Aerospace Working Group Charter

This charter aims to capture the vertical technology work within the DIA with respect to the Aerospace sector. It establishes the foundational context and rationale for applying data communication technologies in this complex field.

DATACOM INDUSTRY ASSOCIATION

Addressing Grand Challenges Through Communication Systems

September 29th

Munich, Germany

Agenda

1. Introduction to Aerospace WG (Paulo Mendes)
2. Insights by Dr. Andreas Iselt, Rivada Space Networks
3. Open Panel with
   - Paulo Mendes
   - Andreas Iselt
   - Tomaso de Cola

Background & Drivers

Industry Scope

Aerospace drives design, manufacturing, and operation of vehicles traversing atmospheric and space realms, vital for global transportation, communication, defense, and universe exploration.

Integration Vision

Growing impetus to embed aerospace data communication systems into a larger Internet version, enabling seamless real-time data exchange across diverse platforms.

Air Traffic Management

Real-time data exchange for precise aircraft tracking and streamlined pilot-controller communication, minimizing errors and optimizing airspace utilization.

Aircraft Operations

Continuous monitoring within aircraft, supporting predictive maintenance and enhanced safety through advanced data communications.

Space Communications

Essential for transmitting vital telemetry and scientific data from spacecraft, enabling seamless Internet integration with space networks.

Aerospace WG Objectives

The **Aerospace WG** analyzes the role of data communication within the aerospace industry, driving safety, efficiency, and innovation despite significant technical challenges in extreme environments.

Cybersecurity

- Protecting sensitive data and critical systems from malicious actors
- Maintaining data integrity within the aerospace ecosystem

Reliability & Resilience

- Ensuring reliable communication with low delays in extreme environments
- Developing efficient data compression and transmission techniques

Data Management

- Managing vast amounts of data from aerospace systems
- Real-time processing for air traffic control and spacecraft navigation

Networking Technologies

- Developing new in-network computing concepts
- Research into extensible data communication frameworks

Themes & Activities

The **Aerospace WG** will undertake three core themes, subject to revision and expansion in future re-chartering efforts.

Services & Ecosystem

Understanding problem statements and use cases to define technical challenges for innovative services within the aerospace ecosystem.

- Decentralized Aerospace Traffic Management
- Mobile Communications Services via flying platforms
- Earth Observation and Sensing Services
- Data Processing Services with AI integration

Design & Architecture

Comprehensive analysis of technical requirements for novel aerospace services, addressing safety, security, reliability, and regulatory compliance.

Policies & Governance

Analyzing the complex interplay between technological innovation and governmental frameworks, encompassing regulatory compliance and international cooperation.

Whitepapers | Webinars | SRA | Joint R&D

Potential Members

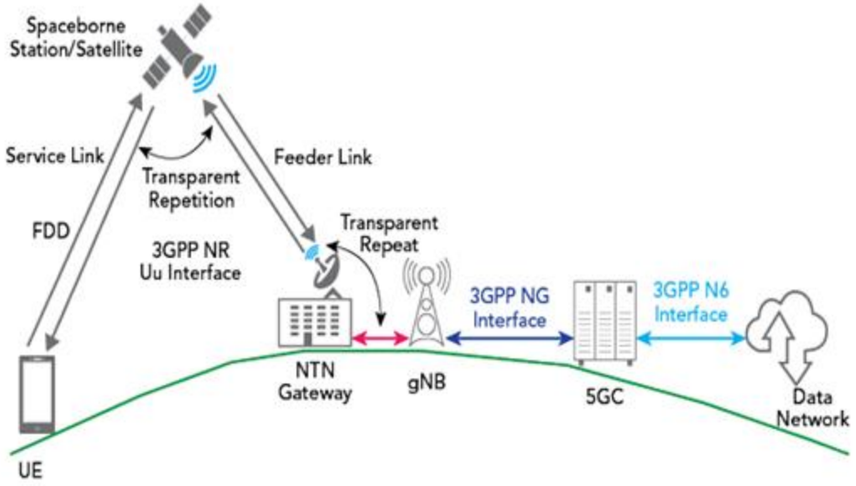
Industrial Members

- Airbus (DE)
- European Space Agency (BE)
- German Aerospace Center (DE)
- Tesat (DE)
- Rivada Space Networks (DE)
- Eutelsat OneWeb (FR)
- Thales (FR)
- Leonardo (IT)
- BAE Systems (UK)
- OHB SE (DE)
- Isar Aerospace (DE)
- E-Space (FR)
- Sateliot (SP)
- Open Cosmos (UK)
- Astrocast (CH)

Academic Members

- TUM (DE)
- ISAE-SUPAERO (FR)
- University of Cambridge (UK)
- Delft University (NE)
- Imperial College London (UK)
- ETH Zurich (CH)
- Politecnico di Milano (IT)
- Université de Toulouse (FR)
- KTH (SE)
- University of Oxford (UK)
- EPFL (CH)
- RWTH Aachen University (DE)

Panel: Analysing the Role of Aerospace in the Future of the Internet



From:
Extending the range of mobile networks

To:
Creating an Aerospace Internet Autonomous System encompassing networking, storage and computing resources.

RIVADA
SPACE NETWORKS

Rivada Space Networks

Dr. Andreas Iselt, VP Network Technology

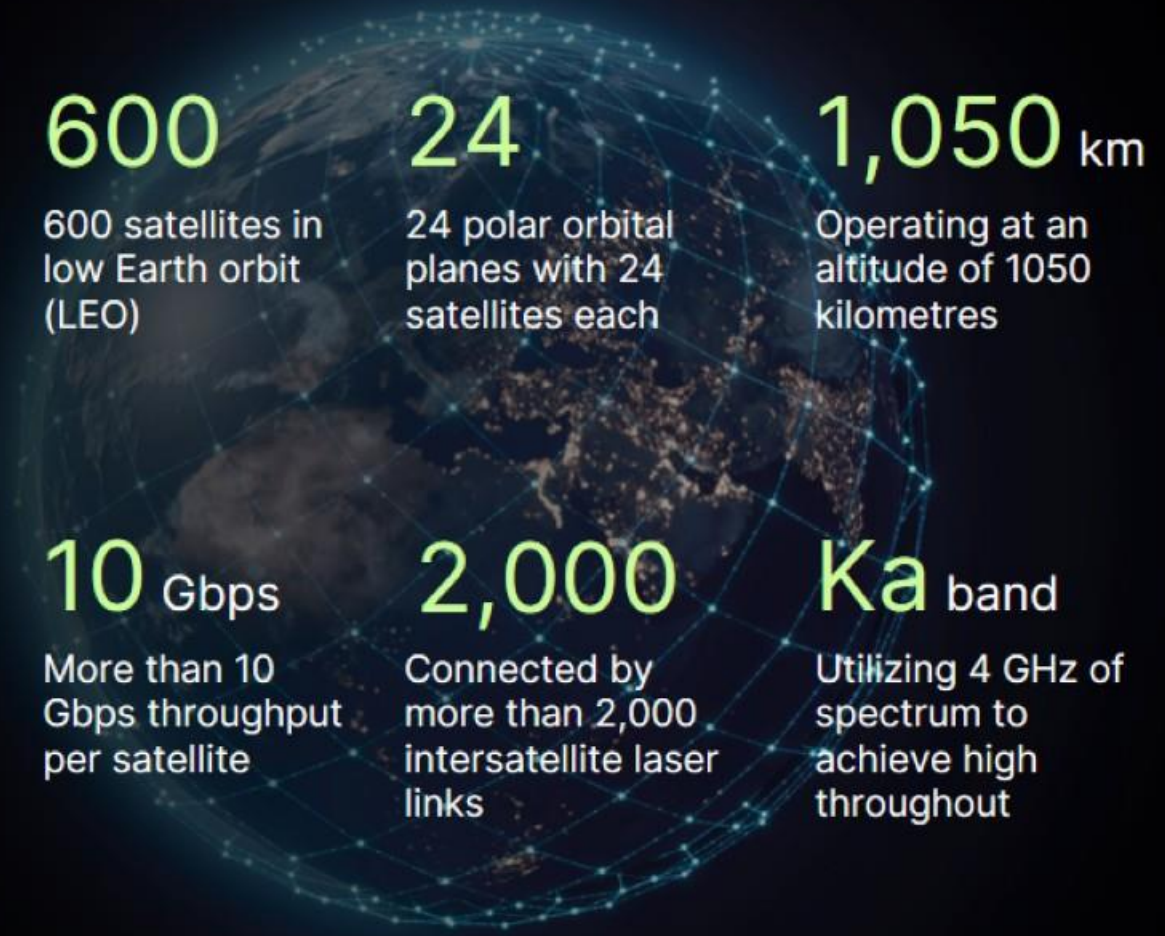
The Outernet

We are a fully inter-connected independent orbital network

We are gateway-less

We are everywhere

We are the Outernet



600

600 satellites in low Earth orbit (LEO)

24

24 polar orbital planes with 24 satellites each

1,050 km

Operating at an altitude of 1050 kilometres

10 Gbps

More than 10 Gbps throughput per satellite

2,000

Connected by more than 2,000 intersatellite laser links

Ka band

Utilizing 4 GHz of spectrum to achieve high throughout

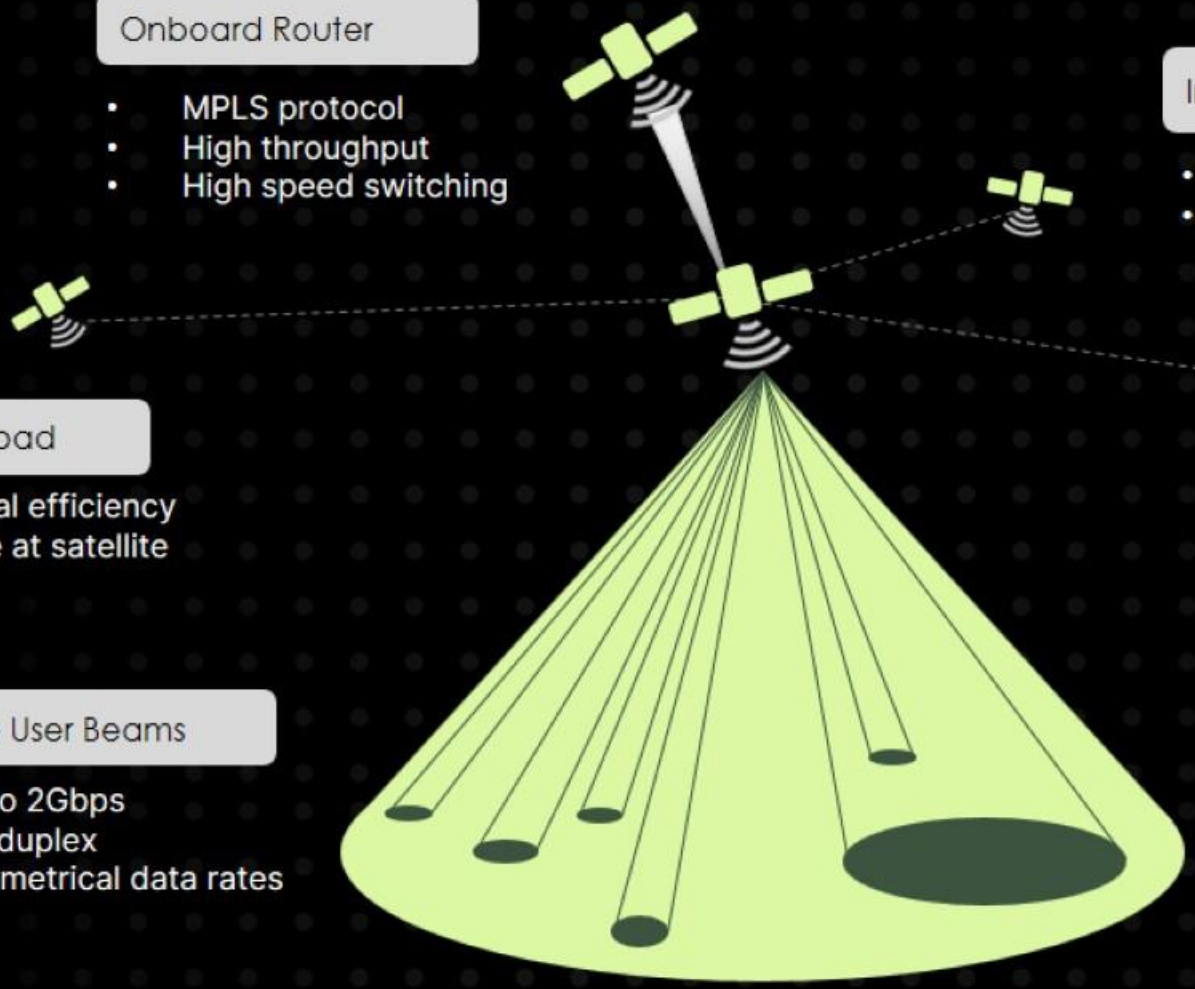
The Space Segment

Onboard Router

- MPLS protocol
- High throughput
- High speed switching

Inter-satellite links (ISLs)

- Optical mesh network enabling high security
- Low latency in-orbit



Regenerative Payload

- Increased spectral efficiency
- Less interference at satellite level

Phased Array Antennas

- Active multi-beam management
- Reconfigurable coverage
- Variable radiated power

Flexible User Beams

- Up to 2Gbps
- Full duplex
- Symmetrical data rates

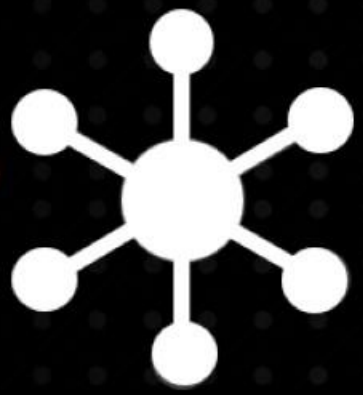
User Terminals Overview

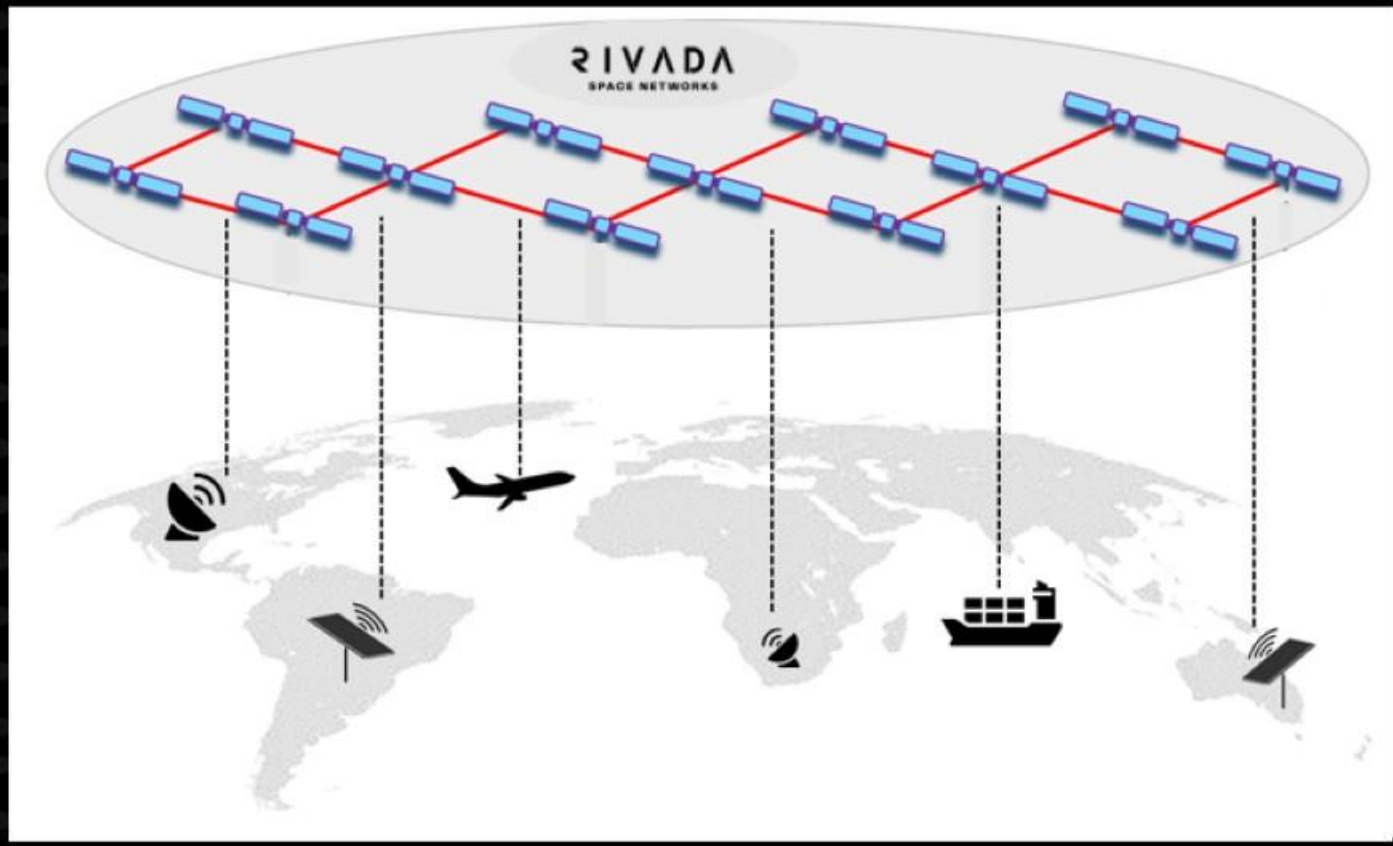
User Terminal Classes

The target application of Private Networks logically leads to three classes of UT:

1. **Small** terminals at the edge of the network
2. **Medium** terminals as the hubs of private networks
3. **Large** terminals for telco / carrier / cloud major aggregation points

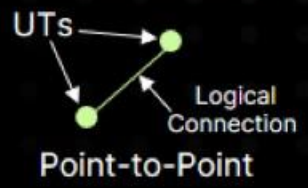
Hub and Spoke Networks





Product Portfolio

E-Line



Point-to-Point

Enterprise Leased Line


Sovereign Connectivity


Remote Site Backhaul

Cellular Backhaul

E-LAN

Multipoint-to-Multipoint

Global Enterprise Networks


Global Enterprise Mobility

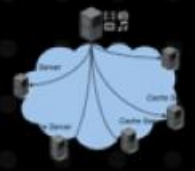

E-Tree

Routed Multipoint-to-Multipoint

Hub-and-Spoke, Mobile Internet Access and Telemetry

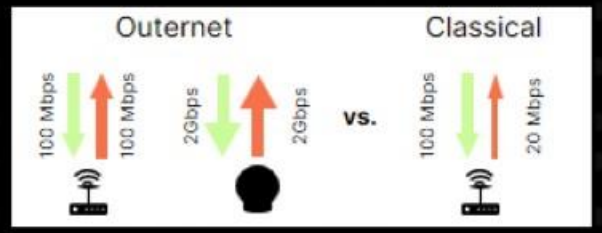


Content Delivery

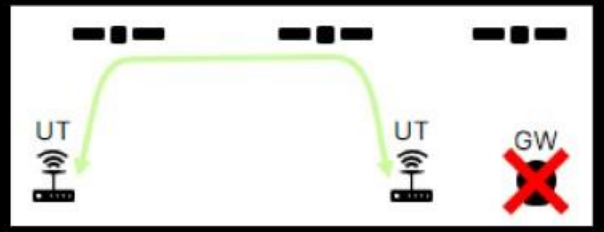


Firmware Updates

Outernet Differentiators



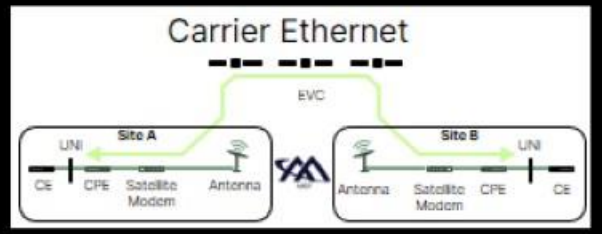
Symmetrical Down/Up Link



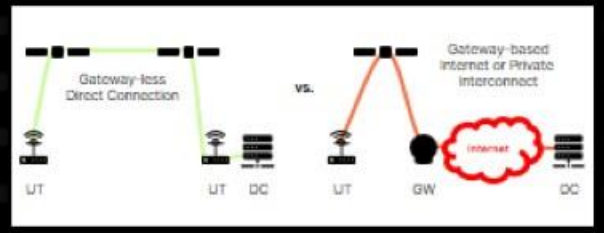
Gateway-less Architecture

Pole to Pole Coverage

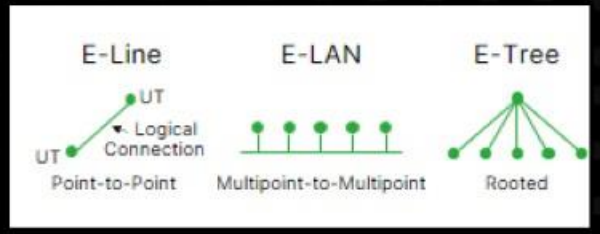
Ultra Low Latency



Layer 2 Connectivity

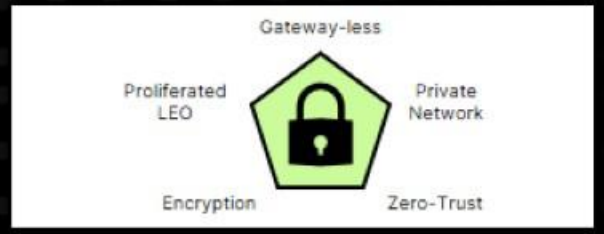


Data Sovereignty



Multi Topology Options

End to End SLA



Security & Resiliency by Design