

# HellasQCI: National scale deployment of quantum communications systems and networks

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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**

## DECLARATION ON A QUANTUM COMMUNICATION INFRASTRUCTURE FOR THE EU

### All 27 EU Member States

have signed a declaration agreeing to **work together** to explore how to **build a quantum communication infrastructure (QCI)** across Europe, boosting European capabilities in **quantum technologies, cybersecurity** and industrial competitiveness.

@FutureTechEU #EuroQCI



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

## Three test-sites:

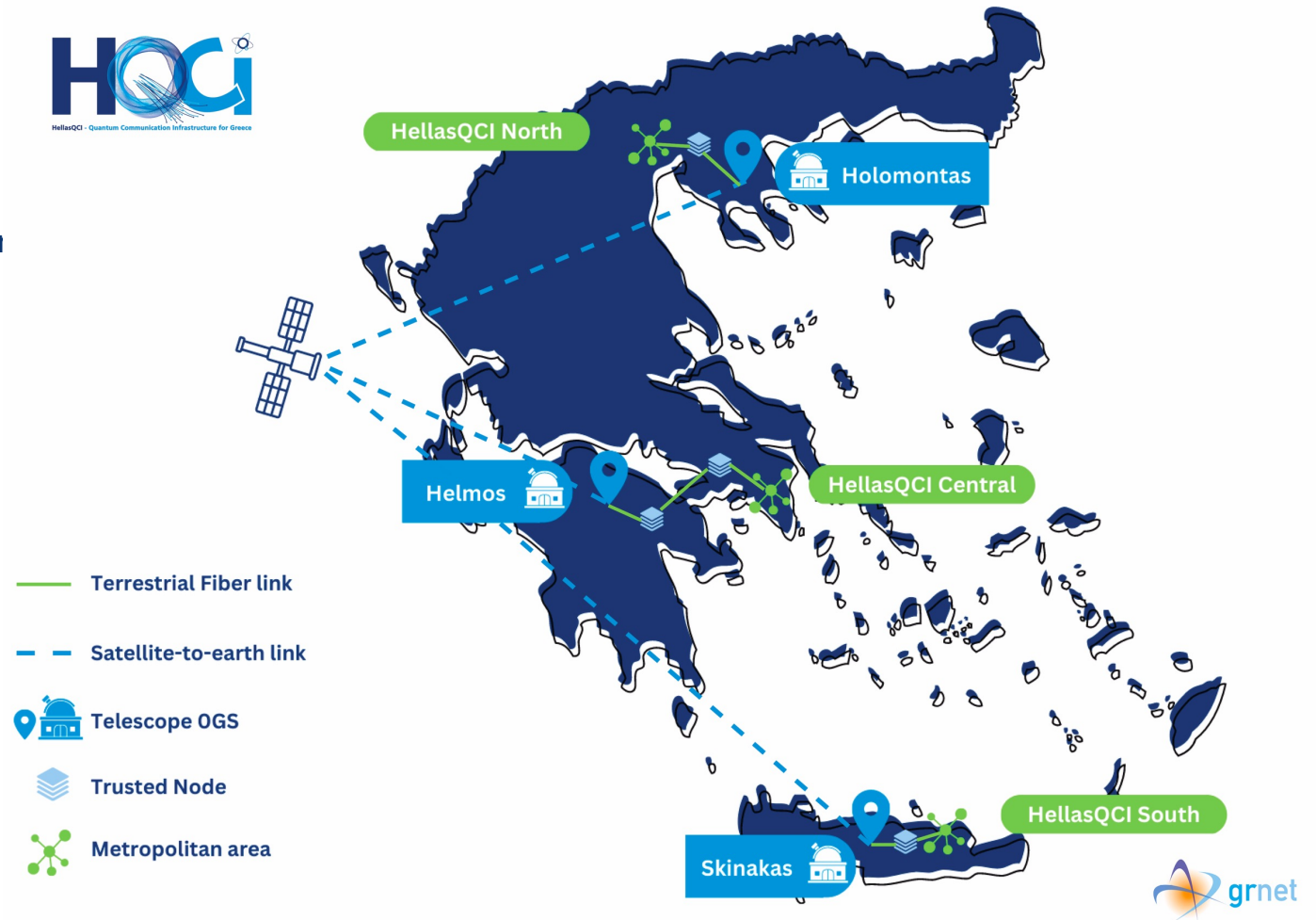
- Athens (Capital of Greece)
- Thessaloniki (North Greece/terrestrial boarder)
- Crete (Island Greece, South Boarder)

## Satellite Interconnection

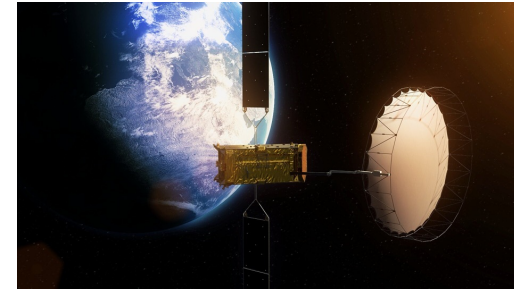
- All 3 telescopes part of ESA ARTES Skylight programme

## Three Phases:

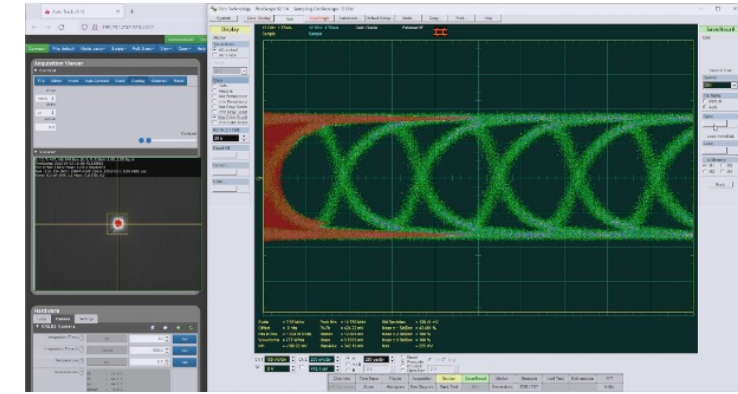
- Phase 0: technology development/Procurement
- Phase 1: Terrestrial Network deployment
- Phase 2: Satellite Connectivity testing



Aristarchos 2.3m telescope



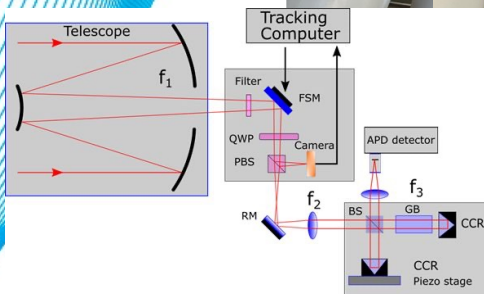
 GEO AlphaSat



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

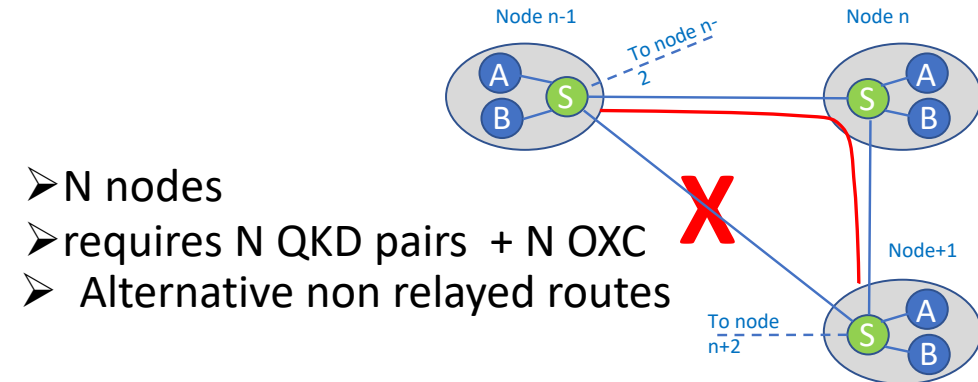
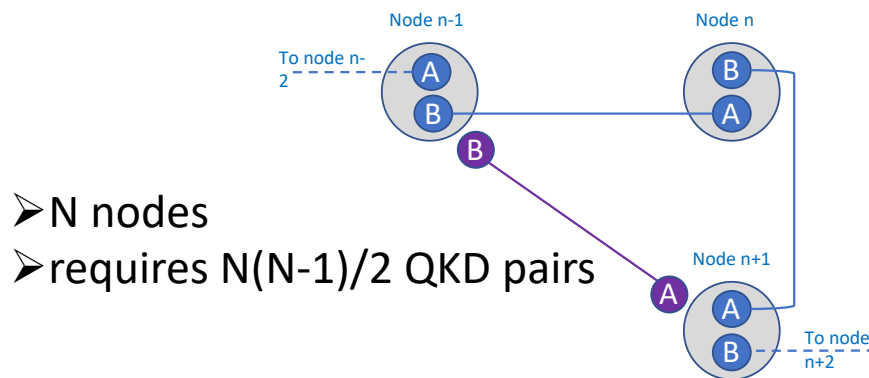
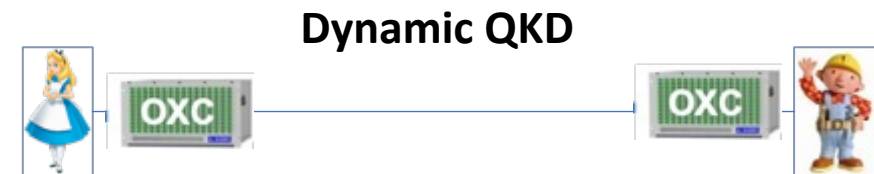
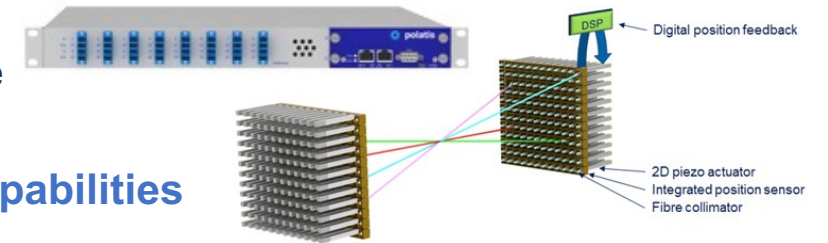
Next steps to connect with QKD EAGLE1:

- ✓ 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**



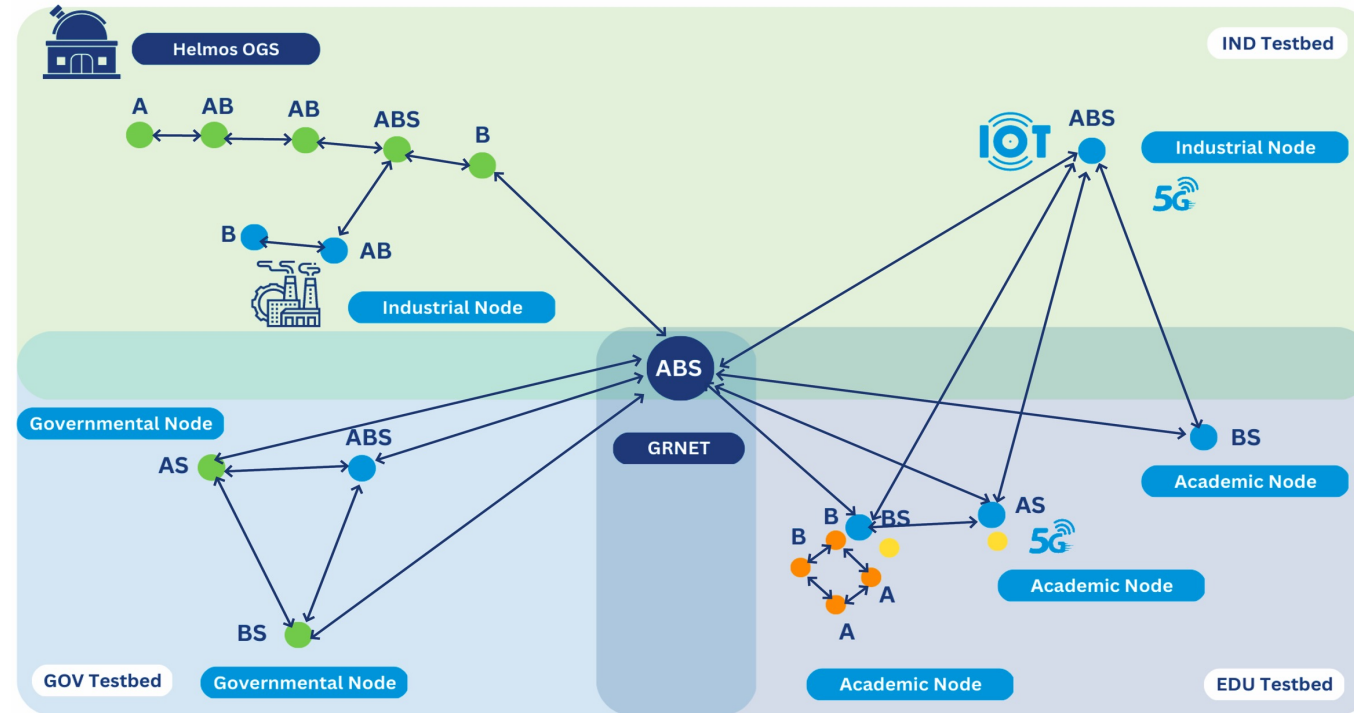
## Three domains :

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

## Increased interconnection

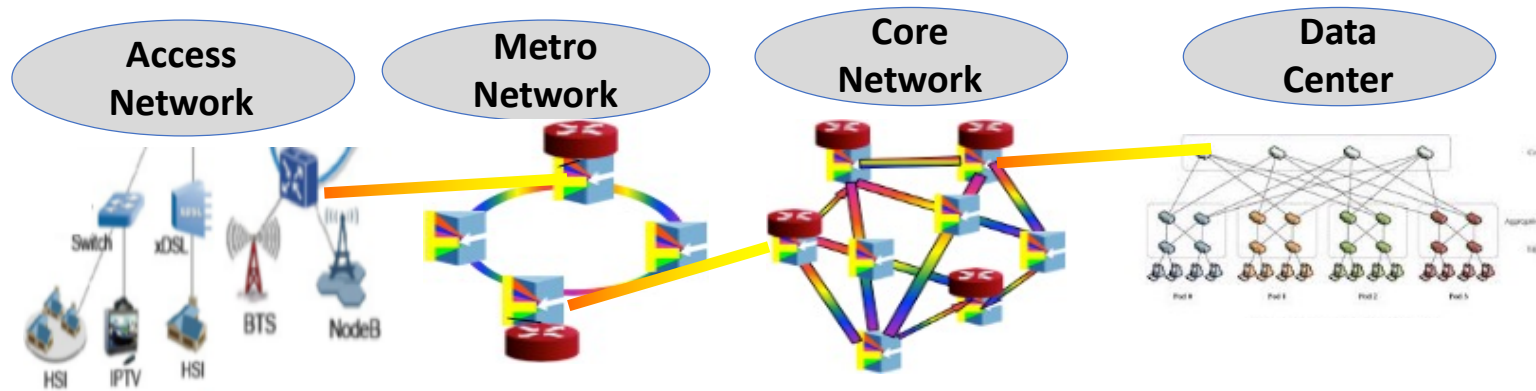
- More than 12 nodes
- Optimize use of available QKD pairs
- Enhanced resilience in critical National Security links

### Athens Testbed

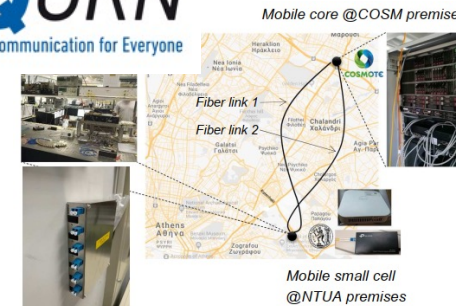


# QKD for Short Metro/Access

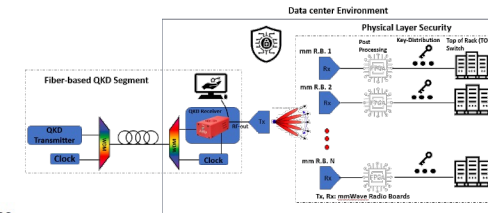
- QKD application field is mainly addressing security for Metro/Core optical networks
- ICCS, COSMOTE and NKUA have demonstrated within H2020 Quantum Flagship project UNIQORN novel Access, 5G and Data Center applications
- HellasQCI acts as a unified telecom field testbed to further develop the technologies



Quantum Secured FTTH services



QKD over 5G



Secure storage in cloud data centres

## 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





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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HellasQCI - Quantum Communication Infrastructure for Greece



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