ETSI/IQC Quantum Safe Cryptography Event

HellasQCI: National scale deployment of quantum communications systems and networks

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HellasQCI - Quantum Communication Infrastructure for Greece

HELLENIC REPUBLIC
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EST. 1837

14/02/2023

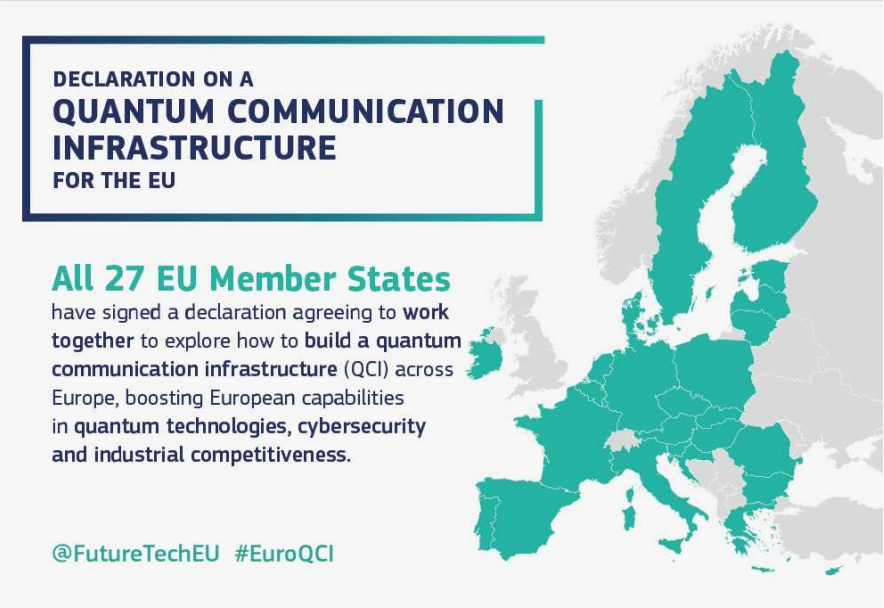
EuroQCI

Will build a **secure quantum communication infrastructure** that will span the whole EU.

Will safeguard **sensitive data** and **critical infrastructures**, providing an additional security layer based on **quantum physics**

Will boost Europe's scientific and technological capabilities in **cybersecurity** and **quantum technologies**

Will improve Europe's **digital sovereignty** and **industrial competitiveness**



The aim is for it to be fully operational **by 2027**

HellasQCI national scale architecture

Three test-sites:

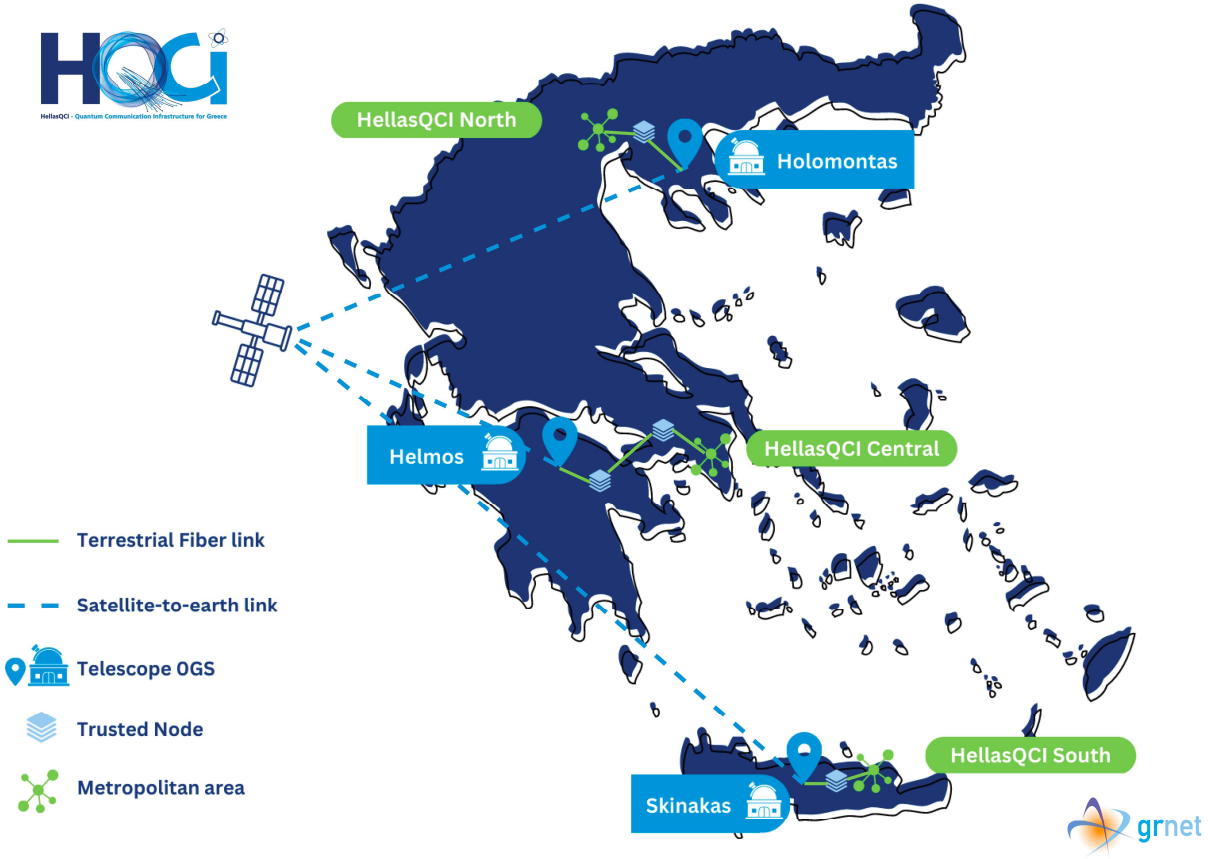
- Athens (Capital of Greece)
- Thessaloniki (North Greece/ terrestrial boarder)
- Crete (Island Greece, South Boarder)

Satellite Interconnection

- All 3 telescopes part of ESA ARTES Skylight programme

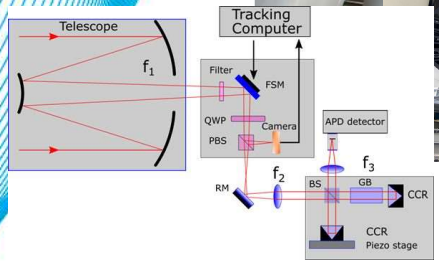
Three Phases:

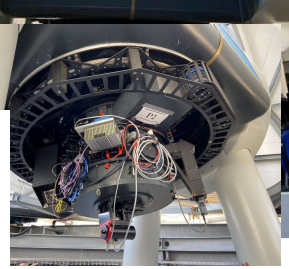
- Phase 0: technology development/Procurement
- Phase 1: Terrestrial Network deployment
- Phase 2: Satellite Connectivity testing

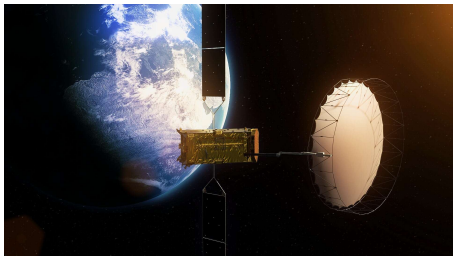


National Observatories as OGS

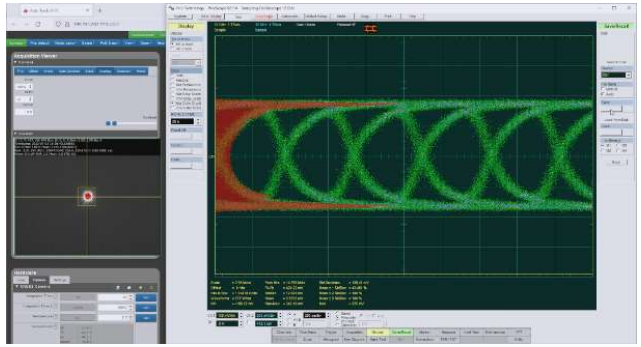
Aristarchos 2.3m telescope







esa GEO AlphaSat



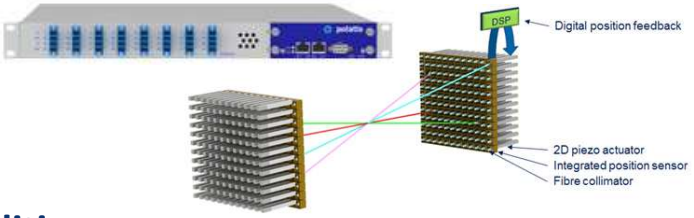
2.8 Gb/s optical links between the Aristarchos telescope and GEO AlphaSat

Next steps to connect with QKD EAGLE1:

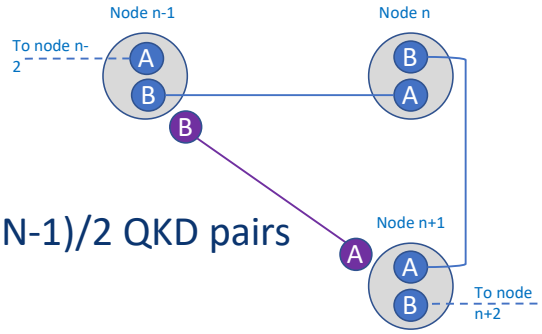
- ✓ LEO satellite tracking capability (new telescope control system)
- ✓ Single photon detection and QKD equipment / terrestrial dark fiber connection

Dynamic DV-QKD for scale and resilience

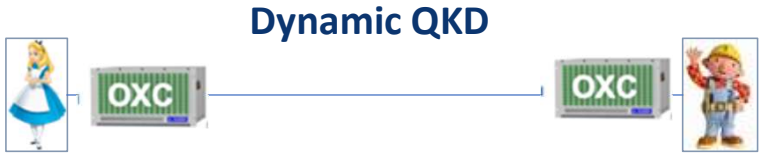
- can optimize resource usage
- Allows for alternative recovery paths and enhanced resilience
- Is suitable for dense urban environments with shorter reach

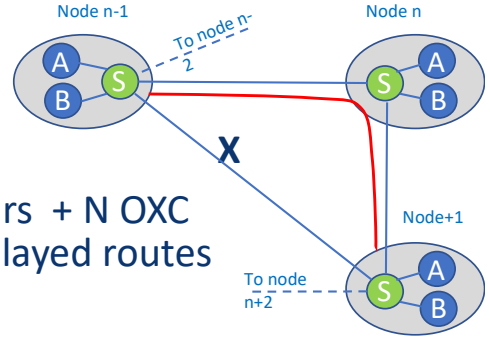


Requires QKD equipment with multipoint connectivity capabilities
Requires low loss optical switches



➢N nodes
➢requires N(N-1)/2 QKD pairs





➢N nodes
➢requires N QKD pairs + N OXC
➢ Alternative non relayed routes

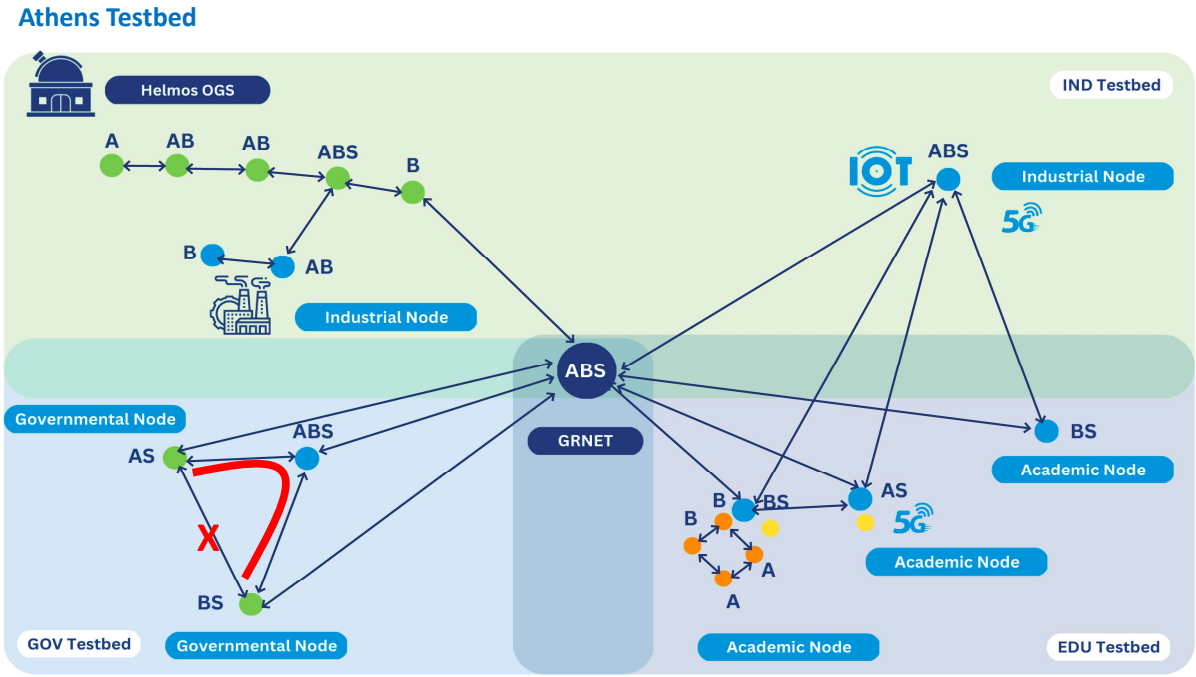
HellasQCI Athens Test-bed

Three domains :

- Governmental (GOV)
- Industrial (IND)
- Research and Innovation (EDU)

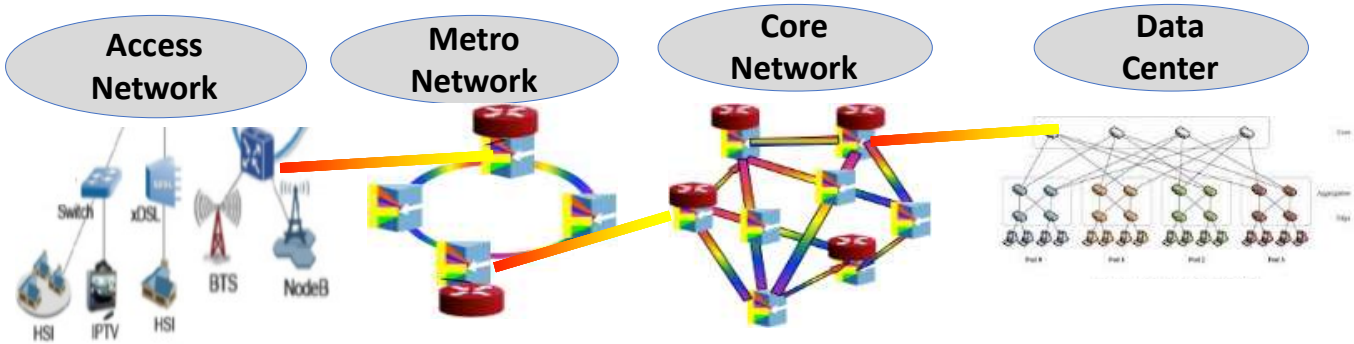
Increased interconnection

- More than 12 nodes
- Exploit Dynamic QKD to optimize use of available QKD pairs
- Enhanced resilience in critical National Security links



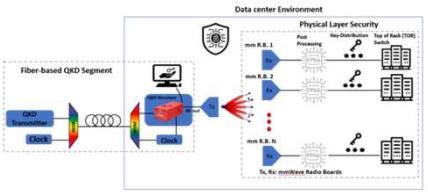
QKD for Short Metro/Access

- QKD application field beyond Metro/Core optical networks
- ICCS, COSMOTE and NKUA have worked within H2020 Quantum Flagship project UNIQORN on novel Access, 5G and Data Center applications
- **HellasQCI acts as a sandpit telecom field testbed to further develop the technologies**



Quantum Secured FTTH services

QKD over 5G



Secure storage in cloud data centres

QKD in Critical Infrastructure

QKD to secure communications in MotorOiL Oil Refinery Infrastructure

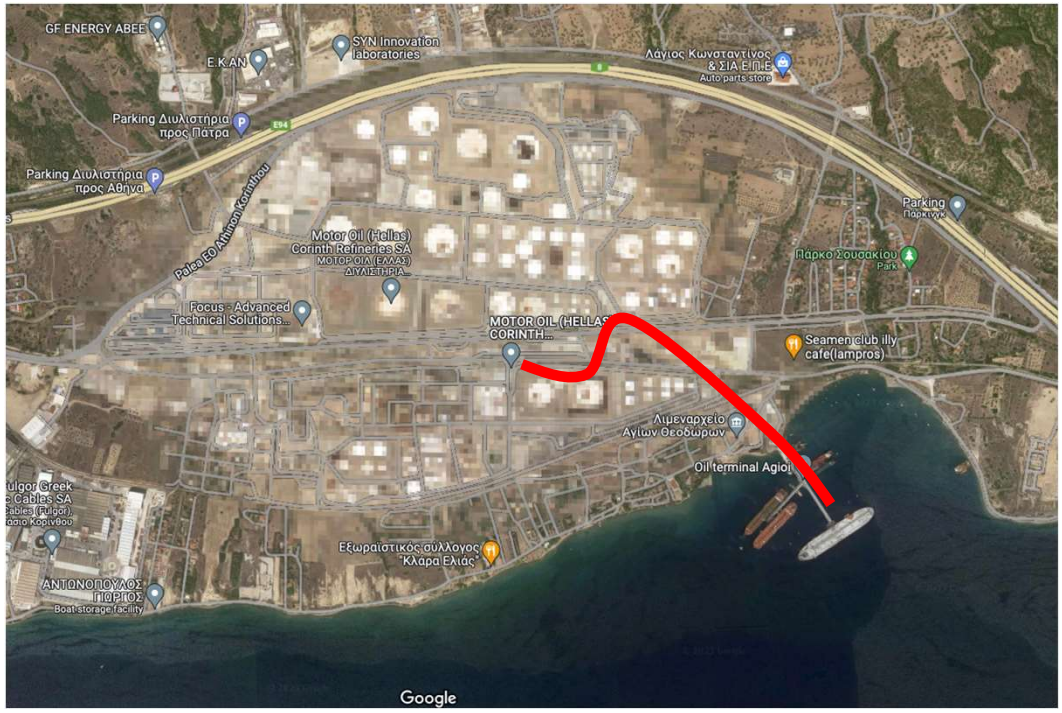
Test operational capabilities of QKD in Harsh industrial environments

Initial deployments with DVQKD systems

Plan to demonstrate the potential for CV-QKD system for industrial application

CV-QKD relies on coherent technology that is compatible with classical coherent communications

Potential future proof low cost deployment suitable for private industrial applications



Key Summary

- More than 15 use-cases with a variety of specifications/requirements
- Rely on Satellite links for Backbone/International QKD links
- Rely on commercial (Dynamic) DVQKD solutions for use cases that require high reliability
- Rely on commercial CVQKD for industrial applications
- Rely on bulk components for research/educational use-cases

Thank you

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Co-funded by the European Union

This project is co-funded by the European Union
under the Digital Europe Program grant agreement No. 101091504.