



## BRIGHT SINGLE PHOTON SOURCES FOR SECURED COMMUNICATIONS

UTS - UNSW- Macquarie University- Northrop Grumman

*"Deliver a solid state, on-demand single-photon source and employ it to demonstrate free-space quantum key distribution."*

### Problem

New capabilities are needed to perform secure, quantum-enabled free space communications.

### Solution

The team employed quantum technologies - single-photon source - to engineer next-generation secured communication channels. A hack would be instantly detected in a channel comprising only single photons. For this purpose, the team engineered "plug and play" ultra-bright quantum light sources that operate at room temperature and can be transferable, designed scalable antennas to enhance photo emission rates, and demonstrated proof of principle quantum key distribution and secured communication.

The technology has significant implications for Australia's national security, not only securing the

process of sending information but also preventing adversaries from decrypting this information.

The team has demonstrated Australia's first sovereign quantum key distribution. The project continues under a start-up, Luminere Systems, and in partnership with local industry, ideas were pitched to NASA.

**START TRL: 4**

**EXIT TRL: 5**

**DIN INVESTMENT: \$750,000**

**EXTERNAL INVESTMENT: \$3,042,243**

**NO OF RESEARCHERS: 9**

**NO OF NEW ROLES: 3**

**DIN SII Funding**  
DIN \$750,000

2020

**US Office of Naval Research**  
Coherent Quantum Emitters  
in Hexagonal Boron Nitride  
\$324,000

2022

**ARC Future Fellowship**  
FT220100053 Quantum  
Nanophotonics with  
Atomically Thin Materials  
\$1,118,243

**UTS Strategic Research**  
Accelerator  
\$500,000

**DIN Video Case Study**  
Video

**Defence Trailblazer**  
Funding \$1,100,000

2023