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IRIS² :

THE NEW EU PROGRAMME PROVIDING SECURE COMMUNICATIONS VIA SATELLITES

Abstract

The IRIS2 satellite constellation (Infrastructure for Resilience, Interconnectivity and Security by Satellite) is the European Union's answer to the pressing challenges of tomorrow, offering enhanced communications capabilities to governmental and commercial users whilst ensuring high-speed Internet broadband to cope with connectivity dead zones. IRIS2 is conceived as a system of systems, comprising constellations of satellites in different types of non-geostationary orbits, from LEO to MEO. It will provide services to a variety of end users with heterogeneous needs, servicing different segments including governmental and commercial end users. The commercial exploitation of a shared infrastructure and the synergies between the governmental and commercial infrastructures support the establishment of a public-private partnership.

In particular, the IRIS2 system is designed to provide and enable several communications services, spanning from robust broadband low-latency governmental services, assured low-latency broadband and narrowband services (i.e., provided through a commercial/shared infrastructure) and space data relay services. The IRIS2 programme aims to develop a space infrastructure that comprises a multi-orbit satellite constellation designed to provide global high-capacity coverage. This multi-layered concept will efficiently cater for the diverse requirements of the target services. High-speed inter-satellite links will interconnect the space segment assets, hence enabling more secure and effective routing capabilities from remote sites to IRIS2 gateways. Hosted payloads offering communication and/or non-communication services will also be made available to governmental or commercial operators. The IRIS2 system will also develop pilot user terminals and test user terminals to allow validation and monitoring of the end-to-end service provision chain according to service portfolio and areas.

To enhance interoperability amongst terminals developed by different manufacturers and to improve their cost effectiveness, user terminals will be compliant with new 3GPP 5G Non-Terrestrial Networks (NTN) technical specifications. The future vision is the integration of the terrestrial and satellite-based networks.

This paper describes the architecture of the IRIS2 system, its key functional and performance requirements, and major technical trade-offs. The analysis is carried out for all system segments and target services with particular emphasis on the robust governmental broadband application. The key system challenges are highlighted, and potential solutions are outlined.