



**Vertical Innovations in Transport And Logistics over  
5G experimentation facilities**

## Project Overview

Kostas Trichias  
WINGS ICT SOLUTIONS

5G PPP Webinar: 5G Innovations for Verticals

05/03/2021



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 101016567.



# Agenda



**01** Project Vision

**02** Project Concept

**03** 5G-Testbeds

**04** T&L facilities &  
5G-enabled use cases

**05** Network Applications (NetApps)

**06** Experimentation Platform

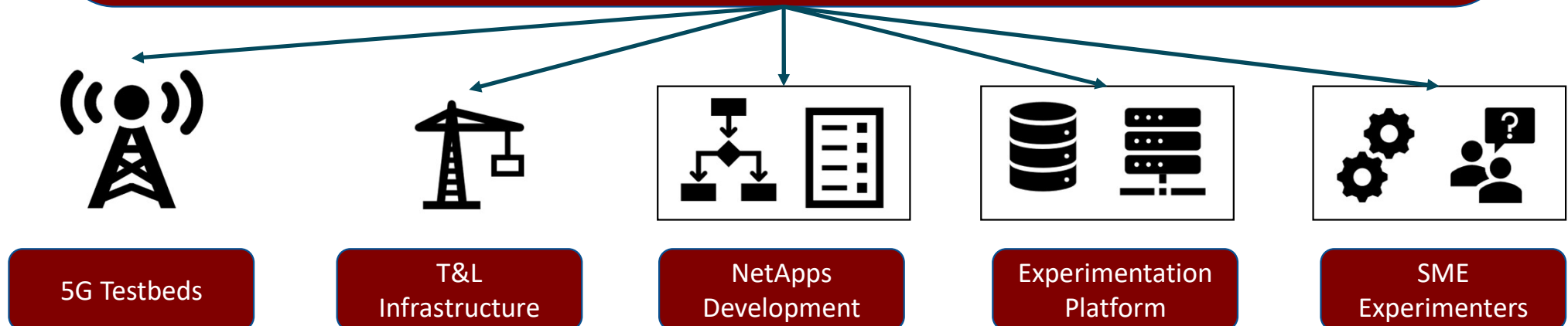
**07** SME/Vertical Experiments

**08** Project time-line



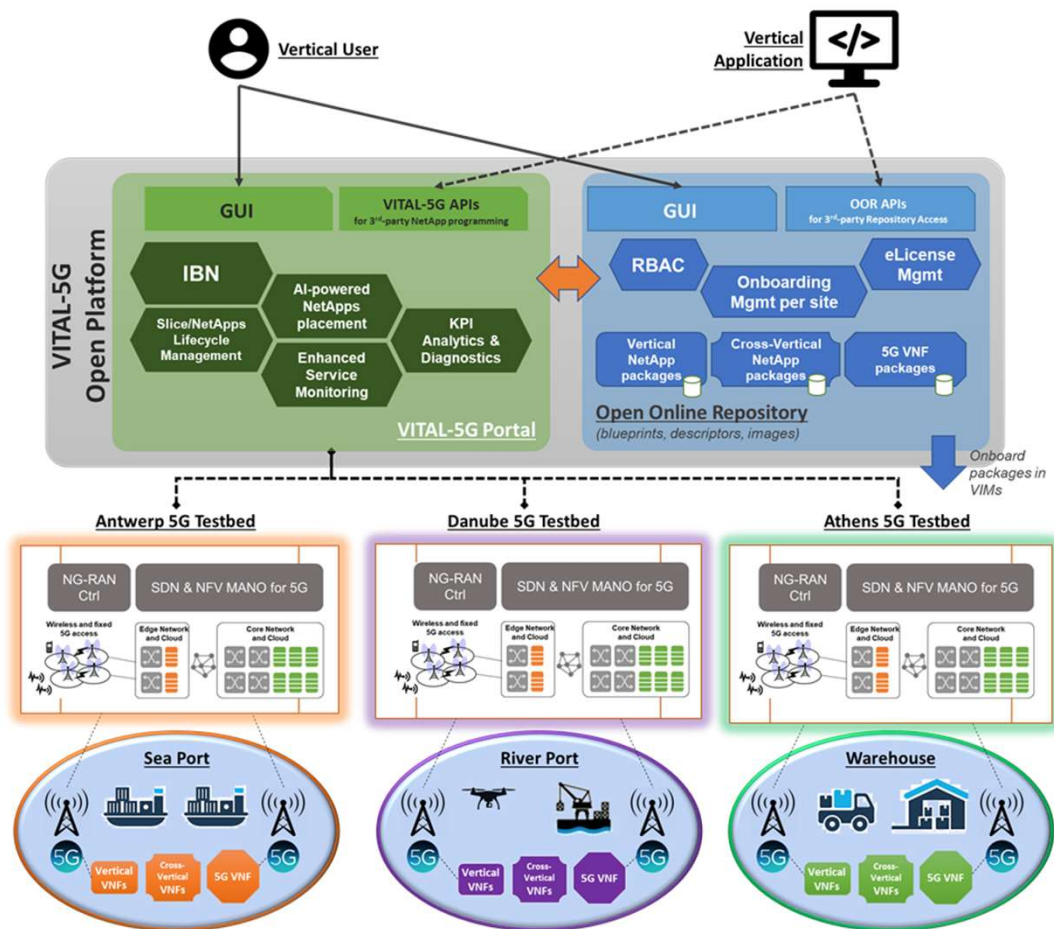
## VISION

To enable creation of 5G-enhanced services for the Transport & Logistics (T&L) industry by bridging the knowledge/expertise gap between the T&L sector, telecommunication experts and application developers. Vital-5G will engage key logistics stakeholders (sea and river port authorities, road logistics operators, warehouse/hub logistic operators, etc.) and innovative SMEs, offering them an open and secure virtualised 5G environment to test and validate their T&L-related, cutting-edge Network Applications (NetApps)





# Concept



## VITAL-5G Experimentation Platform & Open Online Repository

(NetApps Development, Onboarding, Deployment, Experimentation tools, etc.)

## 5G-Testbeds

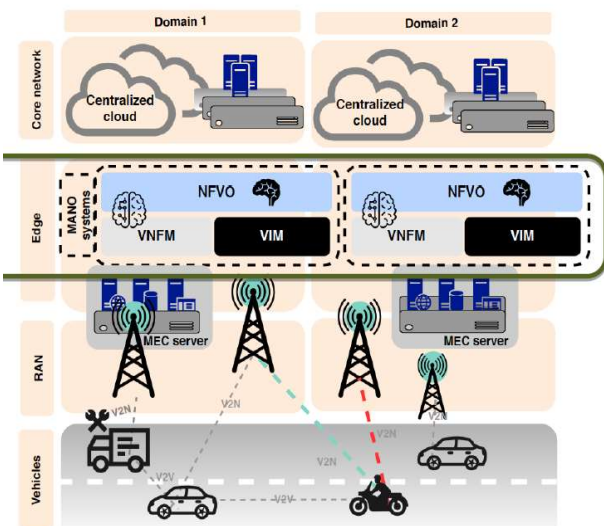
3GPP Release 16 Stand Alone testbeds @ Antwerp, Athens and Danube (Galati)

## T&L facilities & 5G-enabled use cases

(Automated vessel transport, Warehouse/freight logistics, Data-enabled assisted navigation )



# 5G Testbeds



## Antwerp 5G-Testbed

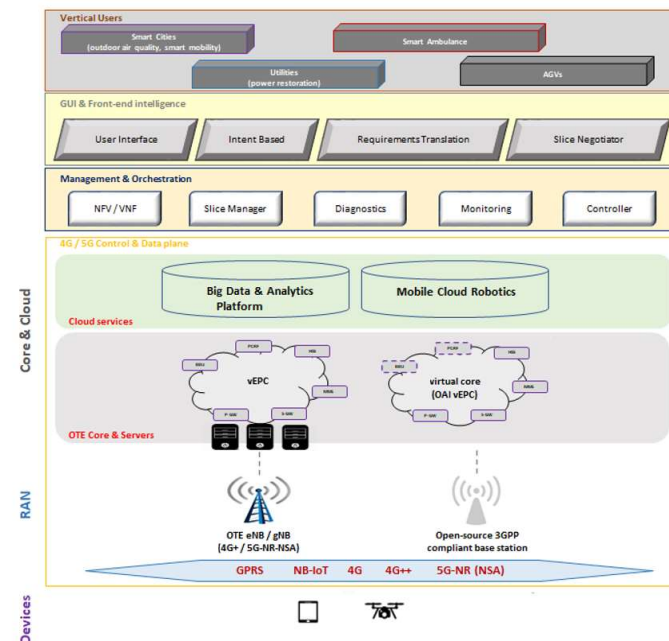
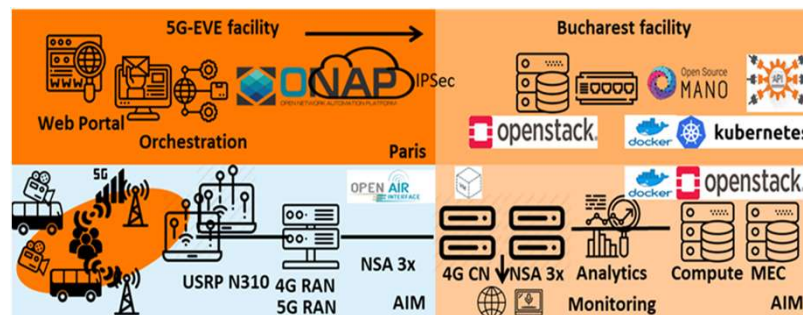
Based on i) Telenet's Innovation Center infrastructure, ii) Connectivity and components from 5G-Blueprint and iii) components from Telenet's commercial 5G network.

To be upgraded to **3GPP Rel.16 SA**

## Galati (Danube) 5G-Testbed

Based on i) Orange Romania commercial infrastructure and ii) connectivity and components from the 5G-EVE testbed. Backhaul to be extended to Galati.

To be upgraded to **3GPP Rel.16 SA**



## Athens 5G-Testbed

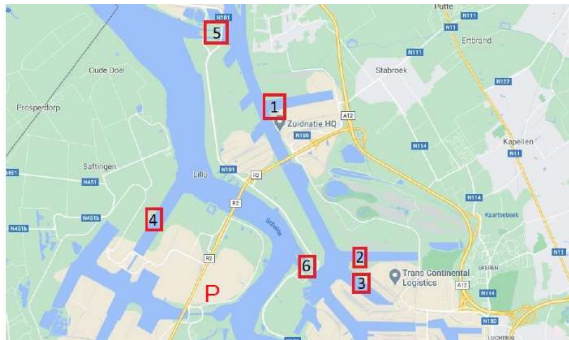
Based on i) OTE's backbone infrastructure and ii) connectivity and components from the 5G-EVE testbed. Indoor & outdoor connectivity over a fiber backhaul.

To be upgraded to **3GPP Rel.16 SA**



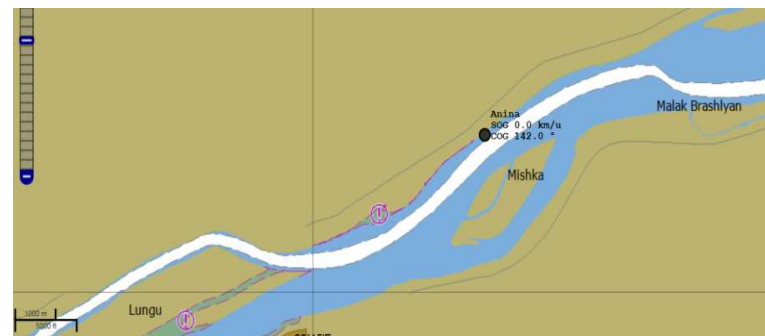
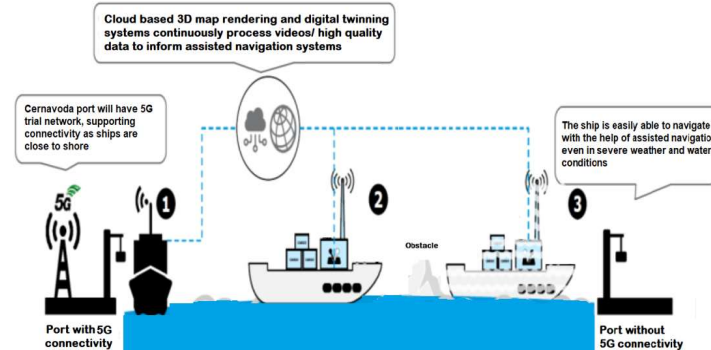
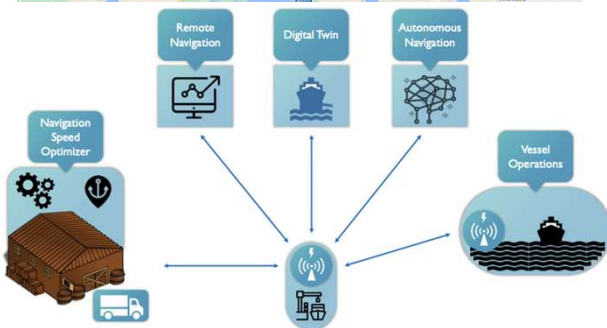


# T&L facilities & 5G-enabled use cases



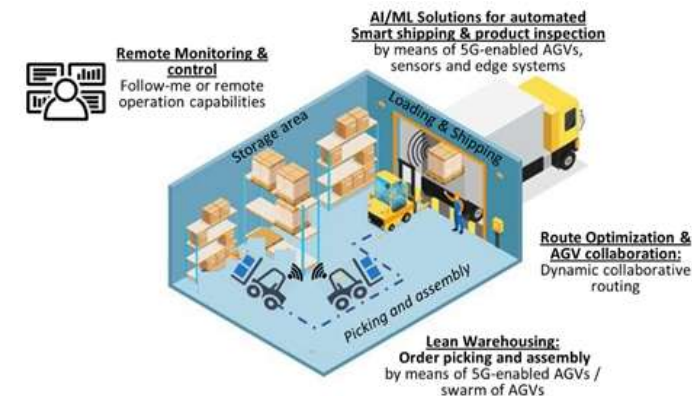
## Galati (Danube) T&L Facility & UC

- **Galati river port (Danube)**
- Data-enabled assisted navigation in severe weather/water conditions
- Remote inspection, fraud detection, insurance
- **KPIs:** Increased safety, electronic map accuracy, etc.



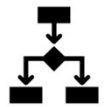
## Antwerp T&L Facility & UC

- **Antwerp sea port (Mission critical)**
- Automated & Remote Vessel navigation in busy port environment
- Port Digital Twin
- **KPIs:** Port safety, reduced dwell times, reduced personnel, etc.



## Athens T&L Facility & UC

- **Athens Logistics hub (3PL warehouse)**
- Smart warehouse / freight logistics
- Lean warehouse, human-AGV collaboration, remote monitoring & control, etc.
- **KPIs:** Increased operational efficiency, productivity, warehouse capacity, etc.

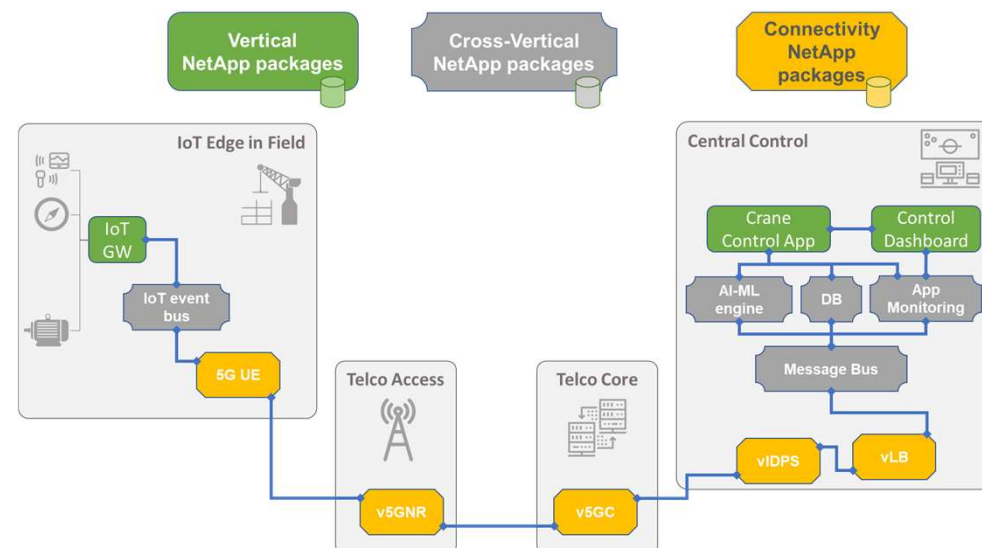


# NetApps



## Network Applications (NetApps)

*Packages containing NFV descriptors, software images, configuration scripts for service chains formed by virtual (VNF) and physical (PNF) functions.*



- **Application –specific NetApps (Green):** Address specific industry challenges for the T&L sector. They can be specific to the connectivity layer implemented at the target T&L premises, e.g., autonomous/remote vessel control, human-robot collaboration application, etc.
- **Application – agnostic NetApps (Gray):** Used to implement core primitives for data processing at the application layer. They include functionalities that can be used in a variety of vertical applications and T&L services, e.g., generic IoT management platform, data ingestion, fusion and processing engine, etc.
- **NetApp implementation:** Multiple NetApps (specific & agnostic) will be “chained” together in a flexible and reconfigurable manner to provide advanced E2E services.
  - Autonomous Vessel Navigation = Digital twin + Monitoring sensor data + Obstacle detection & tracking + Path prediction & vessel control



# Experimentation Platform



**VITAL-5G** aims to minimize the knowledge/expertise gap between telecom providers, vertical industries and application developers through the promotion and validation of NetApps.

- First tests of NetApps and tools
- First experimental results
- Identification of potential improvement points

**VITAL-5G early release**  
(MS4 @ M15)

**VITAL-5G full release**  
(MS6 @ M23)

- Full version of platform and repository (all features available)
- Extensive experimentation of VITAL-5G NetApps (based on UCs)

- Improvements and tuning based on feedback
- Final version of platform and repository
- Support for more NetApps and functionalities

**VITAL-5G stable release**  
(MS7 @ M30)

- **Service Portal**

- Design, onboard, instantiate, monitor/manage and benchmark T&L NetApps (NetApp Life-Cycle Management)
- AI/ML-assisted placement of VNFs/VxFs
- Experiment execution via Dashboards / GUI, programmatic APIs, Intent Based Interfaces
- KPI monitoring and analysis

- **Open Online Repository**

- Catalogue service supporting programmable APIs and GUI to on-board, query, retrieve and update VxF packages, Network slice templates, Network service descriptors, Service blueprints
- Role / Attribute Based Access Control (RBAC/ABAC) to regulate access, view and actions
- License Management for NetApp packages
- Based on Open-source Service catalogue (used in other 5GPPP projects) and providing Open Access to several NetApps





## SME/Vertical Experiments



### **VITAL-5G extensive trialling campaign over state-of-the-art experimentation facilities targeting:**

- i. Validation of VITAL-5G & External NetApp functionality.*
- ii. Showcasing of the added value of 5G connectivity for the T&L sector*
- iii. Performance evaluation & benchmarking of results for various T&L services*

- **VITAL-5G Trials**

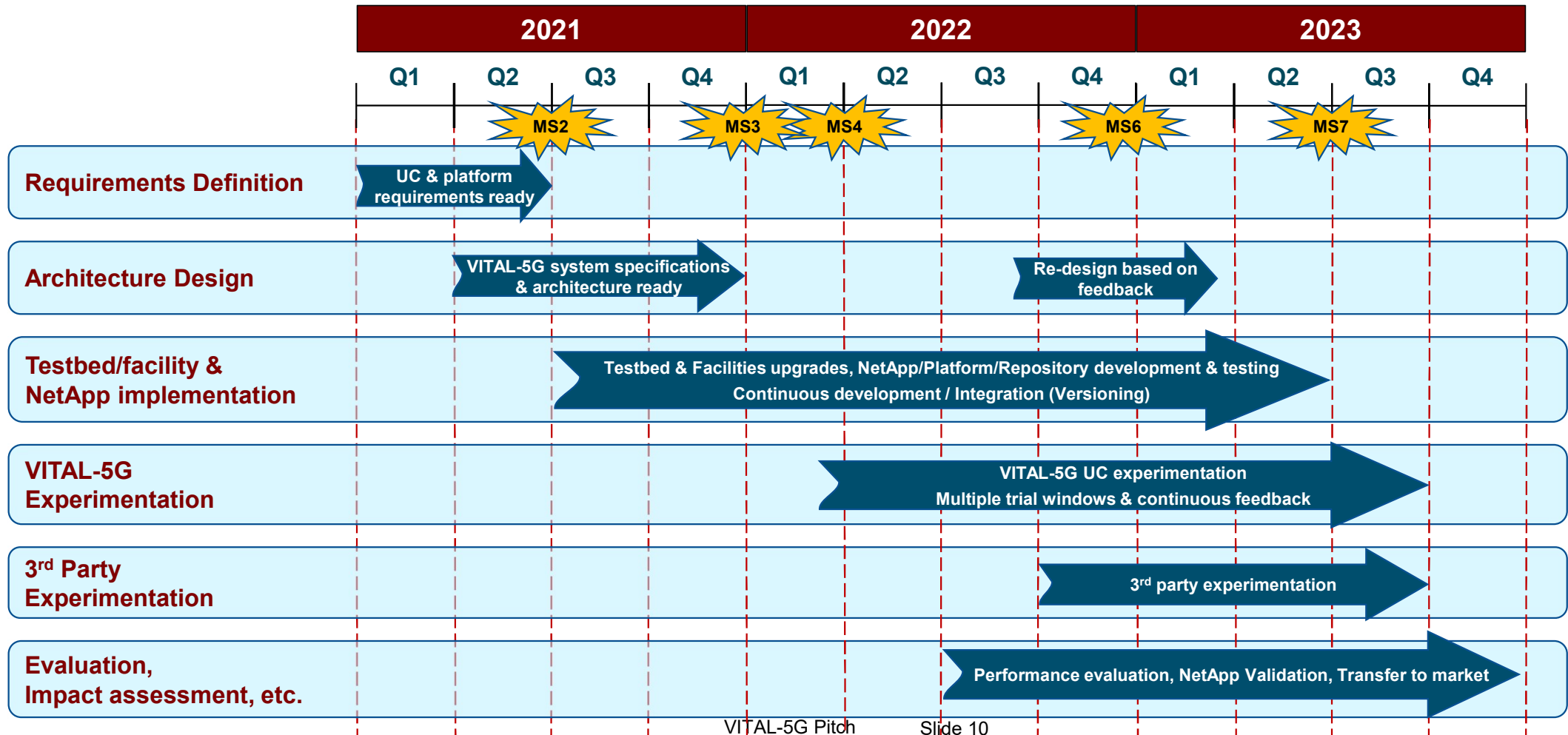
- VITAL-5G partners to perform T&L services evaluations in real-life conditions (3 UCs)
- Provide feedback based on early trials to further improve the design & functionality of the portal

- **3<sup>rd</sup> party experimenters**

- Originating from the network of commercial contacts of the trial facility owners
- Possibility to re-use VITAL-5G NetApps or onboard and test proprietary NetApps in real-life conditions
- Closer-to-market NetApp scenarios
- Baseline for a T&L NetApp business ecosystem



# Timeline





Thank you for you attention!



WINGS ICT SOLUTIONS



Kostas Trichias



Ktrichias@wings-ict-olutions.eu



<https://www.wings-ict-solutions.eu/>



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 951867

