

# JOINT PRESS RELEASE

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## **ST Engineering and NUS to develop network encryption solutions that offer superior security by using next-generation quantum technology**

ST Engineering and the National University of Singapore (NUS) have joined forces to develop network encryption solutions that provide superior security by leveraging quantum cryptography technology. The collaboration is supported under the National Research Foundation's (NRF) Quantum Engineering Programme (QEP).

Current leading security standards such as those used in ATM machines or online transactions do not use quantum technology and this may pose a security risk when quantum computing technology becomes readily available. While these keys can still adequately protect digital communication, there have been reports of breaches and there is a need to explore alternative technologies.

Quantum key distribution (QKD) technology uses the laws of quantum theory to distribute secret keys over an insecure network. It uses the highly sensitive nature of quantum signals and can detect any attempts on eavesdropping, offering a secure form of encrypted communication.

The secret key is transmitted using a sequence of carefully prepared single-photon quantum signals. If the secret key is intercepted, the quantum signals will be disturbed and keys will be rendered useless. This enhances the security of digital communication as data cannot be intercepted or eavesdropped.

The collaboration between ST Engineering and NUS will take this to the next level by using **"measurement-device-independent" QKD (MDI-QKD) technology** to heighten cybersecurity defence against increasingly sophisticated threats. It also operates efficiently under real-world conditions.

NUS researchers and ST Engineering engineers will make advanced quantum cryptography more accessible to the wider market and further advance this technology by developing a new class of "quantum-resilient encryptors". These encryptors provide a highly scalable and cost-effective solution that can be deployed with minimal disruption to existing digital infrastructure. This addresses the current limitations in the market as products are designed for point-to-point communication and are not scalable. This will also accommodate a larger number of users, and will benefit numerous applications – from financial services institutions, to government agencies, and hospitals.

**Mr Goh Eng Choon, President of Cybersecurity Systems Group at ST Engineering,** said, "The threat landscape is evolving very rapidly and we must be prepared for challenges to come in the post-quantum computing era. While QKD technology can be used to secure digital communications, it can also be used to mitigate future quantum computers being used to exploit and maliciously target weak links and disrupt the global

encryption ecosystem. This research into quantum cryptography and the co-development of the industry's first solution will allow us to explore the potential of this technology, further strengthen our arsenal of advanced cybersecurity solutions and gain a foothold in the QKD market."

NUS is also working with leading nanoelectronics institute companies to co-develop new chip-based quantum crypto devices, which can be applied to the new MDI-QKD technology, as well as broader quantum cryptography technology due to smaller device footprint and lower cost. These are among a suite of projects in quantum communication at the university.

**NUS Assistant Professor Charles Lim Ci Wen**, who is the project leader for this collaboration between NUS and ST Engineering, said, "As quantum computing becomes more prevalent worldwide, information security threats will also become more advanced. This collaboration which leverages MDI-QKD will lead to quantum-resilient encryptors that are not only secure against channel attacks but also against detection side-channel attacks.

Asst Prof Lim, who is also an NRF Fellow and a Principal Investigator at the Centre for Quantum Technologies (CQT) at NUS, added, "Additionally, this collaboration provides a fantastic opportunity to explore how chip-based quantum devices can be integrated into commercial network encryptors, which could significantly reduce the cost of QKD technology."

**Mr George Loh, Director of NRF's Services & Digital Economy**, said, "As the use of digital technologies and services become increasingly mainstream, it is important that we find better ways to ensure our online engagement and digital privacy is more secure than ever. The objective of the National Quantum Engineering Programme, launched by NRF in late 2018, is to translate quantum research into tech-enabled capabilities that can benefit society and beyond. The research partnership between ST Engineering and NUS is testament to the success of deep-tech capability collaboration between academia and industry, which is based on strong foundational quantum science research at the Centre for Quantum Technologies in Singapore."

The partnership between ST Engineering and NUS is part of NRF's QEP initiative that was announced in 2018 to help Singapore's industries compete at the global forefront of innovation and enterprise, by tapping world-class expertise in our scientific research community.

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### **About the National Research Foundation, Prime Minister's Office, Singapore**

The National Research Foundation (NRF) is a department within the Prime Minister's Office. The NRF sets the national direction for research, innovation and enterprise (RIE) in Singapore. It seeks to invest in science, technology and engineering, build up the technological capacity of our companies, encourage innovation by industry to exploit new opportunities that drive economic growth, and facilitate public-private partnerships to address national challenges.

Under RIE2020, NRF is committed to create greater value in Singapore from our investment in research, innovation and enterprise through 1) closer integration of research thrusts, 2) stronger dynamic towards the best teams and ideas, 3) sharper

focus on value creation, and 4) better optimised RIE manpower. Visit [www.nrf.gov.sg/RIE2020](http://www.nrf.gov.sg/RIE2020) for more details.

### **About National University of Singapore (NUS)**

The National University of Singapore (NUS) is Singapore's flagship university, which offers a global approach to education, research and entrepreneurship, with a focus on Asian perspectives and expertise. We have 17 faculties across three campuses in Singapore, as well as 12 NUS Overseas Colleges across the world. Close to 40,000 students from 100 countries enrich our vibrant and diverse campus community.

Our multidisciplinary and real-world approach to education, research and entrepreneurship enables us to work closely with industry, governments and academia to address crucial and complex issues relevant to Asia and the world. Researchers in our faculties, 30 university-level research institutes, research centres of excellence and corporate labs focus on themes that include energy, environmental and urban sustainability; treatment and prevention of diseases common among Asians; active ageing; advanced materials; as well as risk management and resilience of financial systems. Our latest research focus is on the use of data science, operations research and cybersecurity to support Singapore's Smart Nation initiative.

For more information on NUS, please visit [www.nus.edu.sg](http://www.nus.edu.sg).

### **About ST Engineering**

**ST Engineering** is a global technology, defence and engineering group specialising in the aerospace, electronics, land systems and marine sectors. The Group employs about 23,000 people across offices in Asia, Europe, Middle East and the U.S., serving customers in the defence, government and commercial segments in more than 100 countries. With more than 700 smart city projects across 130 cities in its track record, the Group continues to help transform cities through its suite of Smart Mobility, Smart Security and Smart Environment solutions. Headquartered in Singapore, ST Engineering reported revenue of \$7.9b in FY2019 and it ranks among the largest companies listed on the Singapore Exchange. It is a component stock of the FTSE Straits Times Index, MSCI Singapore, iEdge SG ESG Transparency Index and iEdge SG ESG Leaders Index. For more information, please visit [www.stengg.com](http://www.stengg.com).