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Industrial application for Global Quantum Communication

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In the last decade the quantum communication community has witnessed great advances in photonic quantum cryptography technology with the research, development and commercialization of automated Quantum Key Distribution (QKD) devices. These first generation devices are however bottle necked by the achievable spacial coverage. This is due to the intrinsic absorption of the quantum particle into the communication line. As QKD is of paramount importance in the future ICT landscape, various innovative solutions have been developed and tested to expand the spatial coverage of these networks [R. Alleaume, 2007, C. Elliott, 2004, F. Xu, 2009] as in the QuantumCity initiative. One such technique that is being considered for the creation of a global QKD network is to couple quantum-secured Metropolitan Area Networks(MANs) with secured ground-to-satellite links as access points to the global network. This technique, however, is susceptible to atmospheric parameters and provides very limited contact times for the quantum key exchange. As parallel step to the development of satellite-based QKD networks, we intend to investigating the use of commercial aircrafts as secure transport mechanisms for a global QKD network. Commercial airliners create an ideal alternate global network for key distribution in terms of coverage, reliability and frequency. Further the airports at each connected city have the appropriate supporting infrastructure to serve as an access point to the global network. The quantum-secured global network will provide the infrastructure to create, distribute and manage encryption keys for use in secure global communication. The objective of this initial concept to create a proof of concept test network to investigate the aforementioned global QKD Network with the use of commercial airliners. The initial systems that are to be used will require the aircraft to be a trusted zone although certified tamper-proofing techniques will be used. The longterm objective is to upgrade the systems to contain quantum security through the use of quantum-powered memory solutions. A secure key management network layer will also be developed and implemented to control the flow and usage of keys within the global network. The secure key management network layer will further control the distribution of keys and encryption within the MAN.

**Level (Hons, MSc,
 PhD, other)?**

PhD

**Consider for a student
 award (Yes / No)?**

Yes

**Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?**

Yes

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