

Research continues on secure, mobile, quantum communications

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Researcher Dr. David H. Hughes of the Air Force Research Laboratory in Rome, N.Y. is leading a team investigating long-distance, mobile optical links imperative for secure quantum communications capabilities in theater.

Hughes and his team have conducted high data-rate experiments using an optical laser link, a tool which exploits the quantum noise of light for higher security. The system uses [adaptive optics](#) for transmission of high data-rate video and audio signals over long distances.

AOptix Technologies, a developer of ultra-high bandwidth laser communication solutions for government and commercial markets has joined forces with AFOSR and AFRL to conduct flight tests at 10,000 feet to evaluate the performance of the high-altitude, air-to-ground, [quantum communications](#) links.

Up to this point, the challenge with free space optical links, which use [fiber optics](#) for transmission have been the turbulence or distortions from temperature differences that cause motion or wind in the atmosphere.

"When you transmit information through turbulence (motion in the atmosphere caused by turbulent cells or "wind") it's distorted just like the information coming from the light reflected off a distant, twinkling star to your eye. It's fuzzy," said Hughes. "You have to overcome that by using adaptive optics to rectify the distortion and get a better quality

signal."

As of right now, Hughes and his team have established an optical link without distortion in test situations at a distance of 35 kilometers in both stationary and flight situations. The next flight test will aim for increased altitudes to demonstrate further air-to-ground distances.

"If we can now put one link on the ground and one on a demo aircraft, it wouldn't take much to apply the technology to operational aircraft for the Air Force," said Hughes.

"This new capability may even save lives because it will enable the military to access ultra-high bandwidth ISR (intelligence, surveillance reconnaissance) information in real-time from various manned and unmanned airborne platforms," said Dean Senner, President & CEO of AOptix Technologies.

Source: Air Force Office of Scientific Research

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