



Resilient and Sovereign IoT Connectivity: Interoperable NTN and Emergency Communications in Europe

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Resilient and Sovereign IoT Connectivity

Interoperable NTN and Emergency Communications in Europe

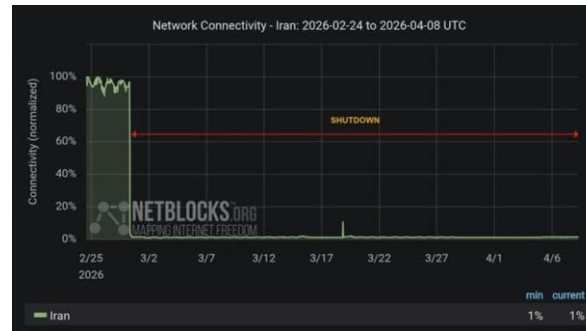
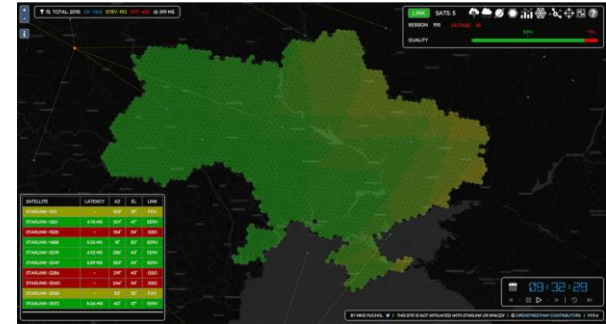
- Ian Shazell – VP Technology, OQ Technology
 - leading 5G IoT, NTN and direct-to-device connectivity
 - Responsible for end-to-end system architecture and mission delivery (space, ground, network)
 - 25+ years in satellite systems and operations, including roles at European Space Agency and in the Middle East

- OQ Technology is a Luxembourgish Low Earth Orbit satellite operator
 - The world's first LEO 5G IoT satcom company
 - Global IoT and M2M satcom solutions
 - Multi-Industry: energy, mining, logistics, maritime, agriculture, government and defense
 - Our patented technology facilitates IoT connectivity anywhere for billions of users, leveraging 5G NTN IoT chips and integrating both terrestrial and satellite networks

Geopolitical Reality: Connectivity Under Stress

Connectivity is Now a Contested and Strategic Asset

- **Ukraine War:** satellite became primary communications infrastructure when terrestrial degraded
 - Dependency on a single provider introduces operational and strategic risk
- **Iran War:** satellite connectivity used to bypass nationwide shutdowns, but actively countered
- Increasing use of:
 - Jamming & spoofing to degrade services
 - Access control & restriction to limit availability
- Connectivity now equals:
 - Resilience in crisis
 - Sovereign control of communications



Where Current Models Fall Short

The Real Gap: Control, Resilience, and Independence

- Terrestrial networks
 - Vulnerable to physical disruption, power loss and congestion
- Satellite Telecommunications today
 - Often single-system dependency
 - Limited fallback between providers
- Fragmented ecosystem
 - Limited interoperability across networks
- Loss of control
 - Access
 - Routing
 - Data location

From Concept to Standard-Based Reality

NTN is Becoming Part of the Cellular Ecosystem

- Shift to standard-based NTN
 - From proprietary satcom → cellular-integrated
- 3rd Generation Partnership Project alignment (NB-IoT, 5G)
 - Built into existing mobile standards
- No specialised devices
 - Standard NB-IoT and 5G user equipment
- Native cellular capabilities
 - Roaming
 - Authentication
 - Mobility
- Ecosystem scaling rapidly
 - Devices, operators, infrastructure

OQ Approach: LEO Direct-to-Device IoT

Standard-Based LEO IoT, Built for Direct-to-Device

- LEO architecture
 - Link budget for handheld & low-power IoT
 - Native mobility support
- Direct-to-device
 - No proprietary terminals
 - Standard NB-IoT & 5G devices
- 3rd Generation Partnership Project aligned
 - NB-IoT today • 5G NTN evolution
- Integrated with terrestrial MNOs
 - Seamless extension of cellular networks
- End-to-end system capability
 - Space • Ground • Network

OQ Approach: LEO Direct-to-Device IoT

From Demonstration to Deployment



OQ Technology Makes History: First-Ever Image Sent via 5G NTN IoT Over LEO Satellite

July 29, 2025



World's First Demonstration of LEO 5G Non-Terrestrial Network Connecting to a Flying Drone

July 16, 2025



OQ Technology Successfully Launches Two ERMIS Satellites on SpaceX Transporter-16

OQ Technology Successfully Launches Two ERMIS Satellites on SpaceX Transporter-16

March 31, 2026



OQ Technology and Nordic Semiconductor Set New Industry Benchmark by Connecting Standard NB-IoT Module to Fully Integrated LEO Satellite Network

OQ Technology and Nordic Semiconductor Set New Industry Benchmark by Connecting Standard NB-IoT Module to Fully Integrated LEO Satellite Network

December 17, 2025



OQ Technology Achieves Europe's First Direct-to-Mobile Emergency Broadcast Message from Space

OQ Technology Achieves Europe's First Direct-to-Mobile Emergency Broadcast Message from Space

November 19, 2025



2026 WINNER RECOGNISED

OQ Technology wins the ESA x GSMA Foundry Excellence Awards 2026 for Direct-to-Device Connectivity

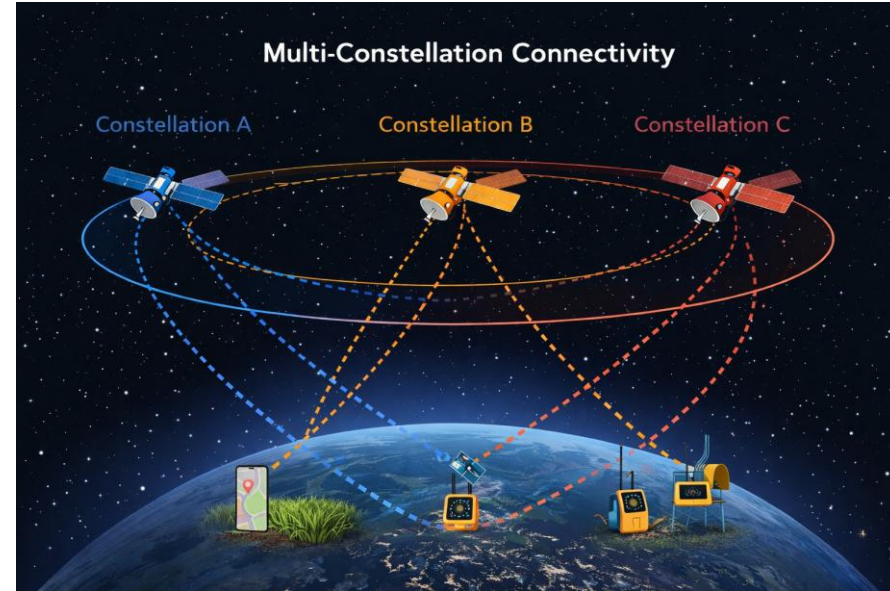
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March 2, 2026

Multi-Constellation Interoperability

Resilience Through Interoperability, Not Isolation

- Future = multi-constellation NTN environment
 - No single system can provide full resilience
- Interoperability via 3rd Generation Partnership Project
 - Common standards across networks
- Seamless roaming
 - NTN ↔ Terrestrial
 - NTN ↔ NTN
- Outcome
 - Redundancy across systems
 - Service continuity in degraded scenarios
 - Reduced dependency on single providers



Sovereign Gateways & Secure Architecture

Sovereignty is Defined at the Ground and Data Layer

- Regional / national gateway deployment
 - Data remains within jurisdiction
- Control of the network
 - Access
 - Routing
 - Data location
- Secure operational domains
 - Encryption
 - Segmentation (civil • commercial • defence)
- Independence from external infrastructure
 - Reduced reliance on non-European systems



Emergency Broadcast

Emergency Communication from Space

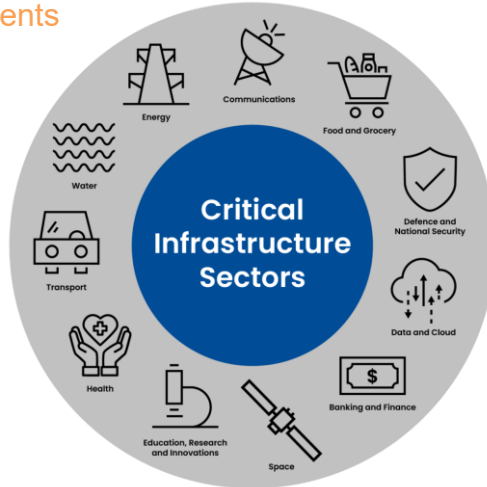
- Demonstrated by OQ Technology
 - Direct-to-device emergency broadcast
- Independent of terrestrial networks
 - Operates during outages, congestion, or shutdowns
- Standard device support
 - NB-IoT devices
 - 5G user equipment
 - No specialised hardware
- Operational impact
 - Wide-area coverage
 - Rapid, simultaneous alerting



Disaster & Defence Applications

Dual-Use by Design: Civil Resilience and Defence

- Disaster response
 - Immediate alerting
 - Network continuity in degraded environments
- Critical infrastructure
 - Energy • Maritime • Transport
 - Remote monitoring and control
- Defence applications
 - Resilient communications layer
 - Reduced dependency on single systems
- Single architecture
 - Multiple use cases across civil and defence



Reality Check: Scaling NTN IoT

Scaling NTN IoT: Engineering Constraints

- Coverage \neq Capacity
 - Scaling users drives capacity limits
- Spectrum constraints
 - Limited and shared resources
- Device limitations
 - Low power • small antennas
- Ground segment scaling
 - Gateway & feeder capacity
- End-to-end network dimensioning
 - Space • Ground • Core

Seamless, Resilient, Sovereign Connectivity

In summary

- Standard-based NTN
 - NB-IoT & 5G (3rd Generation Partnership Project aligned)
- LEO Direct-to-Device architecture
 - Built for low-power, global IoT
- End-to-end system capability
 - Space • Ground • Network
- Proven capability
 - Direct-to-device emergency broadcast
- Built for the future
 - Interoperability
 - Sovereignty
 - Resilience





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