



UNIVERSITÀ
DEGLI STUDI
DI PADOVA

UNITE - Unmanned Aerial Vehicles for Non-Terrestrial Communications and Sensing

Satellites and unmanned aerial vehicles (UAVs) represent a perfect match for non-terrestrial sensing and communications in 6G. Hence, it is of great interest to combine UAVs with satellites to maximize their respective advantages for emerging applications. This project tackles the challenges of using UAV for non-terrestrial communications and non-terrestrial sensing, in combination with satellites, for 6G. The objectives of this research include:

- 1) Data-driven UAV deployment: to perform intelligent analysis of the spatial and temporal needs for UAV deployment using data mining techniques in important 6G scenarios;
- 2) Communications and sensing channel modelling: to establish realistic channel models to describe the 3D environment in non-terrestrial applications;
- 3) Separate non-terrestrial communications and sensing designs: to develop efficient data transmission strategies to ensure the reliable delivery of information and the accurate acquisition of network perception using new channel models, reconfigurable intelligent surfaces and computer vision;
- 4) Integrated non-terrestrial communications and sensing designs: to devise robust signal processing and networking algorithms to integrate non-terrestrial communications with non-terrestrial sensing using dual-functional waveforms and UAV wireless charging based on the previous separate designs;
- 5) Sensing-based communications designs: to design effective non-terrestrial communications methods using the network information acquired from non-terrestrial sensing;
- 6) Disseminate, exploit and communicate the outcomes of this research to the wider community.

Achieving the above measurable objectives will provide crucial inputs to the exploitation of UAVs in non-terrestrial communications and non-terrestrial sensing for 6G by solving its major challenges, which will allow us to address the digital inequality issue and to enhance the terrestrial network functionality.

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Find out more: <https://cordis.europa.eu/projects/en>