



regulation made simple

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regulation made simple

Cutting through the complexity of communications sector **regulation, policy** and **law**:



telecoms



media



digital economy



postal



competition



radio spectrum



consumer protection



sustainability



✓
across
the globe



✓
to provide **clarity**
and independent
insights



regulatory
training



regulatory
intelligence

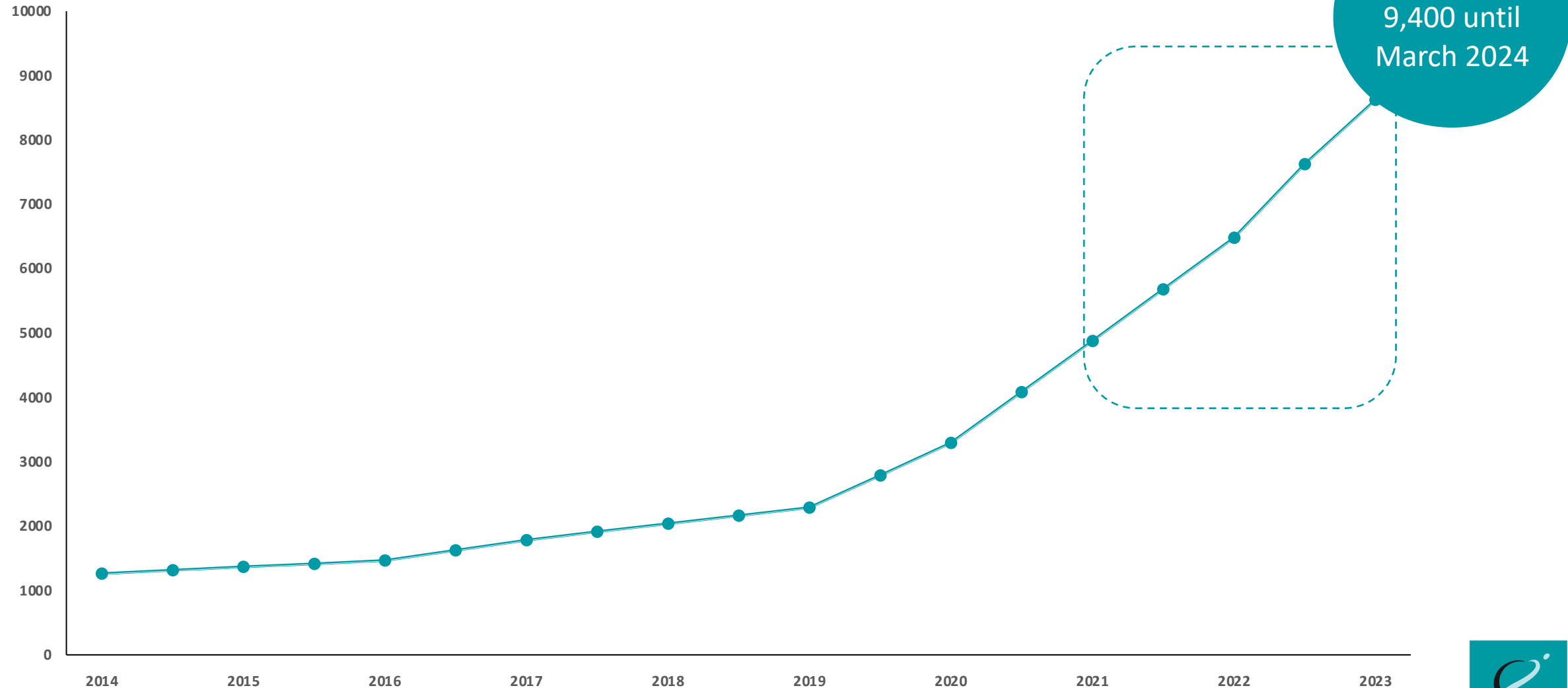


custom
research



conferences
& networking

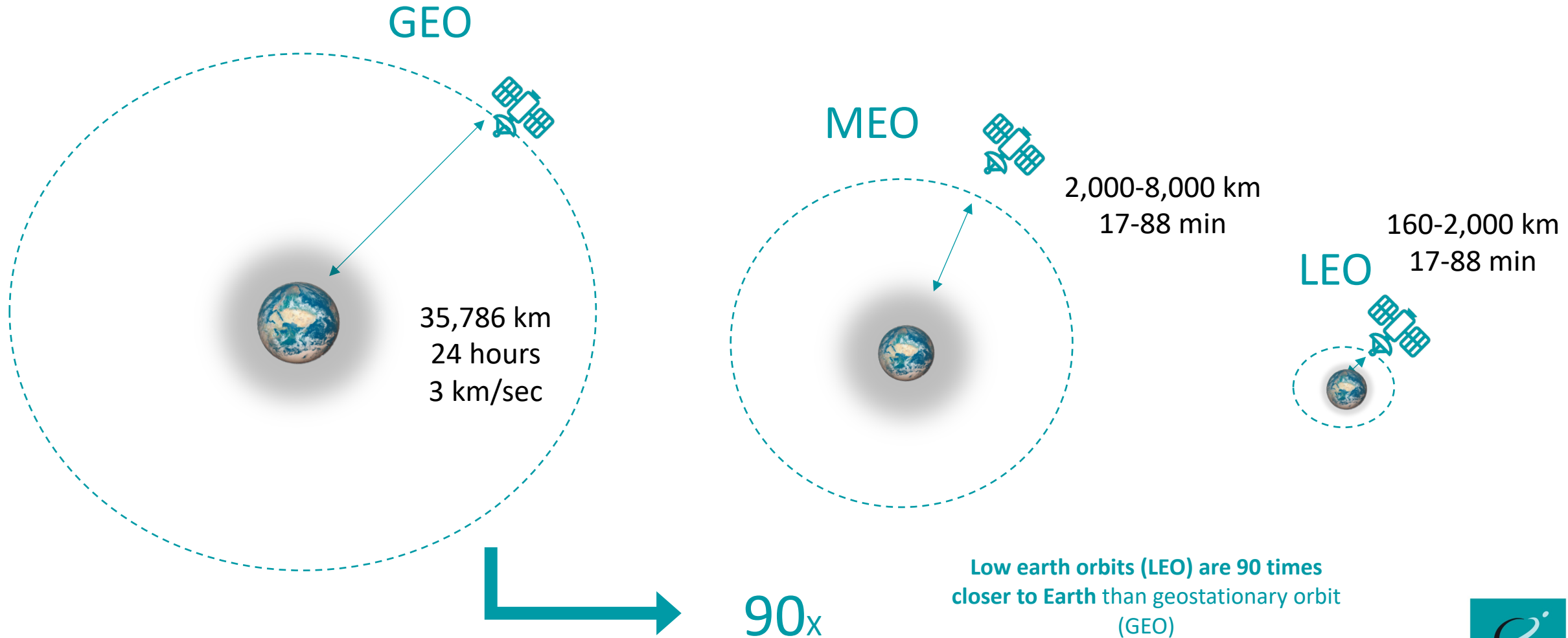
What is happening in Space?



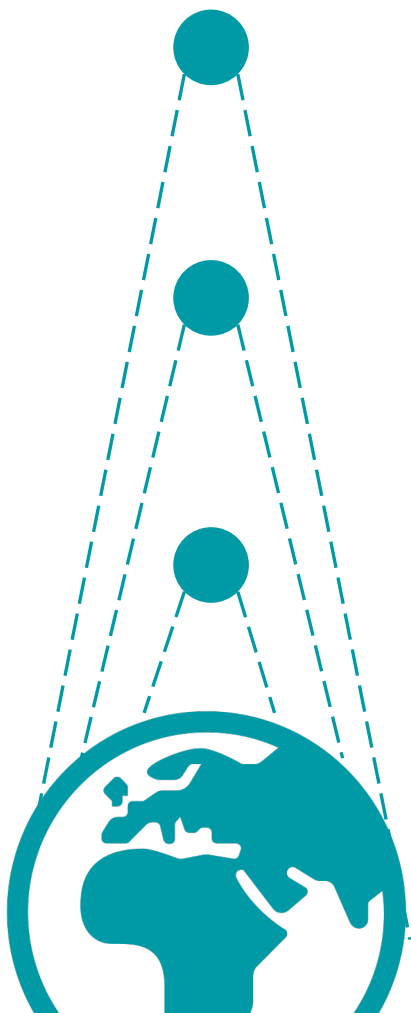
Sources: United Nations Office for Outer Space Affairs (UNOOSA)

Satellite Orbits?

LEO	GEO	MEO and others
94%	5%	1%

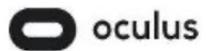


Comparisons of different satellites orbits



			<u>Latency (Average)</u>	<u>Cost per satellite (Approximately)</u>
GEO		Eutelsat, Hughes Inmarsat, Intelsat, Viasat	600ms	\$ 100-400m
MEO		SES/O3B	200ms	\$ 10-50m
LEO		Starlink, Oneweb, Telesat	Below 100ms	\$ 1-10m

Gaming <100ms



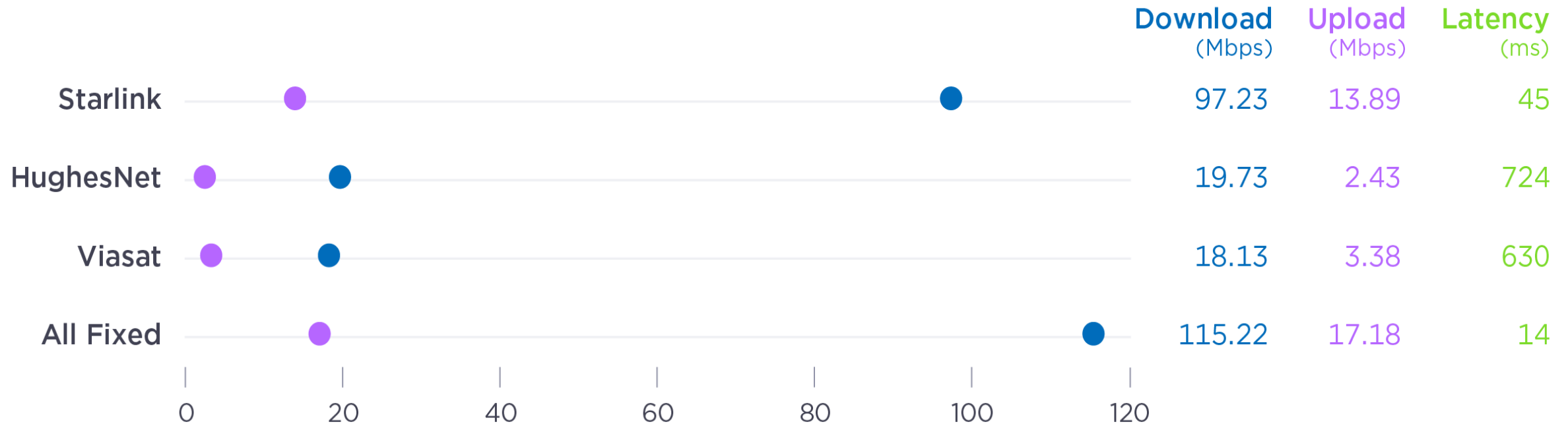
VoLTE <150ms



Cloud <200ms



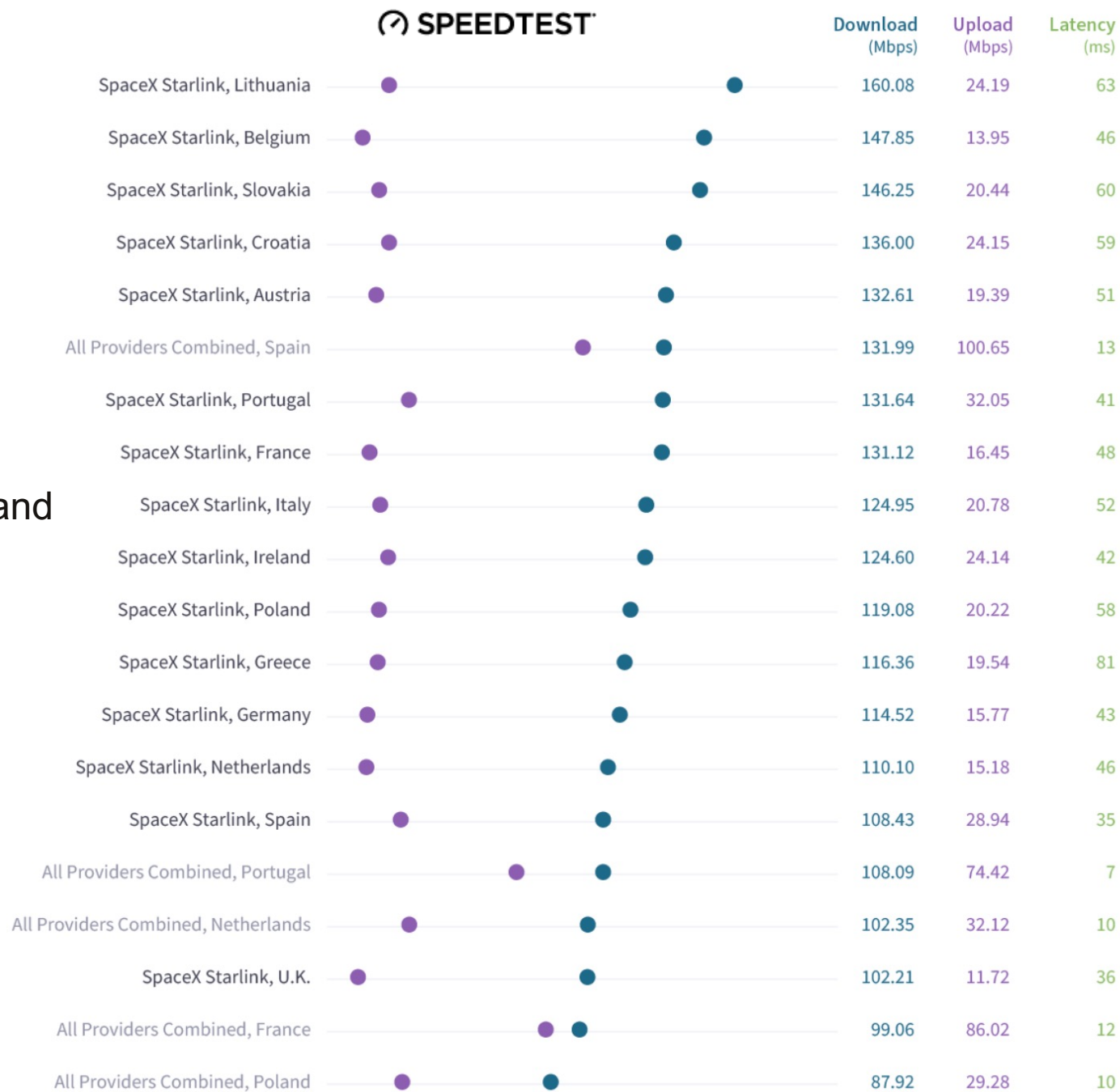
Satellite internet performance vs fixed broadband in the US



Bars indicate 95% confidence intervals

Starlink performance vs fixed broadband in Europe

Starlink outperformed fixed broadband average in 16 European countries



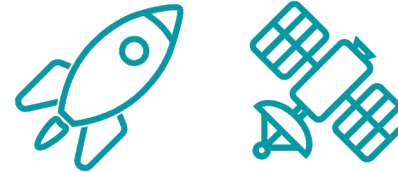
How did it happen?



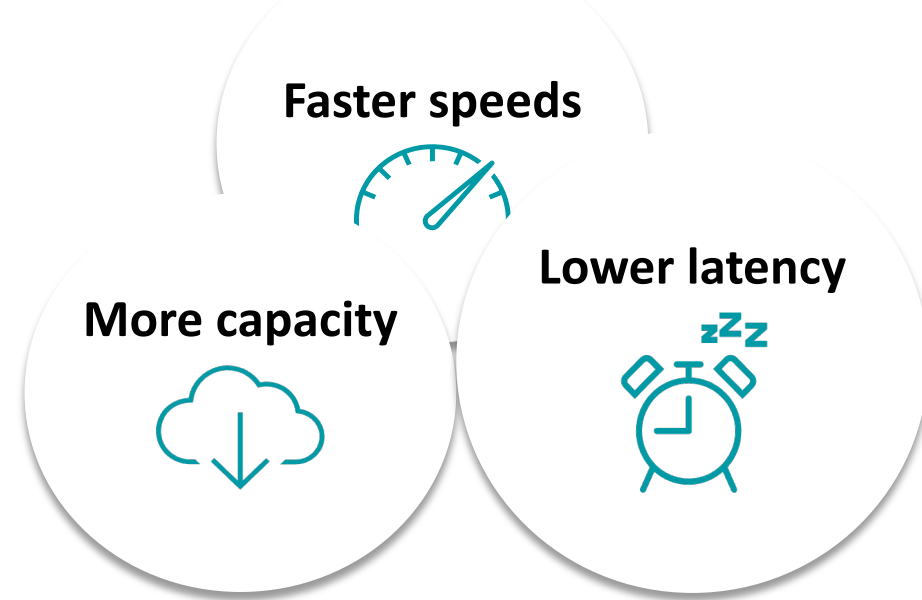
Demand



Technology Development



Cost decreased
(launch and manufacturing cost)

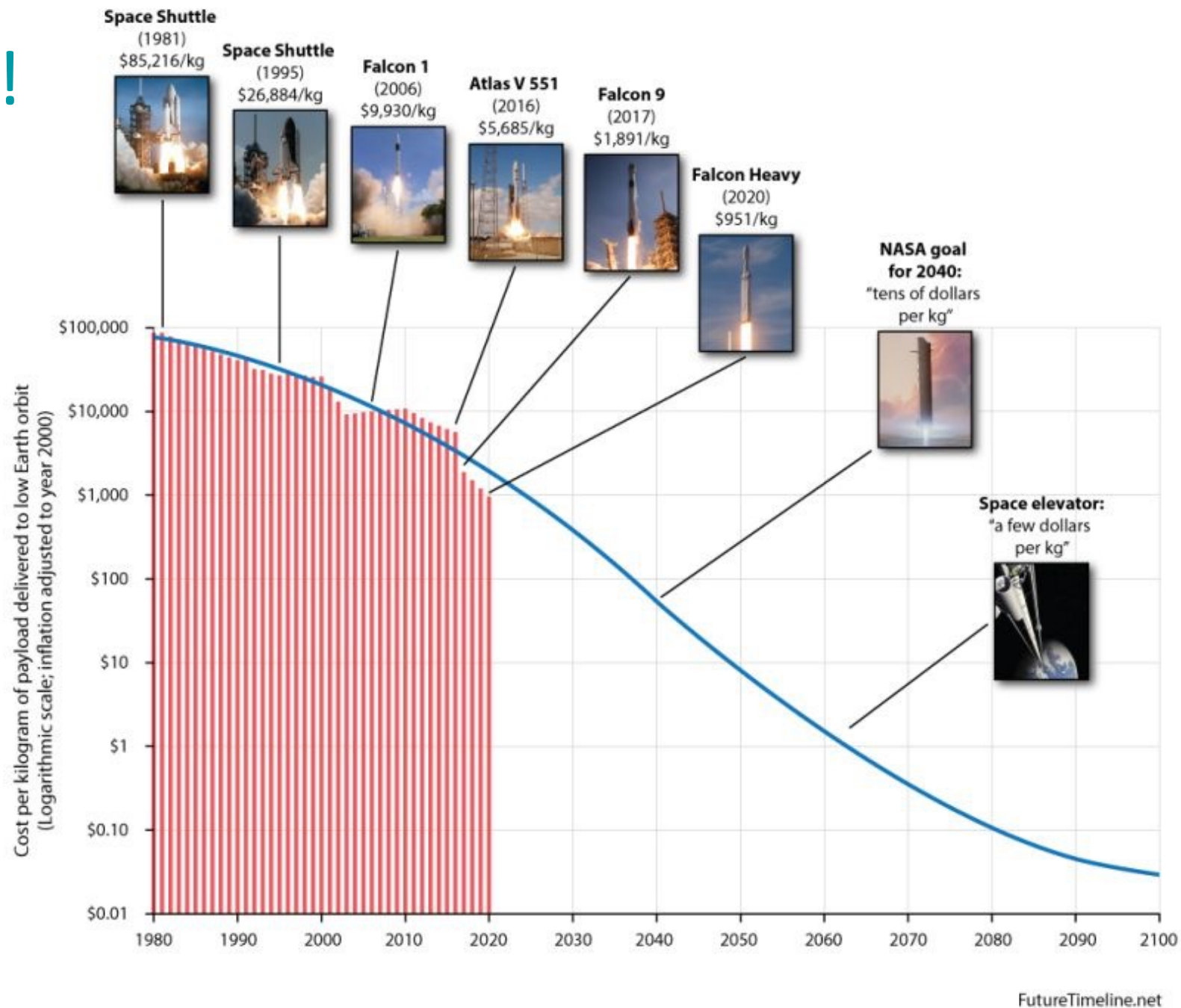


Launch cost!

2010 \$/kg
10,000

2020 1,000

↓



Key LEO constellations influencing the space

amazon | project kuiper

- 590-630 Km
- 3,276 satellites
- Ka band



STARLINK

- Operational
- 335–570 Km
- 12,000–42,000 satellites
- V, Ku, Ka, E bands

TELESAT

- 1015-1325 Km
- 188–298 satellites
- ku, ka band



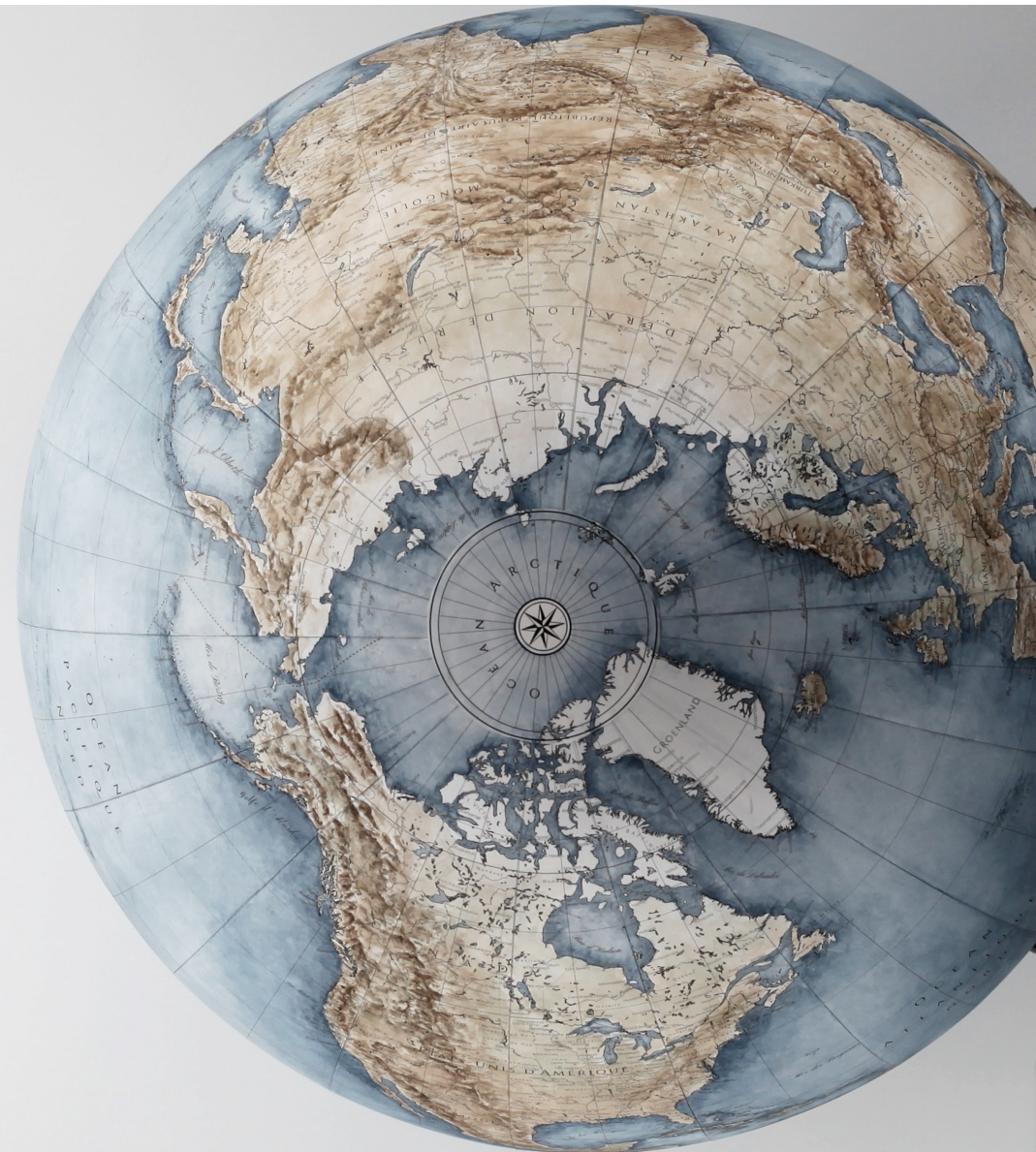
OneWeb

- Operational
- 1200 Km
- 648 satellites
- Ku band

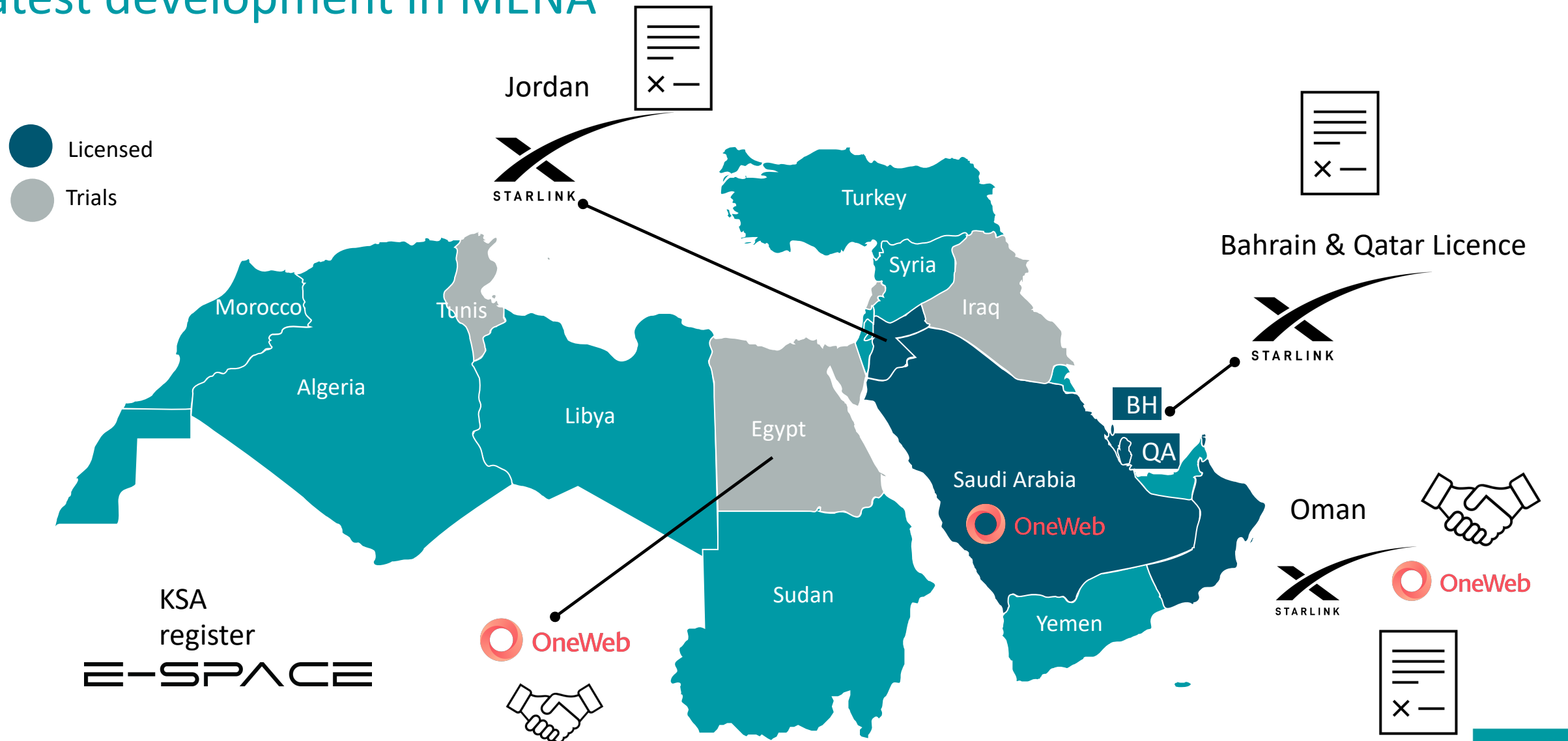


GUOWANG

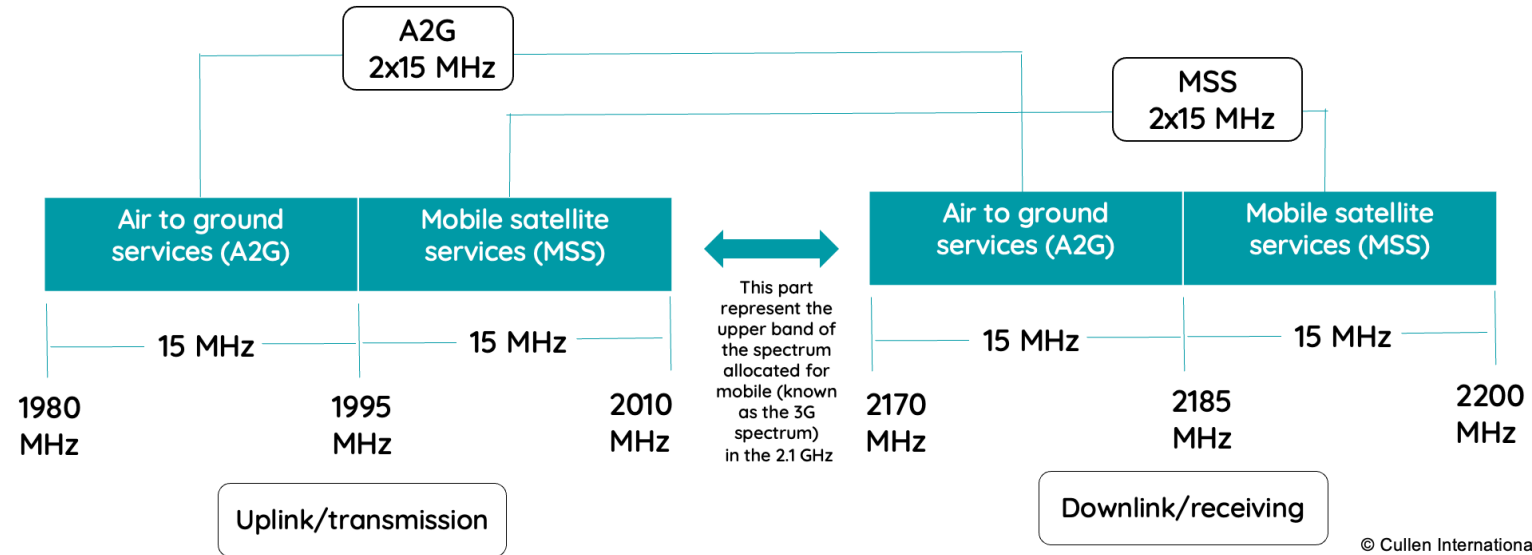
- Proposed
- 1100 Km
- 13,000 satellites



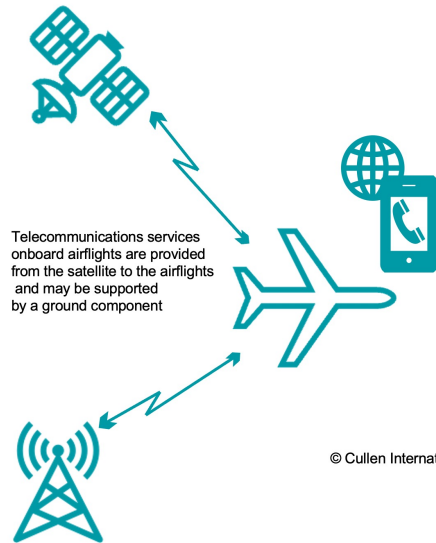
Latest development in MENA



Air to ground licence in Saudi Arabia



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stc

What we need?

Faster speeds



More capacity



Lower latency

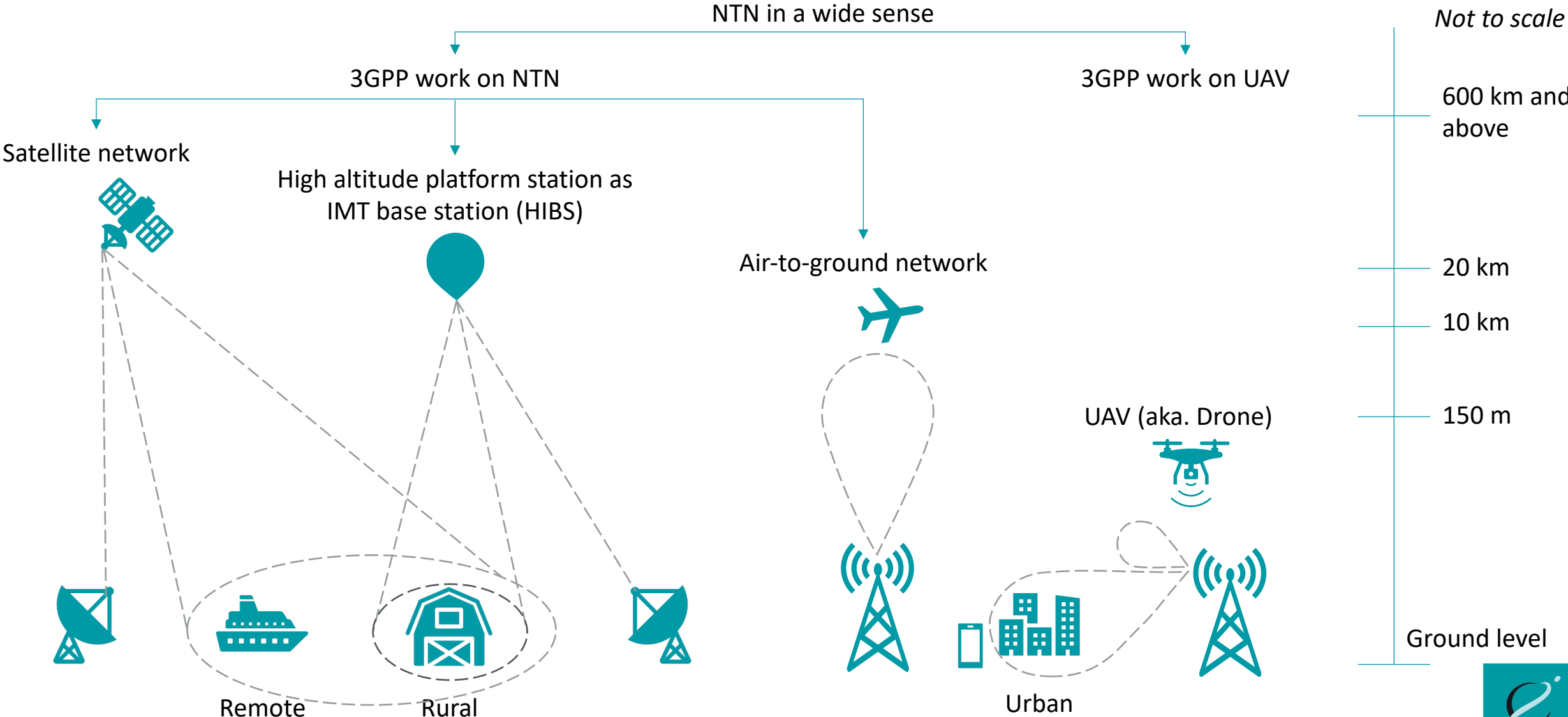


Everywhere

Nearly half of the world's population
lacks internet access.



The solution is hybrid

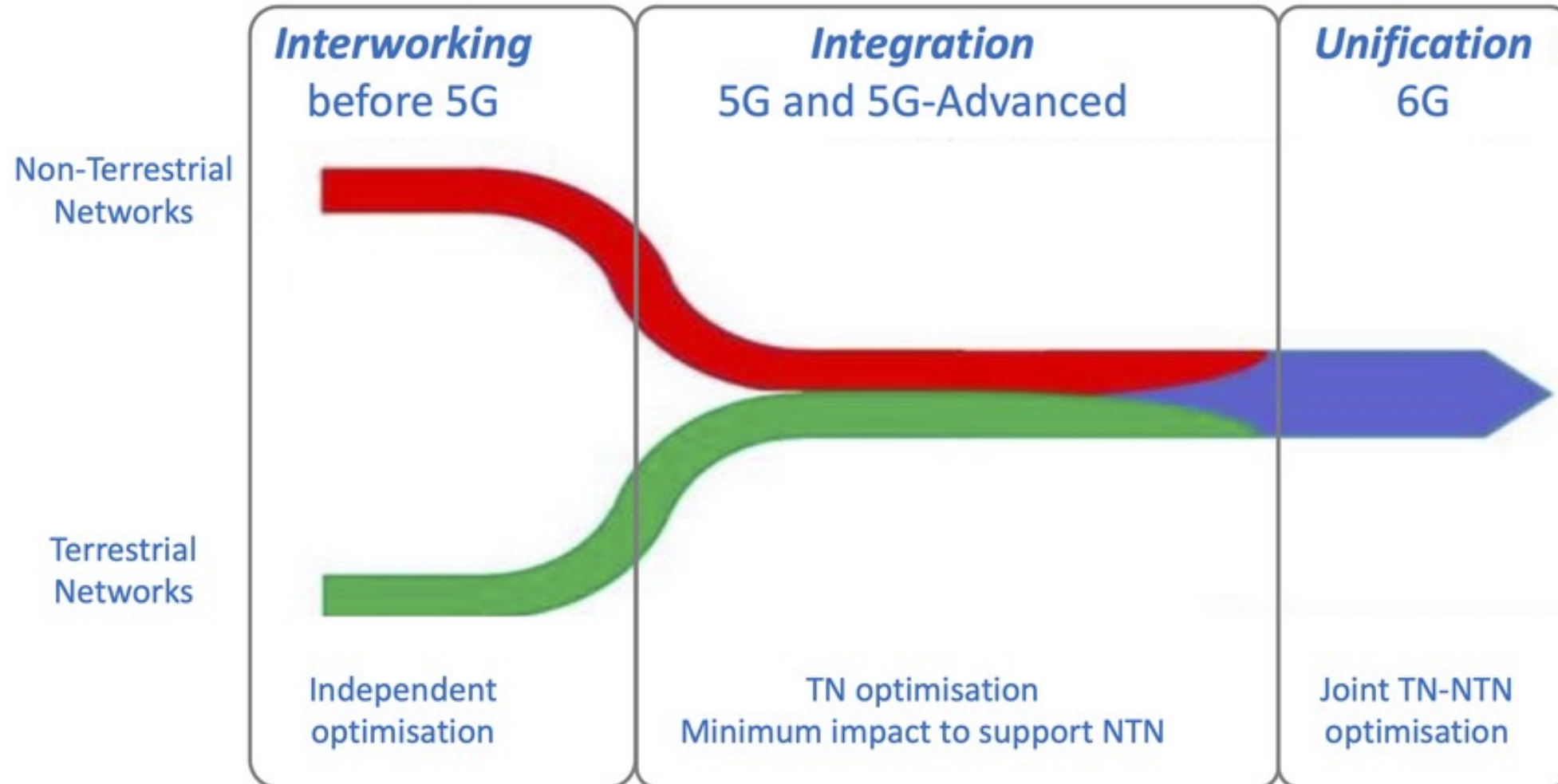


Source: 3GPP

Satellite in the 6G



3GPP Rel.17
NR over Non terrestrial Networks (NTN)



"Complementing" not "Confronting"

Different Targets

Spars and low-density areas 3-5% of people in the world

- ☑ Extends Networks
- ☑ Offload congestion
- ☑ Reliable backhaul option



Satellite broadband and Universal Service Fund

Rural Digital Opportunity Fund by FCC

\$9.2 billion

at least 100/20 megabits per second

Over 10 year – monthly payment

Competitive auction

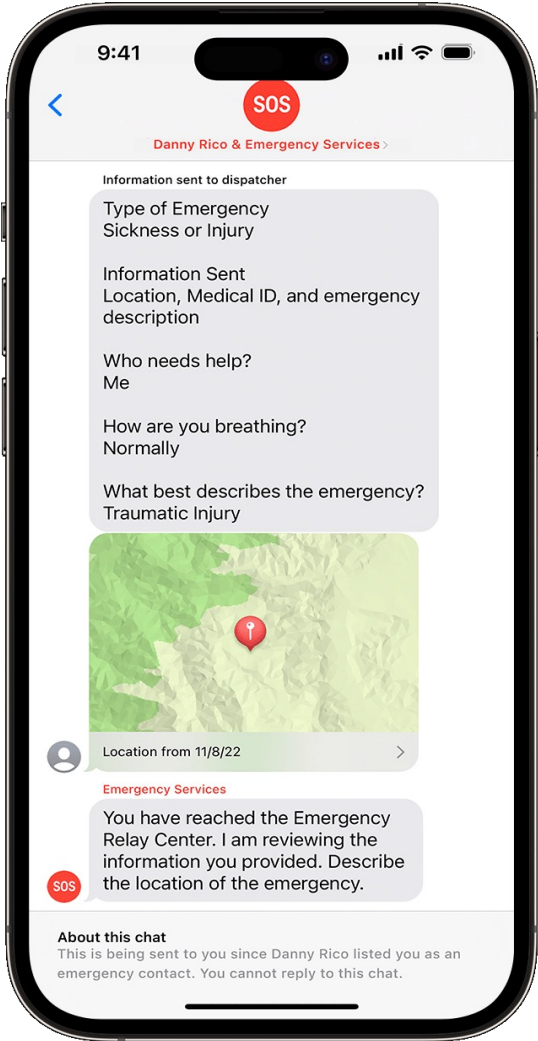
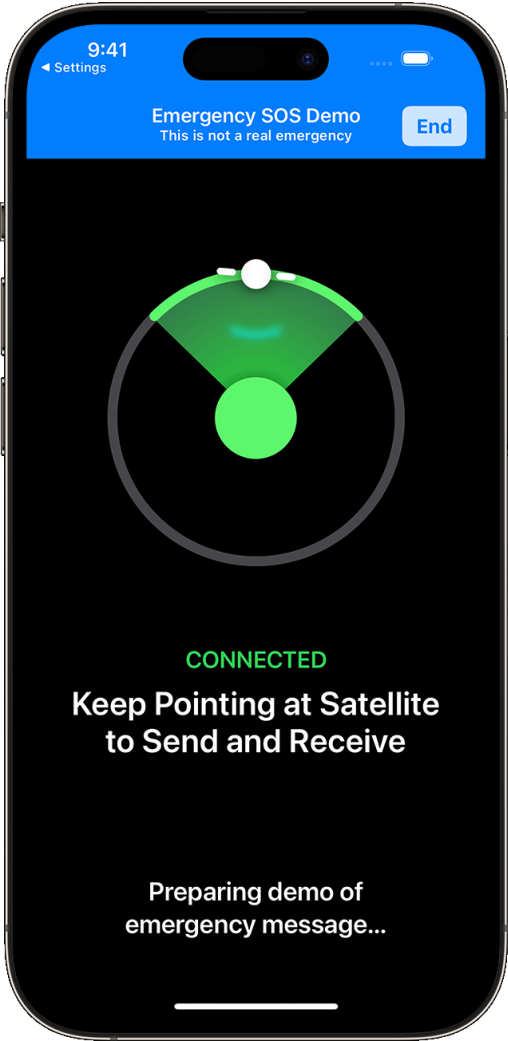


SpaceX secured \$885 million in grant funding to cover rural areas in 35 states

Direct to phone



Huawei Mate 60 pro



D2D implications



Supplemental
Coverage



Emergency
Communications



Lower
Infrastructure
Costs



Emerging
and Future
Applications



Mobility

Thank you!