

**VTT**

# NATO DIANA Secure Connectivity, Space and Quantum Test Centre (SCSQ)

15/04/2024 VTT – beyond the obvious



PART OF THE  **DIANA NETWORK**

# Nato DIANA collaboration framework in Finland

VTT

## Ecosystems



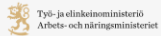
## Industry Partners



## DIANA Accelerators



## Funds



Tesi



## DIANA Test Centres



VTT: Secure connectivity, Space and Quantum Computing

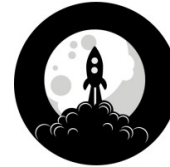


University of Oulu: 6G

### R&D Capabilities

- Research Infrastructure
- Pilot Facilities
- R&D Services

## DIANA Accelerator in the field of Next-generation communication systems and quantum technologies



LaunchPad

## Accelerator Partners



UNIVERSITY OF HELSINKI



Aalto University



# Finnish NATO DIANA pioneer - GIM Robotics

<https://gimrobotics.fi/gim-hand-picked-for-dianas-first-challenge-program/>

**Suomalaisfirma avaa portteja Nato-markkinoille – Tällainen on GIM Robotics, jonka paikkatieto erottui 1300 yrityksen joukosta Naton ideakilpailussa**

**GIM Robotics** is so proud to be among the few DIANA pilot challenge selected applicants! Our main objective is to further develop our core solutions, inherently suitable for dual-use purposes, to comply with relevant NATO standards. We are introducing an affordable localization solution for armoured vehicles in GNSS-compromised environments. “We expect the DIANA Accelerator program to provide us valuable coaching and access to testing facilities, allowing us to develop the solution that our customers desire.” - Tatu Lyytinen, COO at GIM Robotics.

**Naton DIANA-yrityskiihdyttämö ja -testikeskukset palvelevat yrityksiä**

DIANA on Naton jäsenmaiden välinen uusi mekanismi, joka tukee yrityksiä, jotka eivät ole aiemmin toimineet puolustusallalla. DIANA:n toimintaan osallistuminen tarjoaa yrityksille mahdollisuuden testata uusia ratkaisujaan testikeskuksissa sekä yritysten liiketoiminnan kiihdyttämisen puolustusallalle. Ensimmäinen suomalainen DIANA-toimintaan osallistuva yritys on GIM Robotics, joka pääsi viime vuonna mukaan Tallinnassa sijaitsevaan kiihdyttämöön.



# NATO DIANA Secure Connectivity, Space and Quantum Test Centre (SCSQ) offers access to the leading communications, space and quantum technologies ecosystem within the Alliance

- Test Centre operator is VTT Technical Research Centre of Finland Ltd.
- SCSQ supports the development of dual-use technologies for defense, security and civilian use.
- The existing state-of-the-art infrastructure serves especially critical civil infrastructures, defense and security sector research, product development and testing. SCSQ test centre focuses on interoperability, training, technology assessment, and other relevant areas to enhance the collective defense capabilities of NATO and its Allies.

# SCSQ test centre facilities include

- **Secure connectivity (5G/6G and high-performance dual use test infrastructure)**
  - **Space technology (non-terrestrial communication test infrastructure) and**
  - **Quantum (quantum computers, quantum key distribution networks, post-quantum cryptography infrastructure)**
- The test centre facilities are located at VTT sites in different parts of Finland, from Helsinki Capital area in Espoo (VTT HQ) to Oulu and Sodankylä north of the Arctic Circle.
  - The multi-site location enables testing of different types of use cases in state-of-the-art infrastructures in different types of environments and conditions, from security classified laboratory premises to the very challenging Arctic conditions.



# Test platforms for Secure Connectivity

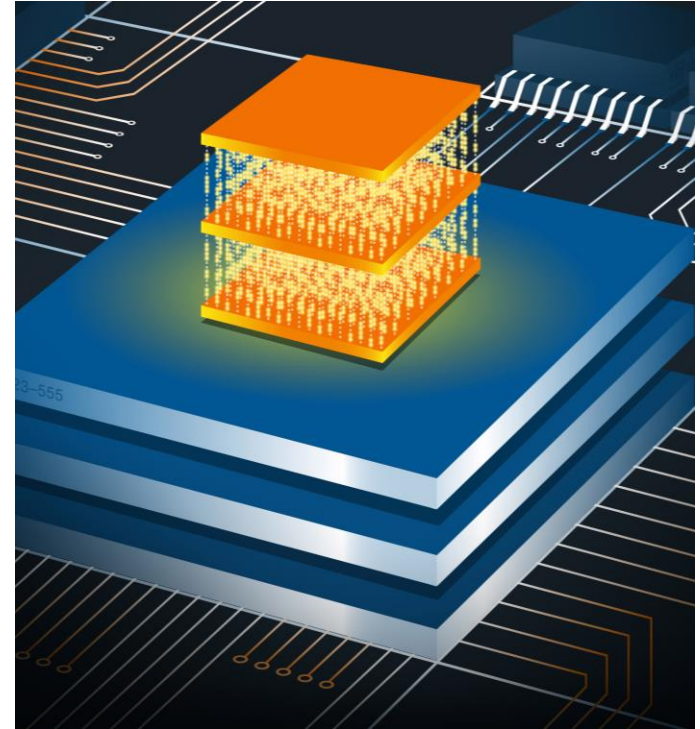
- Carrier-grade 3GPP radio access network - 5G NR and 4G LTE RAN solutions
  - Possibilities to use special frequencies in shielded environments for testing purposes
  - 3GPP Core Network – multioperator, multivendor environments, private networks
  - Emulation environment for research purposes including e.g. O-RAN and Core network non carrier grade systems
  - SDR based UE emulators up to OTA 1000 devices
- Non-3GPP solutions - WiFi/WiFi6, BLE, UWB etc. wireless network systems and other enablers
- Data link Lab as a Service (DLaaS) laboratory
  - Facility on data links and critical communication R&D work for defense, security and critical infrastructure industry
- Cyber security testing facilities
  - Isolated spaces for cyber security testing

# Test platforms for Space technology

- **Laboratory for Millimeter Wave Technology, hosted by VTT and Aalto University**
  - Enables device modelling, device and material characterization, measurements and testing + R&D
- **5G/6G test network with State-of-the art SatCom services**
  - Advanced test network with carrier grade terrestrial 5G equipment, SDR technology and Satellite Communications equipment such as Starlink terminals.
  - Enables generation of proof-of-concepts for private networks with satellite backhauling, testing of terminals and services in operational environment for terrestrial and satellite equipment, cybersecurity related testing and development, R&D for next generation technological enablers.
- **Satellite simulation tools for next-generation constellations and NTN networking**
  - Advanced simulation tools for links between satellite and ground segment, modelling of satellite constellations and their movement in space, and end-to-end networking over those constellations
  - Simulation tools for constellation evaluation and design, analyzing end-to-end performance such as delays over constellations to support defined applications, R&D services.
- **Forestry-TEP platform for remote sensing (<https://f-tep.com/>)**
  - Collaborative digital remote sensing platform. Online solution for commercial, research and public sector users to improve usage of satellite-based data and related applications.

# Test platforms for quantum technologies

- Two quantum computers (5-qubit and 20-qubit computers, also 50-qubit computer is under construction and will be ready in 2024).
- Fiber optic Quantum Key Distribution (QKD) development and test environment, related to national QKD network project NaQCI.fi (<https://www.naqci.fi>)
  - Allows testing of active and passive quantum channel components and setups
  - Includes full QKD software stack for interface testing and algorithm development
  - Supports QKD security performance assessment
- Cleanroom and development facilities for silicon photonics, optical MEMS and packaging
  - Enabling integration with quantum computing
- Quantum and cryogenic characterization laboratory
  - RF and DC measurements down to 10 mK temperatures





# VTT International collaboration in the field of Defence/Security/Space: example case EDF

VTT participates in two European Defence Fund projects that received a total of 58 million euros

News, Press release

🕒 30.06.2023 11:14 EEST



VTT is involved in two projects that received a total of EUR 58 million from the EU. They will help to develop the EU's defence capabilities in critical areas in the pan-European air defence and in space-based military intelligence. The projects are led by Airbus Defence and Space.

# Nato DIANA – Preliminary schedule for Finland

- **2024**
  - April – tentative challenge programme themes announced
  - May – information session for companies that intend to participate
  - July – 2024 challenge programme opens
  - August – pitching training event arranged for companies that will participate
  - August – 2024 challenge programme closes
  - September – pitching training event for start-ups selected for second phase
  - October – 2024 challenge programme winners announced
- **2025**
  - Start of acceleration programme in Finland
  - New challenge programme calls...

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## the obvious

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