

DISCRETION: Disruptive SDN enabled by QKD for secure communications for European Defence

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In a military context, information and communications services are of central importance in different areas. These services rely on secure and reliable infrastructure. In an operational or strategic context, these networks are often static and rigid. SDN (Software-defined Networking) allows increased network flexibility, agility and manageability. These properties are very desirable on dynamical environments, and the SDN can extend their benefits to interface with SDR equipment, in tactical networks. In addition, SDN can also ensure redundancy and resilience against network failures and losses. The adoption of an SDN also opens the possibility to have a flexible QKD network [1]. QKD provides a very secure way to distribute cryptographic keys to different points. However, QKD is fairly limited in reach and flexibility, usually relying on point-to-point connections and rigid infrastructures. SDN and QKD thus provide mutual benefits in symbiotic fashion: SDN enables a flexible QKD network, with control and monitoring capabilities, and QKD enables highly secure communications within the SDN.

DISCRETION intends to develop an SDN solution integrating QKD capabilities to support optical secure communications, in a way that European Defence can benefit from these technologies to be effective not only for the network but also for the cyber situational awareness. Cipher Machines will be the components responsible for assuring data protection and network segregation in DISCRETION, enabling real-time data encryption and decryption, using key material provided by the key management system integrated with the SDN-QKD plane as well as pre-shared keys. The red-black architecture of the military networks will be considered to provide the required level of security and segregation. Mobility and tactical scenarios with SDR solutions shall be analysed and integrated into the SDN framework to cover radio network segments and support secure communication services in mobile scenarios (see **Figure 1**). The DISCRETION project, with its programmable quantum key distribution components, will facilitate the improvement of security and resilience in the exchange of information and in communication services in the military network.

Figures

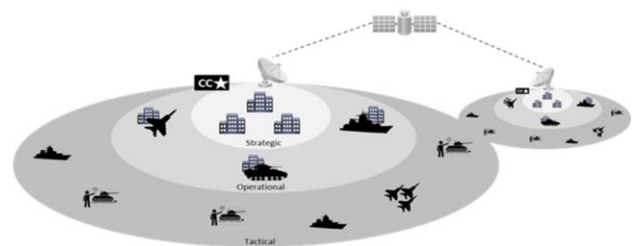


Figure 1: DISCRETION overall abstract scenarios

References

[1] A. Aguado, V. Lopez, D. Lopez, M. Peev, A. Poppe, A. Pastor, J. Folgueira, V. Martin. The Engineering of a SDN Quantum Key Distribution Network. *IEEE Comms. Mag.* Julio 2019.