

How to transfer civilian innovations to defence

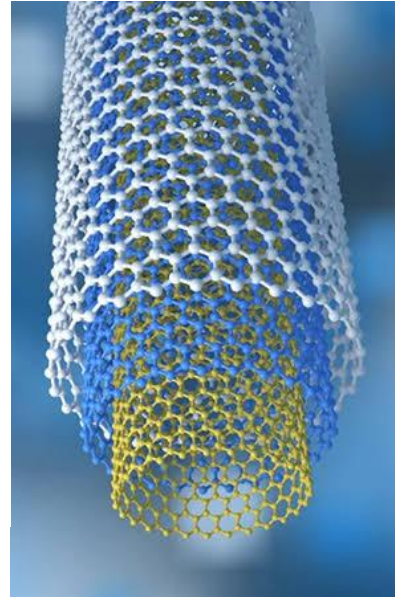
8 October VTT – beyond the obvious

Introduction / New Defence

What is 'dual-use'?

“technologies, goods, and software designed primarily for civilian or commercial use that also have military, defense, or intelligence applications.”

- Drones
- AI
- Advanced materials
- ...



Historically, major technological breakthroughs flowed exclusively from military R&D down to the civilian economy (such as ARPANET evolving into the internet; U.S DoD developing GPS etc.)

The current trends and societal threats call for active research and innovation

Trends and change factors

Sustainability, clean transition
War on European soil, Russian aggression
Cyber-attacks
Losing trust on information
Geo-economics
Concerns on energy cost and availability
Use and mis-use of AI and Quantum
Remote work beyond white collar roles
Connectivity increasingly important but telecom business struggling

Need for innovations

Resilience of critical societal and business infrastructure

Reshaping (6G) telecom landscape after 5G disappointments vs expectations

Use of satellites in connectivity and remote sensing

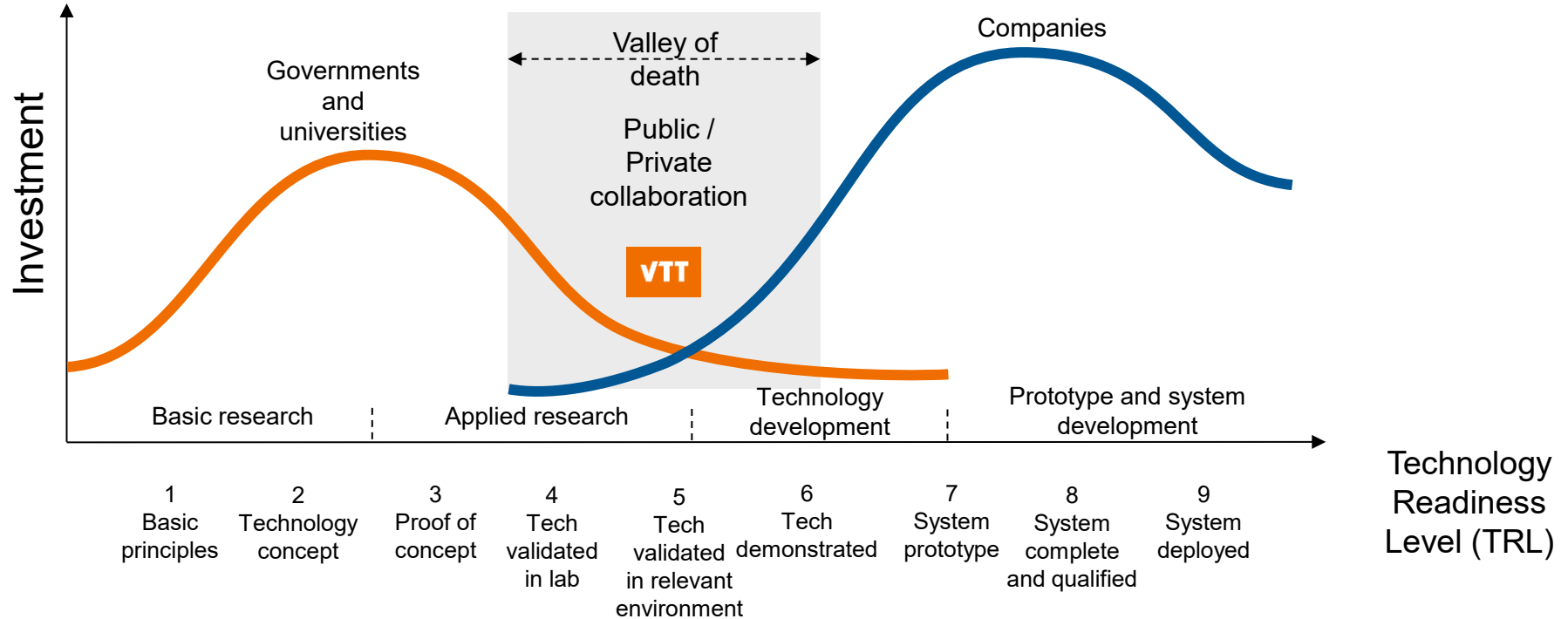
Energy efficient connectivity and digitalization

Digital trust - fight against cyberthreats, privacy malpractices, and AI deepfakes

Quantum-resilient cybersecurity

Digital innovations in defense and public safety

Turning science into dual-use innovations





Paradigm shift – What is New Defence?

**VTT****DIGITAL
DEFENCE
ECOSYSTEM**

ESTABLISHED DEFENCE

NEW DEFENCE

Traditional defence primes with exclusive supply chains	PLAYERS	Growing number of dual-use and start-up companies
Set by governmental entities, focus on national defence and industry policy	AGENDA	Set by new players, especially private companies, with a focus on purpose, business, and exports
Long-term strategic partners for defence forces	TYPICAL ACTOR	Civilian dual-use tech companies, proactive consortia and ecosystems
Defence administrations	FUNDING	New investors, NIF, EIB, DIANA, EUDIS, EDF, BF, private equity funds
Slow pace, inertia, difficult procurements, high barriers to entry	MODE	Speed, agility, experimentation, new mechanisms and initiatives to lower entry barriers
10+ years	DEVELOPMENT CYCLES	Only months or even weeks
Defence administration within its own bubble	COLLABORATION	Seamless collaboration across defence and civilian administrations, industry, and research
From defence to civilian applications	INNOVATION FLOW	From civilian to defence applications (drones, space, AI...)
Controllable, deterministic	NATURE	Uncontrollable, evolutionary

New Defence: a new *modus operandi*

- Requirements for **faster innovation cycles** arising from the war in Ukraine (time to develop countermeasures has gone down to few weeks)
 - This calls for a significant transformation in defence, comparable to **New Space** approach that fundamentally changed space business
 - A large number of civilian companies have interest in dual use applications in fast **growing defence market** – and more **investor money** is available for growth
 - Civilian companies still need **defence primes** as route to defence market
 - Most active primes harnessing this innovation capacity are winners
-
- The trend has been noticed in NATO and EU, and support mechanisms have been created (e.g. [NATO DIANA](#), [NATO Innovation Fund NIF](#), [EU Defence Innovation Scheme EUDIS](#))
 - Also, national ecosystems / facilitators needed, e.g. [the Digital Defence Ecosystem \(DDE\)](#). DDE is a network of Finnish companies in defence and technology bringing new digital defence solutions to international markets
 - Innovative solutions needed from public funding agencies too. E.g. The [Defence and Digital Resilience program](#) encourages Finnish companies and research organizations to create pioneering digital solutions to increase the resilience and security of societies.

The VTT way

VTT's year 2025 in numbers

309 M€

operating income

2,350

employees

488

patent families

51 %

of the net turnover
from abroad

1,085

customers

646

scientific articles



VTT is active on Defence sector

■ Partnerships:

- Partner with the Finnish Defence Forces
- European Defence Fund projects (20 funded)
- USA Department of Defence projects
- [NATO NFPF](#) member (research partnership)
- NATO DIANA coordinator

■ Capabilities:

- Supports all defence domains: land, sea, air, cyber, and space
- Access to world-leading SMEs
- Fully qualified facility and testing sites
- Joint development of special topics
- Complete technology transfer as part of an agreement



EDF, VTT portfolio summary



EDF 2021 call

- 1 Research project funded: ECOBALLIFE (ballistic protection)
- 1 subcontractor (ENGRT, rotorcraft)

EDF 2022 call

- 1 Development project funded: SPIDER* (Space ISR)
- 1 Research project funded: SESIOP (C4ISR – AIRC2)
- 1 subcontractor (TRAVISMOS*, non-thematic call, VR simulation)

**17 projects
+ 3 subcontracts**

EDF 2023 call

- 2 **coordinated** Research projects funded (FESPAN, SWARM-C3)
- 3 partner projects funded (ESOCA, FMBTECH*, NEMO)

EDF 2024 call

- 6 partner projects funded (AI-WASP*, ASTERION, BATTLEVERSE, ENGRT II*, EUROSWEET*, ORDEAL)
- 1 subcontractor role (AURIGA*, armored infantry fighting vehicles)

EDF 2025 call

- 3 partner projects funded (DIALOG-AI, SHIMBAD*, SPIDER2*)

EDF 2026 call

- VTT confirmed as a partner in 20+ preparations, also 1 **coordination** (deadline for proposals 29 September)

The 9 projects with asterisk (*) are Development Action projects (TRL 4-7)

EDF2021-EDF2025 VTT critical technologies matrix

	2021	EDF 2022	EDF 2023	EDF 2024	EDF2025
artificial intelligence		 	 	  	 
autonomous systems				  	
quantum technologies					
biotechnology and human enhancement tech.					
space					
hypersonic systems					
novel materials and manufacturing			 		
energy and propulsion					
next-generation communications networks				  	

Finland is a leading dual-use innovation hot spot

Selected examples

Innovation Hubs

DIANA Defence Innovation Accelerator for the North Atlantic



High-tech companies

NOKIA **ICEYE**

IQM



Funding mechanisms

**BUSINESS
FINLAND**

Tesi

FiBAN
FINNISH BUSINESS ANGELS NETWORK

NATO presence



Defence ecosystems

**DIGITAL
DEFENCE
ECOSYSTEM**



**Finnish Information
Security Cluster**



SAVO DEFENCE



Oulu DefTech Cluster

**DEFENCE TECH
HUB**

**ENTER
ESPOO**

National & international agencies



Hybrid CoE

TRAFICOM
Liikenne- ja viestintävirasto
Kyberturvallisuuskeskus

**International
arrangements**



modirum

GESPI

Millog

INSTA

Patria

EPEC

Telia

SAVOX

Bittium



SAAB

YOUNITE

Reaktor

SOLITA

SENOP

basemark

KELLUU

NOISELESS IMAGING

Mevea
Simulation solutions

Radiantum

BITWISE



Wirepas

AlLiveSim

GIM
ROBOTICS

KUVA SPACE

NORDIC
INERTIAL

Innokas

arbonaut

CONVER
GENTA

Reorbit

NOKIA

SADEinnovations

tke

ELOMATIC



UNIKIE

ERICSSON

HiO

VTT

LAPIN AMK
Lapland University of Applied Sciences

TURKU AMK



MINDFIELD



Tampere
University



ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

Metropolia

Aalto University



MML
MAAN-
MITTAUS-
LAITOS

DEFENCE

DUAL-USE

RESEARCH

Digital
Applications

DOMAINS

DIGITAL
DEFENCE
ECOSYSTEM

VTT Incubation and Acceleration spurs growth and renewal in strategic industries



**Spin-off incubator
VTT LaunchPad**
to commercialize
VTT technologies
as spinoff companies.



**NATO DIANA Accelerator
2025→**
to accelerate civilian
technology companies to also
serve defence industry.



Accelerator Network 2020-24
to accelerate the growth of
food and aggrotech startups.

VTT LaunchPad

develops fundable spin-off ventures based on VTT technologies geared for global impact.

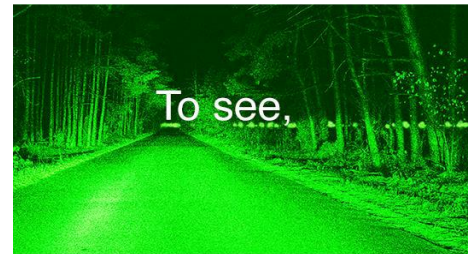
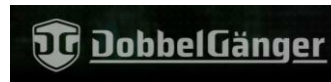
- In 2024, **15%** of all equity capital funding raised by Finnish startups went to VTT spinoffs. In 2020-2024, this number was **10.5%**.
- Since the establishment of VTT LaunchPad in 2019, there has been **14 funded startups**.
- Most up-to-date information: **vttlaunchpad.fi**



VTT spin-offs and licenced technology



KIVA SPACE

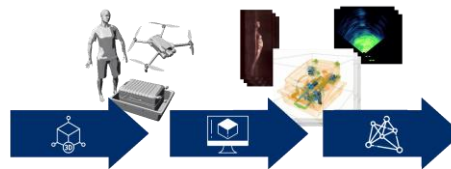


To see,

OBSIDIAN™



MANTIS VISION



SYNADEL

VTT Spin-off incubation

Military Areas for Technical Collaboration

- Arctic Operations and Performance
- Datalinks
- Cybersecurity
- Sensor Data Fusion and Analytics
- Networks Per Need (Land, Sea, Air and Space)
- 5G/6G in Military Applications
- Space and C5ISTAR
- Underwater Explosion Analyses
- Underwater Signatures
- Swarming – Collection Machine Intelligence
- Position Navigation Timing (PNT)
- Secured Connectivity
- Dynamic Spectrum Analysis
- Drones in the Arctic
- Wearable technology
- Life Cycle Management
- CBRN Decontamination
- Military Materials Properties and Performance
- Adaptive Signature Management
- Radar Absorbing Materials
- Material Electrical Properties
- Chlorophyll-based Camouflage
- Advanced Material Technologies
- Microstructurally Accurate Materials
- Materials
- Ballistic Protection Materials
- Improved SITAW, Simulations, Maintenance

VTT in multi domain operations

VTT

PNT functionalities:

- 5G NR based positioning
- Miniaturized atomic clocks

Cyber security:

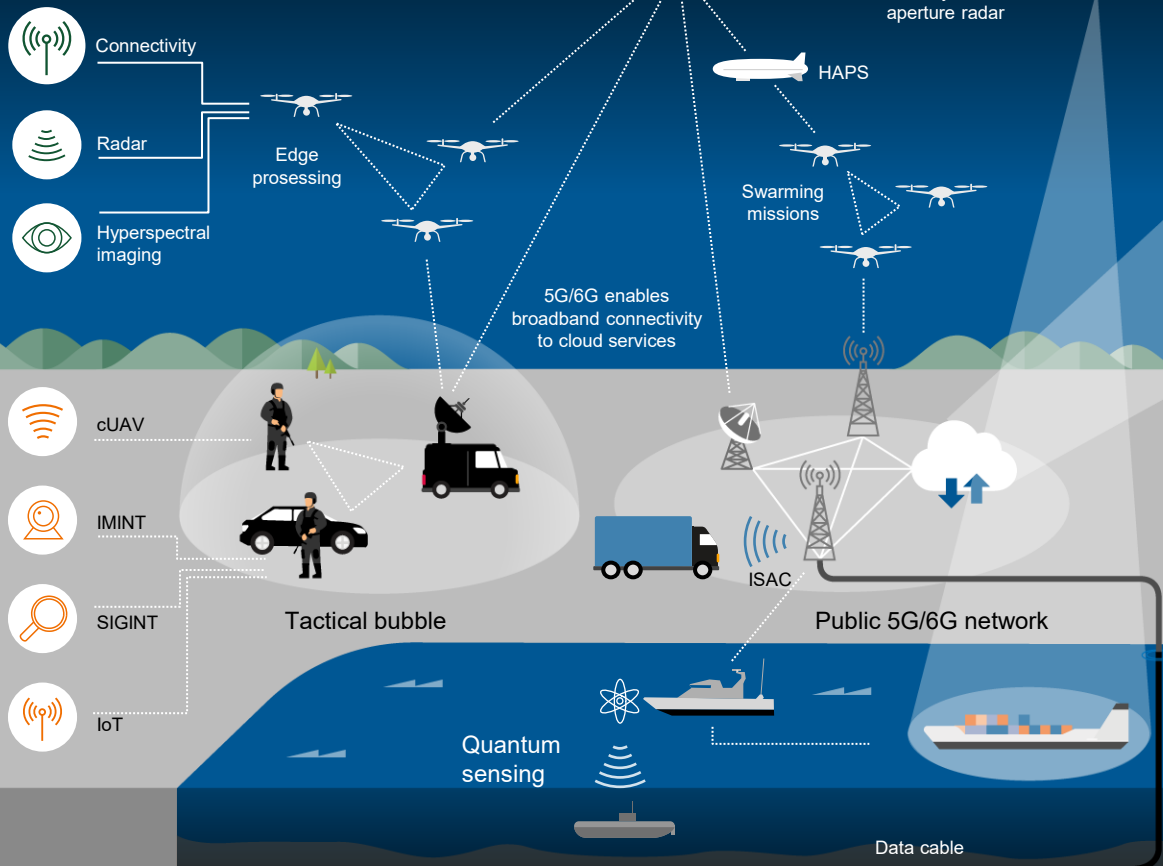
- Zero trust architecture
- PQC algorithm selection & parametrization
- QKD based security on fiber links

Edge processing:

- Updates on AI models
- Built-in processing capability to speed-up decision cycle

Connectivity requirements:

- Secure
- Jamming proof
- Self healing
- Undetectable



Comprehensive
situational awareness

0101010100
1000010110
1000100100
1011000110
1011000011
011111
101010
01001



Sensor fusion with AI assisted image processing, change detection, target acquisition and spectral intelligence to assist in decision making

The Holy Trinity

- **Established Defence:** connecting with European defence primes, MoD & Defence Forces, NATO
 - **New Defence:** activity in innovation ecosystems, generating spin-offs
 - **Total Defence:** unique Finnish asset in involving the whole society ('quadruple helix'), collaboration between governmental entities, industry, academia / RTOs, and the public
-
- Relevant capabilities and solutions developed in the civil domain. Commercial or jointly funded projects (e.g. Horizon Europe, European Space Agency, Business Finland)
 - NB. Horizon Europe, Cluster 3 'Civil Security for Society', "funds research and innovation to address security threats, cybercrime, and natural or man-made disasters across the European Union"
 - EDF has been paramount for VTT in establishing collaboration with defence primes and other organisations
 - Networking and connecting with different kinds of actors in the defence sector
 - Activity in the defence innovation scene; spin-offs; ecosystems and accelerators
 - Enablers needed from governmental side: funding opportunities, collaboration and joint development with the Defence Forces; NATO activities
 - Acknowledging the current **needs** in the battlefield and being able to provide relevant solutions

bey⁰nd

the obvious

Thank you!

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