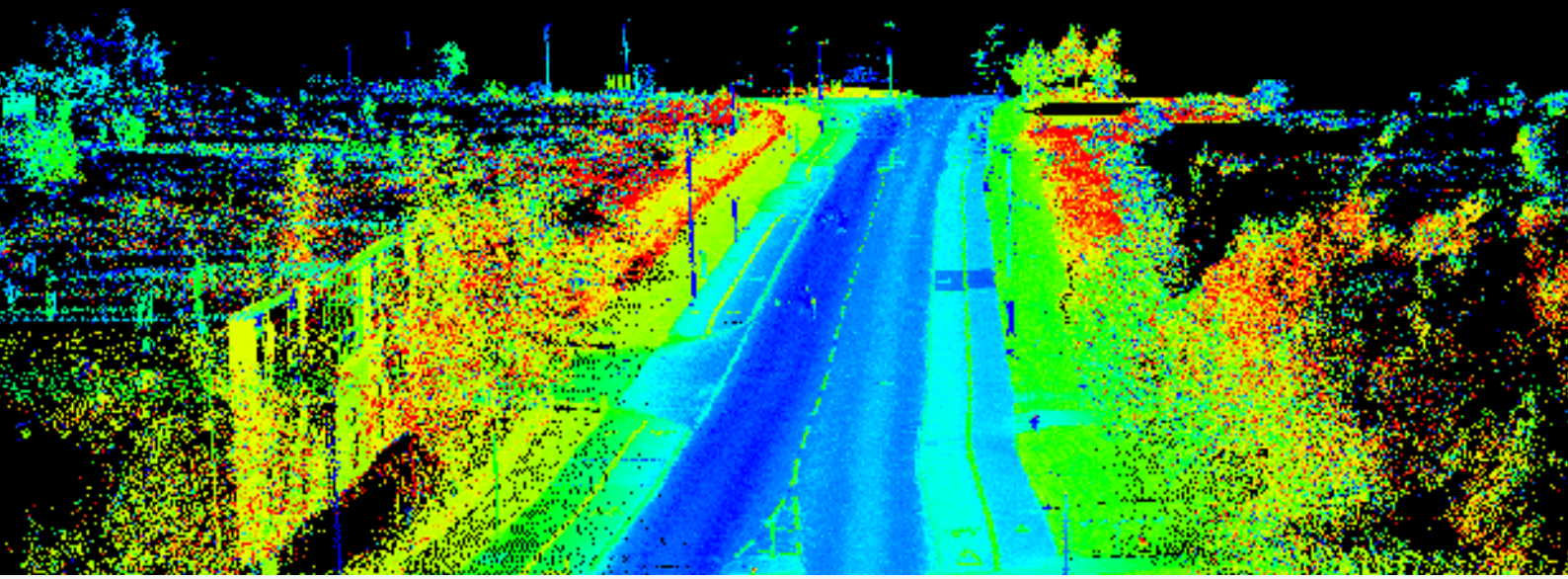
SINGLE-PHOTON LiDAR



ID Quantique (IDQ) is developing a new generation of eye-safe, single-photon LiDAR (Light Detection And Ranging) systems.

This is part of a longer-term roadmap which in the coming years will see development of a family of LiDAR technologies that will extend the detection range and capability to image in conditions of poor visibility beyond those of conventional LiDAR technologies. Approaches will include new configurations of LiDAR with more compact, highly rugged and lower-cost integrated photonics designs, those with an emphasis on computation and greatly simplified optics, and future versions with the ability to see round corners. We welcome discussions with potential end-users and development partners with an interest in developing solutions for industries including (but not limited to) industrial surveillance, defence and security, automotive and aerospace.

What is LiDAR?

LiDAR is a proven and widely-used technique for 3D imaging. Pulses of light from a laser are transmitted toward the area of interest; some of this light reflects from any object in view back to a detector. The time taken for this round-trip is used, along with the speed of light, to calculate the object distance. A typical LiDAR includes an emitter, a receiver, and a processing/control unit: these three components make up the LiDAR transceiver, which is combined with an optical scanning system to map out 3D scenes. The technique is available commercially but most commercial systems operate at shorter wavelengths, restricting their range and ability to image in conditions of poor visibility.

Why use it?

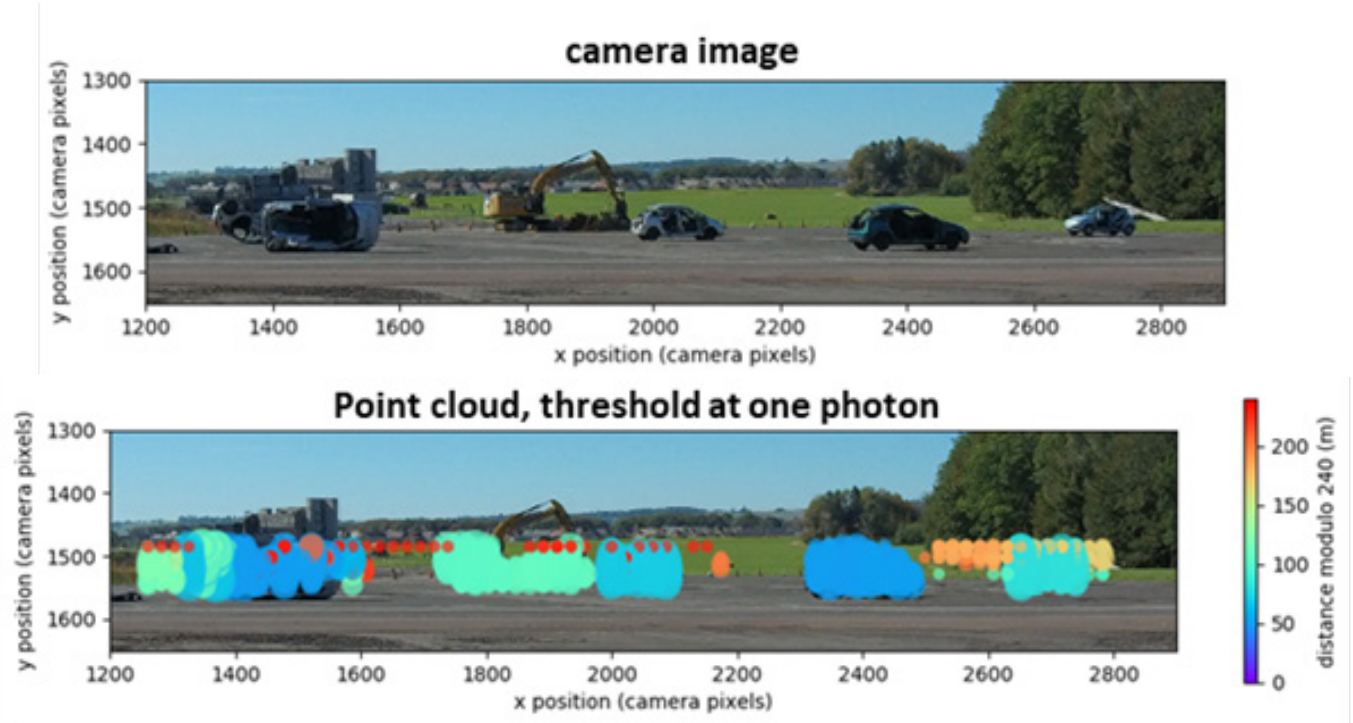
LiDAR has enormous potential in the automotive sector as a vital part of the suite of sensors in autonomous vehicles (AVs): an application that has led to strong investment in the technology in recent years. Alongside AVs, there are myriad other applications for LiDAR across a wide range of sectors, including space, transportation, and defence and security.

Many applications, particularly in the automotive sector, require long (few hundred metre) detection ranges, wide fields of view, and eye-safe operation. These requirements can be addressed by employing single-photon detectors – highly sensitive light sensors – and lasers that operate in the eye-safe wavelength region (greater than 1.4 microns).

How can IDQ help?

With its established reputation in Quantum Key Distribution (QKD) hardware solutions, alongside a history of quality products for precision timing and single-photon detection, IDQ has the in-house expertise to develop and industrialize LiDAR systems. For the LiDAR prototype developed in 2018, IDQ utilized its in-house expertise in high-speed electronics for single-photon detection, optical systems design, back-end & GUI software, and FPGA programming. The result was a 1550nm, single-photon LiDAR system that could detect an object with 10% reflectivity at a distance of greater than 300 metres. IDQ delivered the transceiver system – the optical 'engine' of the LiDAR – that was presented as part of an integrated scanning device at CES 2019 in Las Vegas, just 6 months after project kick-off.

IDQ's core LiDAR concept, which is based around the use of single-photon coincidence detection to distinguish between hard objects and unwanted noise – due to fog, for example – could potentially yield major benefits for defense applications. Of particular interest are those applications targeted at poor visibility environments, such as helicopter landing systems; and more generally, those applications that require automation to remove humans from a dangerous environment, such as vehicles for last-mile resupply.



About ID Quantique

ID Quantique (IDQ) is the world leader in quantum-safe cryptography solutions, designed to protect data for the long-term future. The company provides quantum-safe network encryption, secure quantum key generation and quantum key distribution solutions and services to the financial industry, enterprises and government organisations globally. IDQ also commercializes a quantum random number generator, which is the reference in the security, simulation and gaming industries.

Additionally, IDQ is a leading provider of optical instrumentation products, most notably photon counters and related electronics. The company's innovative photonic solutions are used in both commercial and research applications.

In 2018 IDQ set up a solutions development group and a laboratory based in Bristol, UK, from where several successful projects in LiDAR, optical communications and gas sensing have been delivered. The multidisciplinary group has expertise from basic physics through hardware engineering and soft/firmware, along with commercialisation of complex sensor systems in harsh environments.

Contact: Andrew Strong , andrew.strong@idquantique.com, +44 7484 252154