Satellite: A Real Opportunity for IoT

Rémi Lorrain, LoRaWAN® Network Director
117 LoRaWAN® Operators and Growing

BT, KPN, Proximus, Swisscom, Orange, Objenious (Bouygues), NTT, Charter, Unity Media, Comcast, Cellnex, American Tower, Alibaba, Tata, Teracom, CRA (Czech-republic), ER-Telecom, Ooredoo, ZTE, Tencent, SKT Telecom, KDDI, ... and satellite players (Lacuna space, Swarm,...).

Operator diversity strengthens the LoRaWAN ecosystem: coverage as an enabler

- Cellular operators
- TV and satellite Broadcast telecom
- Utility companies
- Fiber optics telecom
- Broadband telecom
- IoT Solution companies
- System integrators
- Tower-companies
Market Drivers

- Satellite players have been increasingly utilizing IoT over the last 3 years.

- There is fierce competition in this market: dozens of startups and carriers.

- The costs of a launch have decreased, and there has been a steady scale-up of cube satellites on low orbit constellations.

- Space agencies have expressed support for IoT projects.
Implementation Options

**Gateway Back-haul**
LoRa®-based gateway communication with satellite

**Device Back-haul**
LoRa®-based device communication with satellite

**Relay Back-haul**
Battery-powered relays act as a gateway

**Dual Mode Device**
LoRa® Technology + satellite proprietary device communicate with satellite

- Commercially Available
- Prototype, commercial in 2019
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Implementation Challenges

Device Back-haul/Dual Source

- Antenna design.
- Indoor use cases.
- Mobile devices.
- Limited capacity.
- Downlink, pre-provision devices (ABP).
- Device control (downlink).
- Latency: satellite visibility.
- Terrestrial and satellite network interconnection (roaming).
Use Cases

Market Segments

- Coverage complements public and private networks

Collocated Devices

- Devices on the same campus or site

Spread Devices

- Devices spread on large areas

Mobile Devices

- Devices moving on large areas

Use Cases

Metering, pipeline monitoring, logistics (tracking, fleet management), irrigation, cattle tracking, environmental monitoring, supply chain, maritime vessels and fishing buoy monitoring, building monitoring (disaster recovery), water kiosk monitoring (remote areas), mining operations, worker/personal security, smart city, livestock monitoring, remote farm management, remote premises monitoring, gas station monitoring, weather station monitoring, green energy monitoring (solar panels, wind farms, oil rigs), military applications

Collocated devices mostly managed by gateway back-haul or relay back-haul. Spread devices and possibly mobile devices managed by device back-haul
2019: Between Prototype and Commercial Launch

- **Maturity** and fast development of **gateway back-haul** (Inmarsat, Fleet,...).

- 2 LoRa **device back-haul** projects at **early stage** (Lacuna, Swarm).

- 10+ **(Device back-haul / Dual mode) IoT** projects begin commercial phase in 2019, : Hiber, Kineis, Orbicomm, Globalstar. Iridium. Astrocast, Eutelsat, Satellogic...

- Roaming between terrestrial and satellite networks
  - key factor of success.

**Satellite complements terrestrial networks**