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PROFEN SATELLITE SERVICES

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TUYAD CUBESAT VISION
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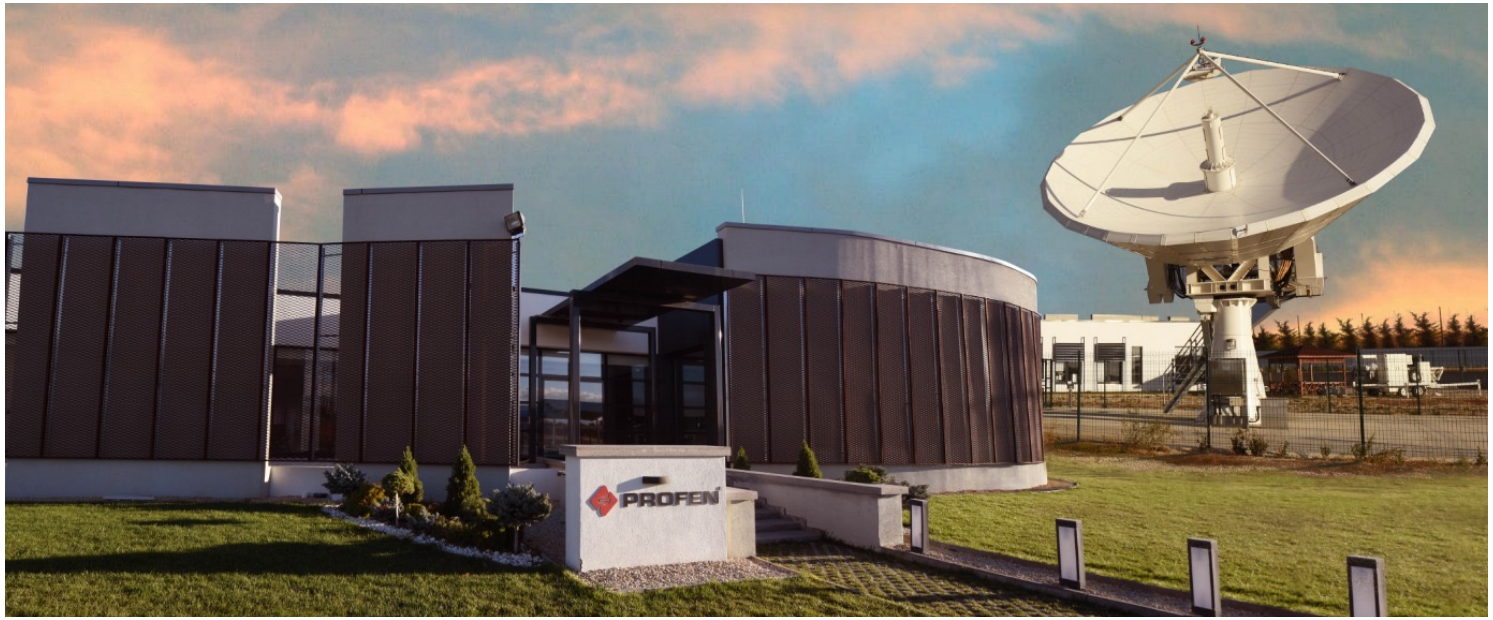
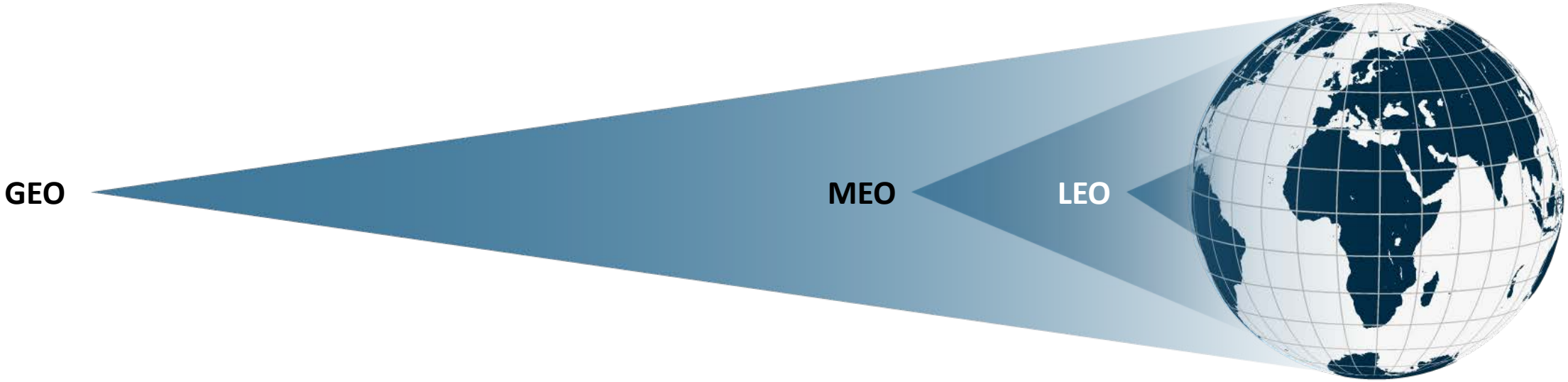
AGENDA

1. Introduction
2. NGSO Constellations
3. NGSO Gateways
4. Multi-Orbit Satellite Services
5. Profen MO Satcom Products&Services



LEO, MEO networks significantly decrease the time it takes to move data from point to point



	GEO (~36,000 km)	MEO (~8,000 km)	LEO (~1,000 km)
Latency	Medium (~600 m/s)	Low (~150 m/s)	Very low (~50 m/s)
Network size for global services	3 satellites (99% coverage)	6 satellites (96% coverage)	Thousands of satellites (100% coverage)
Data gateways required	Few, fixed (Continental)	Several, flexible (Regional)	Numerous, local (several in a country)
Satellite design life (replacement cycle)	15 years	12 years	5-7 years

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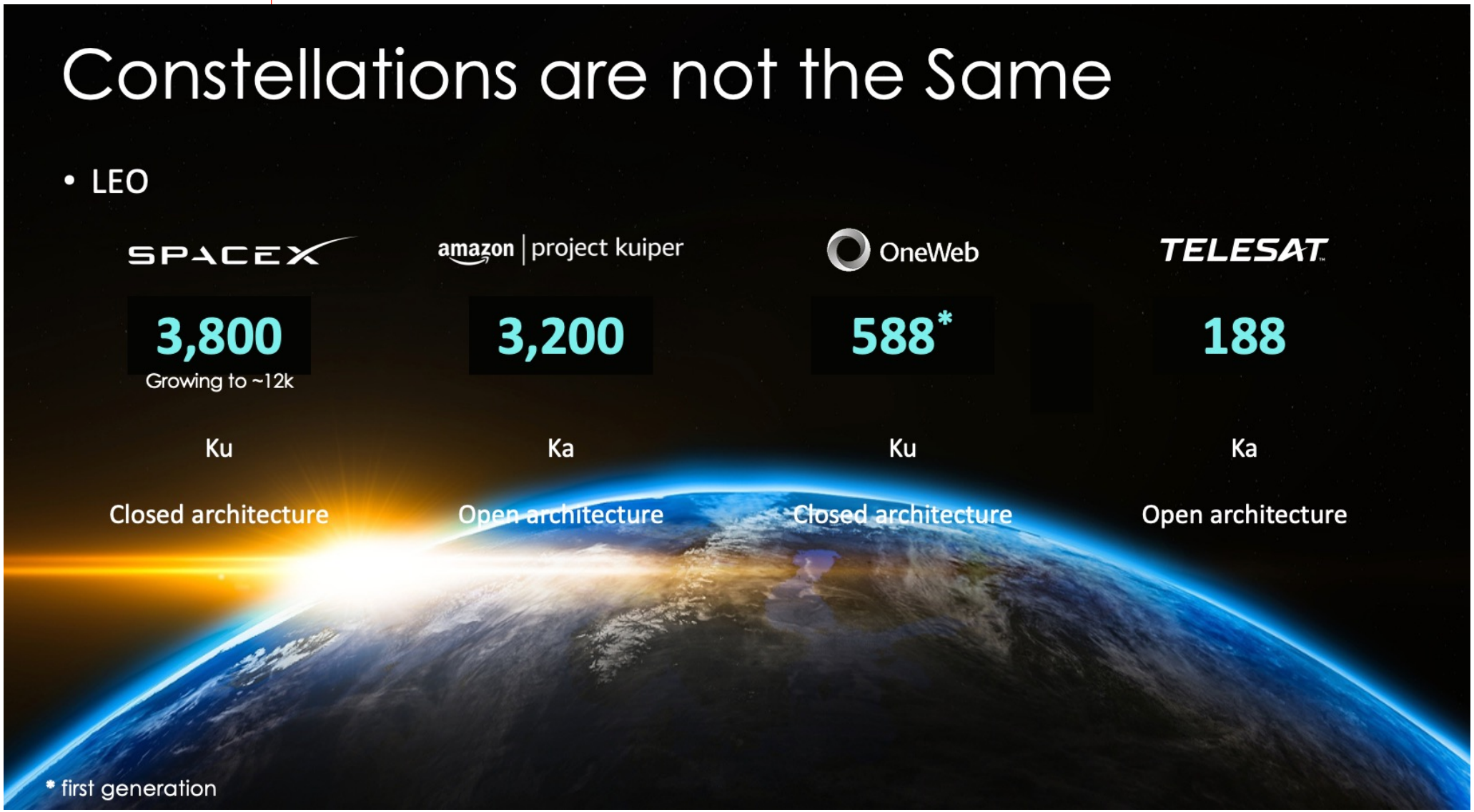
LEO Constellations



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NGSO Gateways

▲ LEO Gateway Example (Starlink Hitachinaka city GW)

▲ LEO Gateway Example (OneWeb Alaska GW)

▲ LEO Gateway Example (Kuiper GW)

▲ MEO Gateway Example (Existing O3b GW)

*Source: Twitter

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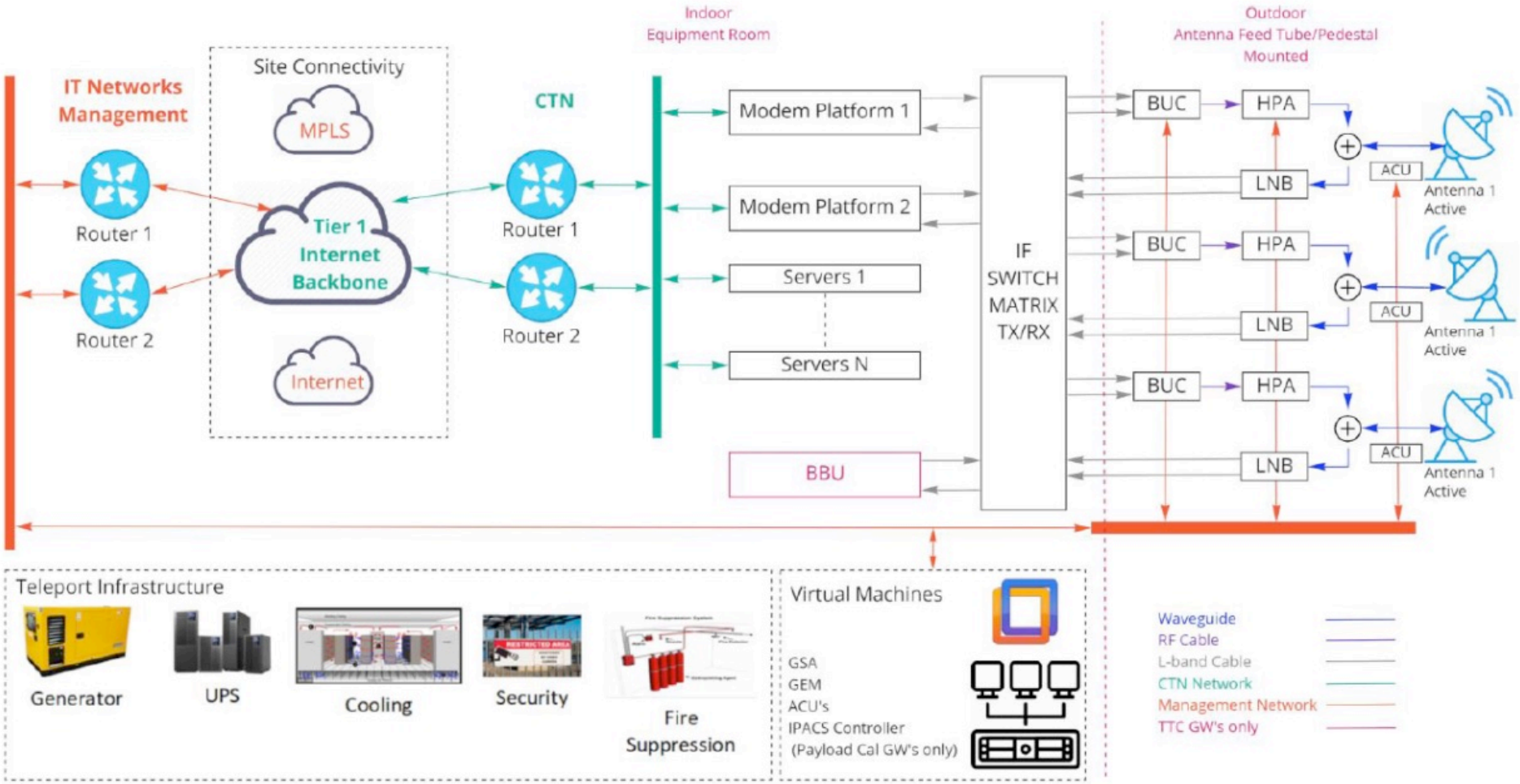
NGSO Gateways

Gateway Antenna Systems - Architecture



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Moving from Backup to Primary Role

- Multi-Orbit connectivity for aero, maritime, energy, enterprise, government and defense sectors

Very High Availability for Mission Critical Operations	Mission Critical Operations
High Speed Demand for Applications	Seamless Connectivity
Low Latency	Uninterrupted Operation of Command-and-Control Networks

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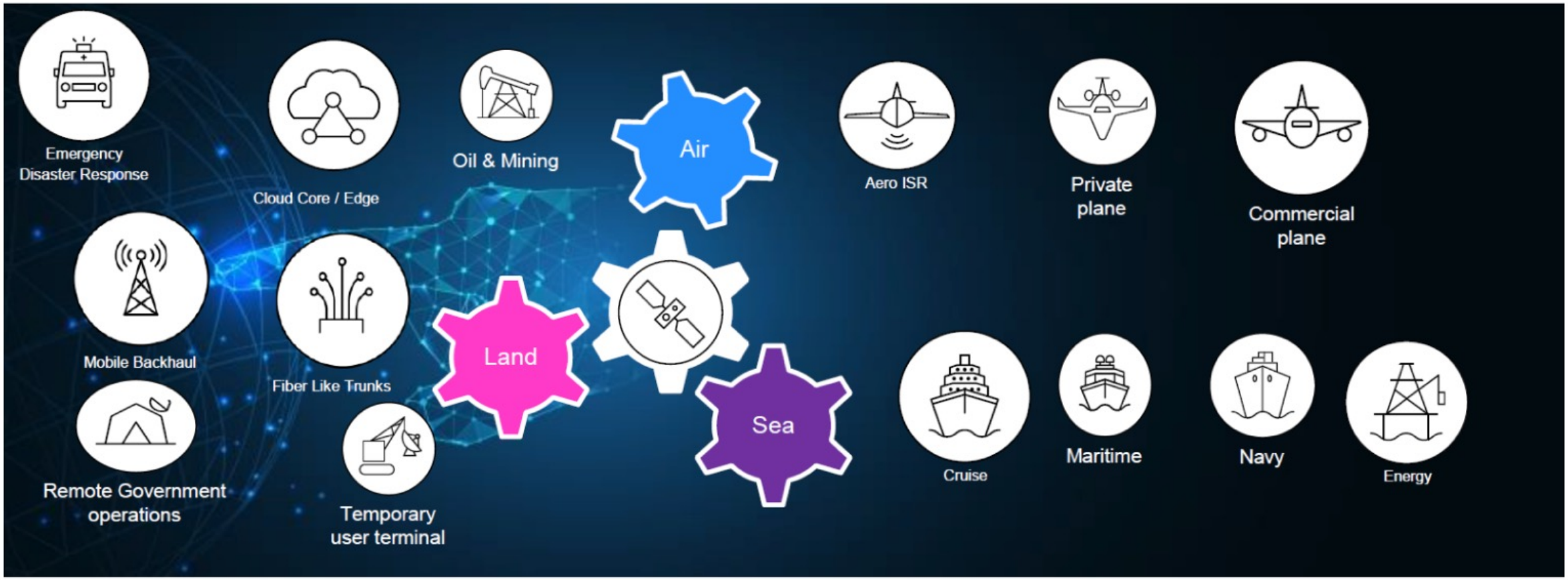
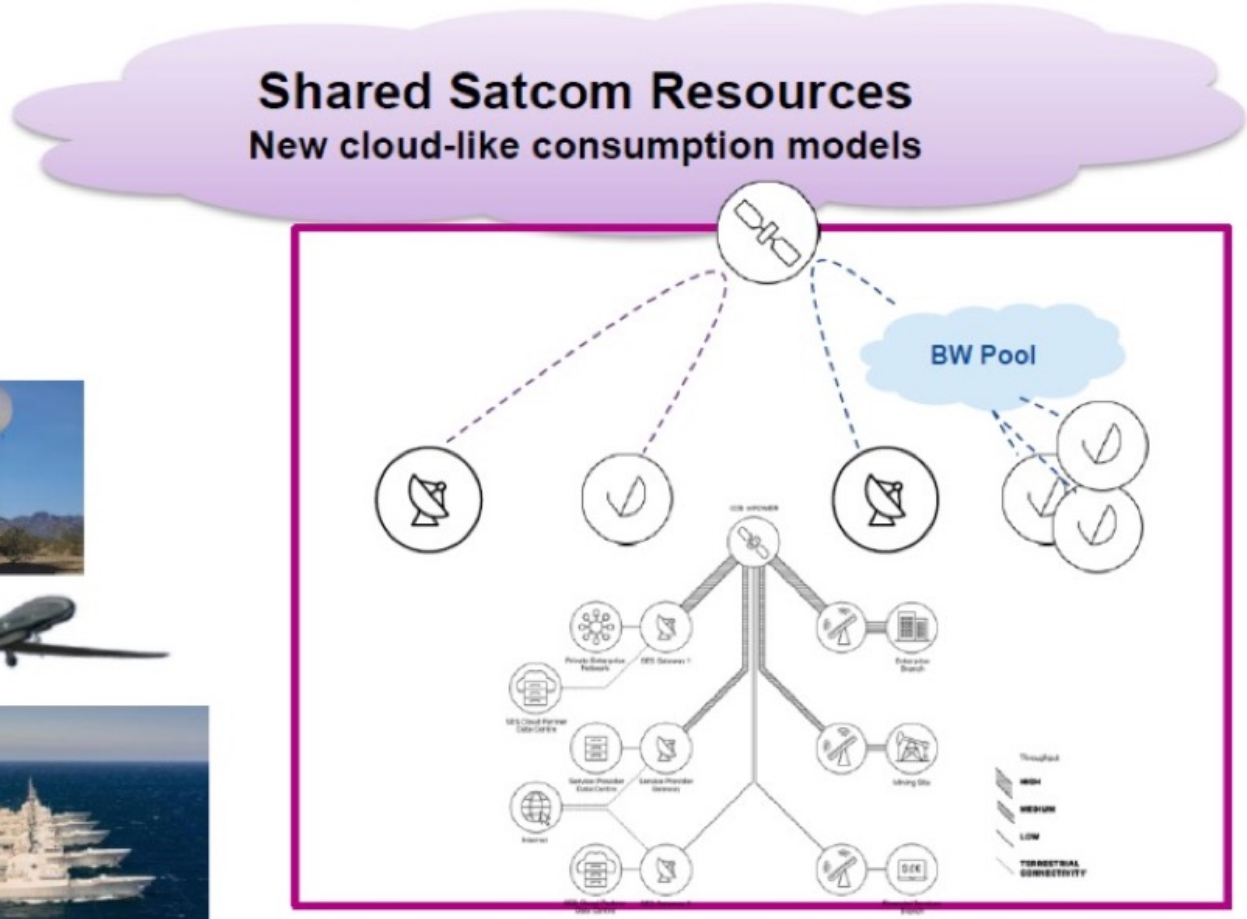
Moving from Backup to Primary Role



Multi-Orbit Satellite Services



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Use Cases

Island Nation

- No fibre / terrestrial connectivity to the outside world.
- Populations with low-GDP / rapidly increasing data demand.
- Distribution via cable microwave network.

Internet to Land-locked

- Land-locked with no fibre / terrestrial connectivity to outside
- Dense population with rapidly increasing data demand
- Local terrestrial content distribution network

National Digitalisation

- Government digitization schemes for high population densities
- Low-GDP / high demand growth regions
- Network aggregation points need high throughputs

Refugee Camps

- Education / Communication Centres
- Cost-effective solution

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Use Cases

Tower Co

- Site expansion
- Leverage infrastructure

Upgrades to 4G/5G

- 10X backhaul capacity
- Turnkey deployment

Disaster Recovery

- Fast response
- High bandwidth

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Use Cases

MBH for MNO's NPN

- MNOs extending their coverage with public and private networks
- Intelligent edge / low latency

Connectivity for Ent.'s NPN

- Enterprises taking ownership of their digital transformation
- Traffic segregation with multiple handoff points

NPNs = 3GPP Non-Public Networks / aka Private Networks

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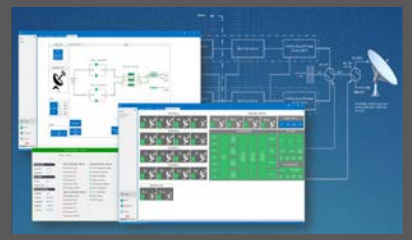
END USERS

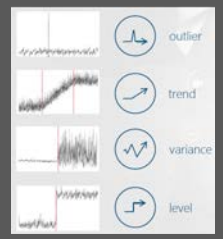
Enterprise | Government | Defense | Agriculture | Transportation

SERVICES

PROFEN SATCOM Cloud Services

- Ground Network Monitoring, Control and Orchestration
- Predictive Maintenance
- Data Analytics and ML/DL Services
- Cyber-Resilient





INFRA

PROFEN Cloud Infrastructure

- Optimized for SATCOM
- Big Data
- IaaS/PaaS/SaaS Infra
- NFV – Digital IF
- Edge Computing

CONNECTION

LEO Tracking Antennas

- 7.3m X/ pedestal ground station
- X/Y pedestal system for 2–7 meter diameter CF reflectors
- S-X-Ku-Ka Bands

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Transportable Solutions

- Carrier grade throughput and beyond fibre in Flexibility
- Cell tower aggregation through distribution points
- Easily and quickly reconfigurable for resiliency, disaster relief, & event congestion
- Access Cloud based applications easily and efficiently

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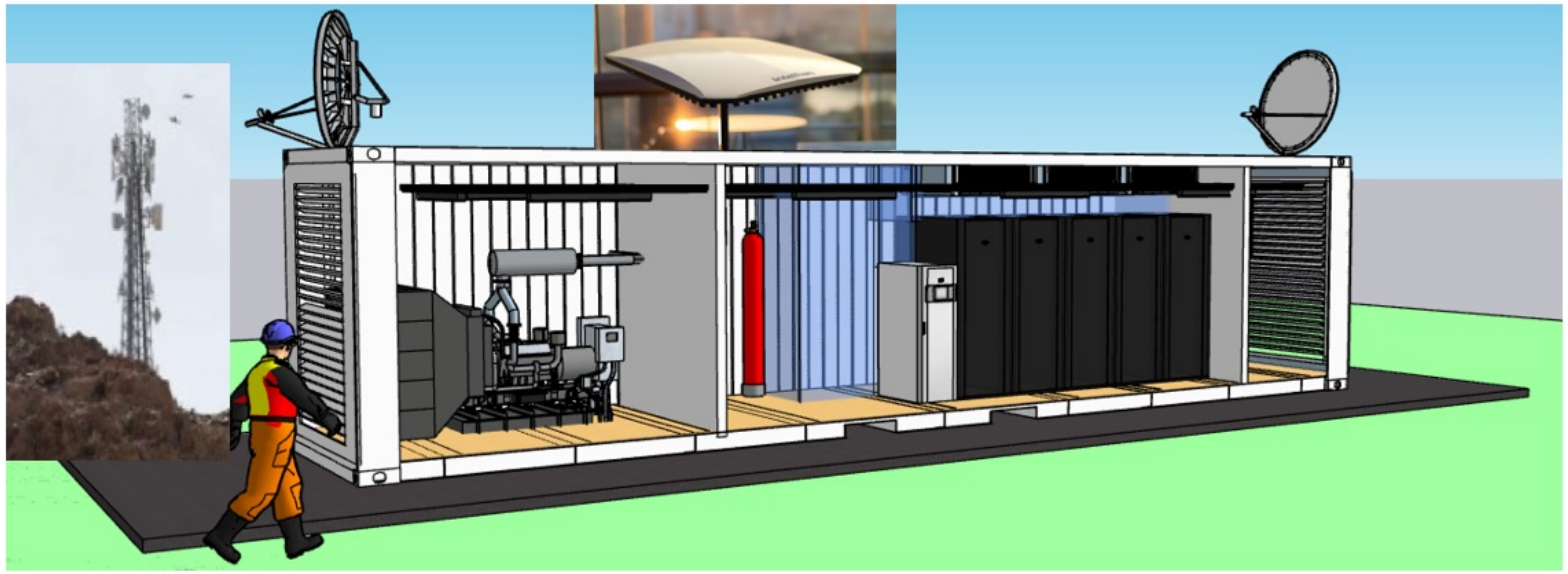

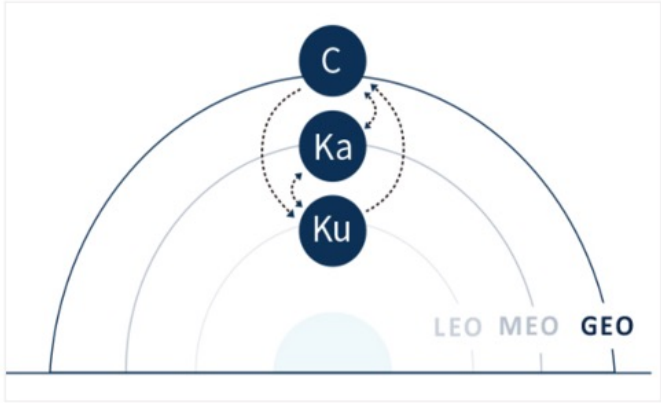

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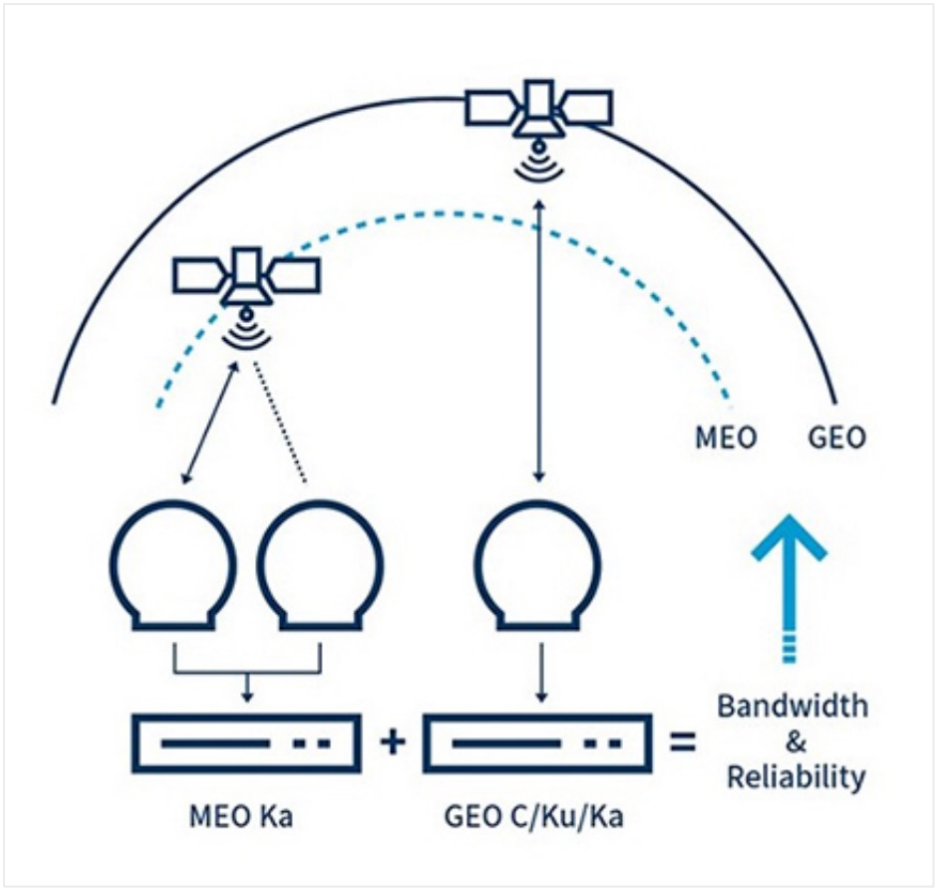
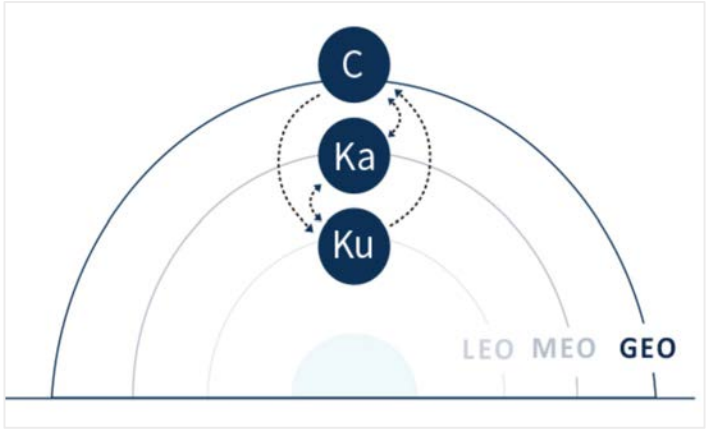


PROFEN Multi-Orbit Services & Products



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THANK YOU!

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