

Abstract Submitted
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Drone-based Quantum Key Distribution¹ ANDREW CONRAD, ALEXANDER HILL, DALTON CHAFFEE, KYLE HERNDON, BRIAN WILENS, University of Illinois at Urbana-Champaign, DANIEL SANCHEZ-ROSALES, DANIEL GAUTHIER, Ohio State University, PAUL KWIAT, University of Illinois at Urbana-Champaign — Quantum communication channels offer the ability to transmit provably secure messages, link together distant quantum computers, and support the deployment of advanced networked quantum sensors. Although many applications of quantum communication channels can tolerate wired connections, e.g., fiber-optic cables, other potential applications benefit from wireless quantum communication links. Small mobile platforms, such as multi-rotor drones, offer the ability for rapid reconfiguration and facilitate operation in both urban and rural environments. Here, we discuss our progress towards developing a quantum key distribution channel over a free-space link between two multi-rotor drones in flight. Establishing such a quantum communication channel requires an advanced control system to perform optical alignment in-flight, as well as developing and packaging a suitable quantum light source, optics, single-photon detectors, time-tagger, and synchronization electronics all into a small Size, Weight, and Power (SWaP) footprint for use on a drone payload.

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