

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advanced Technologies (5)

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SPACE-QUEST: ABSOLUTE SECURE COMMUNICATION BASED ON QUANTUM
CRYPTOGRAPHY

Abstract

In a modern information based society secure communication is of utmost importance. An overnight breakthrough in mathematics or computer science could make electronic money transfer instantaneously worthless. The security of classical cryptography relies on the computational difficulty of certain mathematical functions, and can neither provide any indication of eavesdropping nor guarantee security. Quantum cryptography provides both as it is based on theoretical and experimental proven laws of nature. The use of satellites will enable us to perform quantum communication on a global scale. Currently, with present fiber and detector technology terrestrial quantum communication is limited to within some 100 of kilometers. Since this is still well within a radius a single person can travel within a very reasonable time, space-based QKD is expected to be of high technological impact in the future. The possibility to distribute an absolute secure key between globally separated communication parties makes such a system highly marketable. In various feasibility studies and experimental tests over a 144km terrestrial free-space channel for adopting the concepts of fundamental quantum physics and quantum communications to a space infrastructure it was found, that based on present-day technologies, successful demonstration of quantum communication protocols in space. Here we present the basic principles of quantum key distribution (QKD) and it's current state-of-the-art protocols implementations and resent results from ESA funded studies in this field. The present programmatic roadmap of Space-QUEST is compatible with a launch date by end of 2014