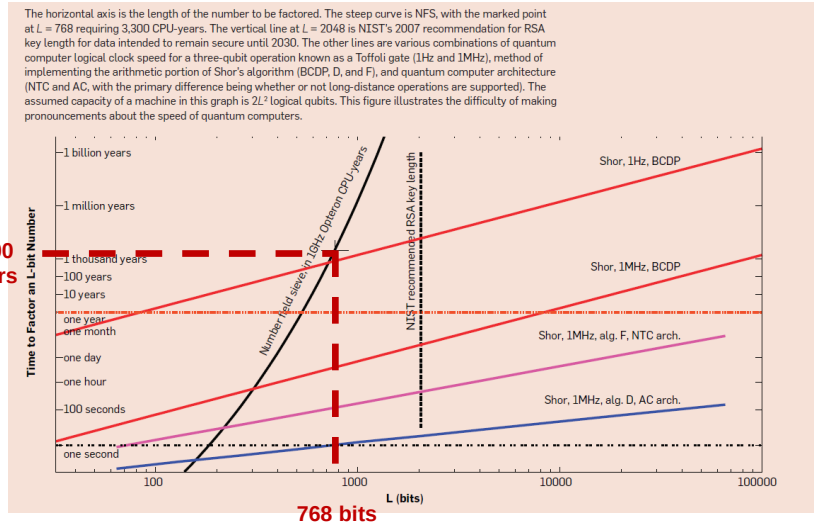
KT’s Quantum Cryptography Technology

Quantum Cryptography Communication: QKD

Unbreakable secure communication based on quantum mechanics against to quantum computers that threaten the current security systems

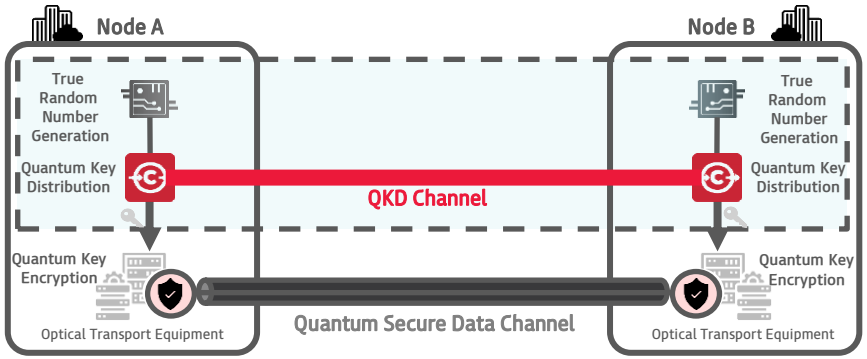
● High-speed computation using quantum computers



Deciphering the 768 bits RSA algorithm:
3,300 years (Classical Computing) → 1 sec (Quantum Computing)

"A Blueprint for Building a Quantum Computer" By Rodney Van Meter, Clare Horsman
Communications of the ACM, Vol. 56 No. 10, Pages 84–93 10.1145/2494568

● Quantum Cryptography Communication



Quantum Key Distribution

- Distribute cryptographic keys that are physically secure from eavesdropping using the principles of quantum mechanics
- Using a true random number-based encryption key
- Stability improvement through continuous/real-time encryption key distribution

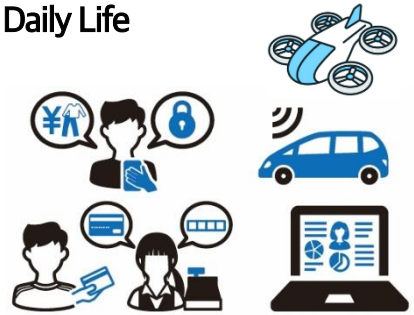
Trends in Quantum Cryptography Communication

Implementation of quantum cryptography communication in various fields including national defense, administration, and civil society

- **Defense, Public, and Administrative Confidential Information**

- Military Operation
- National Secret
- Administrative Documents
- Diplomatic Secret

- **Daily Life**

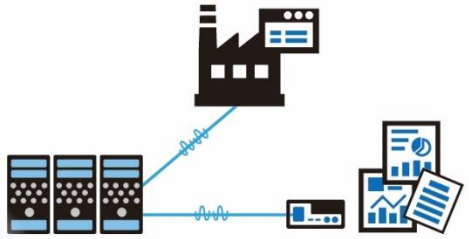


- Financial Services
- Automobile
- Unmanned Vehicle
- Private Information

- **Medical Field**

- Clinical Data
- Person-generated Health Data
- Medical Collaboration
- Genomic Data

- **Industrial Service**



- Industrial Technology
- Contract Document
- Trade Secret
- Customer Information

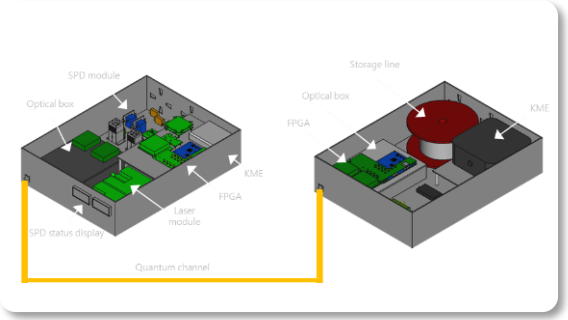
KT's Quantum Cryptography Communication Development

Since the release of the first prototype in 2019, based on our own technology, KT has continued to develop quantum cryptography communication original and commercial technologies

Version 1.0

Securing Original Technology

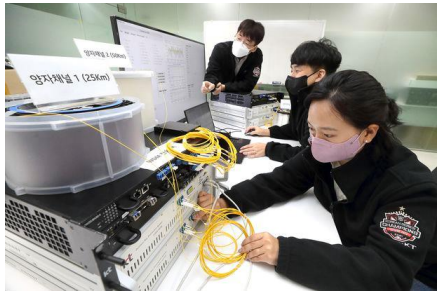
- 2018, Quantum Cryptography Communication R&D Began
- 2019, QKD Prototype



Version 2.0

Commercial Technology Development

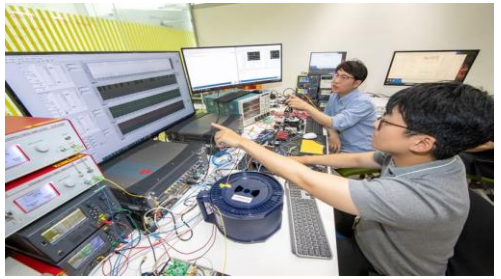
- 2021, 30kbps QKD
- 2022, Commercial Service Technology



Version 3.0

Advanced QKD & Next-generation Technologies

- 2024, 150kbps High-speed QKD
- 2022~, Free-space Quantum Cryptography



Quantum Cryptography Communication Business

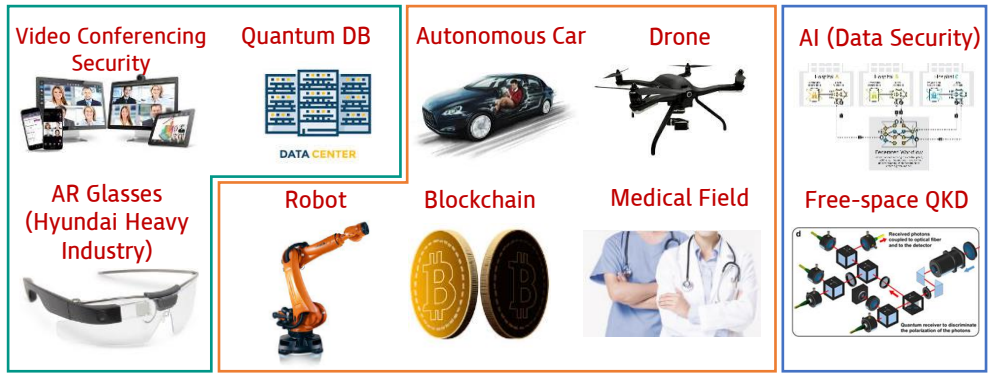
Establishment of pilot networks for quantum cryptography communication in Korea

New applications and services in the public and private sectors

[1st to 3rd Quantum Cryptography Pilot Project]

※ Three Korean Telecommunication Companies Launch Quantum Cryptography Leased-line Service in 2022

➢ Main Services



[1st Quantum Cryptography Pilot Project]

[2nd Quantum Cryptography Pilot Project]

[3rd Quantum Cryptography Pilot Project]

KT's Direction for Quantum Cryptography Communication

Development of unique technologies to expand the base of quantum cryptography communication

Continuous technology transfer to SMEs to vitalize the domestic quantum cryptography communication ecosystem

- KT's Own Technology Development
- Win-Win Partnership with SMEs
- Efforts to Expand the Base of Quantum Cryptography Communication

Quantum Cryptography Communication Core Patents (15 cases)

12 Cases of Quantum Technology Transfer such as Patents, Know-how, and Manufacturing Technologies to 10 Companies over 4 Years

Activation of the Domestic and International Quantum Cryptography Communication

KT-Toshiba global technical cooperation for seeking overseas expansion of domestic technologies/services

Vitalization of ecosystem through domestic technology cooperation

Global Cooperation	▪ Demonstrate Hybrid (QKD & PQC) Quantum Secure Communications with Shinhan Bank ▪ Seoul~Busan Heterogeneous Quantum Cryptography Network Establishment ▪ Cooperate with Toshiba to Promote International Standardization
Domestic Technical Cooperation	▪ Signed MOU with NSR for Quantum Cryptography Communication Technology Security Collaboration ▪ MOU Signed with Hanwha Systems for Linking Air/Space Communication Technology and Quantum Cryptography Technology

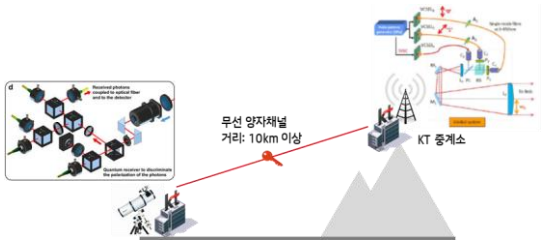
[Hybrid Quantum Secure Network]

[Seoul~Busan Heterogeneous Network]

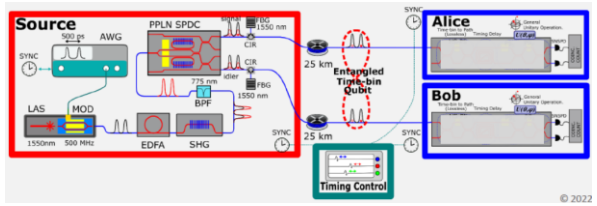
KT's Next-generation Technology for Quantum Information and Communication

Implementation of quantum network through long-distance quantum information transmission

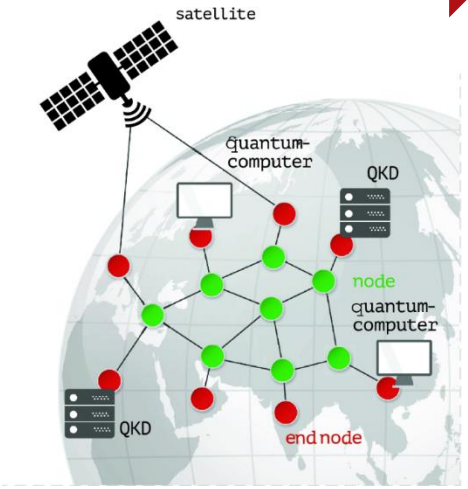
Version 3.0 → Version 4.0 → Version 5.0



10km Class Free-space QKD
(Long-distance Quantum
Information Transmission)



Quantum Repeater
/Quantum Network



Quantum Internet

Towards Quantum Internet

Computer

+

Connectivity

- IT Infrastructure
  - Wired/Wireless Communication
  - Mobile Communication

Internet

Quantum Computer

+

Connectivity

- Quantum Information Infrastructure
  - Quantum Cryptography Communication
  - Quantum Network

Quantum Internet kt


Towards Quantum Internet
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