Quantum entanglement communication From ground to space!

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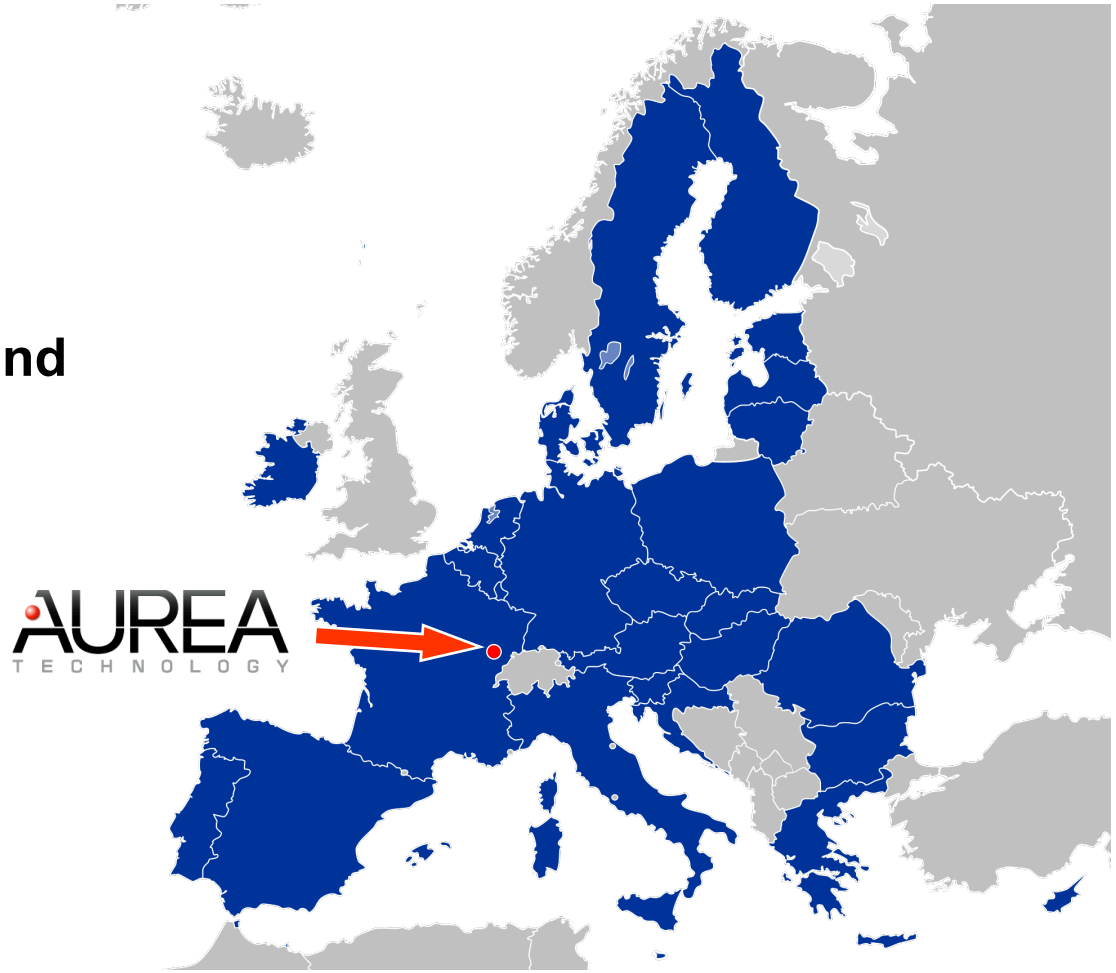
EPIC Online Technology Meeting on Satellite Quantum Communication

AUREA TECHNOLOGY

EPIC European Photonics Industry Consortium

About AUREA Technology SAS

- EU 27 and ESA-member deeptech SME
- Strong Industrial and high-level Quantum background
- Key building-blocks for Quantum Communications
- Strong recognition with many Innovation Awards
- > 300 customers worldwide



EU 27 countries

Leading provider of QKD sub-systems

Key building-blocks for both

Ground and Space ultra-secure QKD communications

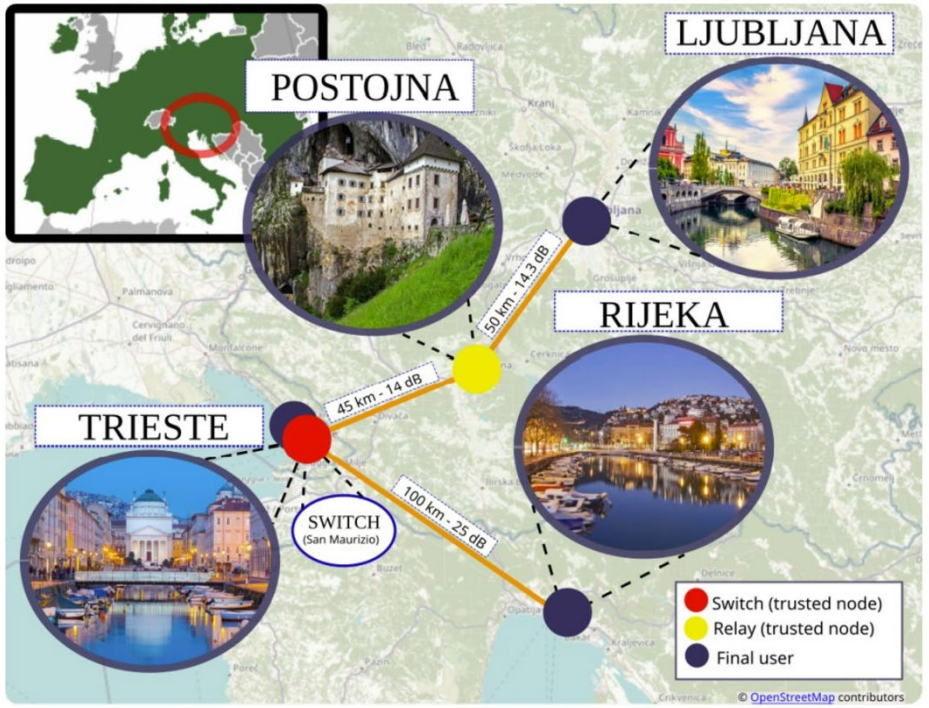
Entangled Photon Sources | *Single Photon Detectors* | *Time Correlators* | *NEW Entangled Photon Sources for Space*

Terrestrial and Optical Ground Station | **Space**

The first « made in EU-27 » inter-countries QKD network

Largest inter-countries QKD Network, by using « made in EU-27 » suppliers

- **This first QKD network deployment between three European countries** paves the way for the European Quantum Communication Infrastructure (EURO-QCI)
- **European countries: Italy – Slovenia – Croatia**
- **Crow fly distance up to 100km between cities**
- **Today's Limitation of QKD in fiber optic networks ~ 150 km**



High-performance Entangled Photon Source for Space QKD

SAGA mission: Quantum communication systems with pan-European reach for ESA missions

- **High performance Entangled Photon Source Demonstration Model**
- **Space based Entangled Photon Source**
- **100% EU Technology**
- **Quantum communication link at 1550 nm – C band**
- **Objectives:**
  - Generation rate > 1 GHz
  - Transmission Key Rate > 10 bits/s @ 60 dB attenuation (LEO Scenario)

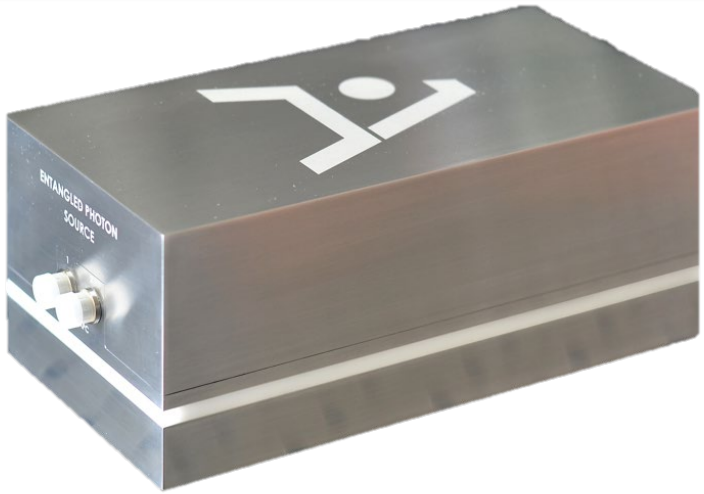
Entangled Photon Source for Space QKD

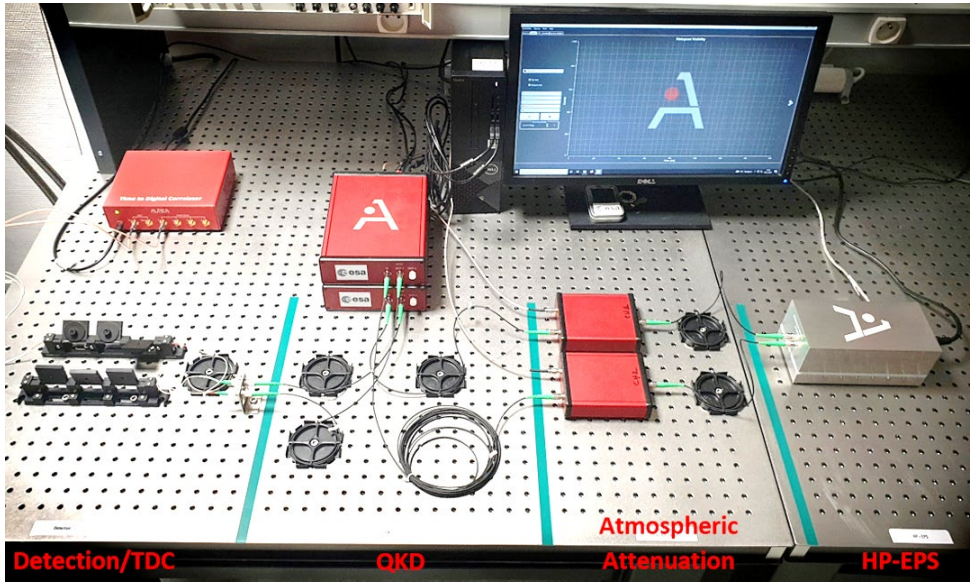
- **Time-Energy entangled photon source**
- 1550 nm Telecom C-Band
- All-fibered optical architecture
- Compact and robust (fibered optical design)
- M < 2 kg
- 100mmx100mmx200mm
- Low thermal load
- Low consumption
- SKR = 10 bits/sec in LEO scenario

- Space compatibility assesment

- TRL 4 achieved and demonstrated to ESA

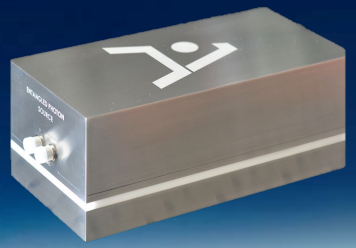
- **Full QKD Test bench on demand**





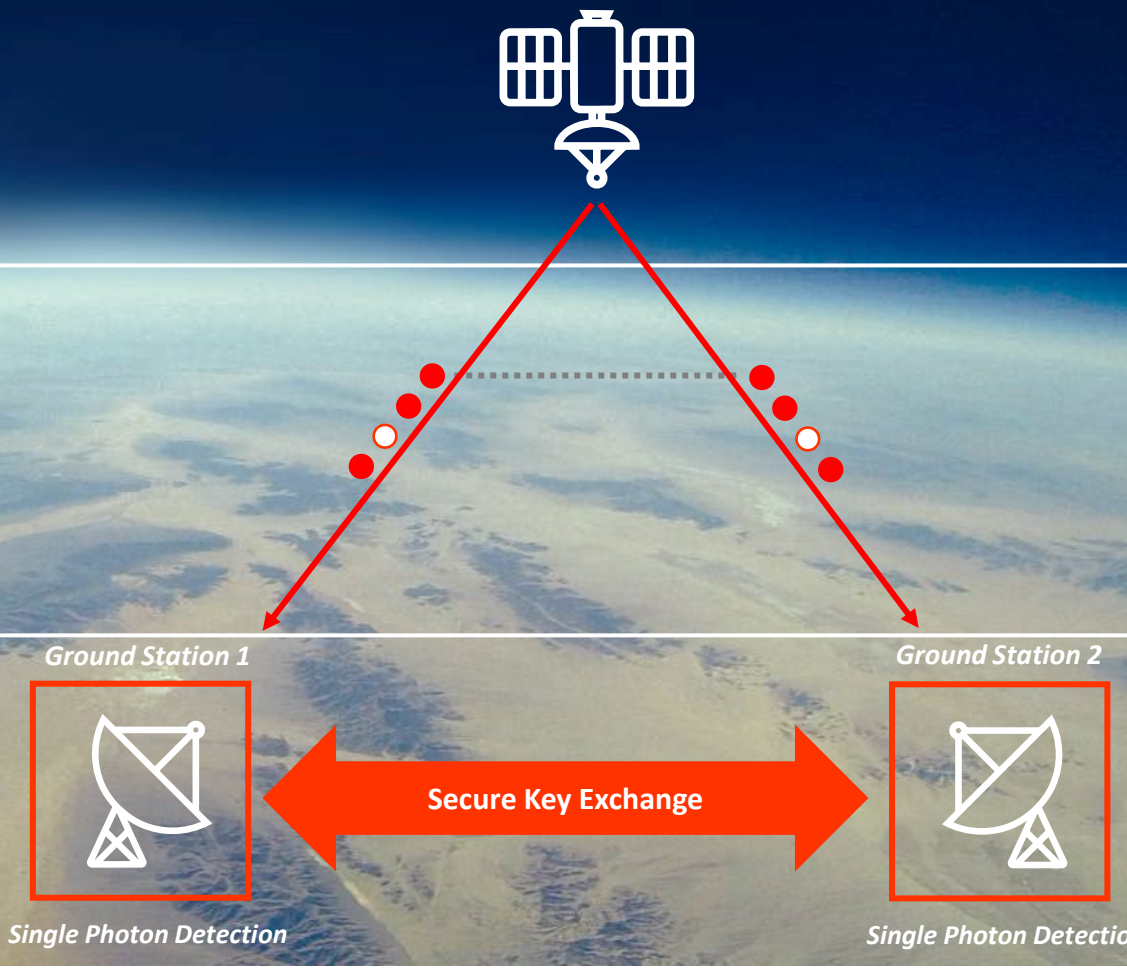
Conclusion: Ground and Space for industrial QKD

Space:
NEW Entangled Photon
Source at 1550 nm (TRL4)



Improve the TRL
Perfom an Outdoor terrestrial demonstration
Perform a space demonstration in a satellite

Ground:
Single Photon detection &
Entangled Photon Sources
Qubits demodulation modules
QKD test benchs



THANK YOU!

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