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UNDERSTANDING AND ENABLING QUANTUM COMMUNICATION AT THE EUROPEAN SPACE AGENCY

Abstract

The reality of large commercial satcom constellations in LEO, whether planned or in various stages of operation, have changed the satellite communication market. Initially, Optical and Quantum Communication technologies were not at the heart of the satcom industry - only isolated and self-standing developments launched successfully, covering niche areas and plagued by high prices, complexity and varying ranges of operability. This has now changed irrevocably. What will be the impact of Quantum technologies on this changed market?

Satellite networks are being operated as parts of commercial telecommunication networks. Within two decades, optical communication technologies went to scale as current and next generations of constellation nodes all plan to embark optical intersatellite links. This was driven by clear needs and business cases.

Quantum technologies are not yet where the optical satcom terminals were at the beginning of this century. Our understanding of the concept of quantum communication has barely begun to evolve beyond quantum key distribution concepts. The European Space Agency has developed a preliminary position on the road towards true Quantum Communication in preparation of Agency wide strategies driving by the Director Generals agenda.

This paper will present an internal White Paper on the subject of Quantum Communication, review ongoing discussions with our key stakeholders, and aims outline the basis for ESA's work in the area in the coming years.