

DEP Topic 2

HellasQCI

DEP Call kick off 24th January 2023 - Brussels



Overview

Objectives

O1: Build the National Quantum Networks infrastructure as part of the EuroQCI
3 national HellasQCI test-sites, 3 national OGS will be connected, 450km length of fiber links will be deployed.

O2: Develop and Deploy advanced quantum systems and networking technologies
DV-QKD, CV-QKD, Single photon detectors and sources, Dynamic QKD, Hybrid Authentication PQC-PUF base, Coexistence.

O3: Advanced use cases in different application scenarios
16 use cases involving Public Sector (Ministries, NIS, Army, Police), the Industry (critical infrastructures) and the research sector.

O4: Provide a training environment for technical, research and end-users staff
Large number of trained users in quantum communication technologies, training workshop events, 1-week summer schools devoted for MSc/PhD students, PhD students participating in HellasQCI activities, Integration of HellasQCI training material in MSc and undergraduate courses → online training platform.

O5: Cooperation with EU Member States to build robust, interoperable and secure QKD systems and networks for the EuroQCI
7 partnerships (LoS) for cooperation with Austria, Bulgaria, Cyprus Ireland, Luxembourg, Malta and Poland national QCI proposals. University of Luxembourg (UNILU) Lux4QCI coordinator and the SETU Waterford (WIT) IrishQCI coordinator are Associated Partners (AP).

O6: National Stakeholder Engagement
Establishment of the HellasQCI community from all relevant national stakeholders that can benefit and support the HellasQCI networks, gather expertise and share knowhow on QCI and QKD. Ensure better participation of Greece into the EuroQCI initiative and populate the database for possible new end-users for the expansion of the national networks.

O7: Provide a secure architecture compatible with EU Standards and Certifications
Alignment with QKD security standards, certifications, and regulations such as ISG-QKD-ETSI group and FGQT CEN/Cenelec. Cooperation with the EuroQCI DEP-Topic 3 CSA "Petrus"

O8: Space segment connectivity
All 3 telescopes part of ESA ARTES Skylight programme. Each one of the 3 OGS will be connected via optical fibers to the closest HellasQCI test-site, and will serve as a permanent trusted node in the HellasQCI. Upon the availability of Eagle-1 satellite the OGSs will be ready to allow the demonstration of various scenarios.

Topology Map



Project Overview

Use Cases

National Security

Use Case 1 — QKD for National Security

Use Case 2 — Enhanced QKD resilience for National Security Links

Use Case 3 — Satellite QKD connectivity for remote National Security Nodes

Use case 16 — HellasQCI space and terrestrial segments

Public Health

Use Case 4 — Secure communications for Public Safety applications

Use Case 5 — Quantum Secure technologies for cloud Health Applications

Use Case 6 — Secure transmission of medical imaging data for Public Hospitals

Use Case 7 — QKD for secure connectivity to supercomputing infrastructure

Industrial | Critical Infrastructure | ICT

Use Case 8 — Quantum cryptography to secure communication links of critical infrastructures

Use Case 9 — ICT sector | Secure storage in cloud data centres

Use case 10 — ICT sector | QKD over 5G

Use case 11 — ICT sector | Next Generation Quantum Secured FTTH services

Use case 15 — Preparation of a quantum encrypted software application

Research

Use case 12 — Preparing for the quantum internet

Use Case 13 — Advanced quantum network controls

Use case 14 — PUF-based hybrid authentication for switched QKD

Key Contacts

- Dr. Ilias Papastamatiou – Project Coordinator (PC) – ipapastamatiou@admin.grnet.gr
- Prof. George Kanellos – Technical Coordinator (TC) - gkanellos@di.uoa.gr
- Dimitrios Kagklis – GR EuroQCI Sherpa – Project Security Officer – (PSO) - d.kagklis@mindigital.gr
- Dr. Evangelia Athanassaki – Financial Manager - eathan@admin.grnet.gr

Target Security Level

- Non classified
- EU Restricted

Project High Level Architecture

Three test-sites

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

Satellite Interconnection

- 3 telescopes part of ESA ARTES Skylight programme

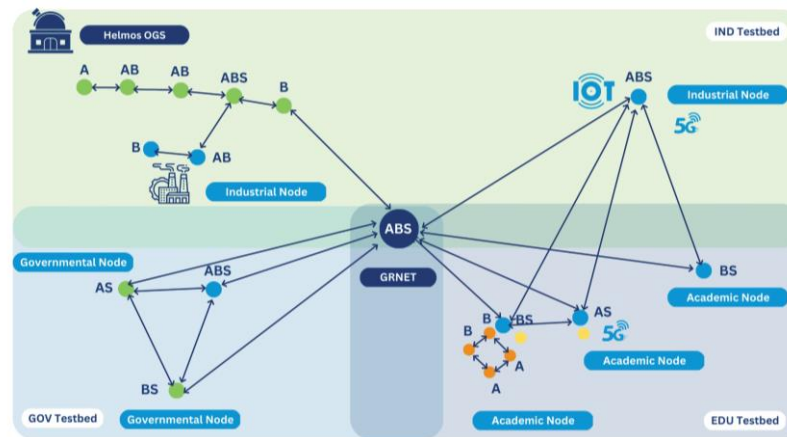
Three domains

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

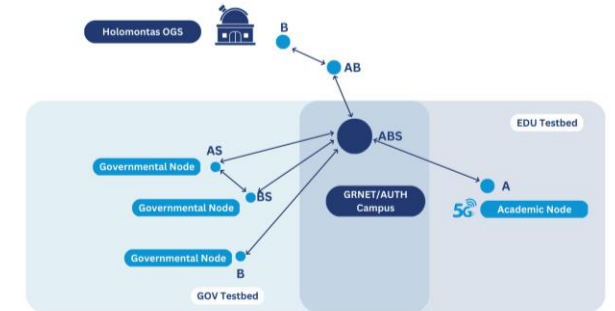
Dynamic QKD

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

Athens Testbed



Thessaloniki Testbed



Heraklion, Crete Testbed

