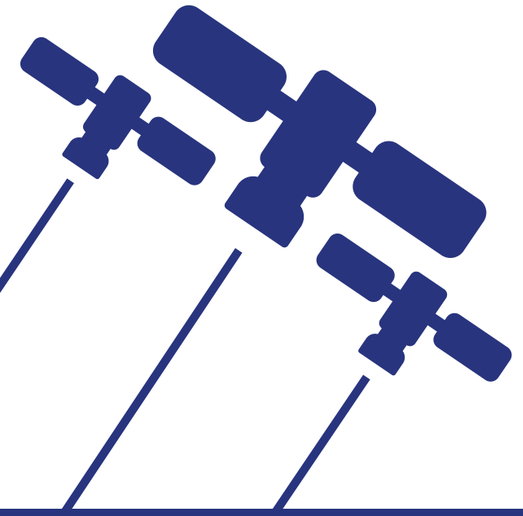

PROJECT FACTS

Start: 1st December 2020

Duration: 28 Months

Call: H2020-SPACE-2018-2020

Topic: SPACE-29-TEC-2020, Satellite communication technologies

Type: Research & Innovation Action

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DYNASAT project

dynasat.eu

Funded by the EU's Horizon 2020 programme under agreement n° 101004145

DYNASAT

DYNAMIC SPECTRUM SHARING AND BANDWIDTH-EFFICIENT TECHNIQUES FOR HIGH-THROUGHPUT MIMO SATELLITE SYSTEMS

DEMONSTRATIONS OVERVIEW

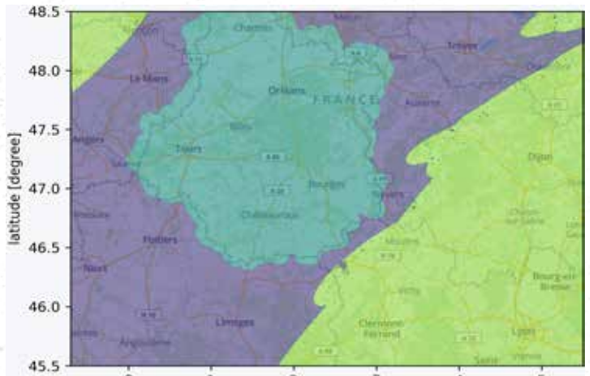
Version 2

dynasat.eu

Dynamic Spectrum Access

Fairspectrum

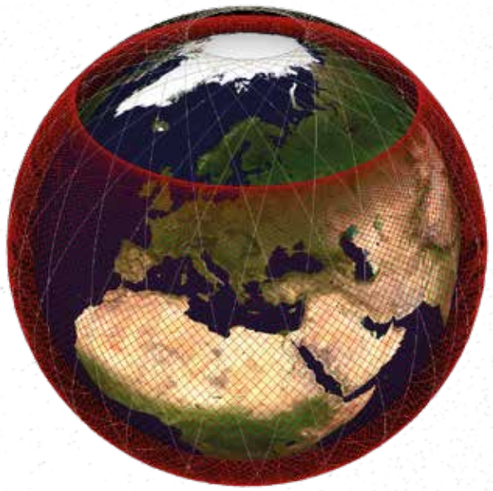
- Visualisation of the sharing scenarios as coverage maps of Terrestrial Networks (TN) and Non-Terrestrial Networks (NTN).
- The presented Key Performance Indicators (KPIs) are coverage, interference, capacity and Spectrum Utilization Efficiency (SUE).
- The study area covers France, Spain, Atlantic Ocean and a part of Mediterranean.
- In the demonstration, NTN is primarily used to cover areas where terrestrial 5G network is not deployed, like sea areas and Spain. NTN coverage is formed by two LEO satellites from the DYNASAT satellite constellation. Each satellite has 91 beams. The DSA system activates and de-activates satellite beams so that the Interference to Noise (I/N) ratio at the terrestrial network UEs does not exceed the set limit. Terrestrial network is presented by real mobile site locations in France.
- The performance impact of the LEO satellite movement is demonstrated by showing coverage areas and KPI graphs for varying satellite locations along the orbit of the satellites.
- The results are generated for the scenarios in which the beams are correctly optimised for all satellite positions, as well as for the scenario in which the beams are optimised for the first location and the optimisation result is used for the other satellite positions.



Assessment of user link capacity at the system level

ThalesAlenia Space
a Thales / Leonardo company

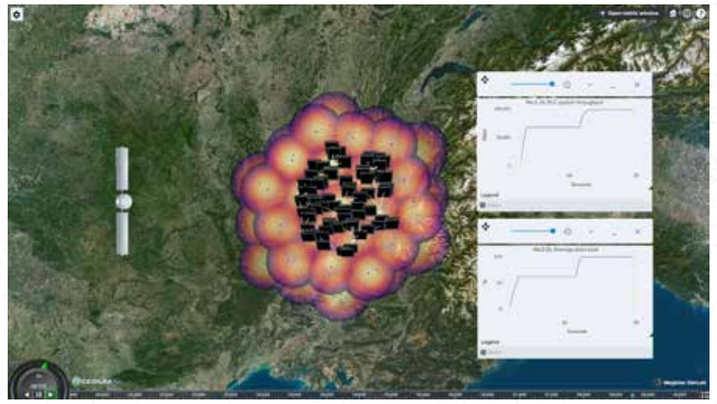
- Relevant charts show maps of Europe.
- Each map displays different information about the constellation's performance, such as delivered capacity or spectral efficiency at the cell level. It is made up of various visual metrics for capturing a snapshot of the constellation.
- These maps cover two scenarios: 1) a baseline scenario and 2) a spectrum sharing scenario.
- A figure depicts the capacity delivered at the cell level evolving over time, by incrementing the satellites positions across their orbits, for several time steps.
- An animation shows the Earth, the orbits of the DYNASAT constellation, and the satellites as they move along the orbits. This allows the geometry of an inclined satellite constellation to be visualised.



Multi-Connectivity for 5G NTN

MAGISTER SOLUTIONS

- Multi-Connectivity (MC) for throughput/reliability enhancement between Non-Terrestrial Networks (NTN) and NTN/Terrestrial Network (TN).
- Design of the MC node addition and traffic steering algorithms.
- Definition of the system architecture, including the measurements and the signalling, as well as the scenarios where MC would be beneficial.
- In the evaluation scenarios, MC can maximize the resource utilization by dynamic traffic steering yielding throughput enhancements.



Coordinated Dynamic Spectrum Access

MAGISTER SOLUTIONS

- Definition of the required measurements, signals, and system architecture.
- Limiting the allowed spectrum per system based on the current needs.
- Allows efficient utilization of satellite connectivity for coverage extension where TN connectivity is not possible or financially feasible.
- Example results show significant spectrum utilization gains from the C-DSA compared a statically coordinated shared spectrum case.