

# ITU Workshop on the Efficient Use of the Orbit/Spectrum Resource

Da Nang, Vietnam 2015

## Regulatory Considerations for Innovative Service

Mariah Shuman

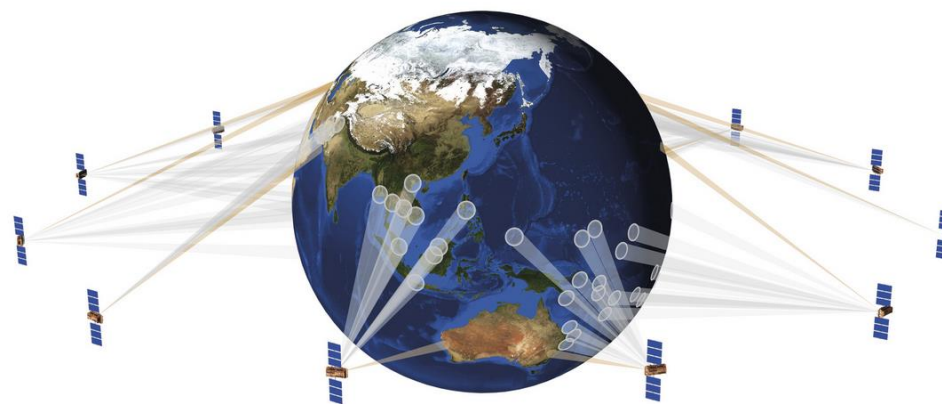
O3b Regulatory Counsel

[mariah.shuman@o3bnetworks.com](mailto:mariah.shuman@o3bnetworks.com)



# O3b's Non-Geostationary Satellite/Constellation Design

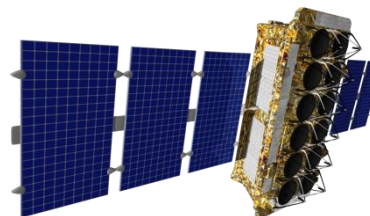
- Circular MEO NGSO equatorial orbit at 8,062 km altitude
  - Closer to Earth than GSO orbit
- 288 minute orbit period
- 12 satellites in orbit
- 10 steerable customer spot beam antennas on each satellite
- Beam coverage: ~700 km diameter on the ground
- Channel bandwidth: 216 MHz
- Coverage: ~45° N/S latitude



# Success of O3b Service Globally

## “Fiber Speed, Satellite Reach”

- Middle mile/Backhaul



## O3b is now in 20+ countries

## Over 40 customers now live over satellites

- Largest operator in the Pacific, outselling satellite and fiber in 2015
- Digicel Pacific (via O3b) increased capacity by 550% in 15 months



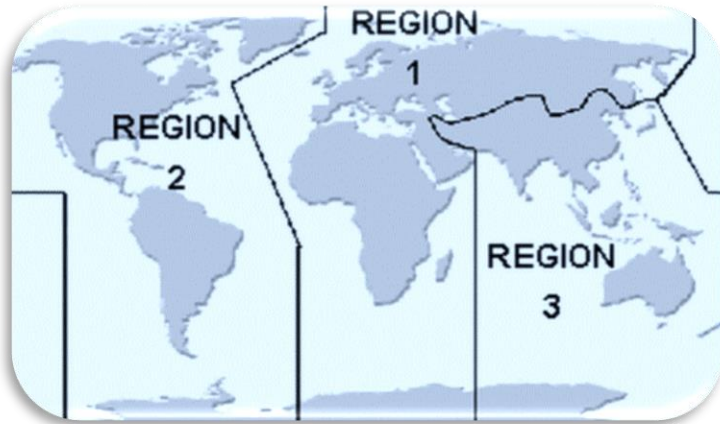
## O3b/HTS is needed to expand service to remote populations

- O3b has enabled 8 MNOs to launch 3G/4G services (Timor, Cook Islands, DRC, PNG)

## Revolutionizing connectivity in mobile backhaul, energy, and maritime sectors

- RCCL's *Quantum of the Seas* is connected by O3b with more bandwidth capability than all other cruise ships in the world put together

# Globally Harmonized Spectrum

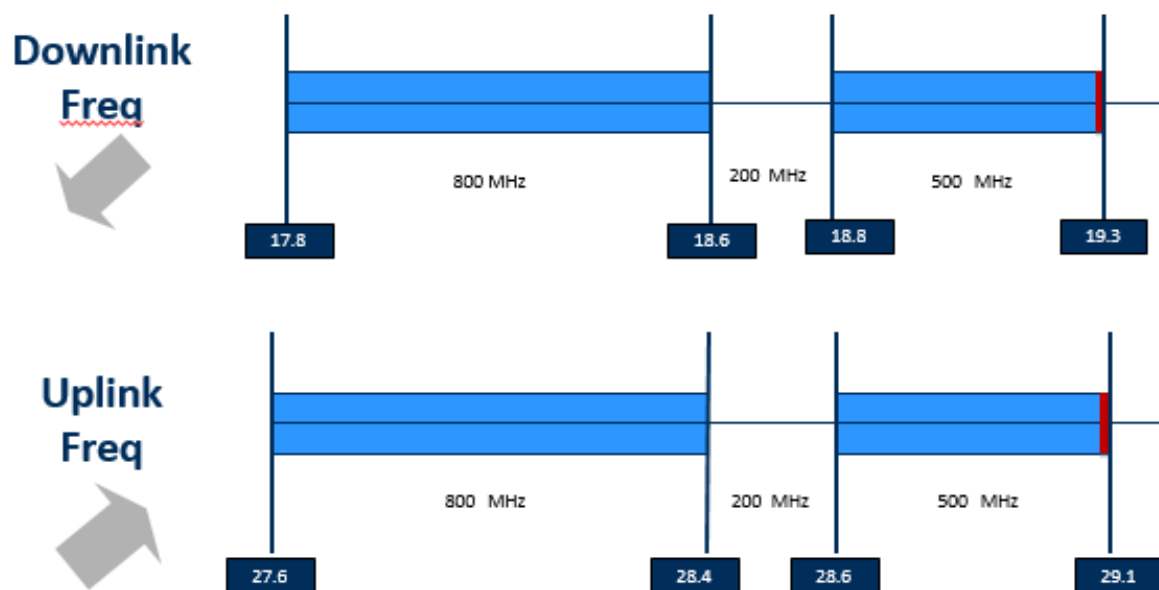


**O3b efficiently reuses Ka-band spectrum and protects GSOs/terrestrial services**

- Satellite is a truly international industry and harmonized allocations allow it to take advantage of economies of scale
- Stable global access to set frequency bands will bring down the cost of service and encourage innovation
- Regulatory certainty is necessary for new technologies

# O3b Frequency Plan & ITU Rules

- O3b is an FSS system fully compliant with ITU Radio & Regulations
- O3b uses frequencies in the Ka-band allocated to the FSS
- O3b system reuses all frequencies and both circular polarizations in every region
- O3b steerable spot beam technology ensures further spectrum efficiency



**Key:**

- |  |   |
|--|---|
|  Denotes 3b Initial Constellation frequencies |  Denotes O3b Additional Complete Constellation frequencies |
|  Frequency in GHz                             |  O3b Telemetry & Command Bands                             |

## High Capacity Throughput

- Throughput available on-board is 10-15x what is typical today with C-band or Ku-band
- More users on ship at substantially higher data rates

- High Speed
- Low Latency
- High Capacity
- Steerable beams

## High Speed

- Terminals deliver data rates up to 500 Mbps

## Low Latency

- Round trip latency of 150 msec.
- Faster network response time
- Higher quality voice calls

## Steerable Beams

- Follow a ship on its cruise
- Real-time updates if course changes



## Example of the O3b Impact: RCCL Cruise Ships

O3b connects the largest cruise ships in the world, *Oasis of the Seas* and *Allure of the Seas*, among other RCCL ships

**Guests:** 6,296 per ship  
**Crew:** 2,165 per ship  
**Length:** 360 meters  
**Width:** 65 meters



RCCL: *“It’s something in the cruise industry that definitely nobody else can offer and it means something different not only for the guests on board, but also for Royal Caribbean. It’s a game changer for us and for guests we are going to attract.”*

# Global Deployment of an Innovative System

## O3b's system is groundbreaking, which can create challenges for licensing/approvals

- Few governments have Ka-band service or spectrum rules
- ITU is still developing some Ka-band rules (e.g., ESOMPs)

## Where licensing is required, application preparation can be complex

- Technical showings
- Narrative text justifying need

## Every country regulates differently...

### Some have minimal/no regulations:

- Informal notification letter
- No fees/reporting

### Some have complex regulations:

- Formal application(s)
- Public consultation
- Homologation/type approval
- Local permits
- Initial/monthly/annual fees
- Annual/quarterly reporting



ITU adopted resolutions for C-band and Ku-band maritime satellite services

Maritime in Ka-band is a natural evolution of C-band & Ku-band resolutions

Possible additional work in WRC-19 cycle

## Existing standards:

**Report ITU-R S.2223:** Technical and operational requirements for GSO FSS earth stations on mobile platforms in bands 17.3 - 30.0 GHz

**Report ITU-R S.2261:** Technical and operational requirements for earth stations on mobile platforms operating in NGSO FSS systems in the frequency bands 17.3 - 19.3, 19.7 - 20.2, 27 - 29.1 and 29.5 - 30.0 GHz

**ECC Decision (13)01:** The harmonised use, free circulation and exemption from individual licensing of Earth Stations On Mobile Platforms (ESOMPs) operating with GSO FSS within the frequency bands 17.3 - 20.2 GHz and 27.5 - 30.0 GHz

**ECC Decision (15)DD:** The harmonised use, free circulation and exemption from individual licensing of Land and Maritime Earth Stations On Mobile Platforms (ESOMPs) operating with NGSO FSS satellite systems in the frequency range 17.3 - 20.2 GHz, 27.5 - 29.1 GHz and 29.5 - 30.0 GHz



**Networks**

*Fiber Speed. Satellite Reach.*