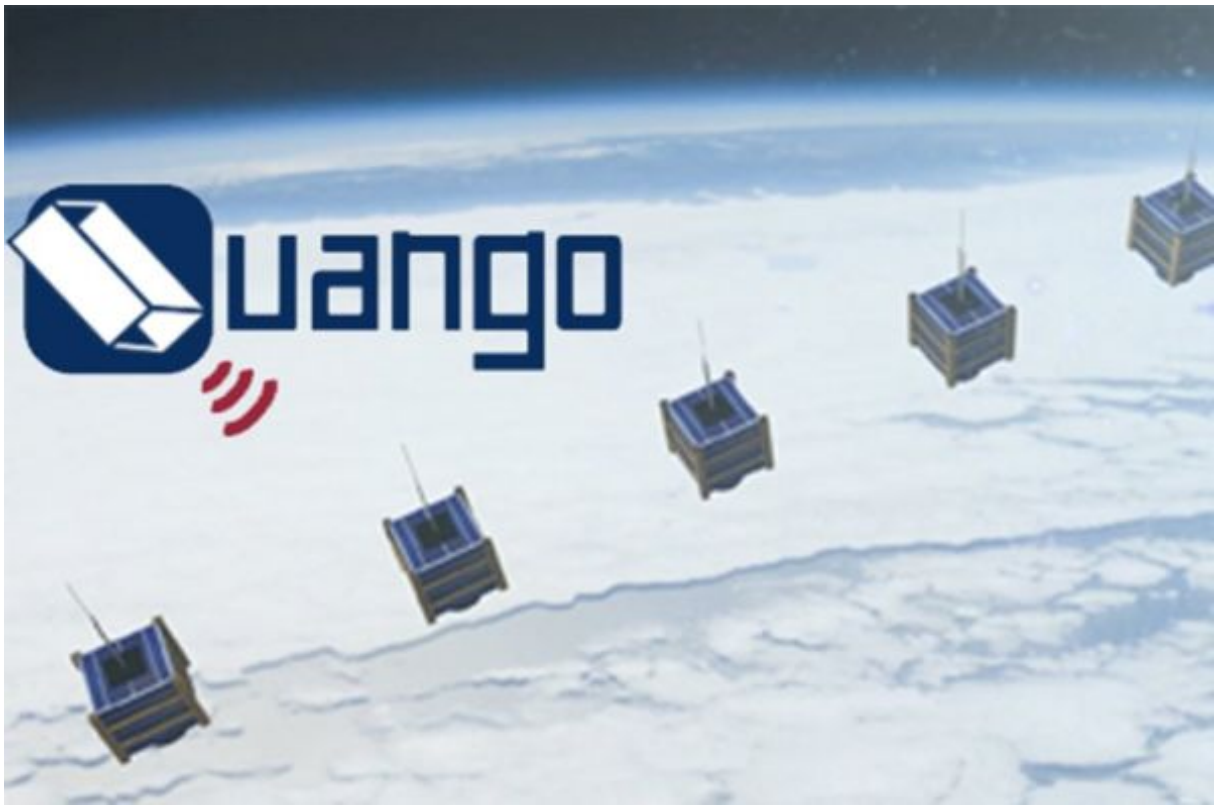


Quantum Communications with NanoSatellites and 5G protocols

The recently launched European project Quango aims to develop a 5G-QKD nanosatellite constellation to ensure maximum security in communications across Europe.

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Cybersecurity is the main concern for the digital world of these days. We all share tons of information on the internet, but are still not clear on how well this data is being protected. Aware of this inminent hacking threat of sensitive and utmost important data, the European Commission has, for these past years, put in motion different programs to find solutions on how to protect all communications within the European region. To do this, it is essential to improve and maximise security protocols with its feasible integration into current communication channels, such as 5G, which not only involves ground but also satellite communications.

Quantum Key Distribution (QKD) is an ultra-secure form of encryption that allows data to be transmitted with a very high level of security, and is proving to be a protocol that can be

easily integrated into current technologies that are being used to transmit information throughout the European continent. On the other hand, 5G is the fifth generation of wireless connection that is being currently deployed all over the world to enable the Internet of Things (IoT) technology.

Coordinated by University of Padova, in collaboration with the research institutions ICFO, Sorbonne University, University of Malta, and the companies Sateliot, Stellar Project, and Argotec, the project aims to design a secure communication network implementing Quantum technologies, 5G communications and nanosatellites. More specifically, the project aims to design a 12U-CubeSat low-earth-orbit satellite constellation, deployed in an orbit in space at 600km, that will combine capabilities for secure communications with QKD and 5G connections.

QUANGO will carry out laboratory demonstrations of critical components, subsystems and payloads and study their implementation feasibility. It will then pioneer the integration of QKD security systems into 5G protocols aiming to create, in the long run, a 5G-QKD satellite constellation that can cover all European areas and offer the maximum security in communications.

QUANGO will provide a new paradigm to share the satellite infrastructure required for secure communication based on quantum technologies and for 5G communication. It will help lay the groundwork for the future Quantum European Infrastructure, a pan-European quantum communication infrastructure that uses satellite as well as ground-based solutions to connect and link European regions and cities.

As Valerio Pruneri, Group Leader at ICFO, partner in Quango and expert in quantum technologies, states, i¿½Quantum technologies are proving to be a game changer in the fie d of communications and cybersecurity. With the project Quango, we will test the technolo y that we are developing for QKD for integrating it in 5G networks which will be deployed usi g a nanosatellite constellationi¿½.

Finally, as Giuseppe Vallone - the coordinator of the project and quantum technology expert - emphasizes i¿½In Quango, we will develop and test the technology required for a secu e communication network deployed using nanosatellites. Combining new technologies such s Quantum Communication and 5G in a space environments requires interdisciplina y competences and an European collaboration is the best way to achieve the ambitious goa s of Quangoi¿½.