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
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).
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
**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.

**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.

**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.
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.

- **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

---

**VITAL-5G Pitch**

**Slide 8**
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

• **3rd 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
## VITAL-5G Pitch

### Requirements Definition
- **2021**: Q1 - Q2
- **2022**: Q3
- **2023**: Q4

### Architecture Design
- **2021**: Q2 - Q4
- **2022**: Q1
- **2023**: Q2 - Q4

### Testbed/facility & NetApp implementation
- **2021**: Q4
- **2022**: Q1 - Q3, Q4
- **2023**: Q1 - Q4

### VITAL-5G Experimentation
- **2021**: Q4
- **2022**: Q1 - Q3, Q4
- **2023**: Q1 - Q4

### 3rd Party Experimentation
- **2022**: Q1 - Q4

### Evaluation, Impact assessment, etc.
- **2022**: Q3
- **2023**: Q4

---

**Timeline**

- **Q1** - **Q4**: Timeline overview
- **VITAL-5G Pitch** - Slide 10
Thank you for your attention!

WINGS ICT SOLUTIONS

Kostas Trichias

Ktrichias@wings-ict-solutions.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