What’s new in the satellite world

Robert Suber | Managing Sales Director
Renaissance: Internet giants turned space entrepreneurs

Google and Fidelity invested $1 billion in SpaceX

SpaceX – Commercial launch services – Mars Colony Plan

Softbank to invest over $1 billion in OneWeb

Virgin Orbit – Small satellites
Virgin Galactic – Space tourists
First round investor of OneWeb

Owns Blue Origin – Private spaceflight services & science missions

Sundar Pichai

Elon Musk

Masayoshi Son

Richard Branson

Jeff Bezos
The network of tomorrow

Space-Based Platforms

- GEO
- MEO
- LEO

Coverage

Latency

Density

Intelsat Network Core

Integrated User Terminal

Software Defined Terrestrial Network

Aero

Government

Smart City

Media

Integrated User Terminal

Maritime

Oil and Gas

Connected Car

Telco/ISP

4G MNO

5G MNO

Telecom

Internet Service Provider

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Building Blocks of Transformation

Satellite Launch Innovation

Spacecraft Innovation

Constellation Innovation

Ecosystem Innovation
Innovations in Rocket design

- Space X (Musk)
- Blue Origin (Bezos)
- Virgin Galactic (Virgin)

- More options
- Re-usable technology
- Cleaner/cheaper launches
The disruptors: in a space industry worth >$300bn this decade

**Relativity**

Intelligent Robotics  
Worlds largest metal 3D printing robot  
100 percent 3D printed  
Revolutionizing how rockets are made and flown  
Target build in 60 days

**Rocket Lab**

Rocket Lab is the only rocket firm in the world with its own launch complex (on North Island’s Mahia Peninsula).  
The Electron satellite test program launched 3 shoe-boxed satellites in Jan 2018, and projected to cost <$5 million per launch.

**Virgin Orbit**

Virgin Orbit will launch small satellites using its LauncherOne orbital launch vehicle.  
Essentially LauncherOne is a Boeing 747-400 airplane designed to hold a rocket under its wing. Once it reaches an altitude of ~35,000 feet, the rocket would be fired into space.
Building Blocks of Transformation

Satellite Launch Innovation

Spacecraft Innovation

Constellation Innovation

Ecosystem Innovation

Space Segment technology

Modern technology

Antenna technology
Redefining GEO communication satellites with HTS
Redefining communication satellites
High Throughput (HTS) satellites

- Frequency reuse
- Concentration of power
- Digital payload

- More flexibility & scalability
- More throughput (40Gbps- 500Gbps)
- Smaller antennas
What’s on the Horizon for GEO
Software Defined Payloads

- Change configuration once launched
- Incredibly flexible, change beam power, shape, frequency from the ground
- Shorter time to build, 18 months as opposed to 2.5 to 3 years
- Very complex ground system to manage the SDP

- On the ground several advances continue
- Backward compatibility with existing ground segment
- SD universal & interoperable modems & terminals – the breakdown of proprietary terminals
The next level of flexibility and performance

Concept of operation

- Replace wide beams with high performing spot beams without dedicating continuous resources
- Benefits are better performance and utilization

Adjust beam deployment based on demand. Bandwidth in each beam can be different.
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Different Constellations

OneWeb (Softbank/Airbus/Qualcom...)
- 640 satellites
- 1,200km
- 8 launched to date
- Ku/Ka Band
- Bent pipe
- 1.2 Tbps (approx. 50 ground stations)
- In service 2021/2022

Starlink (Space X)
- 12,000 satellites to be launched by mid 2020’s
- 1,600 Ku/Ka at 550km
- 2,800 Ku/Ka at 1,150km
- 7,500 V Band at 340km
- 182 launched to date (550 km orbit)
- 23.7 Tbps (71 ground stations for Ku/Ka band. Does not include V Band
- Partial Start of service 2020

Project Kuiper (Jeff Bezos)
- 3,236 Satellites
- Use of Intersatellite links
- Very hush on spec
- In service 2024?
Building Blocks of Transformation

Satellite Launch Innovation

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Ecosystem Innovation
Electronically Steered Antennas (ESA)

No moving parts

Ultrathin and light

Active phased array

Modules can conform and be shaped to a curved surface

Metamaterial

Passive array
Intelsat and Kymeta
Changing how satellites are accessed

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

Intelsat has purchased an equity stake in satellite communications antenna manufacturer Kymeta following joint efforts to develop the Kalo satellite services and mTenno 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.

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

Kymeta’s KÂLO redefines satellite connectivity with services purchased in familiar, flexible data packages combined with radical pay-for-what-you-use pricing. KÂLO to leverage Intelsat’s IntelsatOne® Flex managed services platform and address the
Next generation modems and antenna innovation

- Easier integration and scalability of networks with next generation modems
- Modems that support broadband, IoT, connected car and that are backward compatible
- Electronically steered antennas, more powerful with smaller form factors
- New antenna capabilities drive emergence of new verticals including: coms on-the-move (COTM) and coms on-the-pause (COTP), internet of things (IoT)
Thank you

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