Satellite Markets And Technology Trends

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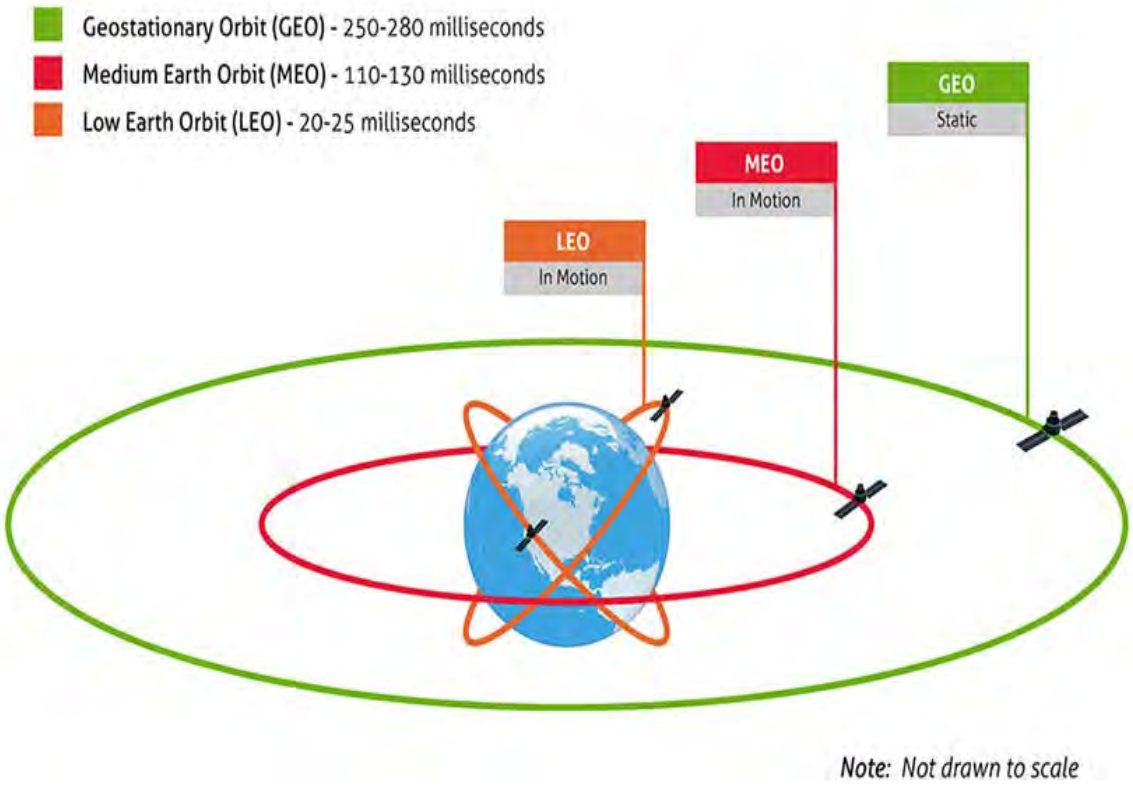
Word of Introduction

A 10-year forecast of satellite and launcher markets has good news and bad news for hardware manufacturers: There will be many more satellites to build and launch, but the average manufacturing and launch price will increase only marginally, if at all, and may even drop after accounting for inflation

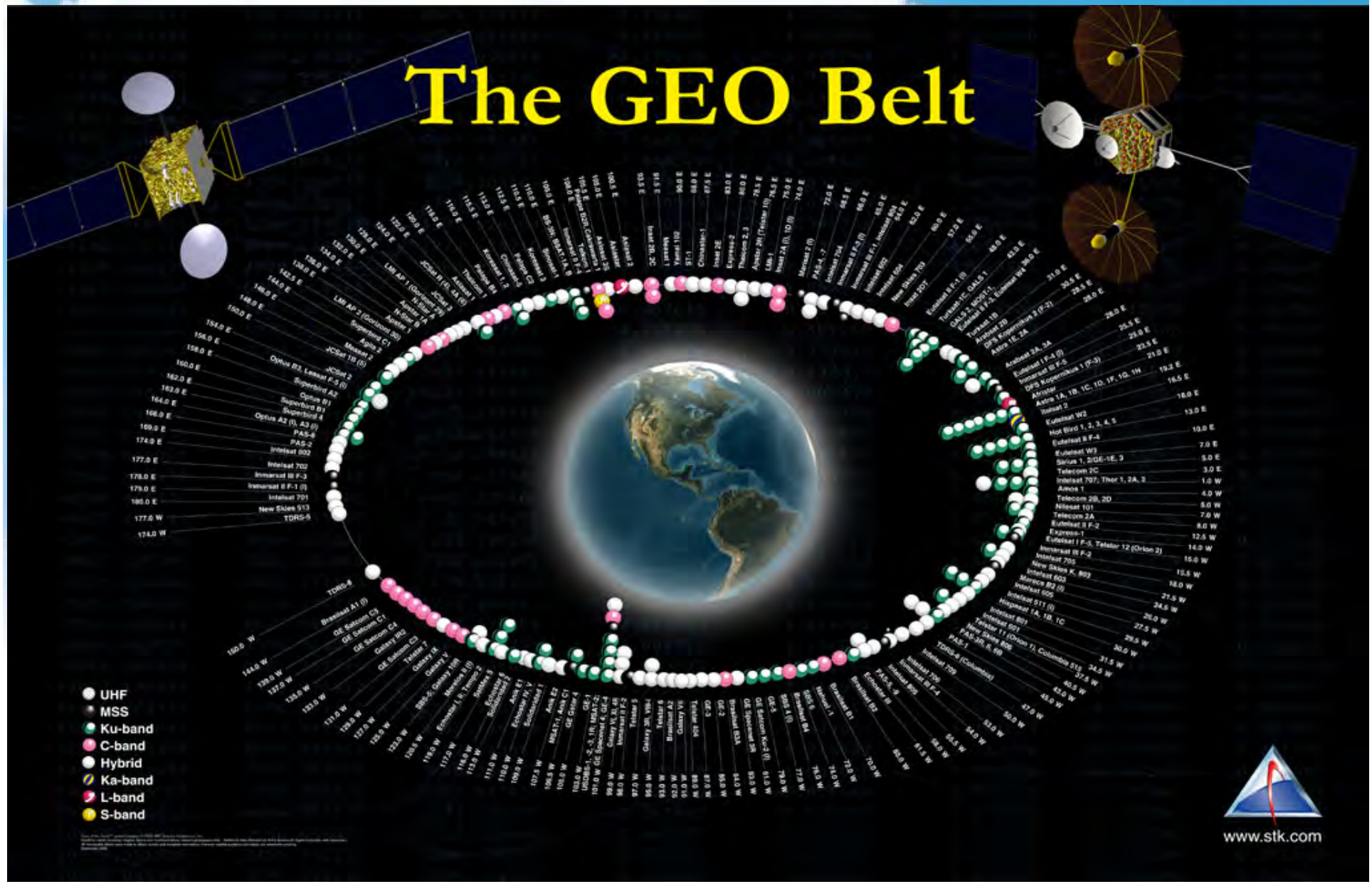
Source Euroconsult

3 Basic Orbits

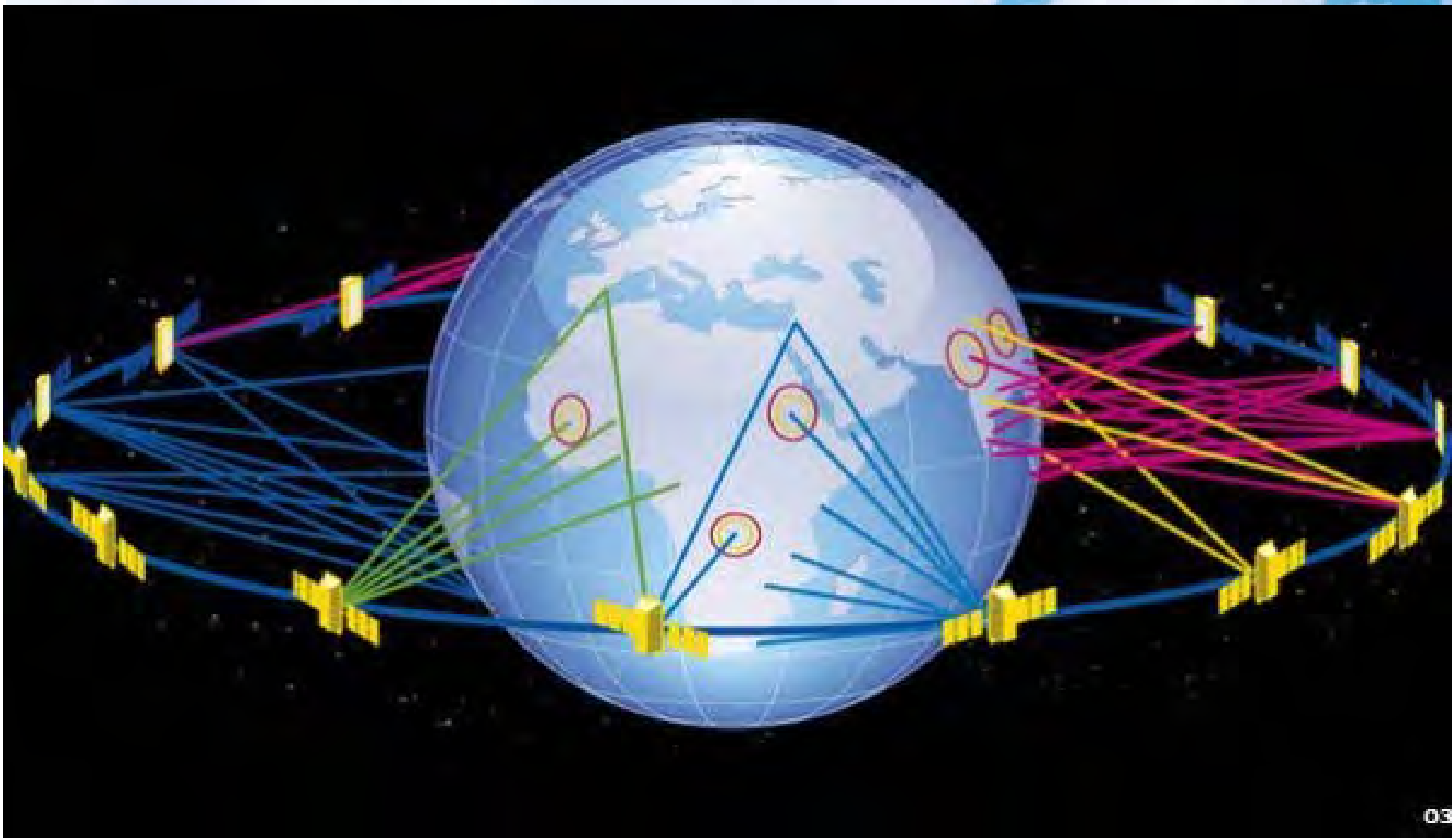
- Circular Polar Orbit
- Elliptical Inclined Orbit
- Circular Equatorial orbit (geostationary)



Geo Satellites



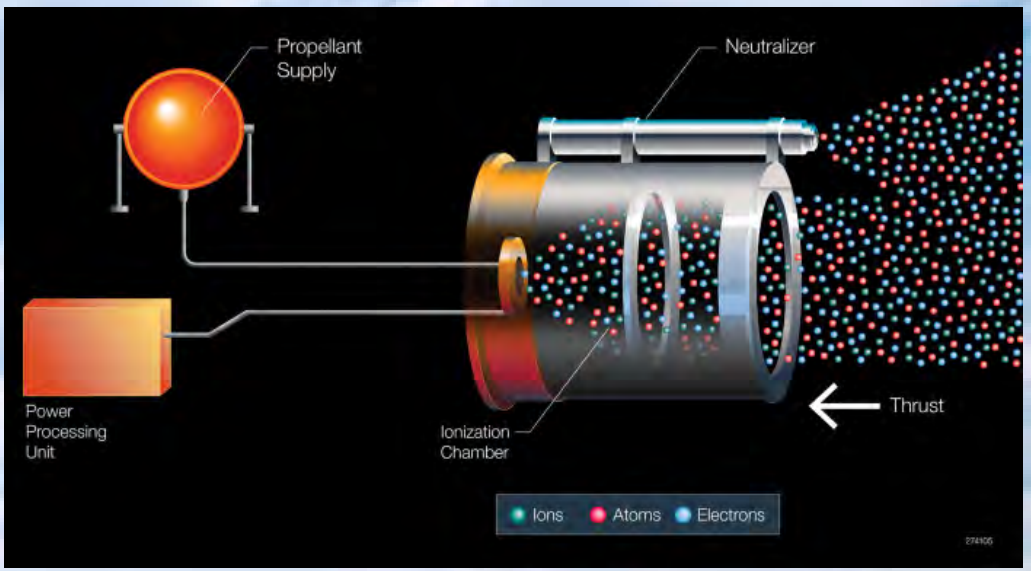
MEO Satellite (O3B)



2 Types Propulsion System

Unified Propulsion (UPS)

All Electric Propulsion



- **Light Weight Low Cost to launch**
- **Slow orbit raising, 25 year life time**

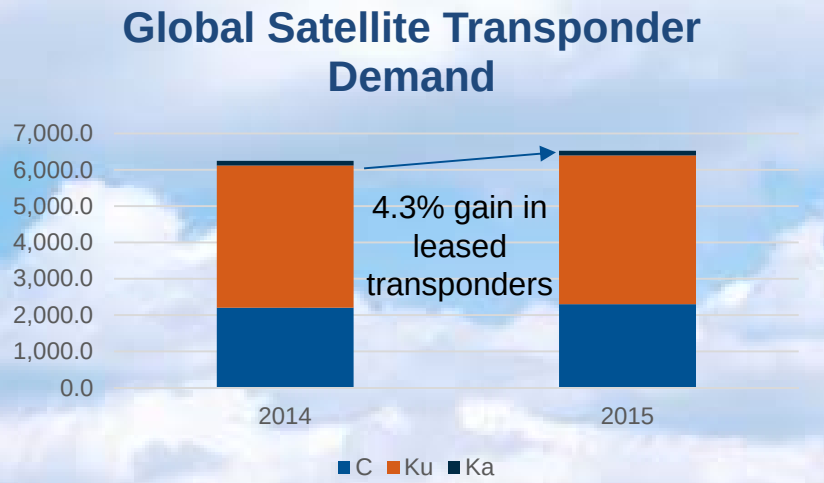
Launch Vehicles

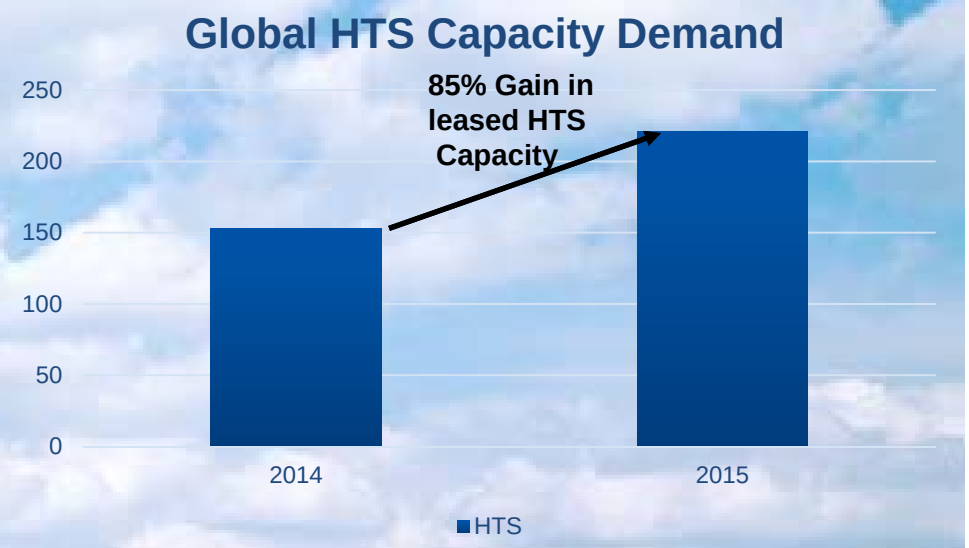
- **Expendable vehicles**
  - Ariane (Europe), Delta etc..
- **Reusable Orbital Launch Vehicle**
- Space-X, Blue Origin Etc..

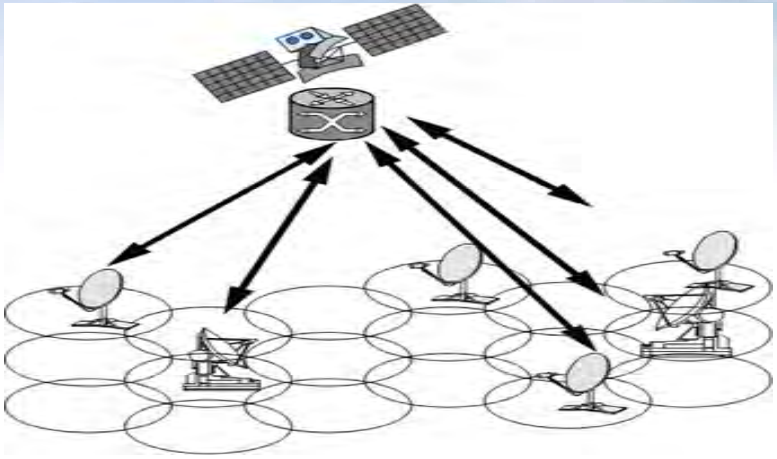
Estimated Cost	
Expandable Vehicles	Reusable Vehicle
≥ $2,000 per pound	≤$1,000 per pound

Game Changer

Global Demand for Bandwidth





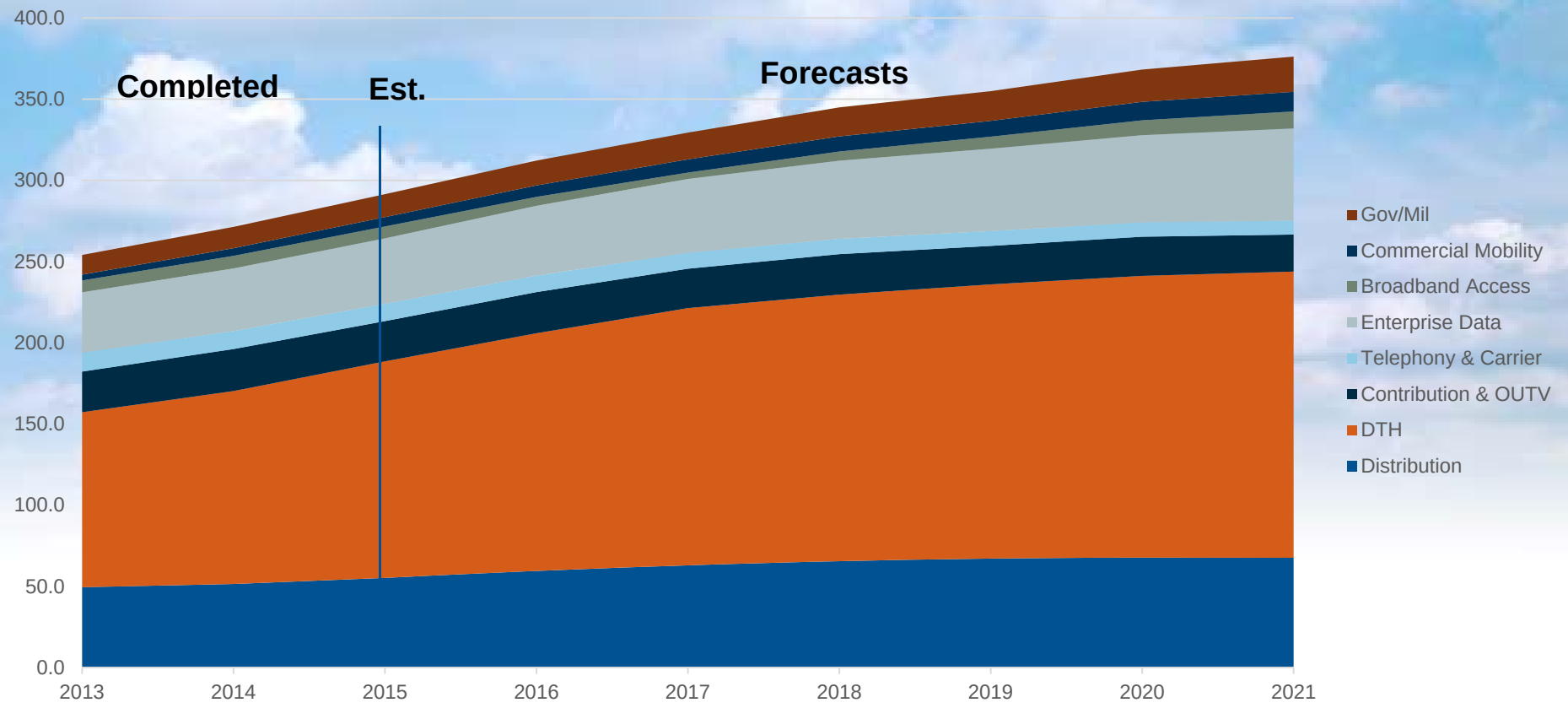


Global Satellite Market Drivers

- **Media Market**
- **Fixed and Wireless Broadband**
- **Mobility and Government**

▪*Source NSR*

Transponder Demand by Application In Asia-Pacific 20013-2021



Source APSCC

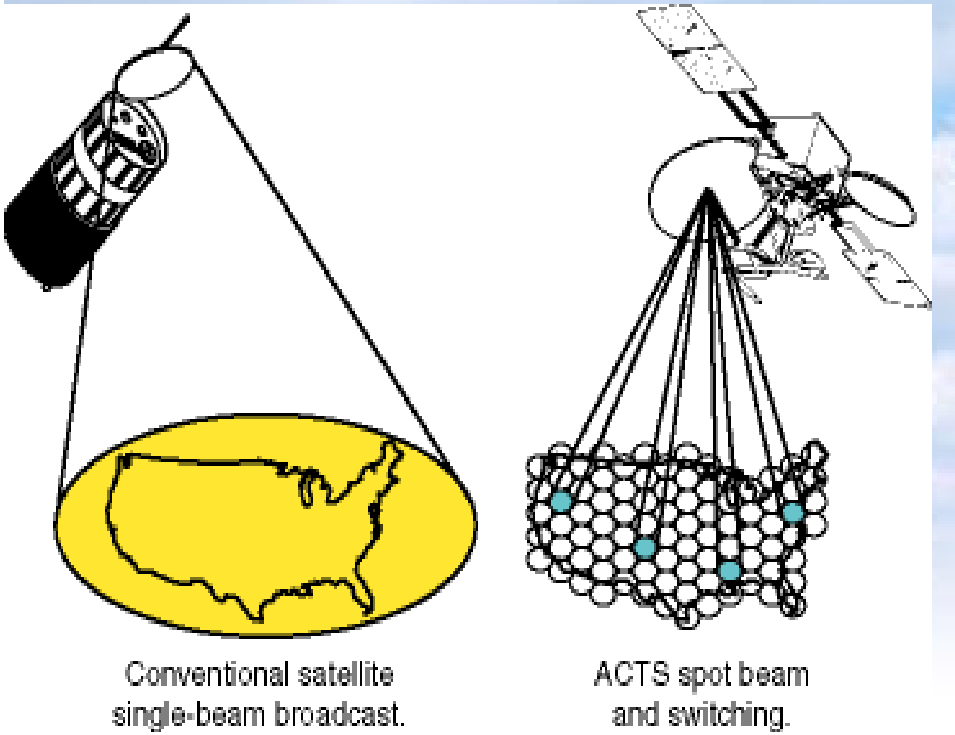
Satellite Capacity & Demand
Asia-Pacific

- The demand for bandwidth is insatiable
- Asia-Pacific is the 2nd largest market for satellite capacity usage
- Telecommunications-related applications utilize >50% of satellite capacity

Source ASCC

Approach on efficient beam power

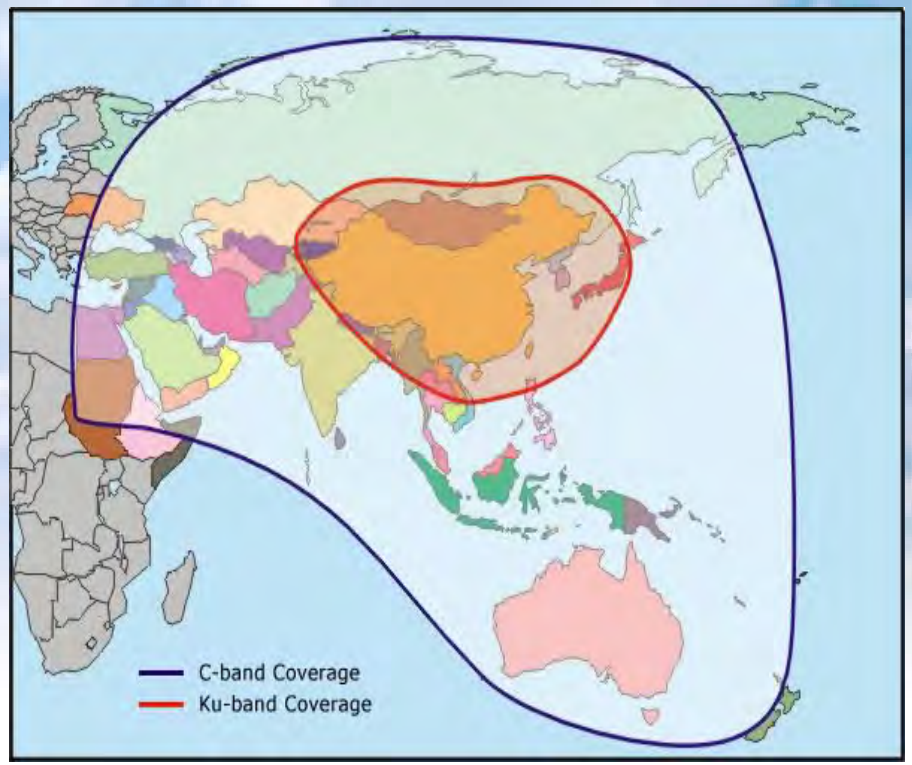
Standard Beam Coverage



Conventional satellite single-beam broadcast.

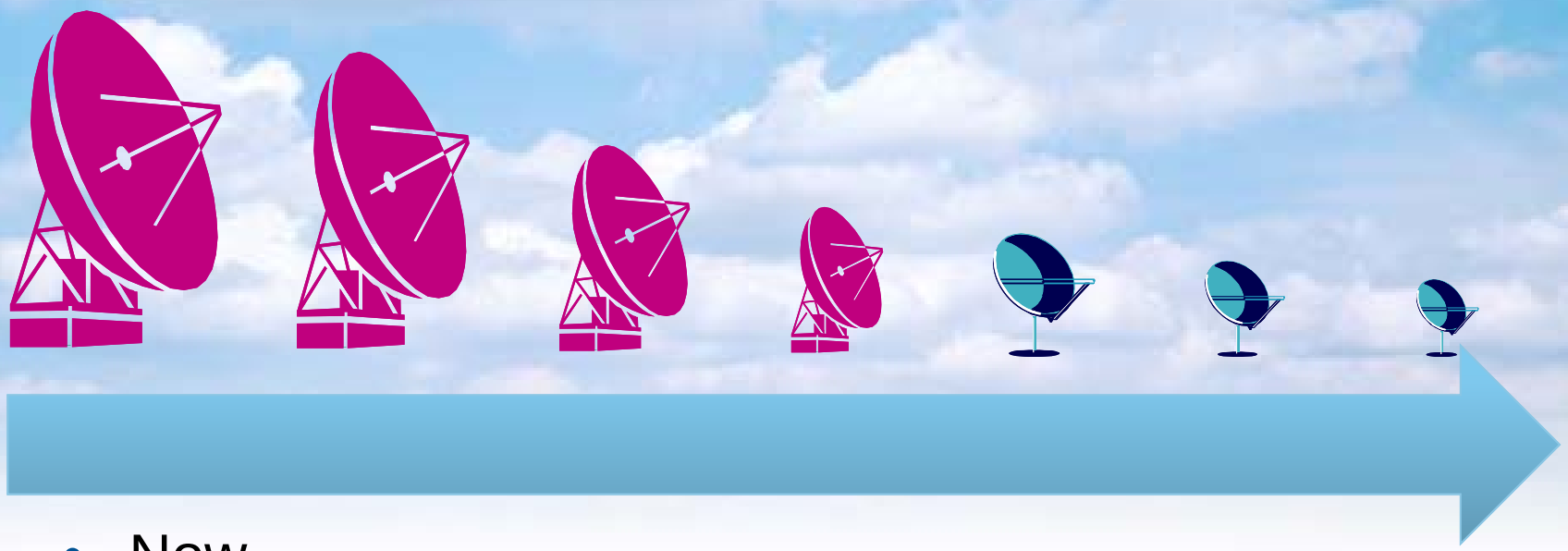
ACTS spot beam and switching.

Beam hopping in multi-beam



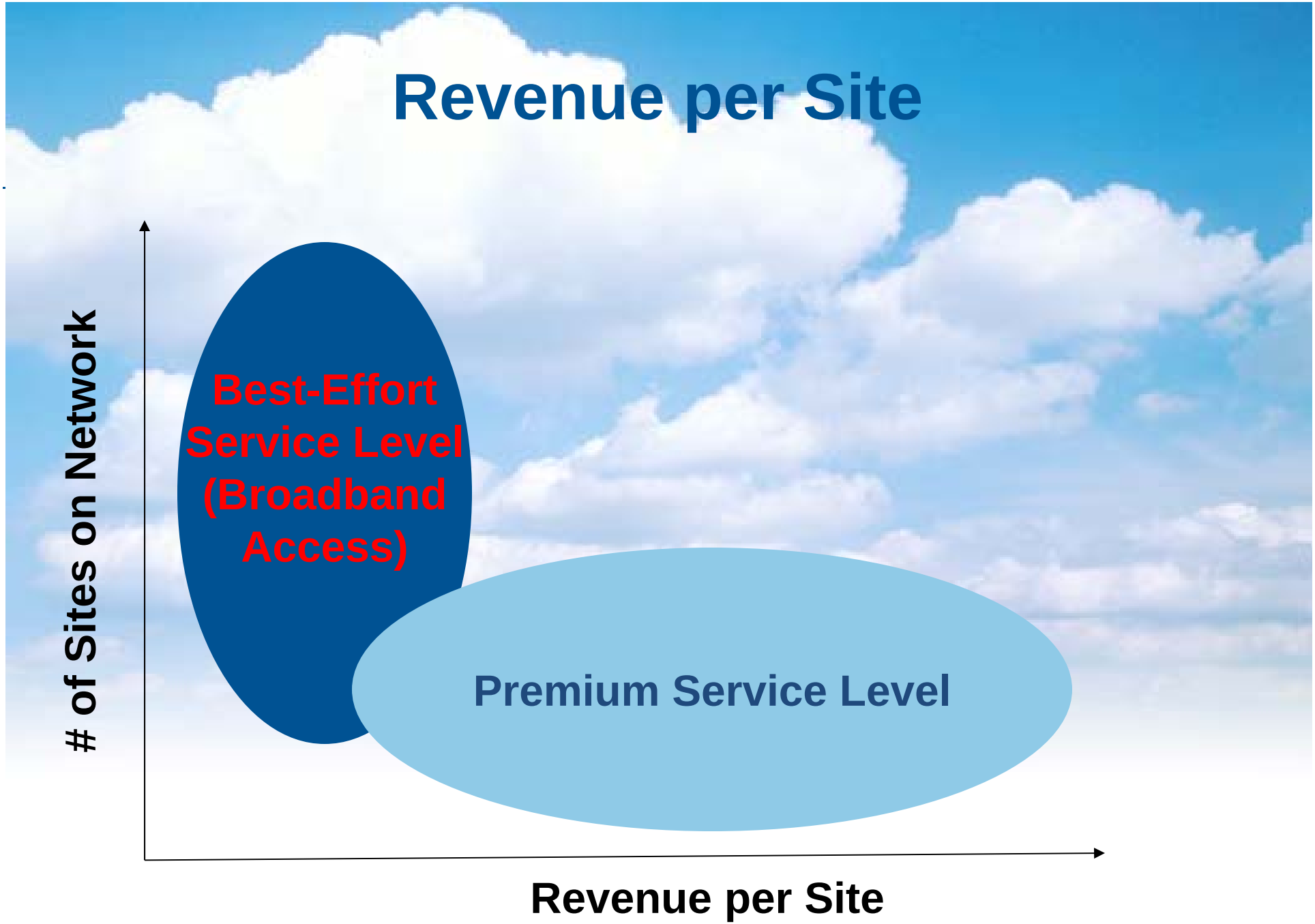
Game Changer?

Ground Segment

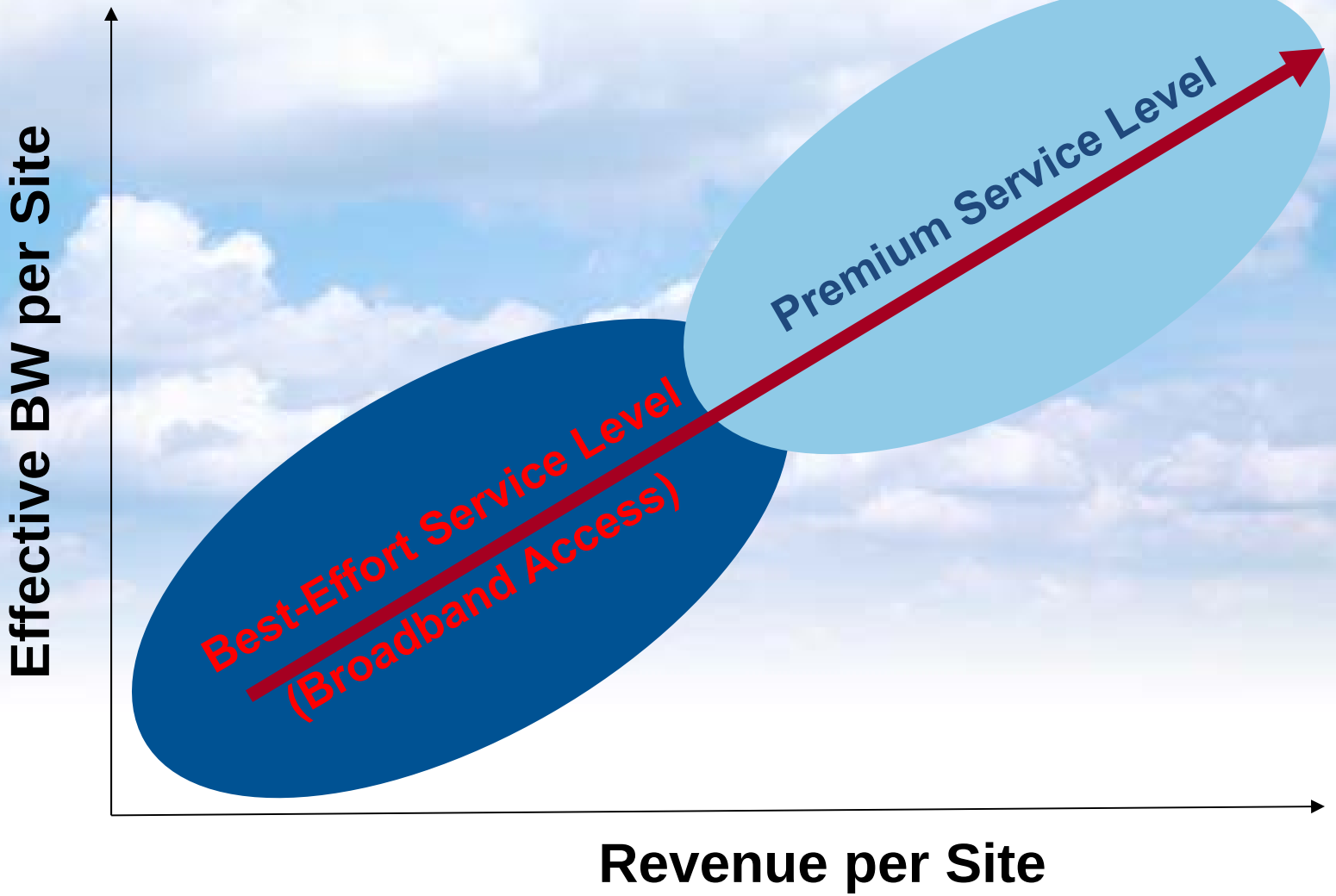


- Now
- C-Band 18m-1.8m
- Ku-Band 13m-1.2m
- Ka-band under 1m

Revenue per Site



Effective BW per Site vs. Revenue per Site



Satcom Infrastructure Technologies that extend bandwidth & Reduce Expenses

Service Level	MF TDMA	DAMA	SCPC
Best Offer	✓		
Medium Grade		✓	✓
Premium			✓
	Trends		
	Mx-DMA		**Dynamic SCPC**
			DVB-S2 Extension
		Bandwidth Cancellation	
		HighResCoding	

Conclusion

- There will be many more satellites to build and launch. New satellites will be lighter with a longer life time on orbit.
- Ground Equipment Segment manufacturers are adopting more and more new techniques to make satellite capacity cost more and more affordable.

THANK YOU!