LoRaWAN® with Satellite Connectivity

Simple. Affordable. Transformative.

LoRaWAN®

EchoStar Mobile

LoRa Alliance®

The LoRa Alliance®

- Global open non-profit alliance launched in 2015

- Develops and maintains LoRaWAN® standards
  - Recognized by ITU as an international standard

- Educates the market about LoRaWAN technology, the latest advancements and deployments

- Develops and maintains the LoRa Alliance certification program

Contact us via lora-alliance.org

LoRaWAN® Satellite Connections Provide Seamless Collaboration with LoRaWAN Networks

HOW IT WORKS

- Low-cost battery-powered devices connect directly to satellite networks

- LoRaWAN sends small packets of data to reach satellite (LEO, MEO, GEO)

- Geo-stationary and non-geo-stationary

- Satellite collects messages, and relays collected data to the ground station
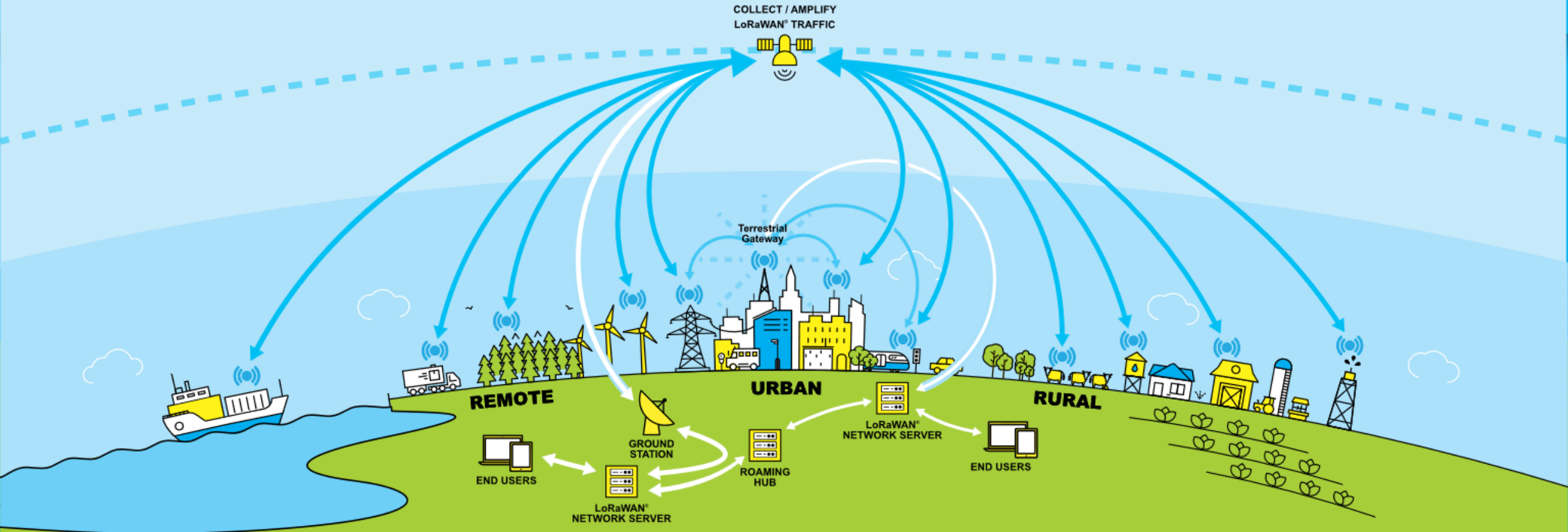
WHAT IT ENABLES

- Coverage to remote and hard to reach areas (oceans, deserts)

- Global roaming

- Reduces risk and enhances safety on hazardous and inaccessible sites

- Supports all applications:
  - animal tracking
  - infrastructure maintenance
  - crop irrigation
  - mining
  - oil & gas…

EUTELSAT

EchoStar Mobile™

FLEET

Lacuna space

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NTN LoRaWAN®: EXPANDING CONNECTIVITY BEYOND TERRESTRIAL LIMITS

COLLECT / AMPLIFY
LoRaWAN® TRAFFIC

Terrestrial
Gateway

REMOTE

URBAN

RURAL

GROUND
STATION

ROAMING
HUB

LoRaWAN®
NETWORK SERVER

END USERS

LoRaWAN®
NETWORK SERVER

END USERS

FLEXIBLE AND AVAILABLE

- LoRaWAN® allows for terrestrial, satellite or hybrid networks
- Same LoRa® chipsets
- LEO, MEO and GEO satellite options
- Easily integrated with already-deployed IoT systems and applications
- Global roaming

INFRASTRUCTURE BENEFITS

- Low-cost battery-powered devices connect directly to satellite networks
- High capacity with LR-FHSS
- Low power: Satellite connectivity does not impact device power consumption
- Bi-directional communications with LoRaWAN E2E security
- Possible to use LoRaWAN relay specificationsfor satellite

When to deploy NTN LoRaWAN

- Serving remote locations with poor terrestrial coverage (e.g., rural, offshore, maritime)
- Monitoring of critical assets (e.g., railways, roads, bridges, pipelines)
- Monitoring of natural assets (e.g., forests, rivers, glaciers)
- Monitoring of mobile assets for maritime and logistics
- Connection of low-density remote sensors (e.g., utilities, agriculture)
- Monitoring energy infrastructure and renewables (eg O&G platforms, wind turbines)

NTN LoRaWAN® ADDRESSABLE MARKET

Satellite coverage enables new verticals, such as

- **Environmental Awareness**
- **Critical Infrastructure Monitoring**
- **Asset Tracking (Search & Rescue)**
- **Asset Tracking (Logistics & Mobility)**
- **Precision Agricolture**
- **Maritime**
- **Industry 4.0**

Smart Building
Smart Industry
Smart City
Smart Country
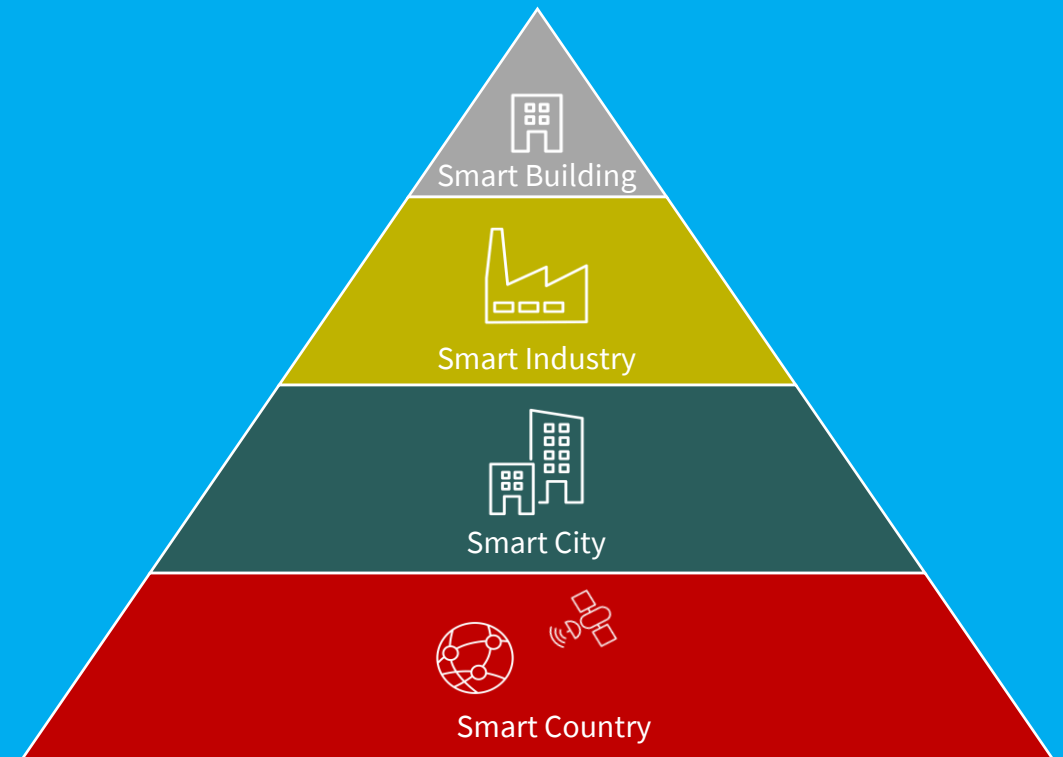
ENVIRONMENTAL AWARENESS

Silvanet by Dryad Networks

Sensors by ForestGuard

uAir SAT by Portugal Online

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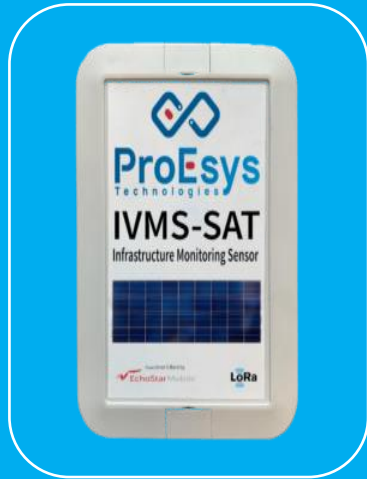
PERSONAL & MARITIME TRACKING

KIP2 beacon by Abeeway

ONE by Connected

SAT IoT hub by Cyric

Soil Monitor by Dales Land Net

STARGET by Symes

Value chain of the LoRaWAN® based Satellite IoT Ecosystem

Examples of key vendors

Technology Enablement	Chipset	Antenna and other Components	Modules	Devices	Operator

SEMTECH

TX with LR-FHSS:
Transmit with Long Range - Frequency Hopping Spread Spectrum

SEMTECH
LR1120

LoRa Edge LR1120

SKYWORKS

SiGe 2431L 201GB

S-band Front-end Module

QUECTEL

LC76F

GNSS

ECHOSTAR

EchoStar Mobile EM2050

EM2050 Module

Lacuna space

LS300 Sensor and Relay

ProEsys

CP-SAT

Cathodic Protection Device

Lacuna space

ECHOSTAR

FOSSA

SOURCE: IoT Analytics

LoRa Alliance

LoRaWAN® LIVE

KEY TAKEAWAYS

- Well identified market request for global satellite-based IoT connectivity

- Revenues from Satellite IoT are growing 14 times faster than traditional satellite connectivity revenue. By 2030, there are projected to be 40 million satellite IoT connections, with a compound annual growth rate of 27% (**)

- NTN LoRaWAN is a reality today

- The rise of satellite IoT connectivity will depend on partnerships and collaborations between terrestrial and satellite IoT players.

- 3GPP NB- NTN is approaching and may take longer than anticipated but will be a contender to NTN LoRaWAN

SOURCE: IoT Analytics

Please send inquiries to:

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