

# Next Generation Satellites: The Path for the Pacific Islands

Robert Suber, Intelsat

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24 Apr 2017



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# Diverse, Reliable, Global and Innovative

## 2016 Financials

Revenue 2.188 Billion USD

Backlog 8.7 Billion USD

EBITDA 75%

## Number 1 satellite company

Revenue

Reach

50 Traditional Satellites

3 Epic<sup>NG</sup> Satellites

## Strong history

First commercial  
satellite operator

launching Early Bird

1965

## Feb 28<sup>th</sup> 2017 announced

conditional merger with  
OneWeb and Softbank to

inject 1.7 Billion to become

40% shareholder



# Building Blocks of Transformation

## The industry in Renaissance period

1

**Satellite Launch  
Innovation**

2

**Spacecraft  
Innovation**

3

**Constellation  
Innovation**

4

**Ecosystem  
Innovation**



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# These internet giants and entrepreneurs are investing heavily in the satellite Industry ...

## A Space Race in Silicon Valley

Jan 2015 - Google and Fidelity invests \$1 billion in SpaceX satellite programme



Larry Page



Plan to launch 4000 satellites into orbit by 2030



Jeff Bezos:  
Founder of Amazon

Source: [theinformation.com](http://theinformation.com)

Google CEO Larry Page. Photo by Bloomberg



Facebook plans for satellite in 2017 that will provide internet access in Africa



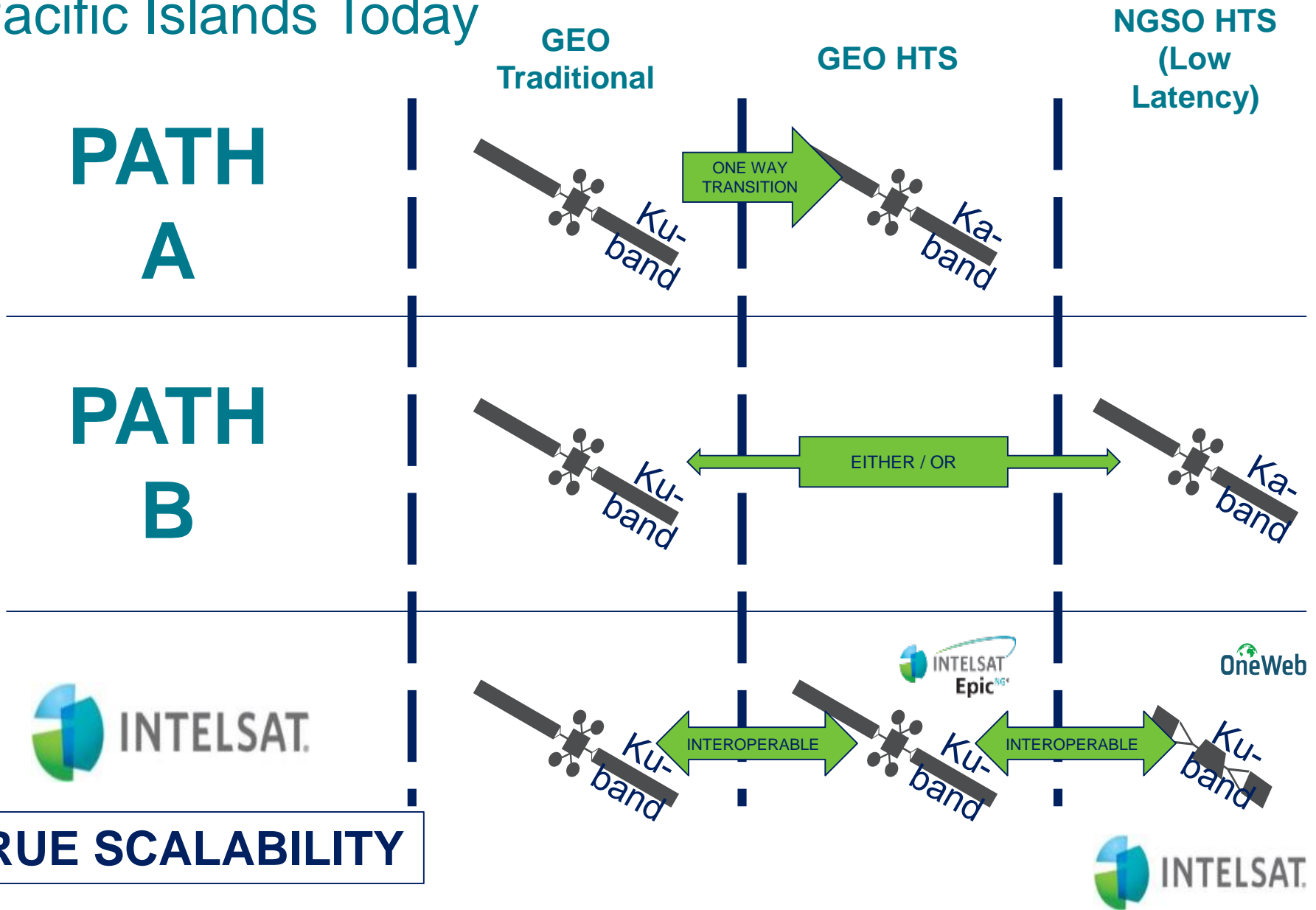
Richard Branson

- Virgin Galactic
  - Re-usable
  - Space tourist
- OneWeb
  - LEO satellite constellation

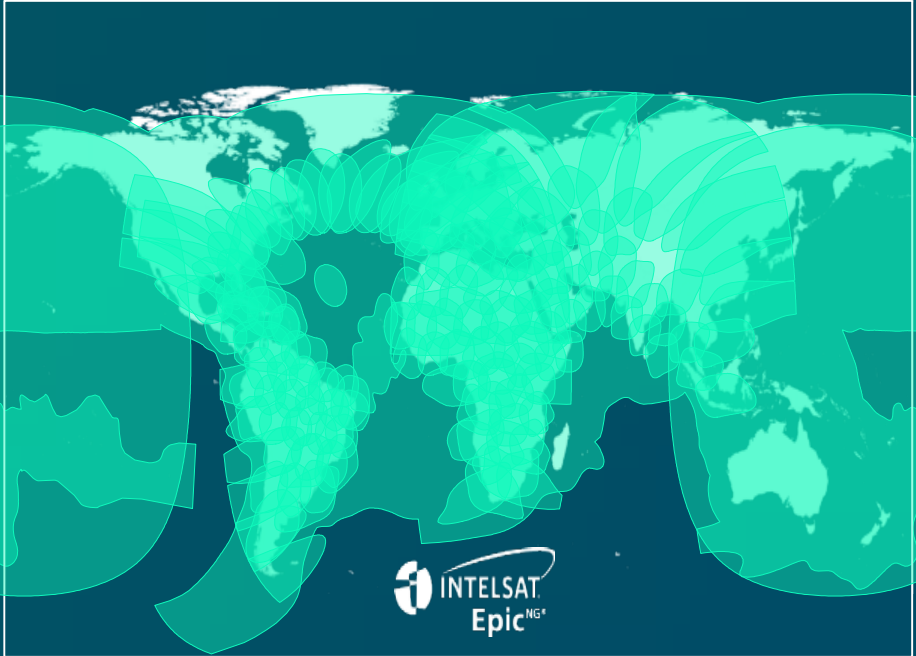
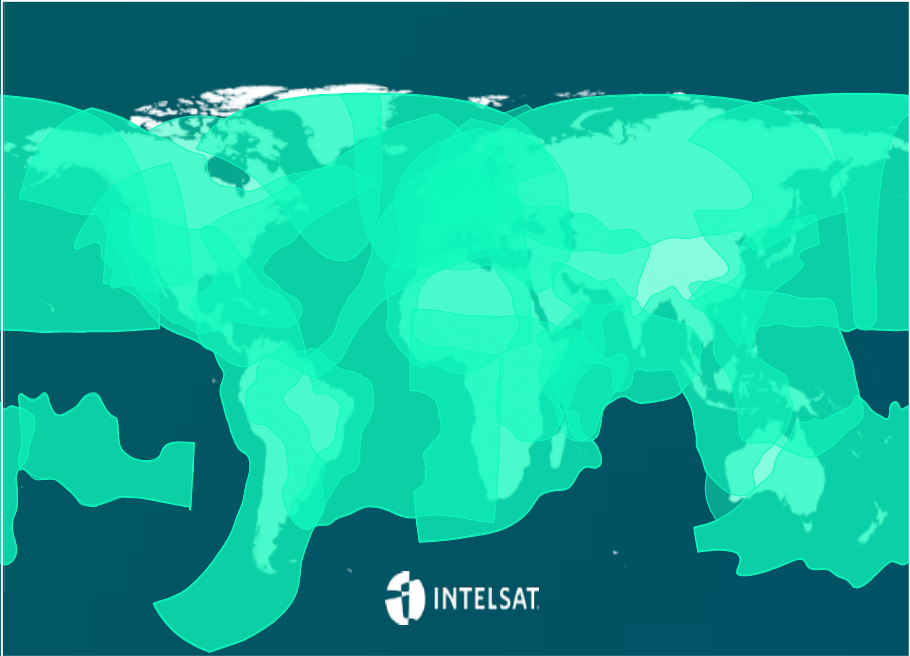
- Owns Space company BLUE ORIGIN
- Launched and landed rocket vertically for second time
- Great Inversion



# Different Paths to High Throughput Satellites in the Pacific Islands Today



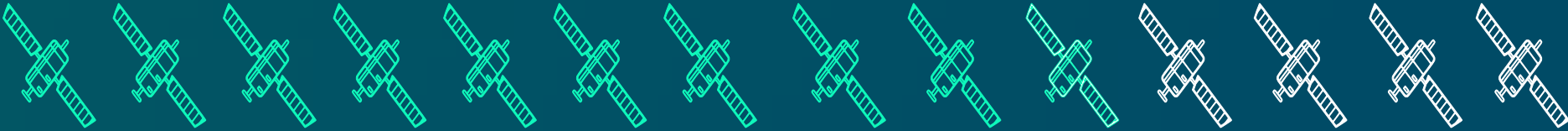
# Building a Global Ku-band Network



Up through 2015

2016-2017

2018 onwards



IS-14 IS-18 IS-19 IS-20 IS-22 IS-21 IS-34 IS-29e IS-33e IS-32e IS-35e IS-37e H-3e EpicN Class

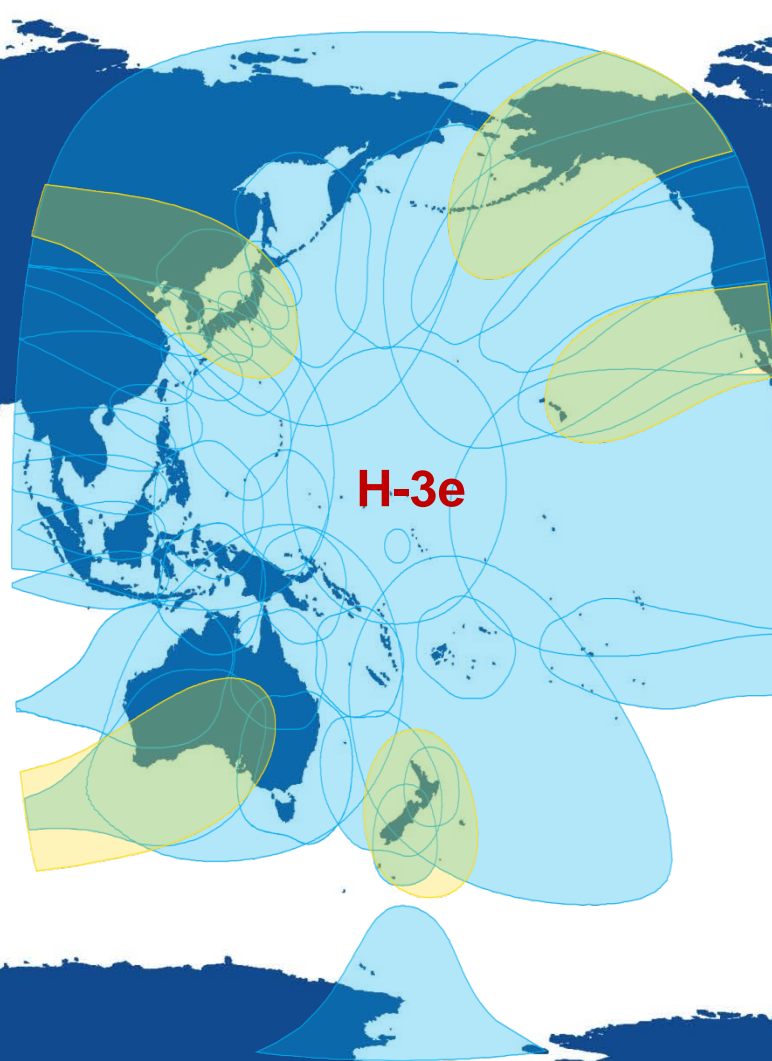
# Horizons 3e Coverage: Oceania



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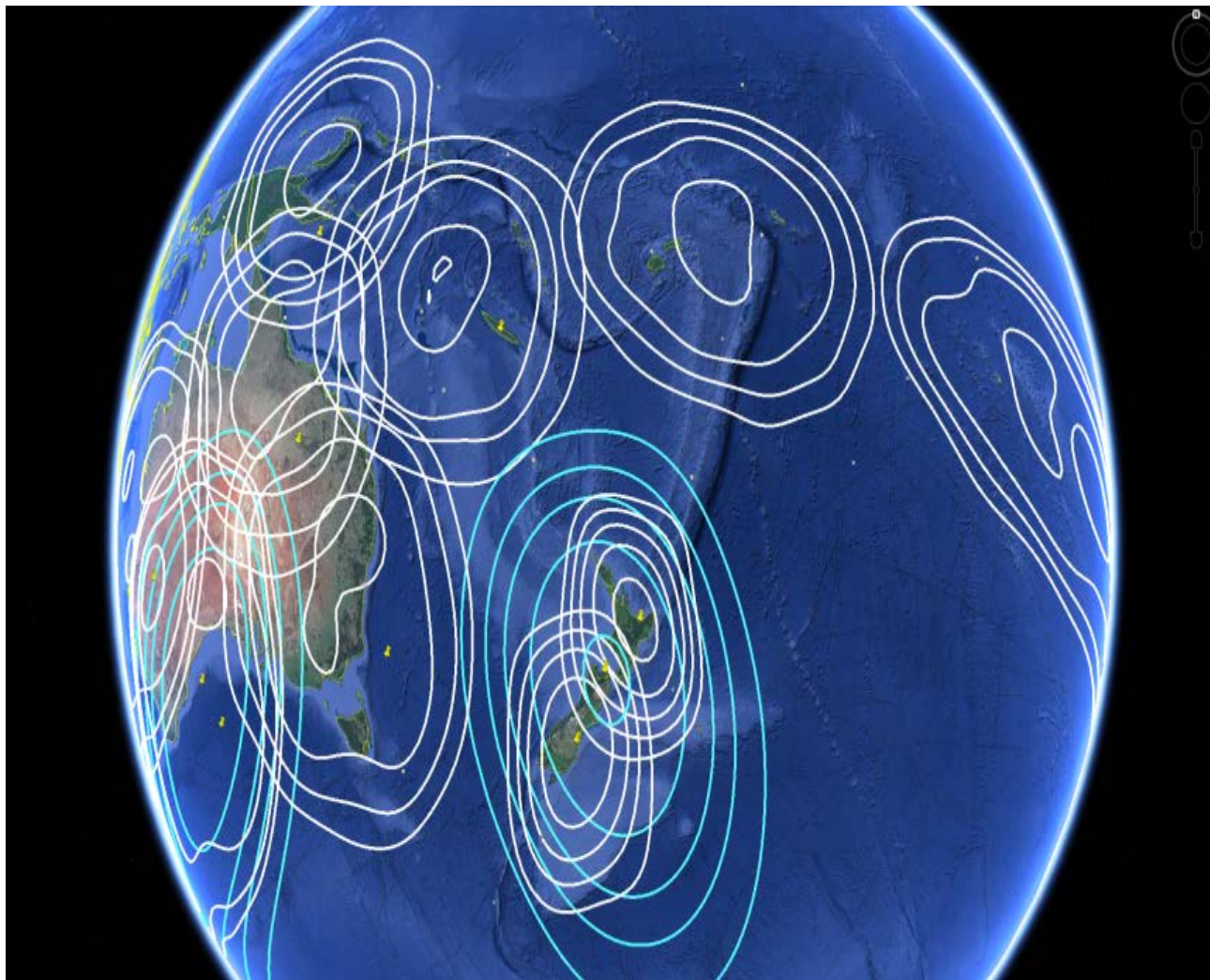
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# Horizons 3e at 169°E





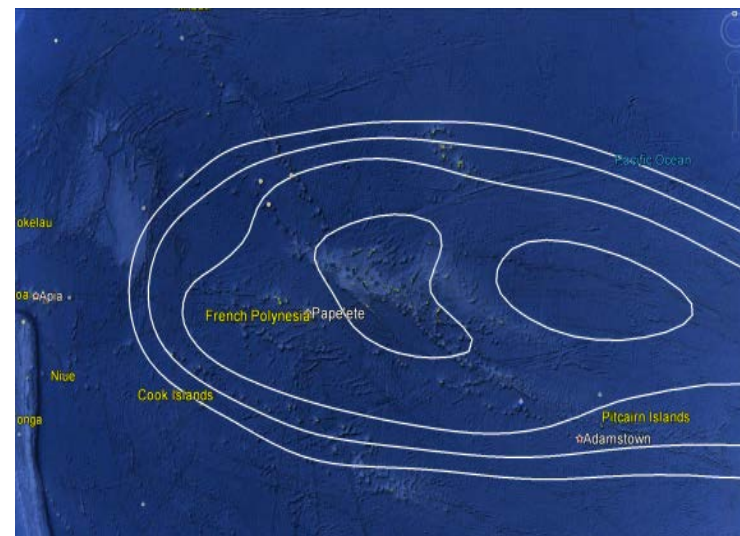
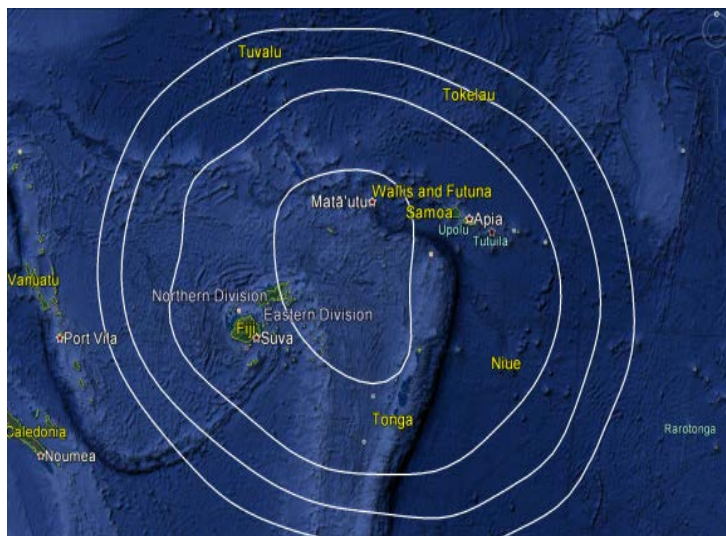
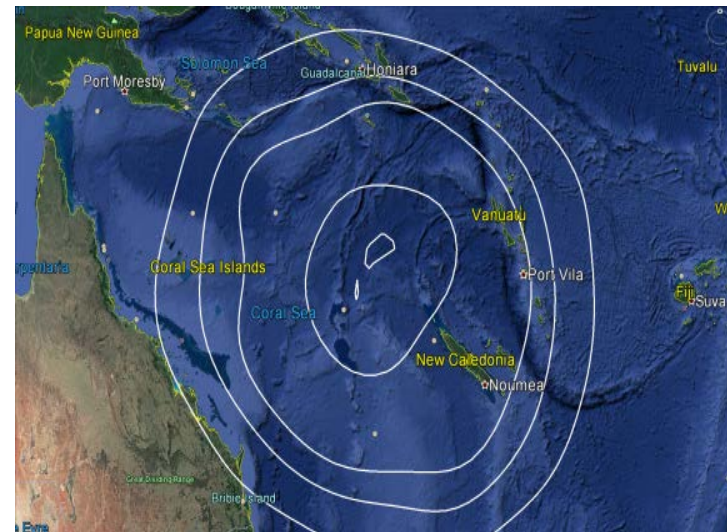
# Oceania C-band & Ku-band Coverage



Blue – C-band  
White – Ku-band

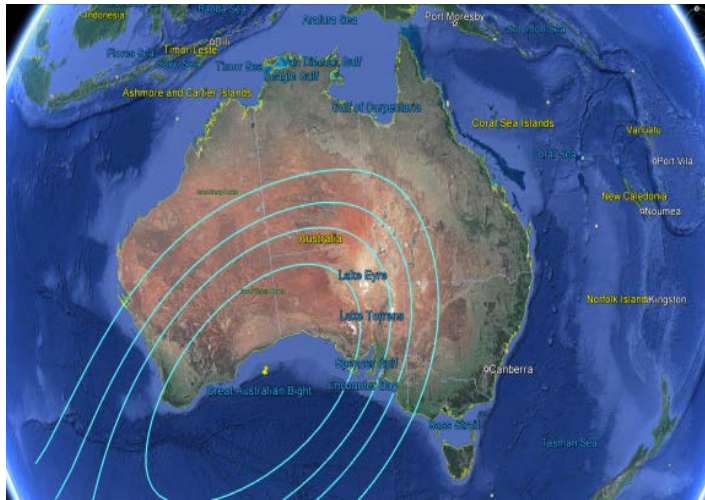
*Note: These are indicative coverage. Precise coverage maps will be provided when the satellite design is completed.*

# Pacific Island Ku-band Spot Beam Coverage

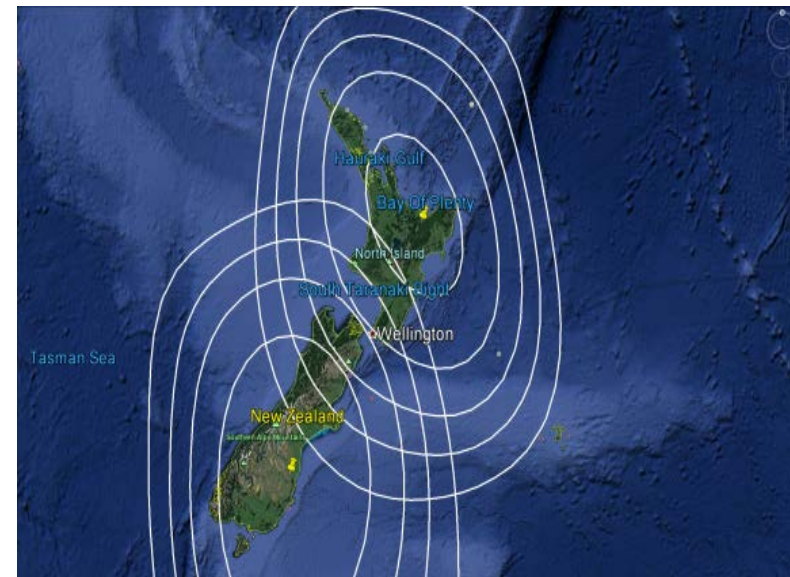
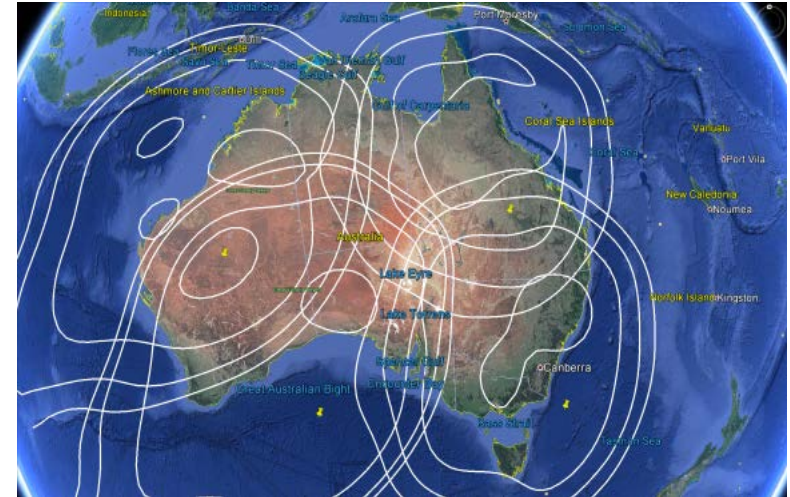


# Australia & NZ C-band & Ku-band Coverage

## C-band



## Ku-band



# Horizons 3e

## Overview of the Satellite

- Joint satellite of Intelsat and JSAT
- Orbital Location: 169° E
- Satellite type: Boeing 702MP with Epic<sup>NG</sup> high throughput design
- Launch: 2nd half 2018
- In-service: Q3 2019
- Completes the global coverage of the Epic<sup>NG</sup> fleet in Asia Pacific region

## Mission of the Satellite

- Payload: optimized C-band and high throughput Ku-band capacity
- Target region: Asia & Pacific
- Applications:
  - Maritime and Aeronautical
  - Government
  - Cellular Backhaul
  - Consumer Broadband
  - Enterprise Networks

# Horizons 3e: The Epic<sup>NG</sup> Advantage



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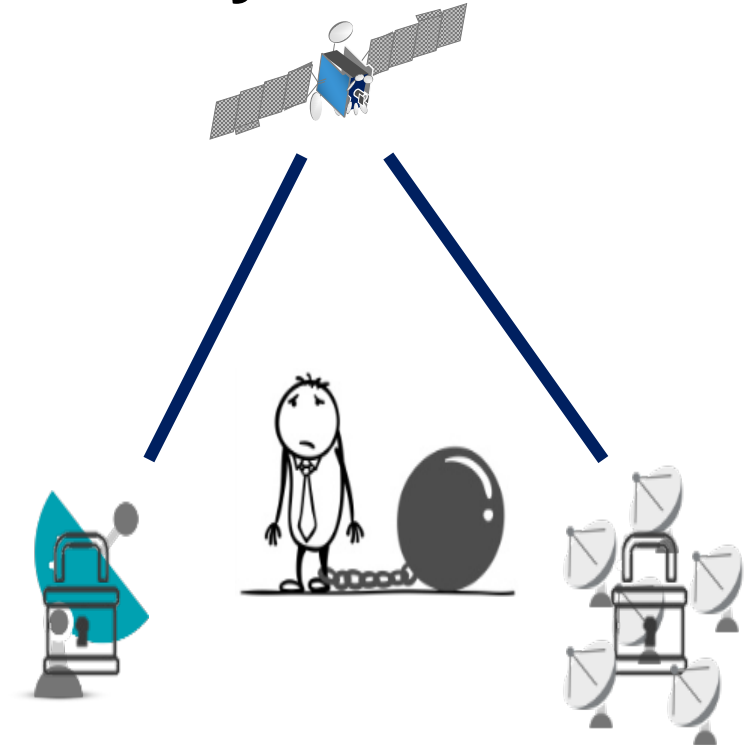
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- Backward compatibility with existing equipment
- Freedom to choose your own ground technology

## Epic<sup>NG</sup> Ecosystem Partners

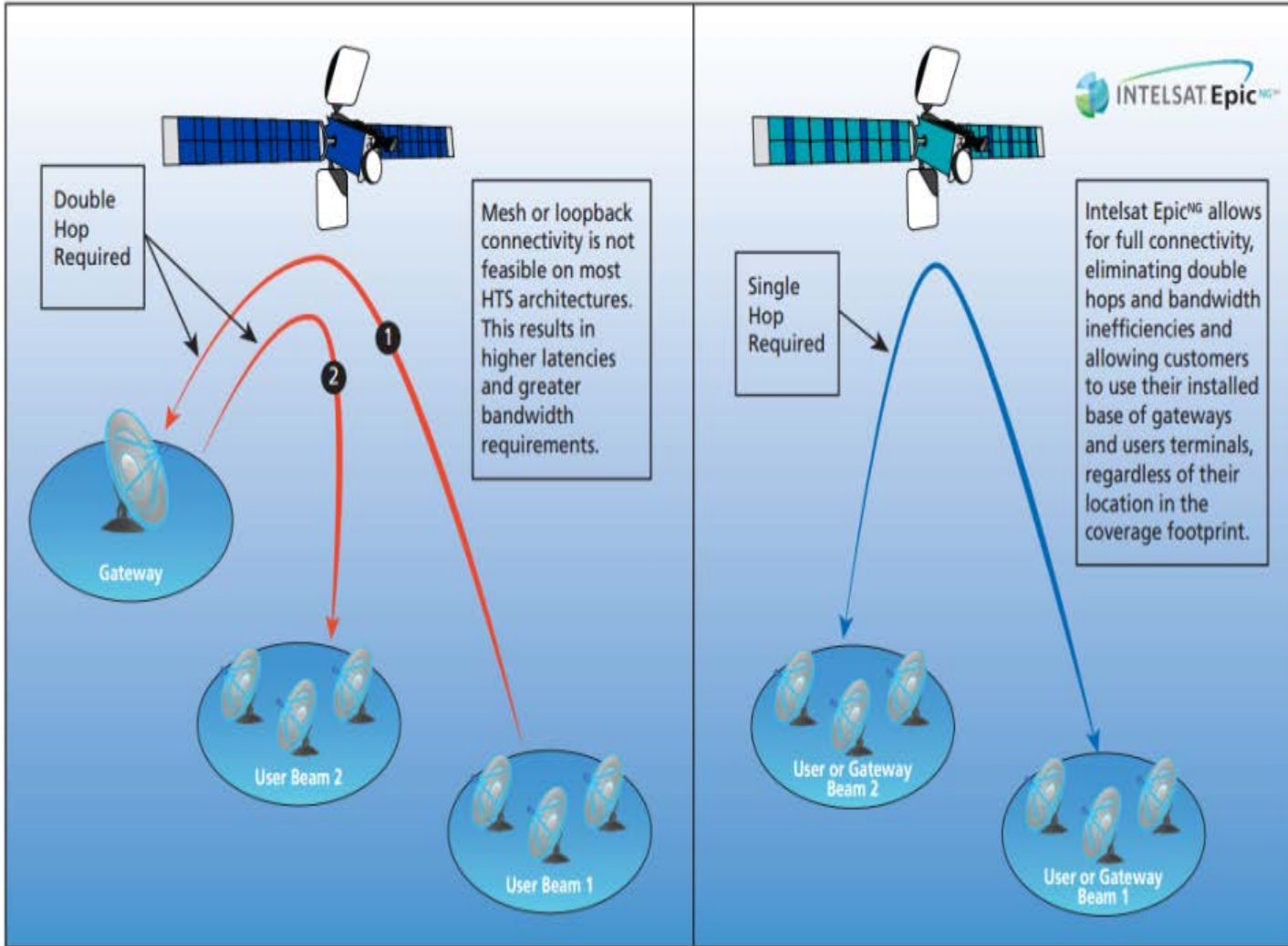


## Other HTS Systems



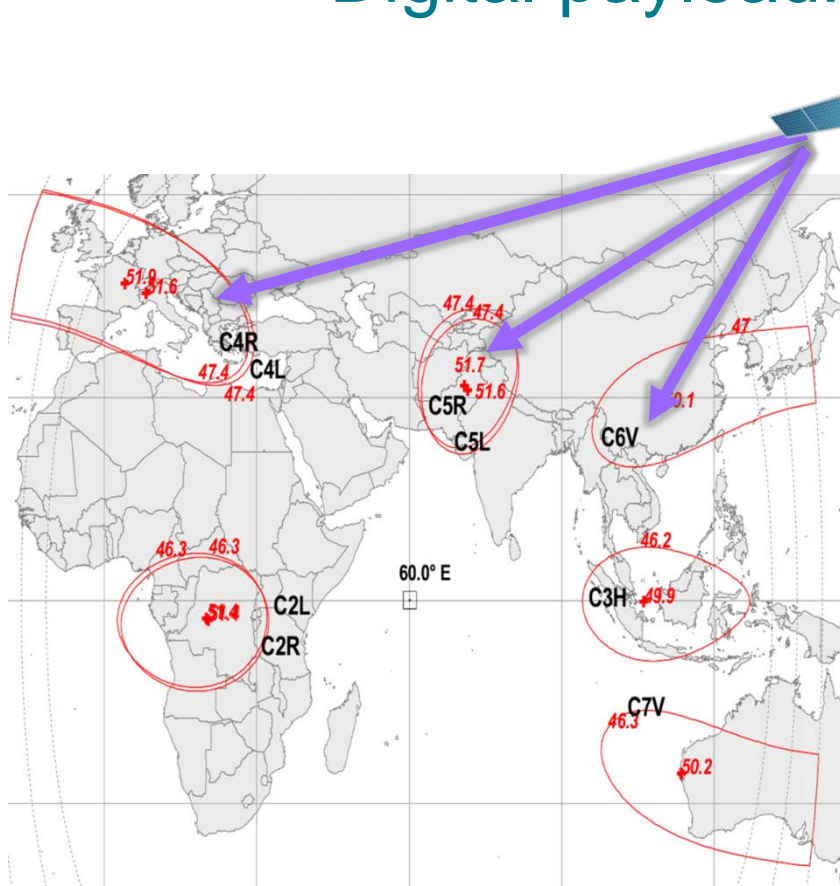
Customer is locked into a closed and proprietary architecture

# Flexible Connectivity

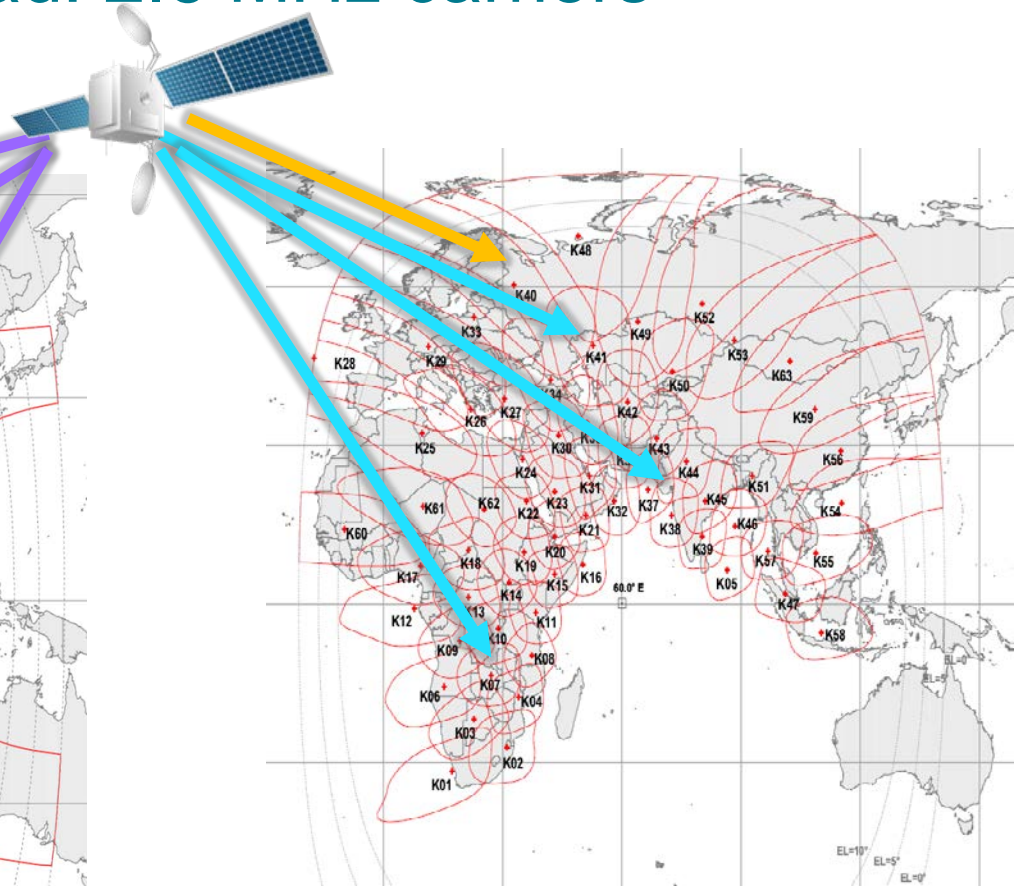


# Intelsat Epic<sup>NG</sup> Flexibility – Any Beam to Any Beam Connectivity

## Digital payload: 2.6 MHz carriers



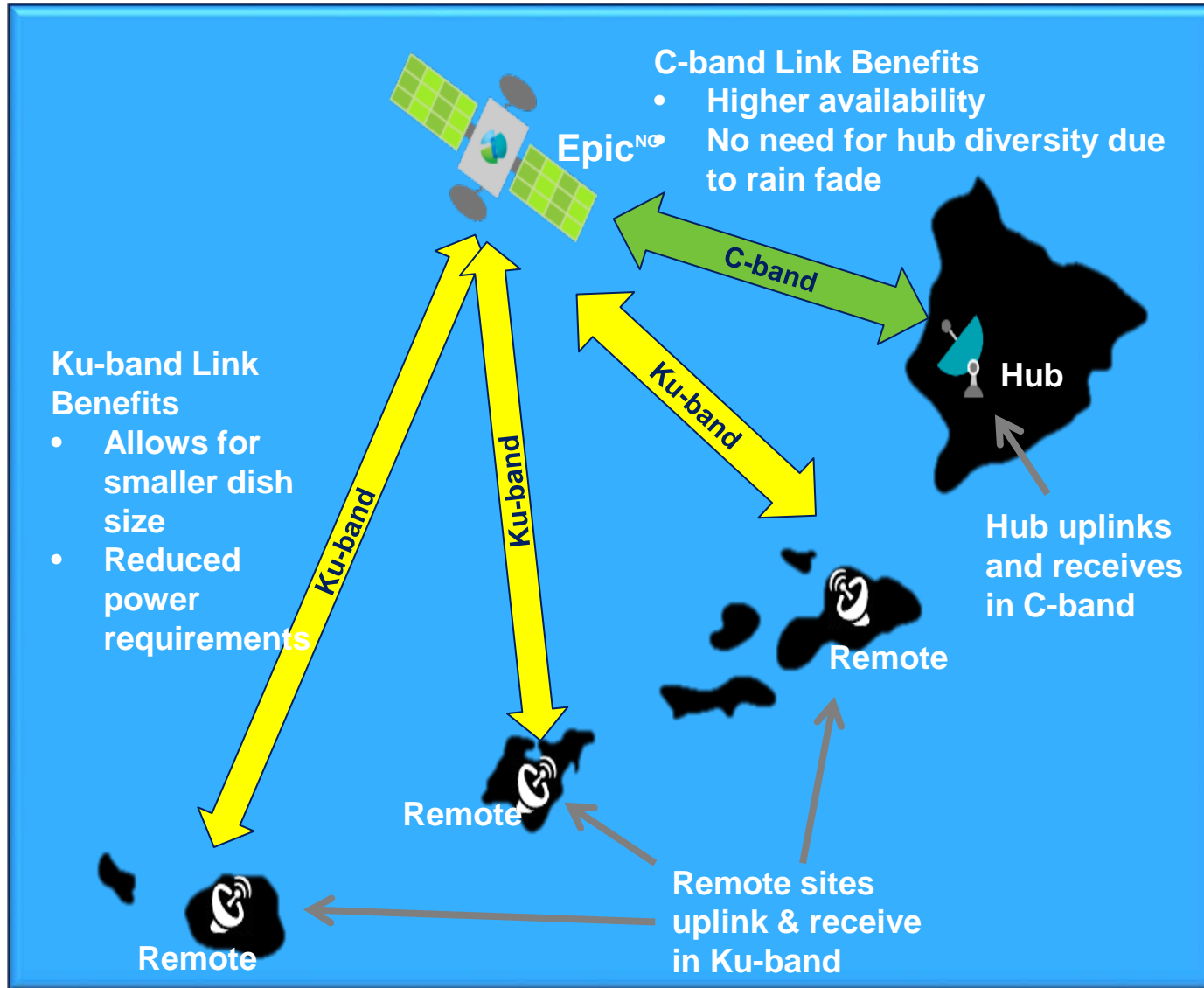
IS-33e C-band



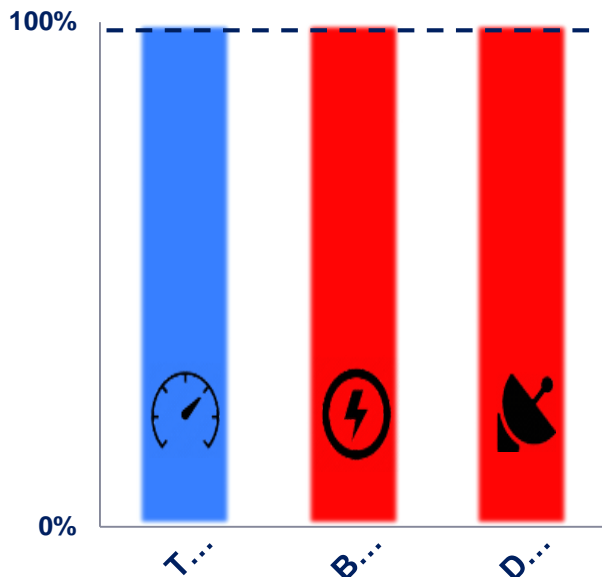
IS-33e Ku-band



# H-3e - Hybrid C-band and Ku-band Network over Select Areas



# Traditional Satellite: At the Remote Site Today



Assume throughput at 100% for a given BUC size and antenna size



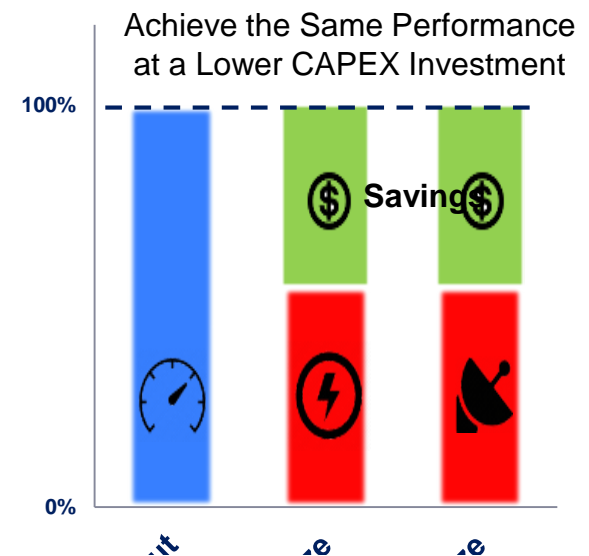
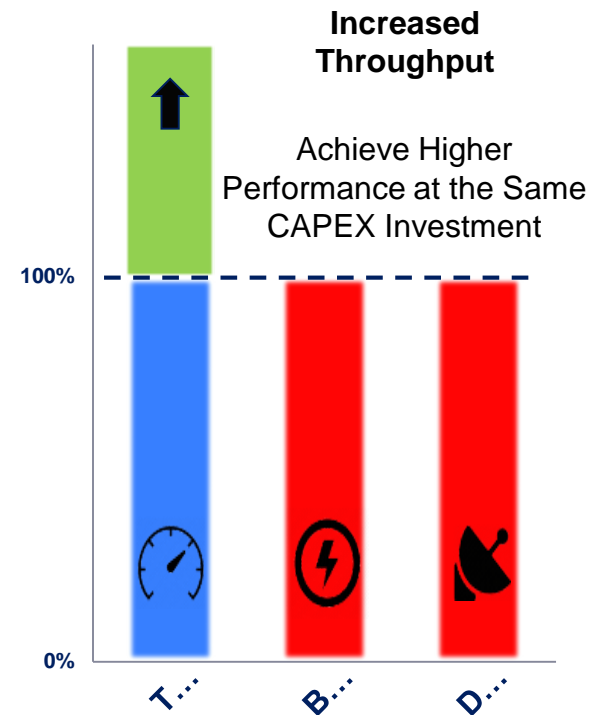
## Better Performance

Get more from your existing network at no additional investment

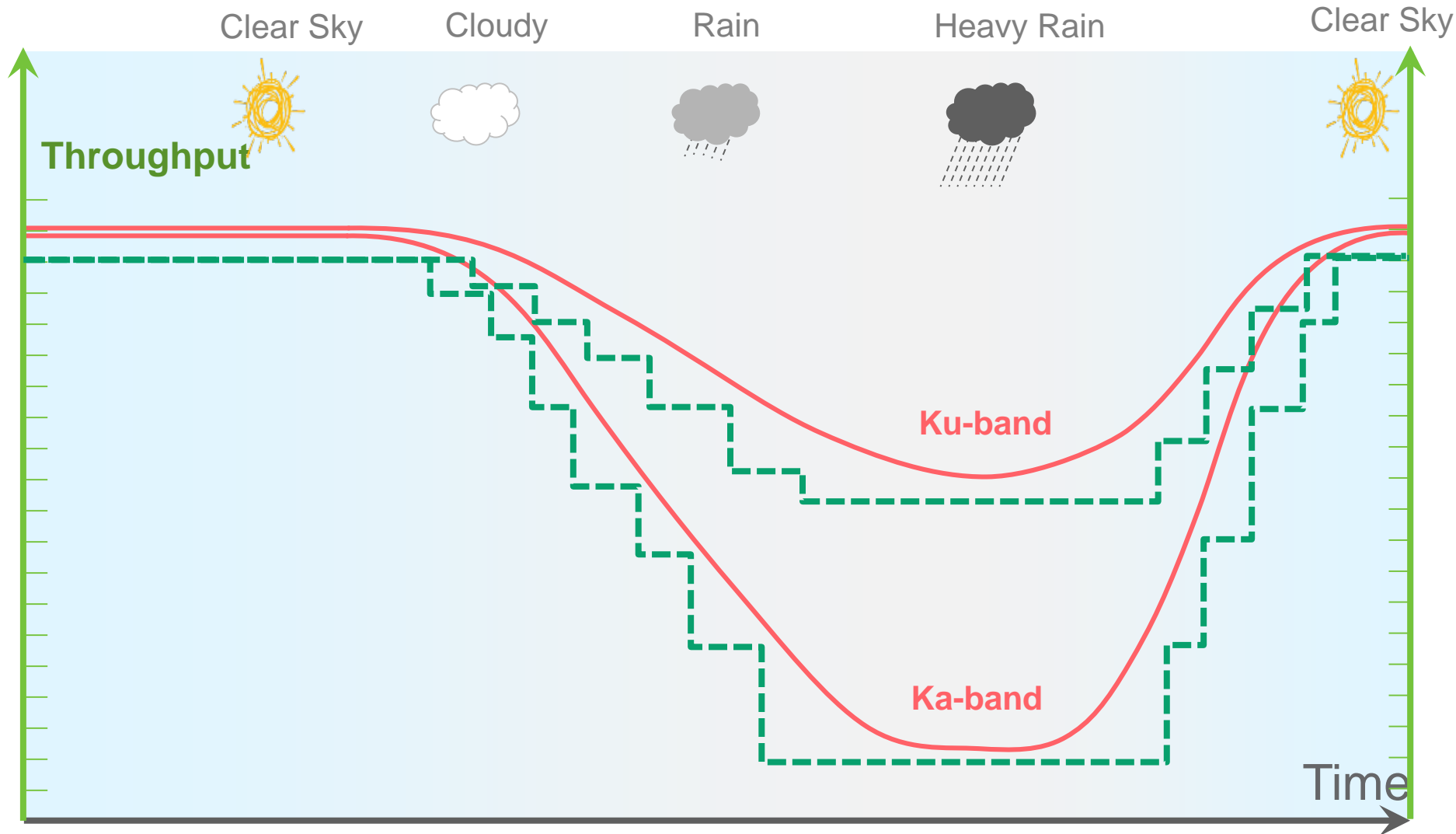
## Lower Costs

Expand your network at a lower cost

Sites previously restricted due to dish size now possible



# Signal Attenuation at Different Frequency Bands with Adaptive Coding Modulation (ACM)



# Intelsat IS-29e Epic<sup>NG</sup> Test Results

| Current Hardware  | Antenna Sizes | Epic <sup>NG</sup> Efficiency (bits/Hz) |
|-------------------|---------------|---|
| Comtech CDM625    | 2.4m          | Up to 2.5                               |
| Comtech AdVSAT    | 1.0m – 2.4m   | Up to 2.5                               |
| iDirect Evolution | 0.83m – 3.8m  | Up to 2.5                               |



**165% increase**

Customers are seeing **increased link margins, increased spectral efficiency and/or higher Mbps throughput** compared to traditional wide beam satellites

| Next Gen Modems         | Antenna Sizes | Epic <sup>NG</sup> Efficiency (bits/Hz) |
|-------------------------|---------------|---|
| Newtec DVB-S2X, 256APSK | 1.2m-3.8m     | Up to 5.0                               |



**330% increase**

Our vendor ecosystem collaboration enables customers to fully leverage the capabilities of Epic<sup>NG</sup> satellites and further capitalize on the high performance and flexibility of Epic<sup>NG</sup>



# Intelsat – OneWeb Alliance



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*First and only fully global, pole-to-pole high throughput satellite system*

- › The OneWeb satellite constellation
- › 650 satellites (Constellation – 18 planes of 36 satellites)
- › Low latency (<30ms round trip delay)
- › Look angles > 57°

**Total Throughput of the system:**

**5 terabits per second**



## DESIGN PHASE

### LEO HTS

- › Pole-to-pole coverage
- › Small terminals, low latency

### HTS 2.0

- › Software defined payloads with flexible coverage, power and connectivity

- › 4 HTS satellites already contracted
- › OneWeb investment phase



## LAUNCH PHASE

### HTS 1.0

High Throughput Satellites

- › HTS spots positioned in high traffic areas
- › Complementing first layer not replacing it
- › Provides depth of coverage

- › 3 HTS satellites launched
- › 2 upcoming



## COMPLETED

### WIDEBEAM SATELLITES

- › Uniform quasi global coverage
- › Base layer of the network
- › Provides breadth of coverage

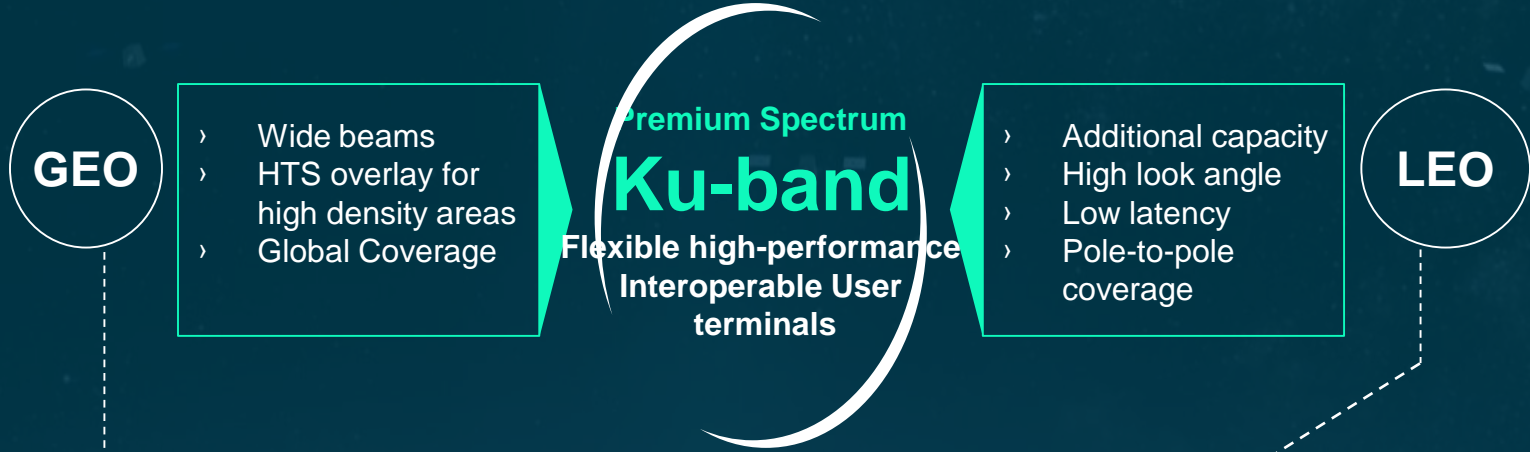
- › 50 satellites
- › 7 wide beam mobility satellites
- › 100% complete



Up through 2015

2016-2017

2018 onwards





# Designed with Interoperability in Mind

## Interoperability triggered by:

Remote situation: shifting to the stronger signal based on geographic location or remote attitude

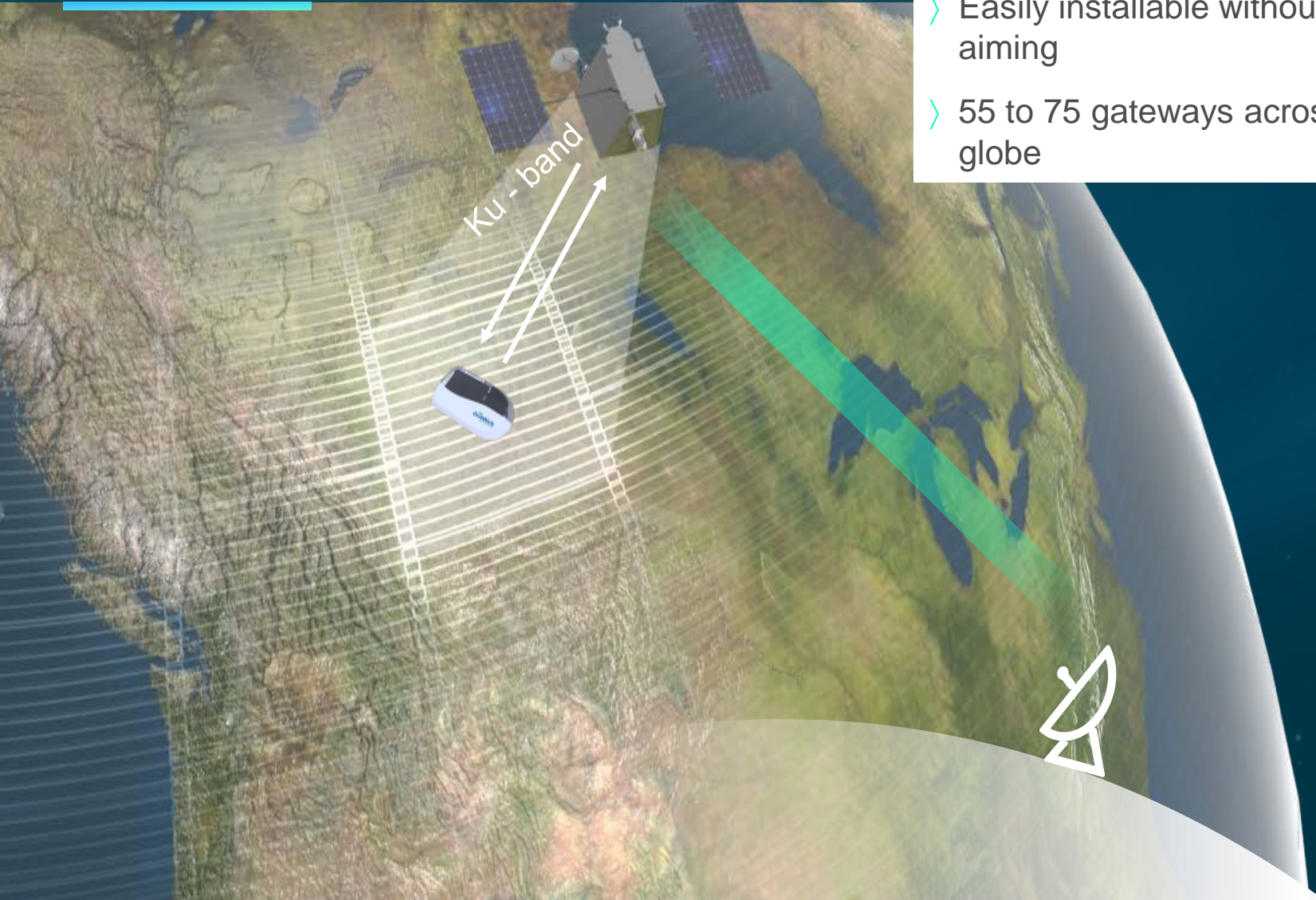
Capacity availability: shifting depending on local capacity availability

Application-based: ability to route IP traffic depending on application



# OneWeb System: Ground

- › Affordable, compact, interoperable access terminals
- › Easily installable without position aiming
- › 55 to 75 gateways across the globe



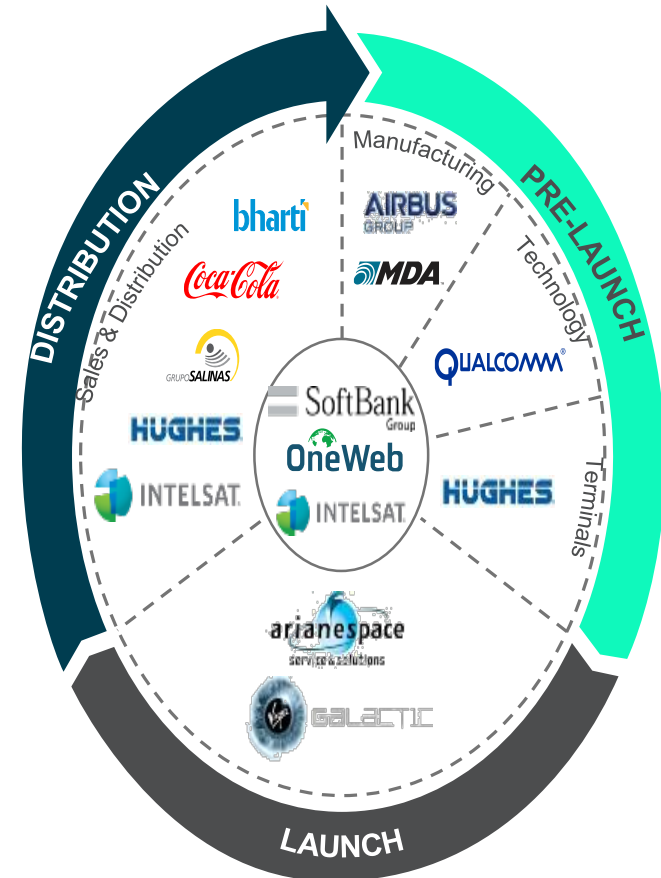
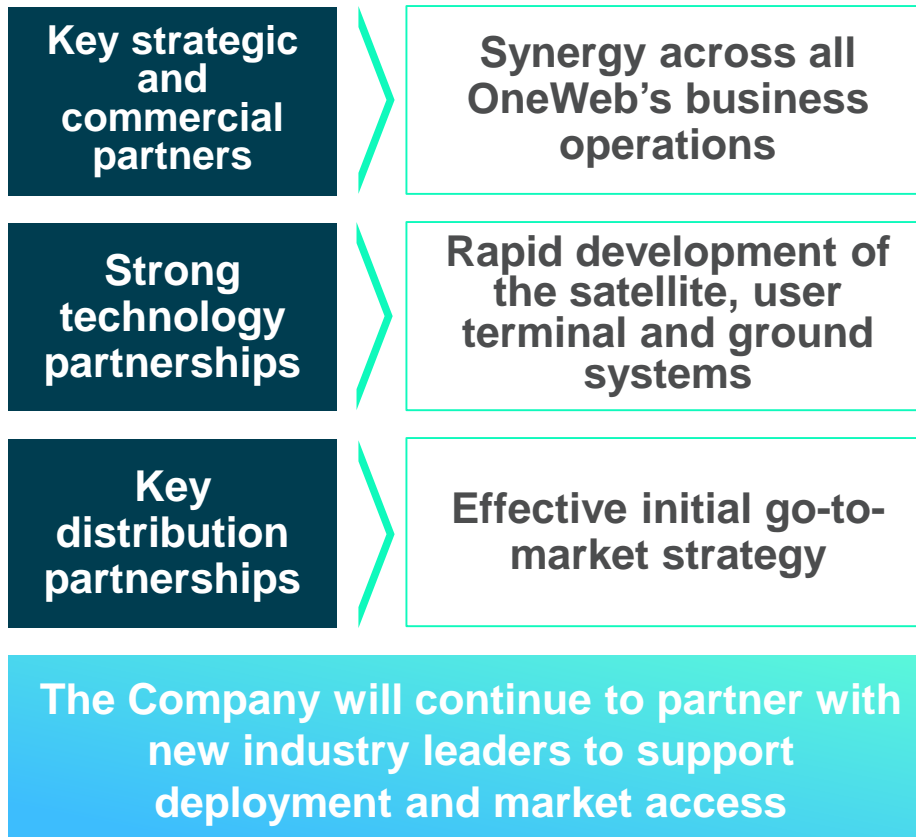
# Intelsat – EcoSystem



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# Well-Established Partnership Ecosystem Fostering Innovation



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**Electronically Steered  
Antennas (ESA)**

**No moving parts**

**Ultrathin and light**



**PHASOR  
SOLUTIONS**

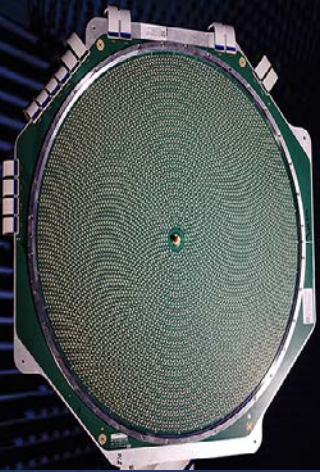
**KYMETA™**



- > Active phased array
- > Modules can conform and be shaped to a curved surface

- > Metamaterial
- > Passive array

# Intelsat and Kymeta Changing how satellites are accessed



KYMETA®

CURRENT

KYMETA NEWS

UPCOM

## Intelsat Buys Equity Stake in Kymeta; Stephen Spengler Joins Antenna Manufacturer's Board

Anna Forrester March 8, 2017 M&A Activity, News 112 Views



[Intelsat](#) has purchased an equity stake in satellite communications antenna manufacturer [Kymeta](#) following joint efforts to develop the *Kalo* satellite services and *mTenna* antenna technology.

The satellite operator [said Tuesday](#) the transaction comes with the appointment of Intelsat CEO Stephen Spengler into Kymeta's board of directors.

"The demand for fast, reliable broadband connectivity requires innovation in-orbit and across the entire satellite ecosystem to unlock new growth opportunities," said Spengler.



[BACK TO KYMETA NEWS](#)

## Kymeta and Intelsat Announce KĀLO™, a New Service to Revolutionize How Satellite Services Are Purchased

Kymeta's KĀLO redefines satellite connectivity with services purchased in familiar, flexible data packages combined with radical pay-for-what-you-use pricing. KĀLO to leverage Intelsat's IntelsatOne® Flex managed services platform and address the

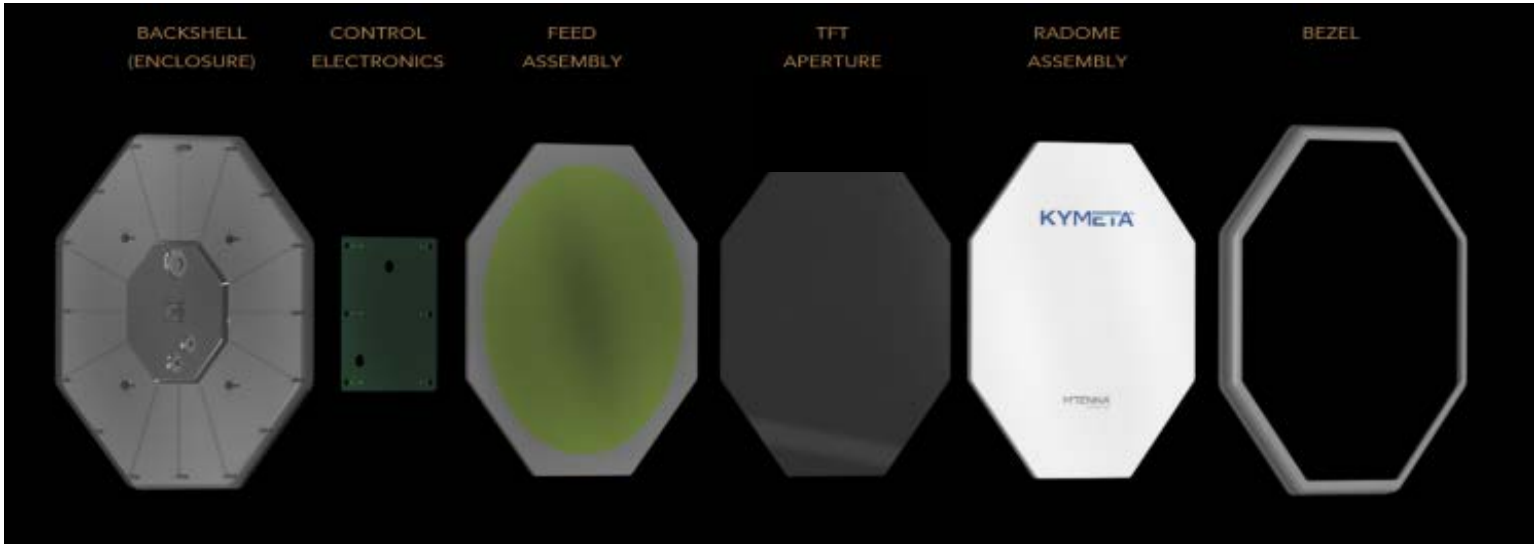


# Ground segment advancements - Kymeta

Intelsat Acquires Equity Stake in Kymeta, Announces Service for Satellite Purchases



mTenna<sup>u7</sup> – the world's first, electronically scanned satellite antenna that can be used extensively across mobile and fixed platforms will begin commercial trials in May.



Intelsat is creating an interoperable network relying on the core wireless standard 3GPP to seamlessly integrate with future networks such as 5G.

Intelsat is working closely with players outside of the satellite industry such as QUALCOMM to integrate their chip technology into terminals.

This will transform satellite communications from last mile solution to become an integral part of the Telecommunications network.

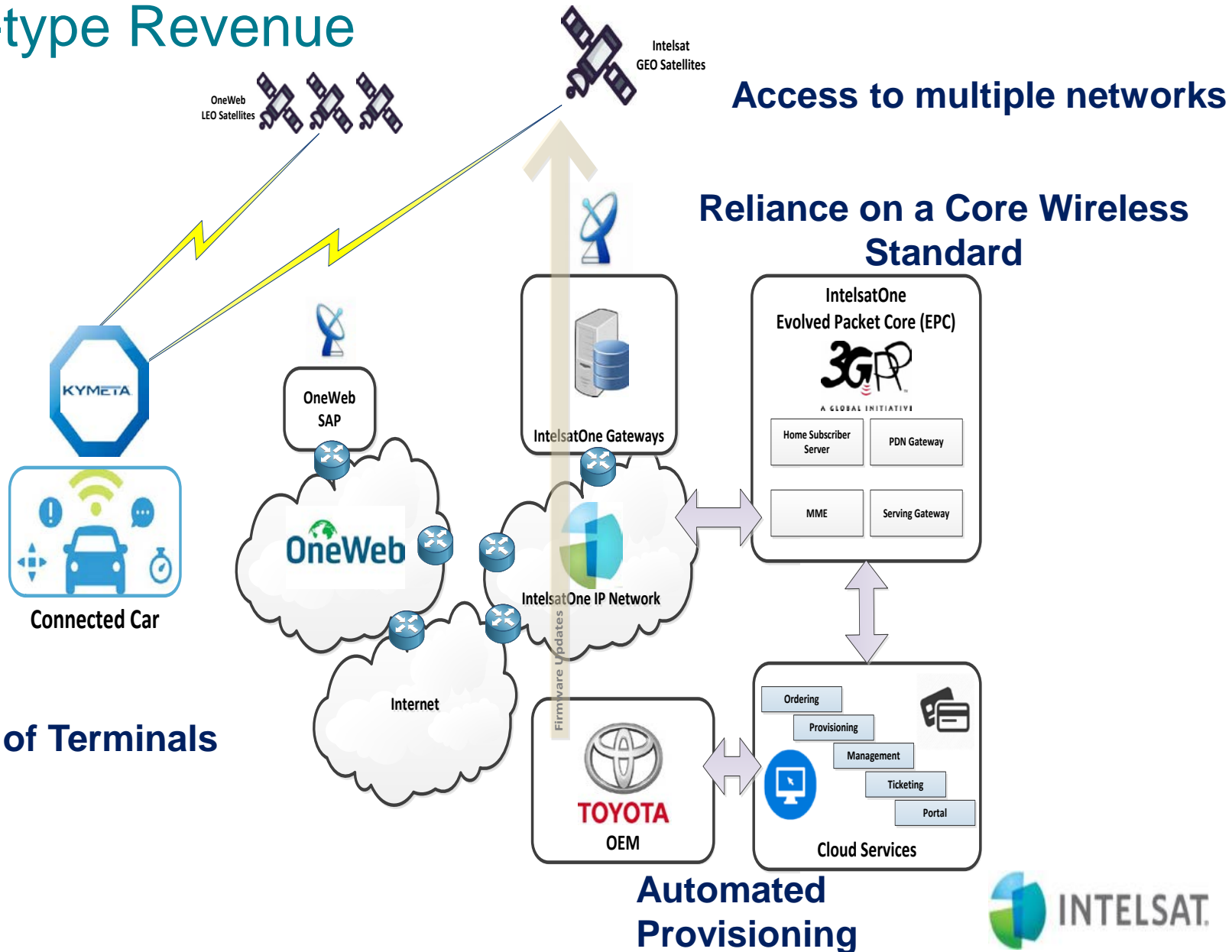


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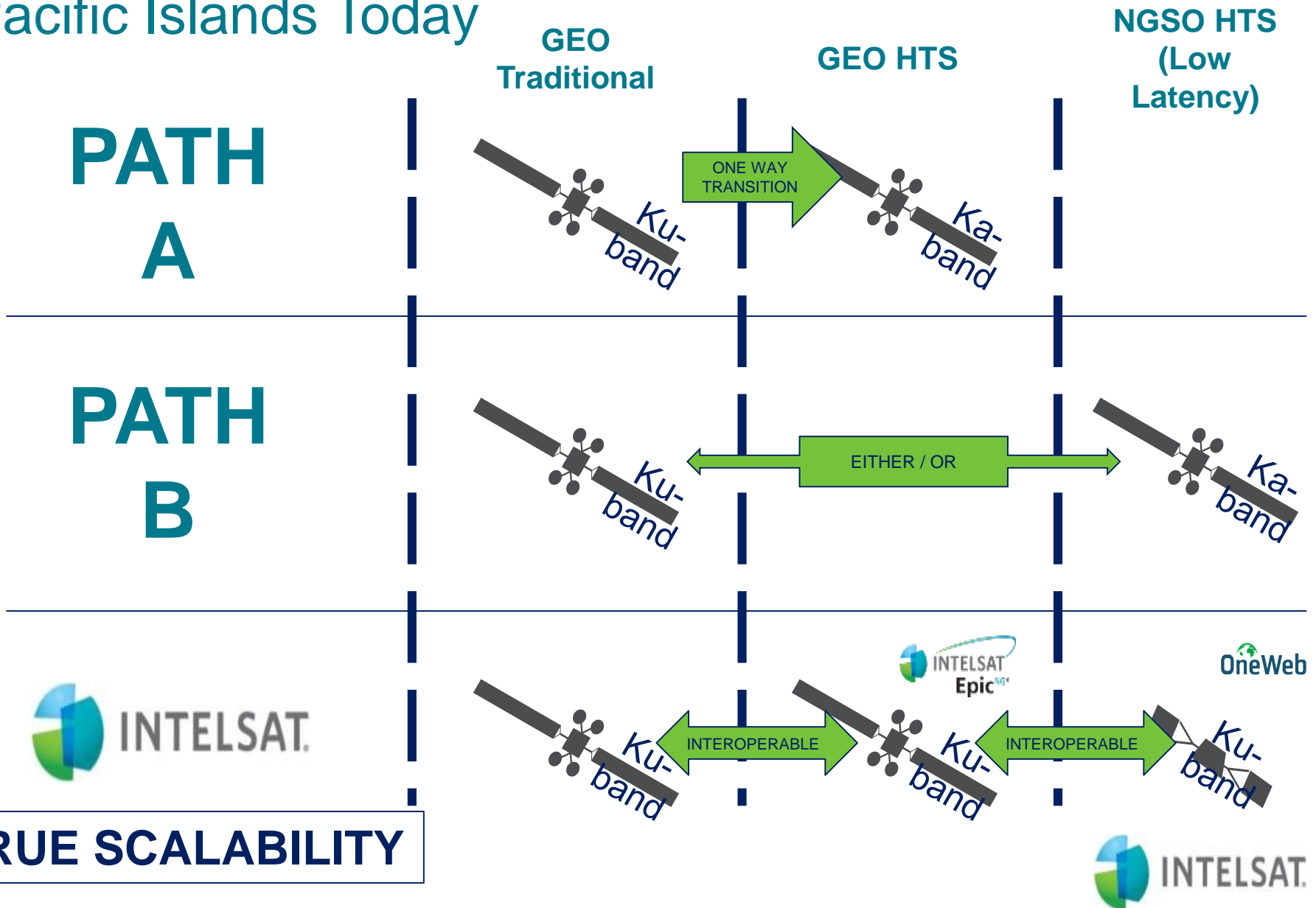
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# Our Future Architecture is Scalable and Drives Retail-type Revenue



# Different Paths to High Throughput Satellites in the Pacific Islands Today



Thank You



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