

AstroMesh

Intersatellite Communication and Radiation Monitoring System for CubeSats

Highlights

Radiation Tolerance

Proven resilience in space environments, leveraging technology from CELESTA, TRISAT-R and RADIOX missions.

Mesh Networking

Robust, radiation-tolerant wireless transceiver configured for intersatellite communication.

Advanced Dosimetry

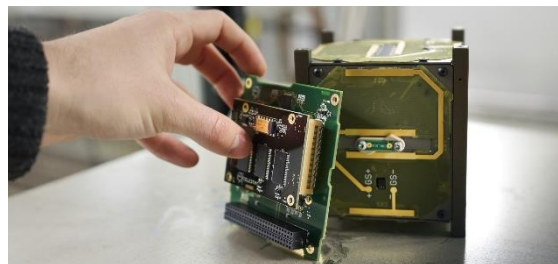
Integrated Floating Gate devices and SRAM sensors.

CubeSat Compatibility

Fits within a standard 1U CubeSat unit (10 cm x 10 cm x 10 cm), optimized for minimal space usage and weight under 200 grams.

Keywords

Mesh network, satellite constellation, radiation monitoring, IoT wireless platform.



Description

The AstroMesh Integrated Monitoring System represents a revolutionary approach to space radiation monitoring and intersatellite communication. Rooted in CERN's expertise in space electronics and successful missions like CELESTA, TRISAT-R and RADIOX AstroMesh offers a robust solution tailored for the expanding field of satellite constellations.

AstroMesh integrates advanced radiation sensors and a mesh network configuration, enhancing both communication and data reliability across satellite constellations. This system utilizes cutting-edge dosimetry technologies, including Floating Gate devices and SRAM sensors. These sensors are integrated with a radiation-tolerant wireless transceiver, enabling dynamic and resilient intersatellite communication. The design is optimized for low power consumption, requiring less than 100 milliwatts, which helps in extending the operational lifespan of satellites and maintaining their efficiency in the harsh environment of space. AstroMesh is tailored to improve the data reliability and communication capabilities of satellites, making it a vital component for modern satellite operations.



AstroMesh

Advantages

Enhanced Communication Capabilities

AstroMesh enables mesh network configurations, allowing for self-healing, dynamic data routing and redundancy, which are critical for maintaining communication links in case of partial system failures.

Technical Precision

Maintains high performance and reliability in harsh space environments, ensuring precise radiation data collection.

Proven Performance

Built on successful CERN technologies operational in LHC and space missions, validated in rigorous environments.

Integration Versatility

Designed for easy integration into CubeSat platforms, offering scalability and adaptability for various space missions.

Applications

Intersatellite communication for:

- Low Earth Orbit satellite constellations
- Geostationary Platforms
- Disaster Management and Response
- (Deep) Space Missions

The applications listed above are examples of where AstroMesh could be utilized. The versatility of the technology encourages further exploration.

Publications

DANCEZA, S., ZIMMARO, A., FERRARO, R., SCIALDONE, A., SIERRA, R. (2024). RAD-TOL WIRELESS SOLUTIONS: STATUS AND FUTURE DEVELOPMENT [POWERPOINT SLIDES]. BE DEPARTMENT, CERN. [Link](#)

For further information and licensing requests, please reach out to the CERN Venture Connect Program Manager.

CVC Programme Manager

Linn Kretzschmar

Linn.kretzschmar@cern.ch

Research Contact

Salvatore Danzeca

Salvatore.Danzeca@cern.ch

Weight
< 200g

Up to
500km
Communication range