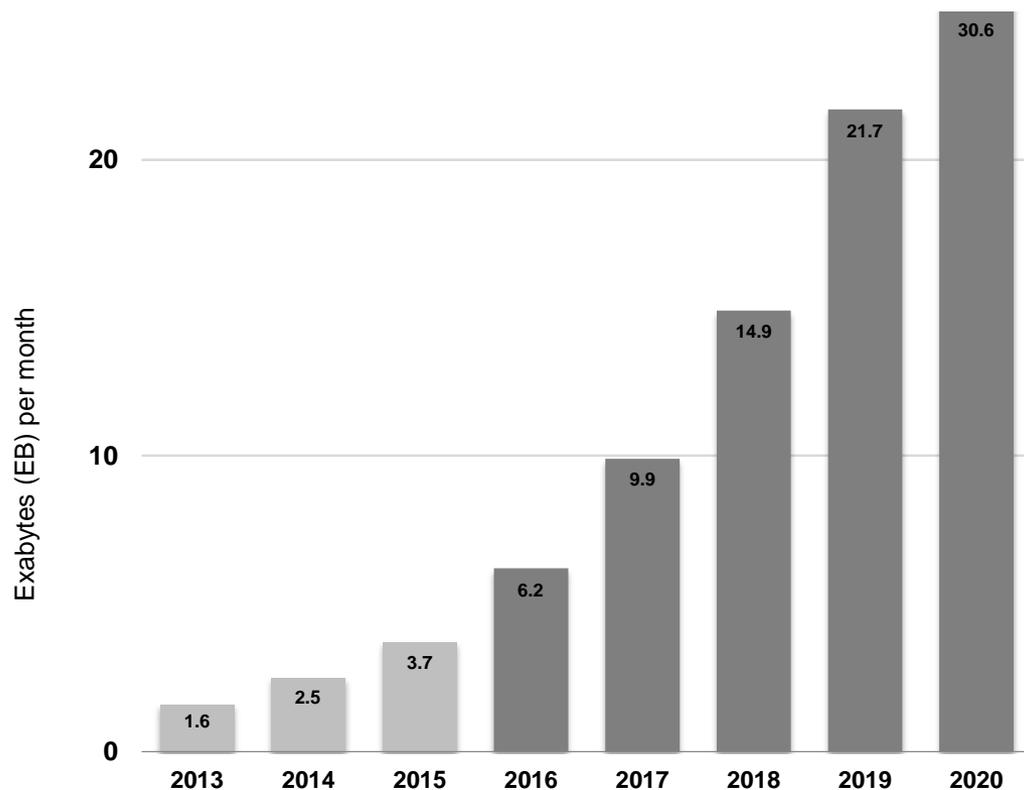
Globalstar Terrestrial Authority Timeline

Terrestrial Authority Timeline Review

Nov 13, 2012	Globalstar Files Petition for Rulemaking
Jan 20, 2013	Initial & Reply Comments Filed
Sep 5, 2013	FCC Circulates Notice of Proposed Rulemaking (“NPRM”) Internally
Nov 1, 2013	FCC Unanimously Votes For and Releases NPRM
Feb 19, 2014	NPRM Publication in Federal Register
May 5, 2014	Comment Due Date
Jun 4, 2014	Reply Comment Due Date
Mar 10, 2015	Successful completion of TLPS demonstration at the FCC
May – Aug 2015	TLPS Deployment at a University in Chicago
Oct 2015 – Ongoing	TLPS Deployment at Washington School for Girls in D.C.
May 13, 2016	FCC Circulates R&O for Commissioners’ vote
Mid-May 2016	Receives “Yes” vote from Wheeler; “No” votes from Pai / Rosenworcel
November 10, 2016	GSAT requests terrestrial relief for 11.5 MHz of Globalstar’s licensed spectrum
December 23, 2016	FCC adopts Globalstar’s Report and Order

Mobile Data Demand and the RF Spectrum Resource

Between 2013 and 2020, conservative projections indicate that mobile data demand will have grown by a factor of 30. Given the finite nature of available RF spectrum for mobile applications, no realistically achievable amount of new spectrum resource will service this demand. Rather, network providers must rely upon spectrum allocations that are most compatible with high density indoor and outdoor small cell architectures.



30.6 Exabytes (EB) of data =



*The LIBRARY
of CONGRESS*

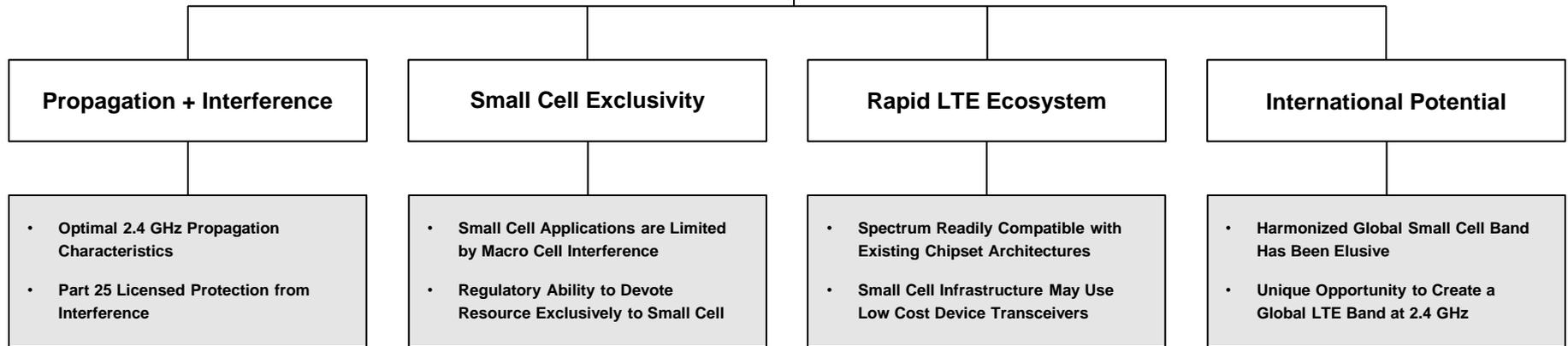
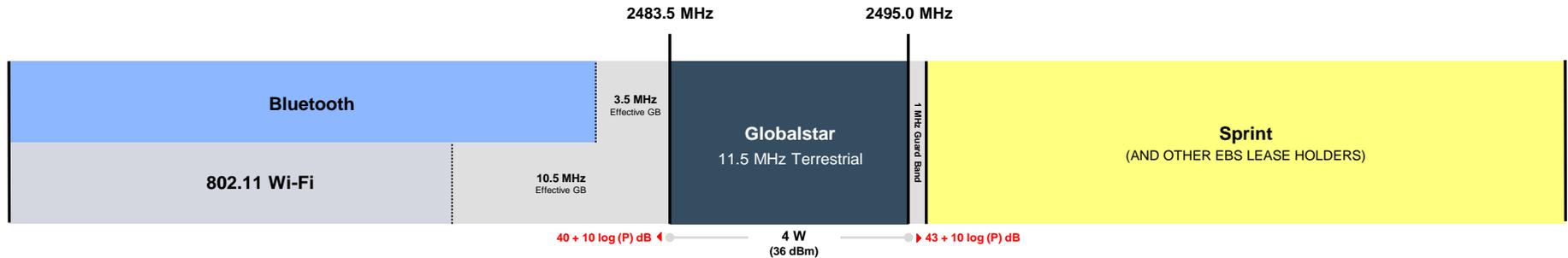
x 1.5 million

**transmitted over wireless
networks *each month***

Source: Cisco White Paper entitled "Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2015-2020" dated February 1, 2016

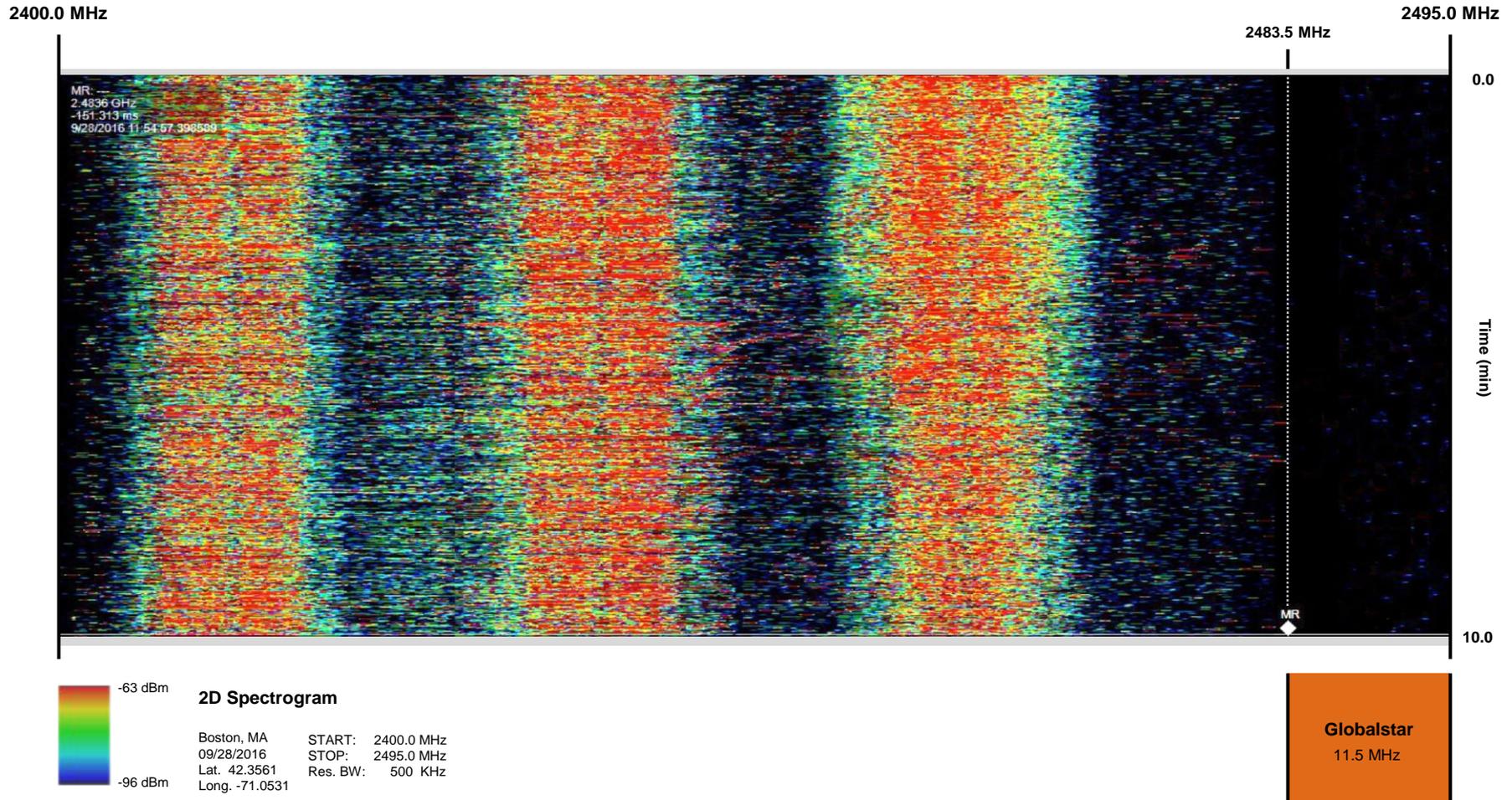
Globalstar 2.4 GHz as a Small Cell Resource

The Globalstar terrestrial band provides 11.5 MHz (3.7 Billion MHz-POP) across the entire United States. As a resource for LTE networks, Globalstar 2.4 GHz is unique in its support of small cell deployment. The band holds physical, regulatory, and ecosystem qualities that distinguish it from other current and anticipated allocations.



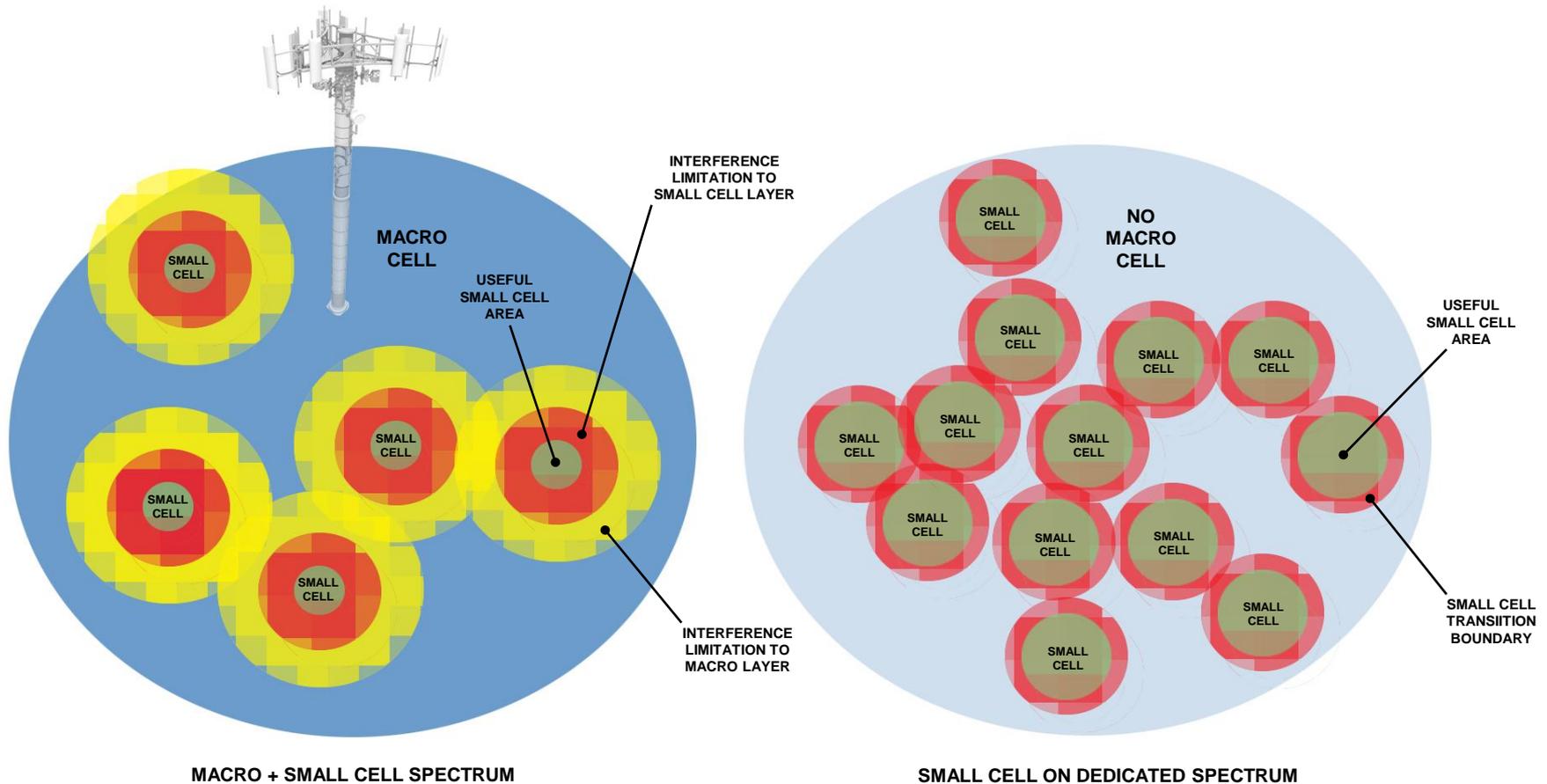
Spectrographic View of Globalstar 2.4 GHz

Due to favorable propagation characteristics, the globally harmonized unlicensed band at 2.4 GHz is both a uniquely important and polluted allocation. The 11.5 MHz licensed terrestrial allocation in Globalstar spectrum has been established under highly protective Part 25 rules. As a result, this band will enjoy full interference protection from adjacent services, permanently maintaining its performance characteristics for LTE.



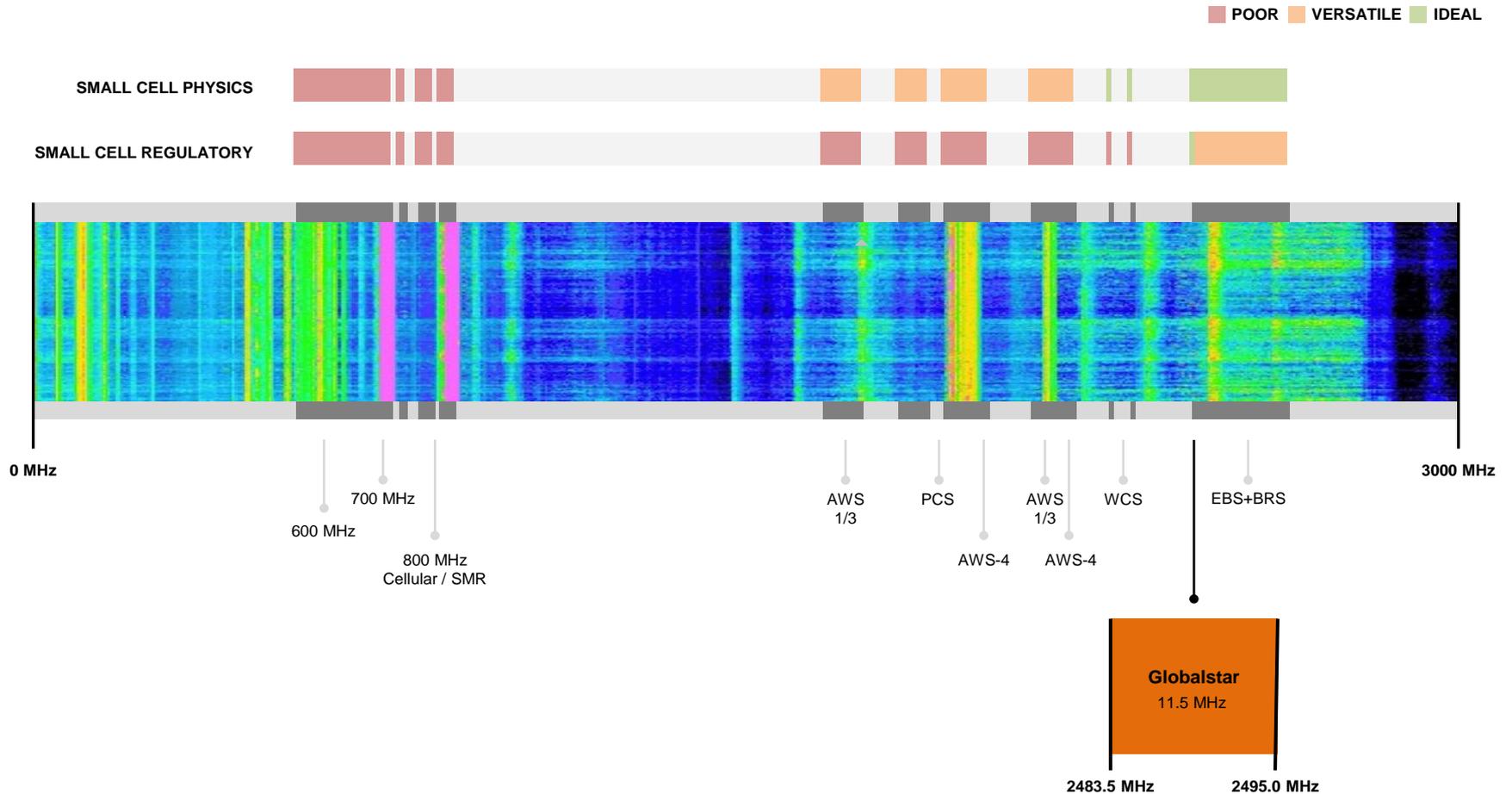
The Need for Dedicated LTE Small Cell Spectrum

Small cell dominated network topologies are essential to meeting wireless capacity demands. However, sharing spectrum across both macro and small cell layers introduces interference limitations that severely compromise network performance. Globalstar licensed 2.4 GHz provides a unique opportunity for operators to dedicate high quality spectrum exclusively to capacity producing small cell infrastructure.



Scarcity of Dedicated LTE Small Cell Spectrum

Conventional commercial wireless network allocations must meet minimum population coverage requirements, which effectively prohibits the exclusive use of most carrier spectrum for small cell. In addition, low frequency carrier spectrum is not physically well suited to high-density small cell topologies. Globalstar 2.4 GHz is at an ideal small cell wavelength and has no terrestrial population coverage requirements.



See: FCC, *Wireless Construction Requirements by Service*, <https://www.fcc.gov/general/wireless-construction-requirements-service>

Licensed 2.4 GHz Small Cell Impact

Small cell represents the most viable method of meeting the next wave of capacity requirements. At 2.4 GHz, physical and regulatory advantages enable the resource to produce multiples of the capacity possible on macro cellular spectrum in the same environment. Even minimal density of low power cellular infrastructure improves effective capacity by more than one order of magnitude.

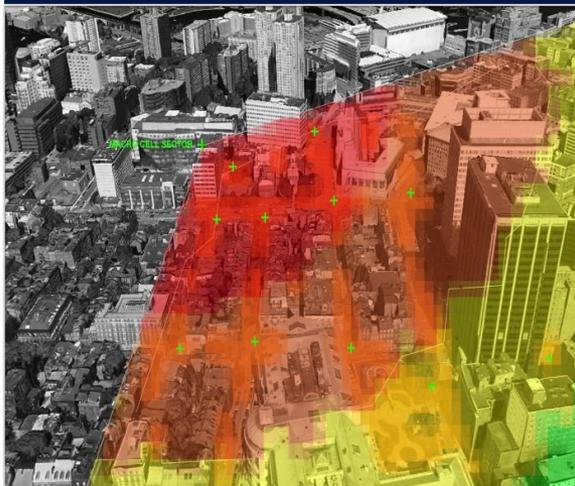
Conventional Macro Cellular Sector



Macro Performance Assumptions

- 10 x 10 MHz FD-LTE, Single 120 deg. Sector
- Peak Aggregate Throughput: <86 Mbps
- Significant Variation in QoS Near Cell Boundary

1 Watt Class 2.4 GHz LTE Small Cell



1 W Small Cell Performance Assumptions

- 10 MHz TD-LTE, 10-15 Outdoor Pico Cells
- Peak Aggregate Throughput: >500 Mbps
- High Signal Quality Near Point of Consumption

0.2 Watt Class 2.4 GHz LTE Small Cell

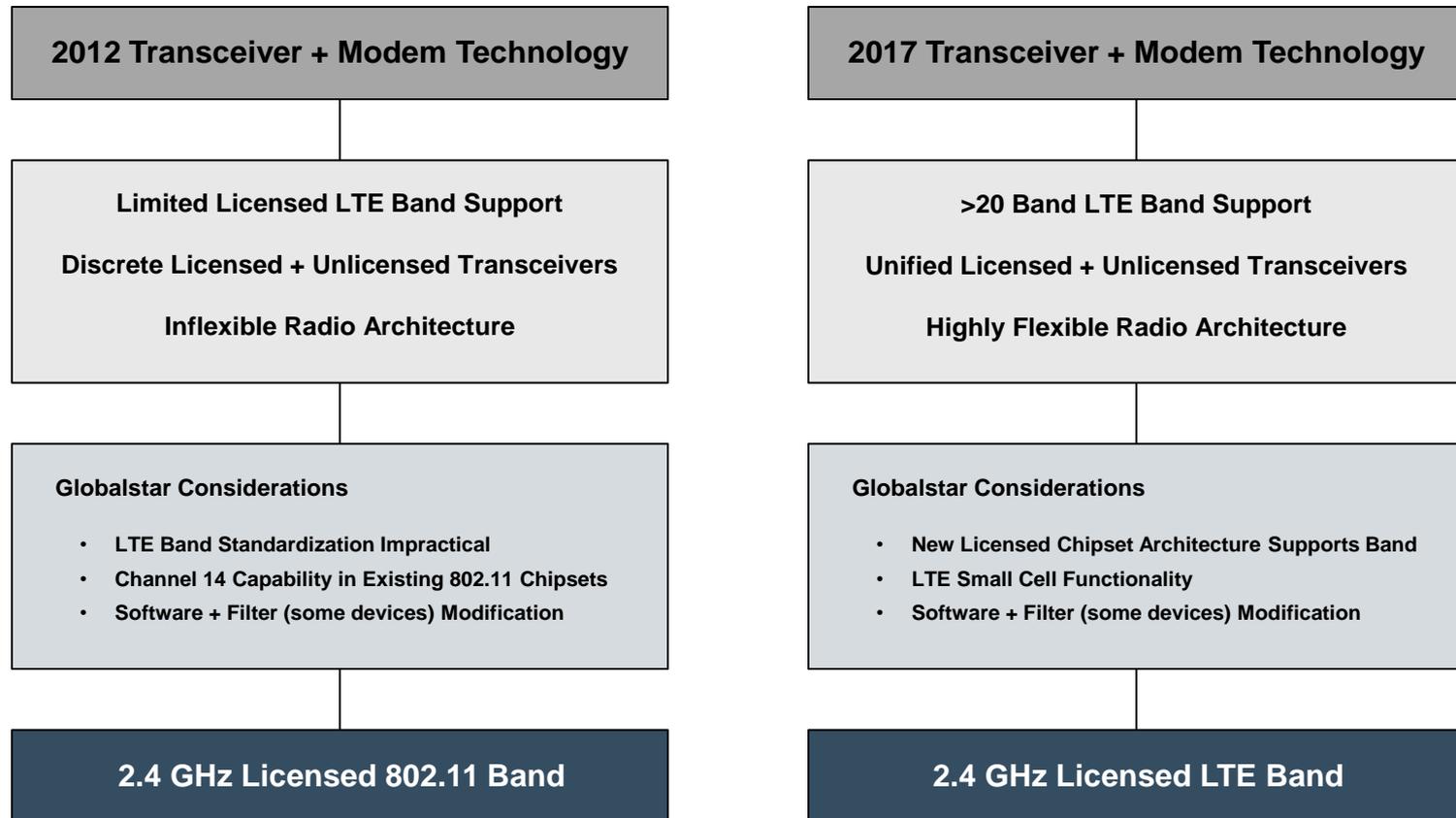


0.2 W Small Cell Performance Assumptions

- 10 MHz TD-LTE, 25-50 Indoor Femto Cells
- Peak Aggregate Throughput: >1 Gbps
- High Signal Quality Near Point of Consumption

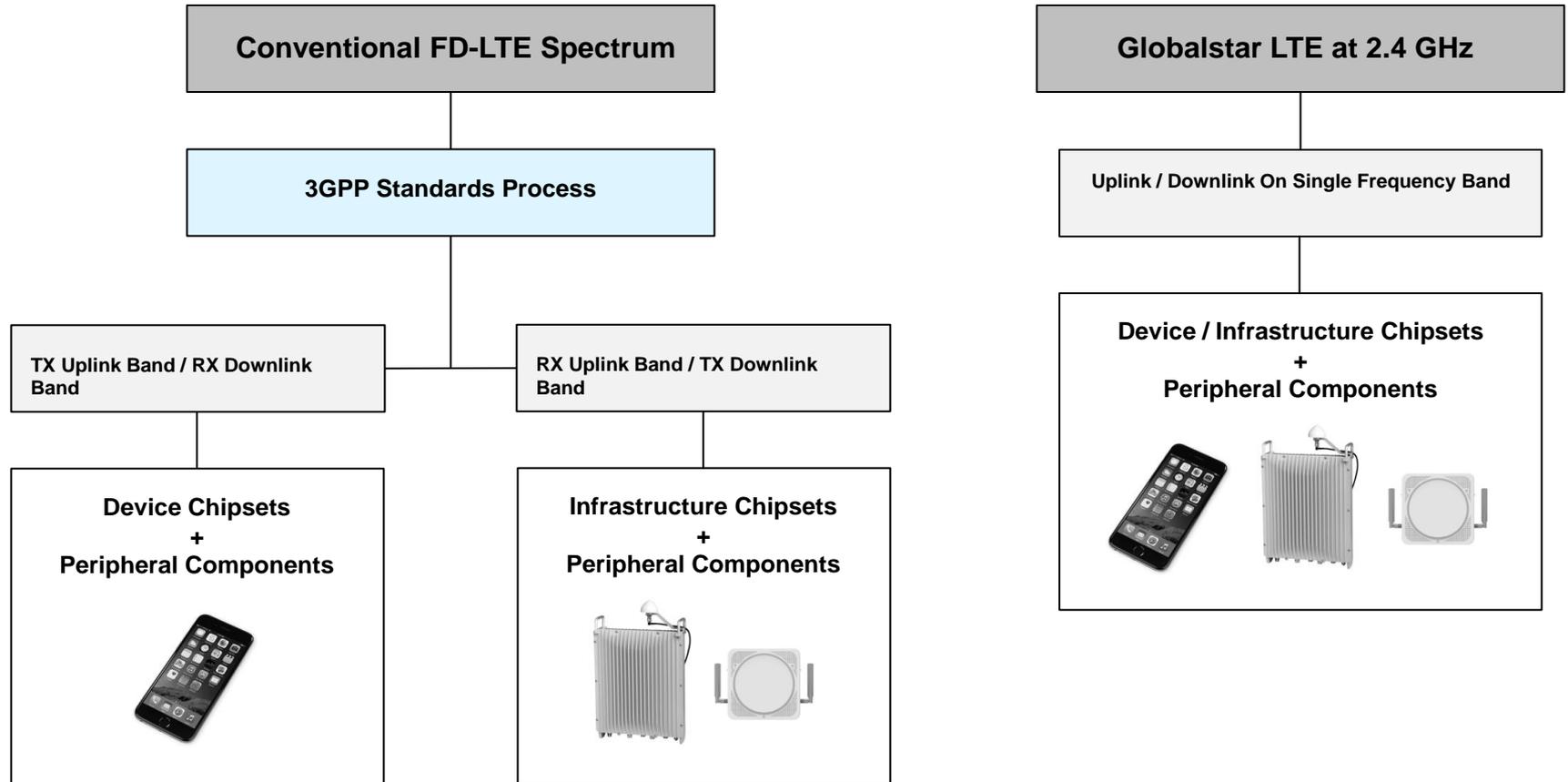
Globalstar 2.4 GHz LTE Ecosystem for Devices

Transceiver technology has evolved significantly since Globalstar's original TLPS proposal. Whereas the RF chipset ecosystem of 2012 was highly inflexible and unable to accommodate LTE services in Globalstar spectrum, current and anticipated radio architectures present a rapid path to availability.



Globalstar 2.4 GHz LTE Ecosystem for Infrastructure

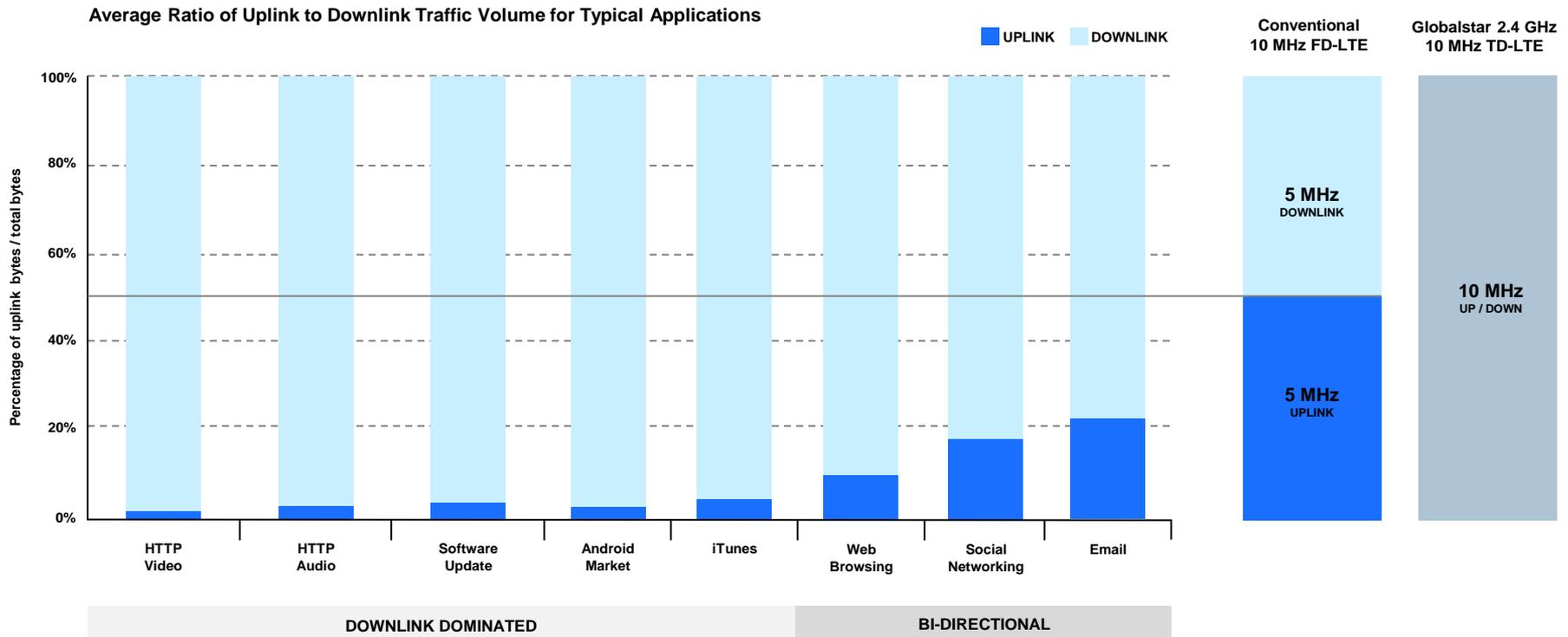
For conventional FD-LTE spectrum, transceivers used for infrastructure and devices are fundamentally different. This means that bulk quantities of transceivers and peripheral components (e.g., filters) may not be used to improve the economy of small cell ecosystems. For Globalstar 2.4 GHz, however, TD-LTE enables small cell infrastructure that may use the same high volume / low cost chipsets as ordinary user equipment.



Note: Standards process not required to develop infrastructure equipment given the ability to use existing chipsets and peripheral components, however, Globalstar and its partners may choose to complete the standards process in due course.

The Performance Benefits of TD-LTE vs. FD-LTE

Symmetrically paired spectrum is an artifact of early 1G / 2G networks, where uplink and downlink bandwidth consumption was identical. Today, data usage is strongly biased towards the downlink. TDD (Time Domain Duplex) spectrum permits adjustment of the uplink / downlink ratio to match demand patterns. Thus, a TD-LTE channel may demonstrate significantly higher performance than an FD-LTE channel of the same size.



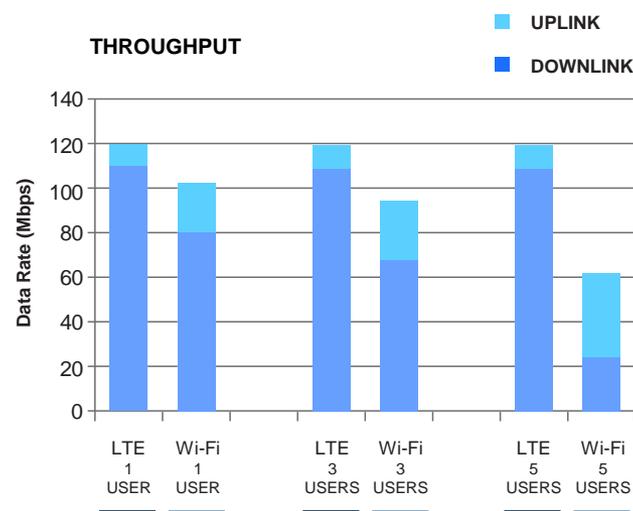
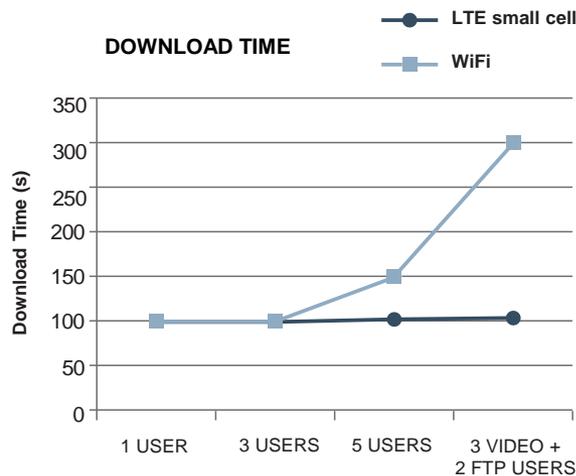
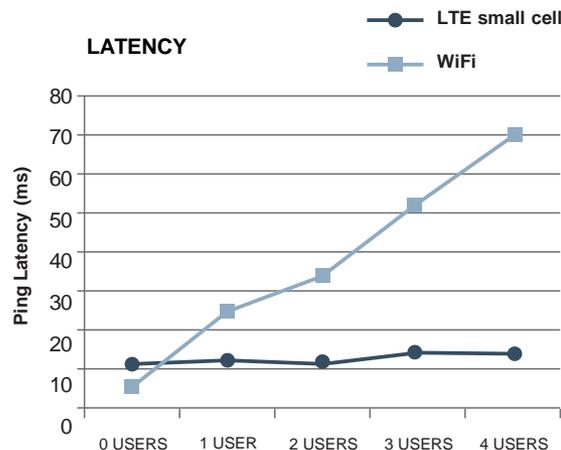
See: Ericsson, *Uplink Versus Downlink Traffic Volumes*, <https://www.ericsson.com/res/docs/2015/mobility-report/emr-uplink-verus-downlink-traffic-volumes.pdf>

Representative Performance: Small Cell LTE vs. 802.11 Wi-Fi

While 802.11 is a favorable protocol for many applications, LTE is a superior standard. This is especially true for carrier grade services that require low latency and consistent performance in high traffic environments. In moving to TD-LTE, Globalstar 2.4 GHz will enjoy a performance advantage relative to the original TLPS concept. The data below summarizes the difference between TD-LTE and 802.11 characteristics.

802.11 Wi-Fi Frequency: 2.4 GHz TX Power Level: 24 dBm (250 mW) Antenna Configuration: UL – 2x2 DL – 2x2

TD-LTE Frequency: 2.6 GHz TX Power Level: 23 dBm (200 mW) Antenna Configuration: UL – 1x2 DL – 2x2



See: Huawei, *LTE Small Cell vs. Wi-Fi User Experience*, www.huawei.com/ilink/en/download/HW_323974

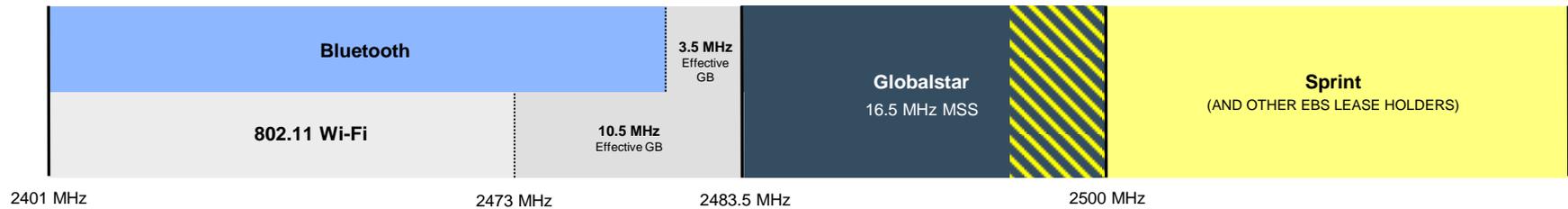
International Potential for Globalstar 2.4 GHz

Due to the Company's position as an MSS provider, the Globalstar spectrum footprint is consistent across all international regulatory domains. Following the recent FCC conclusion, Globalstar expects to expand its terrestrial authority in key international markets.

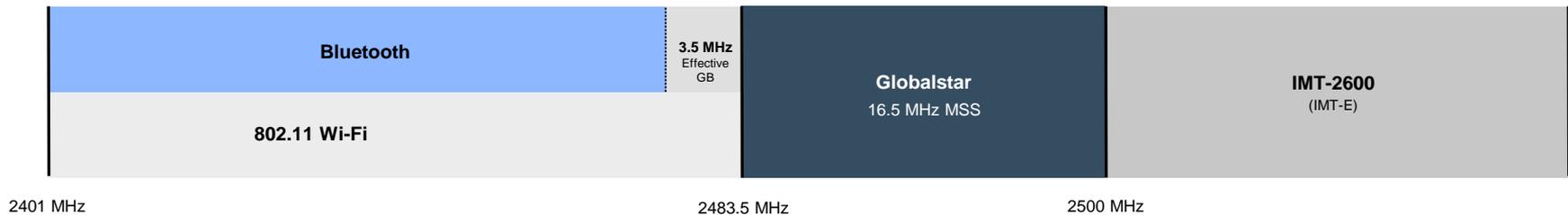
New U.S. Terrestrial Authority



U.S. Satellite (MSS) Authority



Typical Existing Global Band Plan



Note: GB = Guard Band

Key Value Drivers

MSS Operations

- Diverse product and service offerings across consumer, commercial and government markets
- New product offerings – inexpensive consumer mass market Sat-Fi, two-way simplex and two-way SPOT devices
- Operational focus materially expanded to include new territories such as Central & South America and Southern Africa

Second-Generation Upgrades

- Second-Generation upgrades materially improve data speeds and applications
- Significant reduction in product cost – ability to develop low-cost products for the mass consumer
- Materially improves call quality with built-in redundancies

Spectrum

- Domestic terrestrial authority received on 11.5 MHz of S-band spectrum – 3.7 billion MHz pops
- Unique globally harmonized position
- Opportunity to deploy terrestrial services globally