SNS ICE / GUIDE: Automotive, Transport & Logistics Solutions Webinar

TrialsNet Perspective

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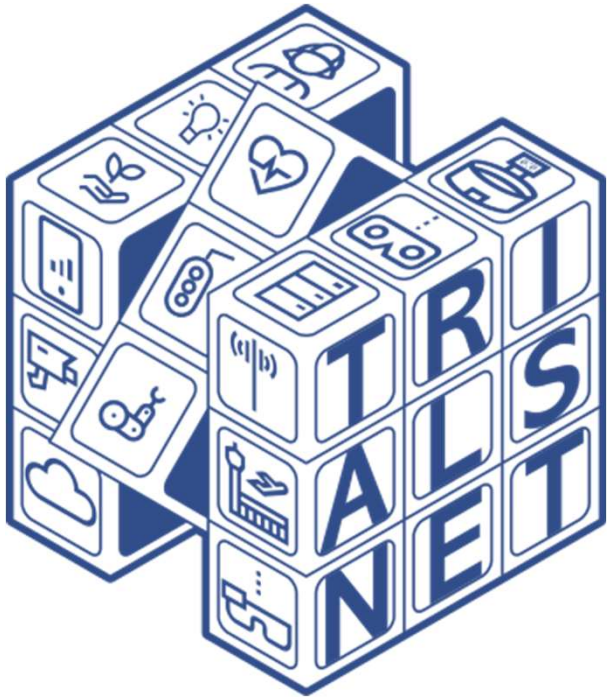
TrialsNet project has received funding from the European Union's Horizon-JU-SNS-2022 Research and Innovation Programme under Grant Agreement No. 101095871

Outline

- Project introduction
- Smart Highway infrastructure & Zero-Touch Service Management of automotive services
- Sub-project use case: Automated Teleoperated Sustainable (ATOS) Driving

Project Introduction



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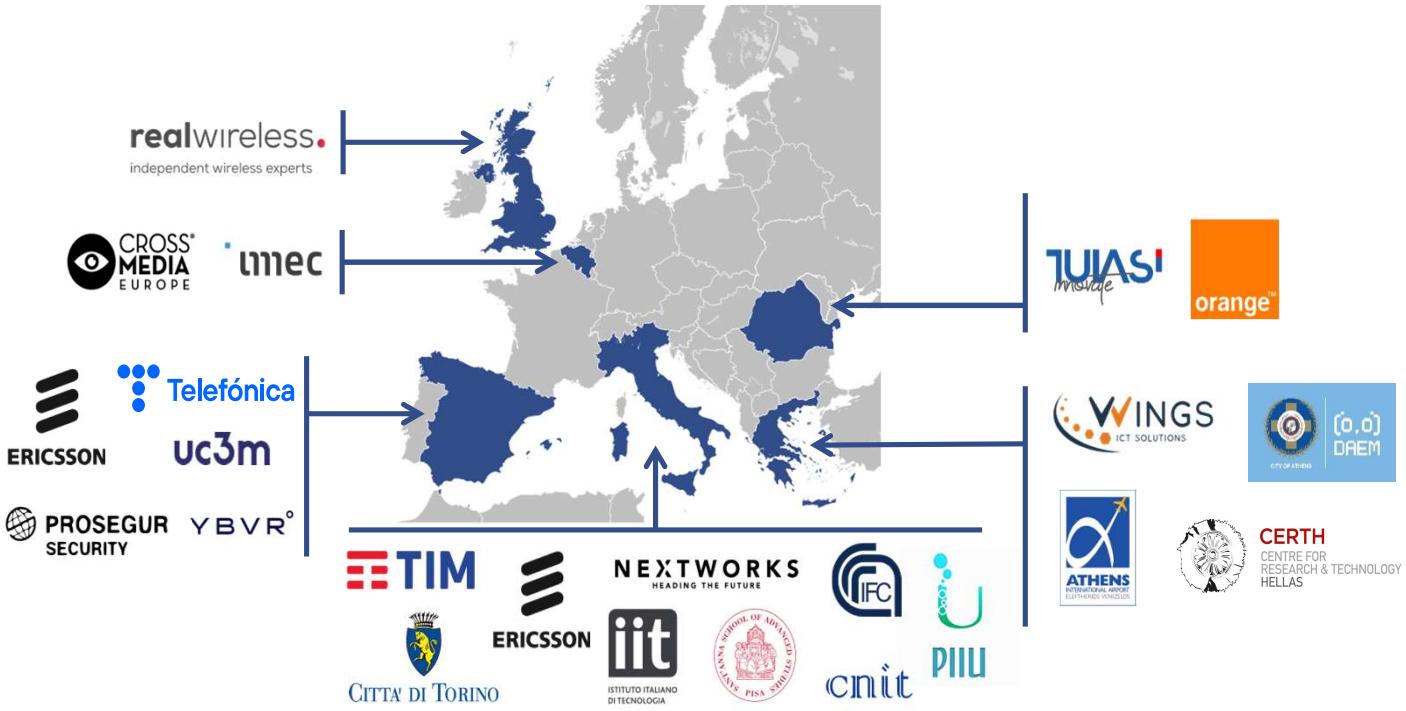
Vision

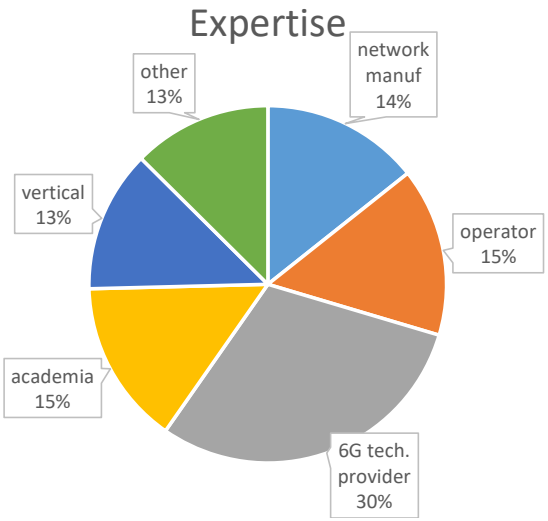
- Improve "**livability**" and people's quality of life by enabling compelling societal values as **sustainability, resilience, inclusion, trust, security**, etc. through the **implementation of 5G and beyond applications** in the three domains of:
  - Infrastructure, Transportation, Security & Safety
  - eHealth & Emergency
  - Culture, Tourism & Entertainment

- TrialsNet performs **large-scale trials** with **verticals (and real users)** to implement a various set of innovative 6G applications, over a **wide coverage area** (4 clusters) which will be essential for the transition towards the next generation of mobile networks

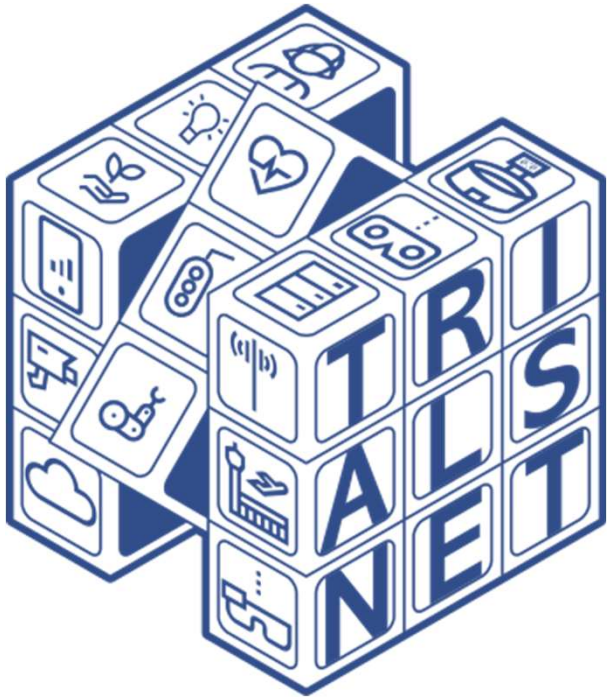
Project set-up: Consortium

Strong Consortium of 23 partners





Smart Highway infrastructure & Zero-Touch Service Management of automotive services



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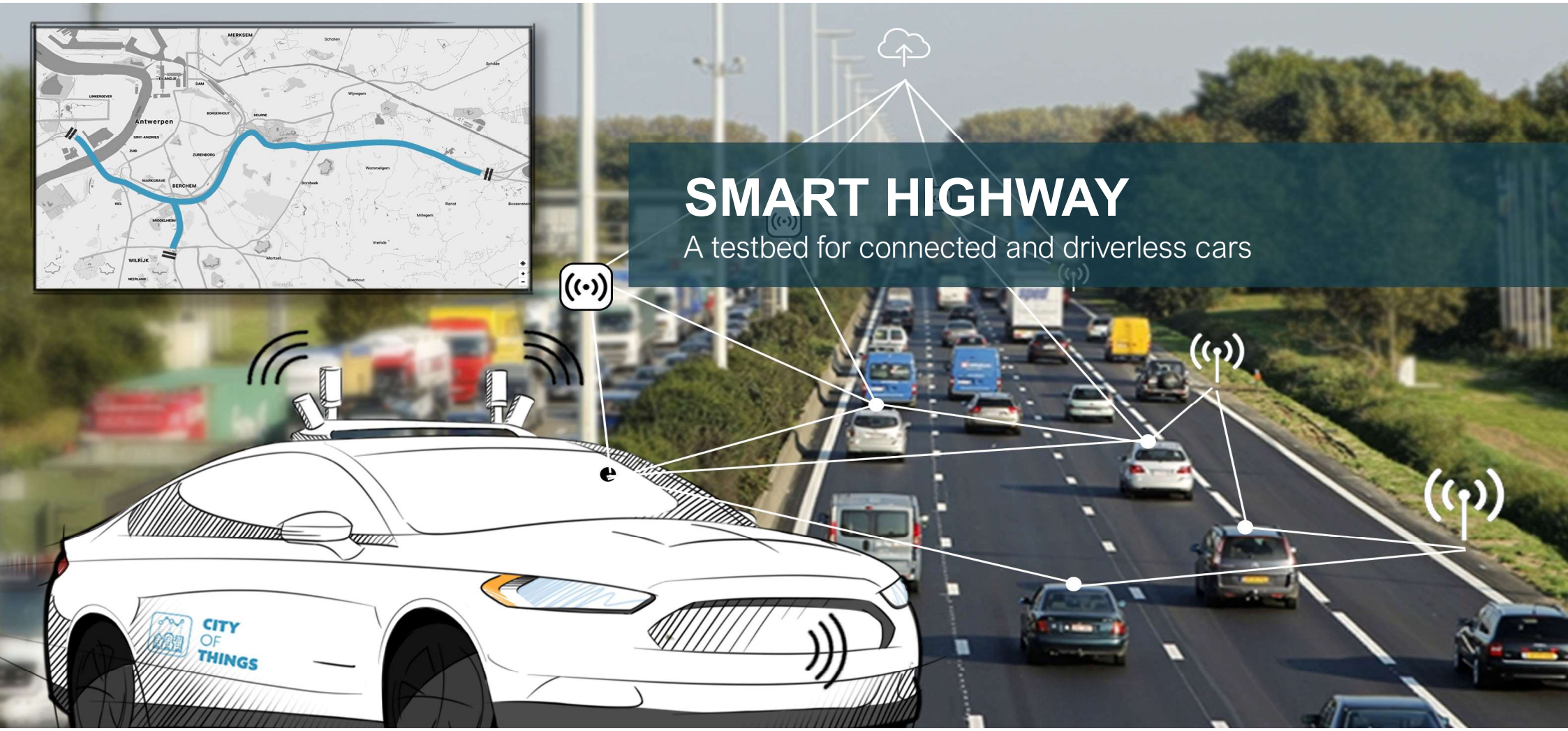
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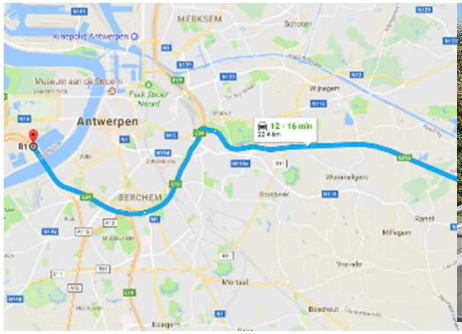
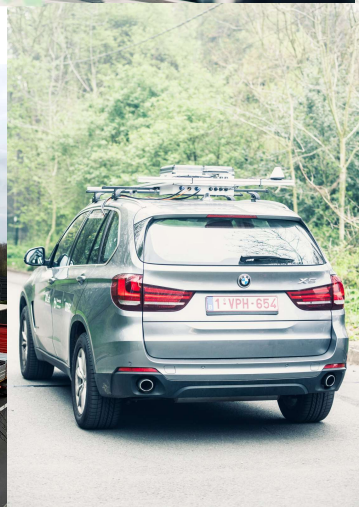
BERCHEM
Bornbeek
Ranst
Bossenstein
KIEL
MIDDELHEM
Millegem
Vremde
WILRIJK
Mortsel
NEERLAND
Boechout
SMART HIGHWAY
A testbed for connected and driverless cars
CITY
OF
THINGS

Connected Mobility Testbed – “Smart Highway”

Scalable and reliable V2X….





… testing and validating

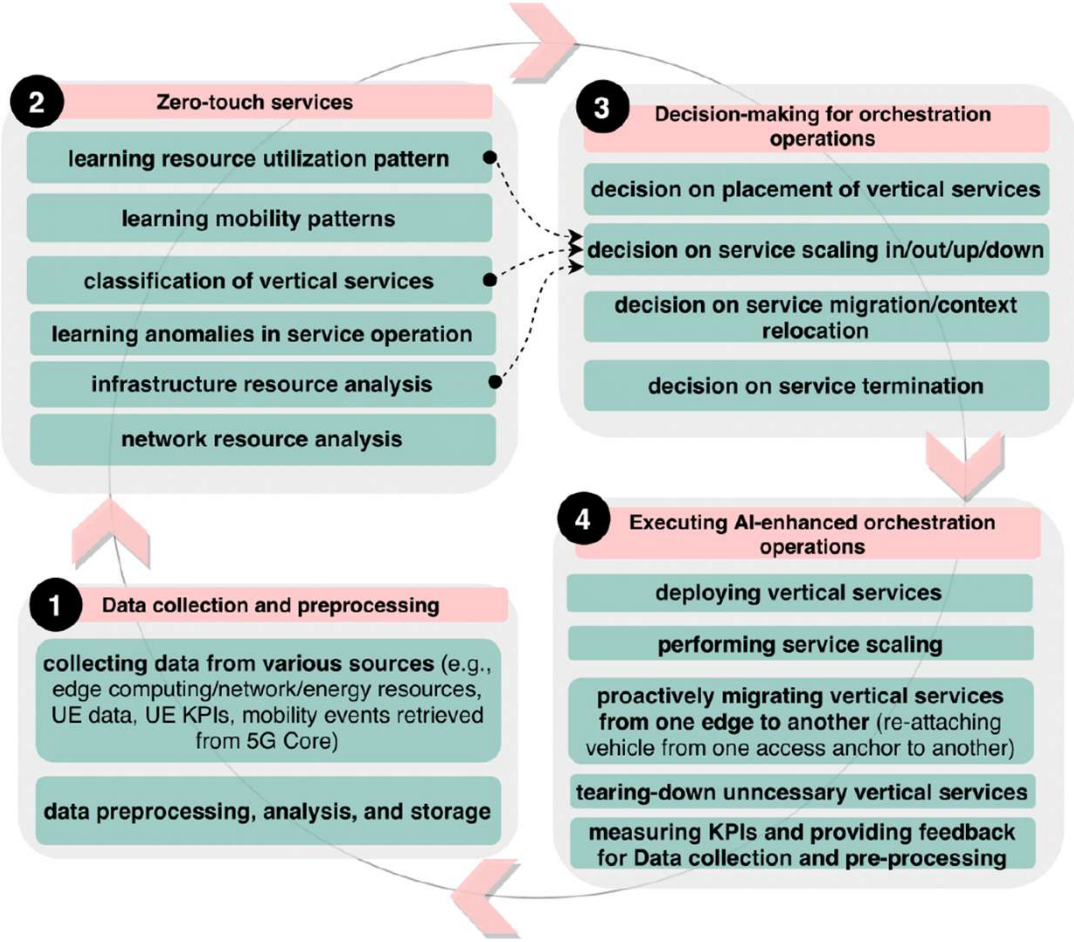
1. Ultra-fast **connectivity**
   - Vehicle-to-vehicle & vehicle-to-infrastructure communication
   - Minimal latency (10-15 ms)

2. Extensive **computing power**
   - In the vehicle & at the roadside
   - Supporting data-intensive applications, e.g. using artificial intelligence

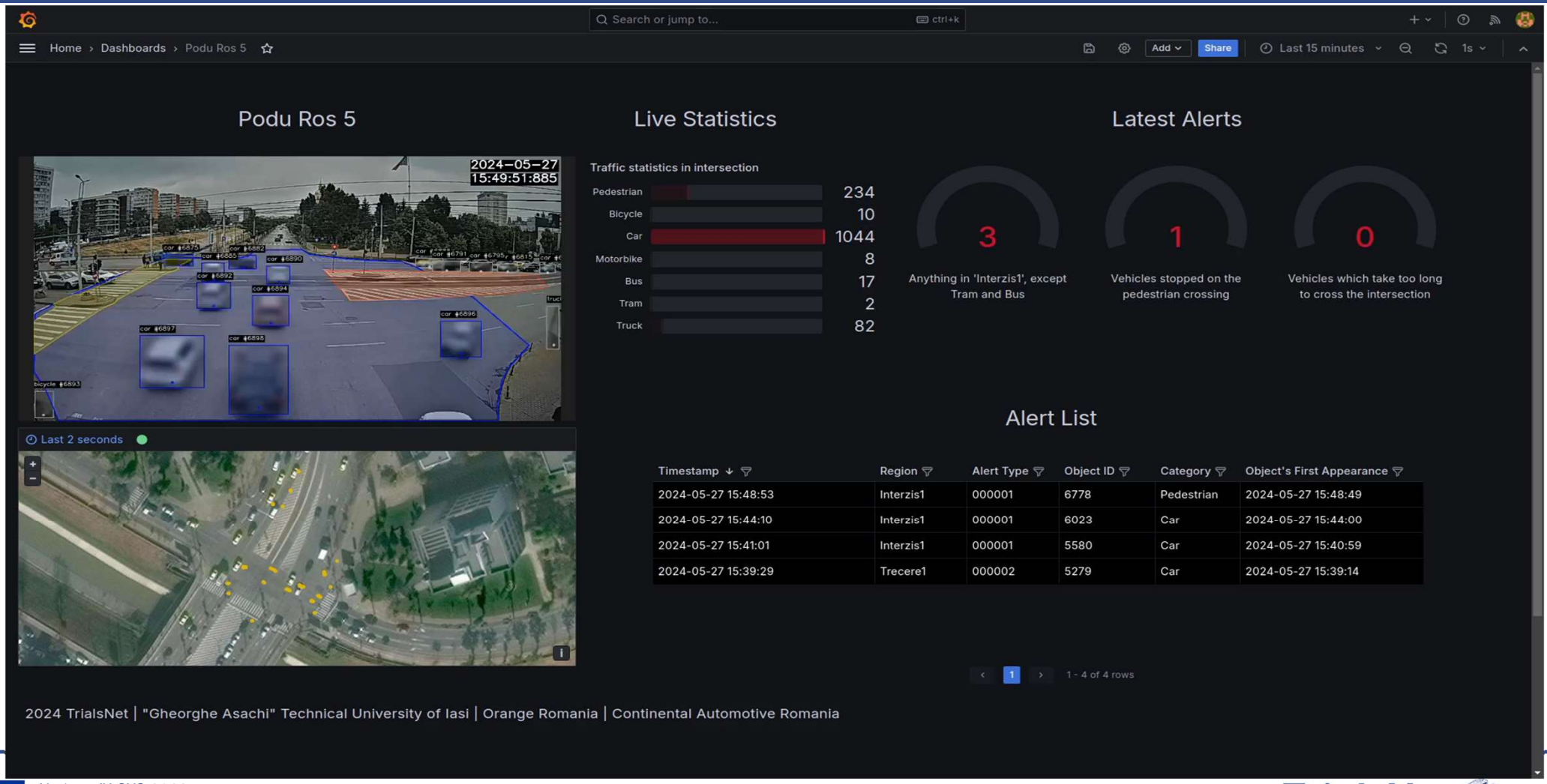
3. Precise **positioning**
   - GPS combined with other techniques for optimized accuracy
   - In the order of 1-10 cm

Zero-touch Service Management in TrialsNet

- Automated orchestration of network resources using **rule-based and AI/ML techniques**
- Carefully designed taking into account the **UC performance requirements**



UC4: Smart Traffic Management application

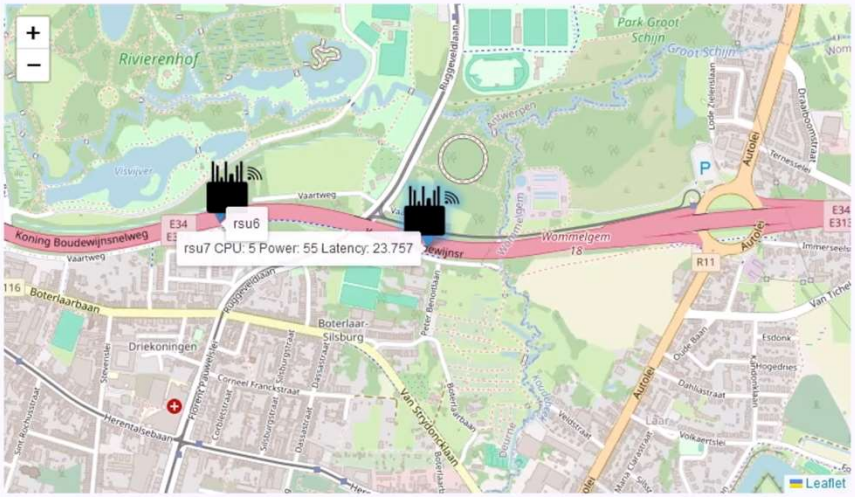


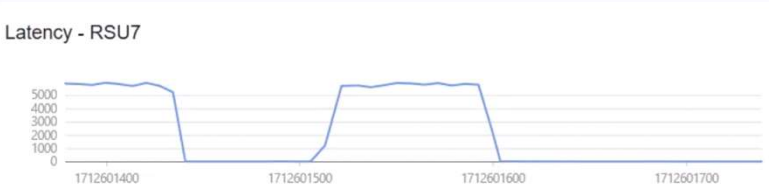
Automated orchestration of automotive services

Smart Highway Testbed | Running Nodes: 4 | Selected Node: Rsu7

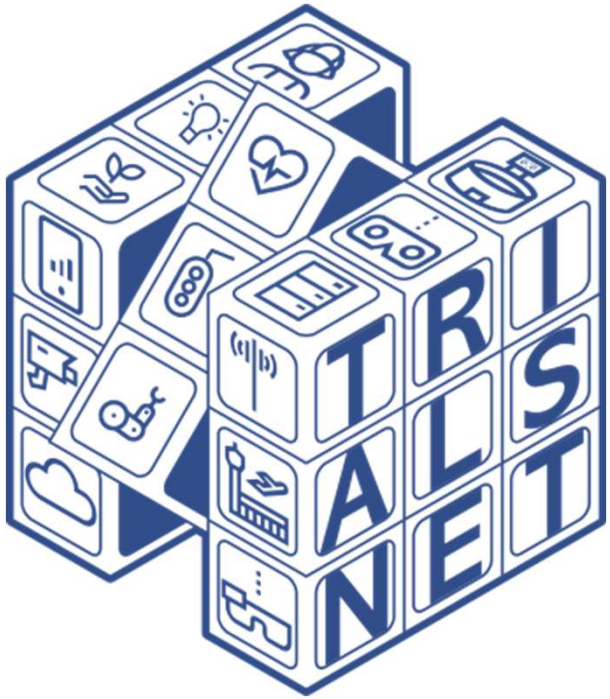
Track selected Node: ☑

Node	CPU (%)	Memory (%)	Storage (Gb)	Latency (Ms)	Power (Wt)	Latitude (D)	Longitude (D)	Elapsed (S)
rsu7	5	16	9.5	23.757	55	51.210586667	4.480953333	1.092
rsu4	49	18	9.3	6311.276999999999	65	51.215726667	4.457215	0.093
rsu6	5	18	9.6	23.384999999999998	63	51.211206667	4.472616667	0.093
rsu5						51.211915	4.461538333	2.093





Automated Teleoperated Sustainable (ATOS) Driving



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Automated Teleoperated Sustainable (ATOS) Driving

- Explores the integration of teleoperation within Beyond 5G (B5G) and upcoming 6G network frameworks
  - dynamic requests to adapt QoS parameters → network exposure capabilities in TrialsNet infrastructure
  - subscription to network performance metric data → longer and more reliable support for teleoperation

Remote station (left), Automated Teleoperated truck (right)

Use Case description

- Support tele-operation service requirements in dynamic network conditions
  - Including automation of orchestration service and taking into account sustainability metrics like energy consumption of network functions

KPIs:

Network:

- Down/up-link aggregated throughput
- Network round-trip latency
- Packet loss
- Energy consumption

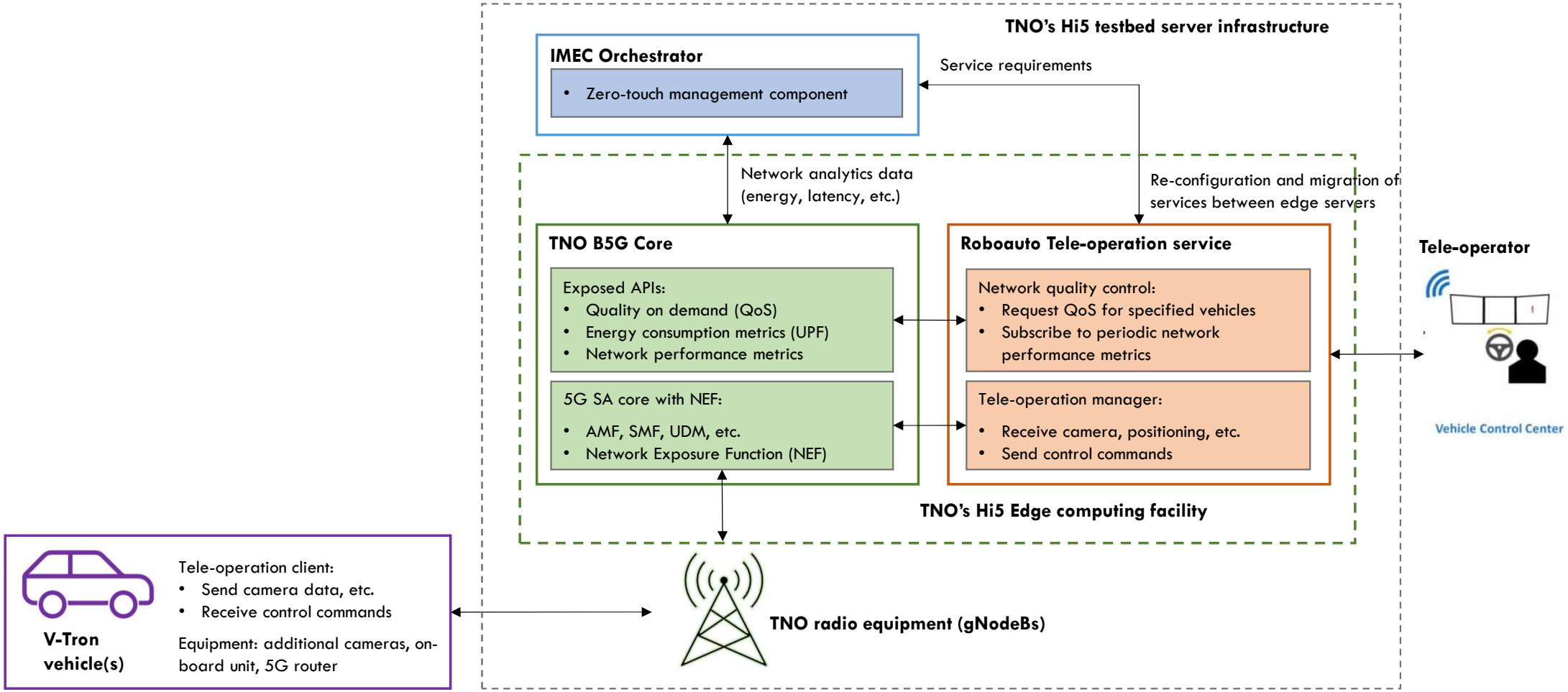
Application:

- One-way latency, down/up-link throughput per user
- Service reliability
- Max achievable speed
- # of teleoperation disengagements

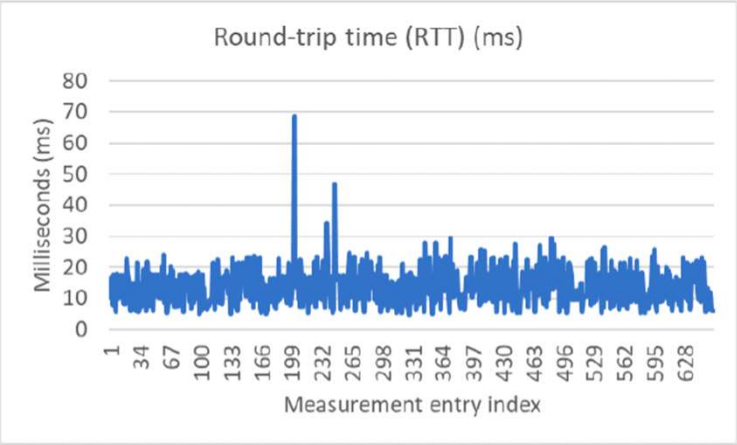
KVIs:

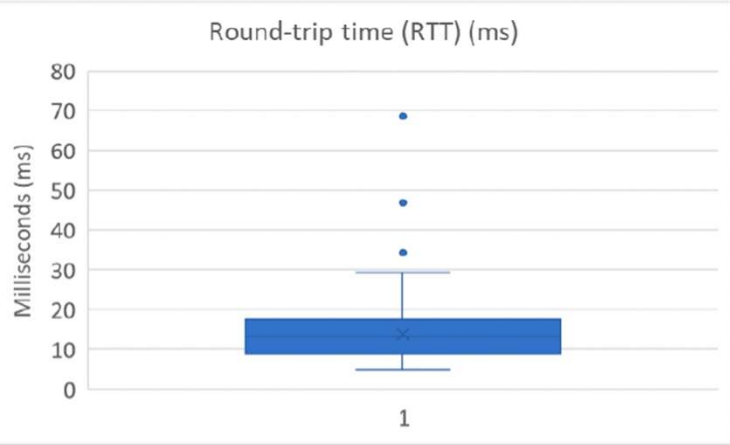
- Environmental:
  Energy usage reduction in the cloud/edge infrastructure
- Societal:
  Addressing driver shortage in Europe
- Economical:
  Increased productivity of drivers and trucks

Infrastructure overview

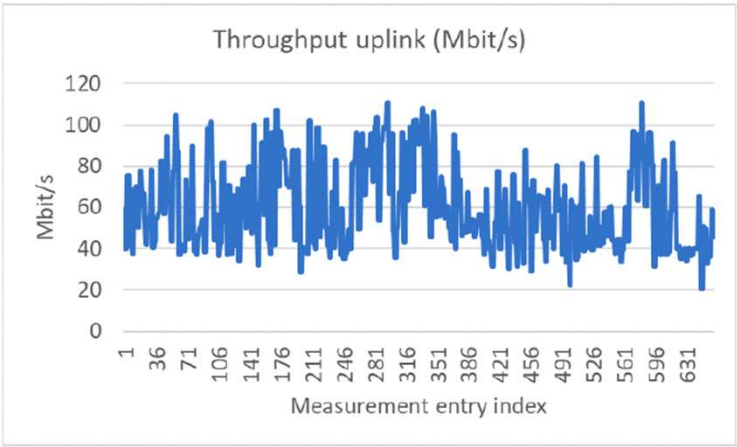


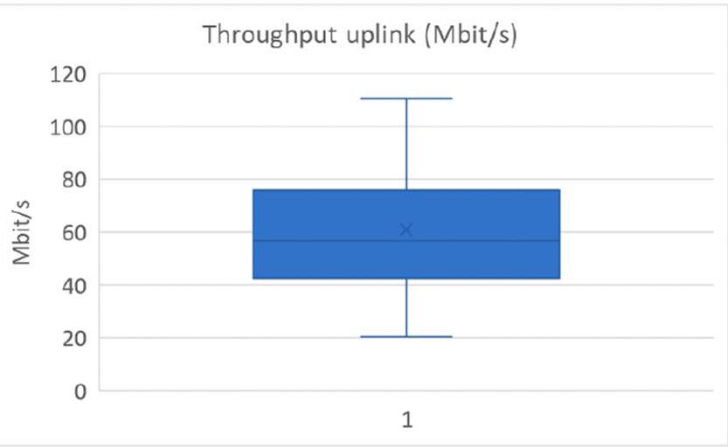
Preliminary results





95% of RTT values < 30ms ✓
Requirement: One-way latency 25ms





95% of UL throughput values > 20 Mbps ✓
Requirement: 25 Mbps for one vehicle

TrialsNet

imec

embracing a better life

Thank you

www.trialsnet.eu

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