5G-TOURs Project Introduction

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5G Experimentation Facilities and Vertical Trials Workshop

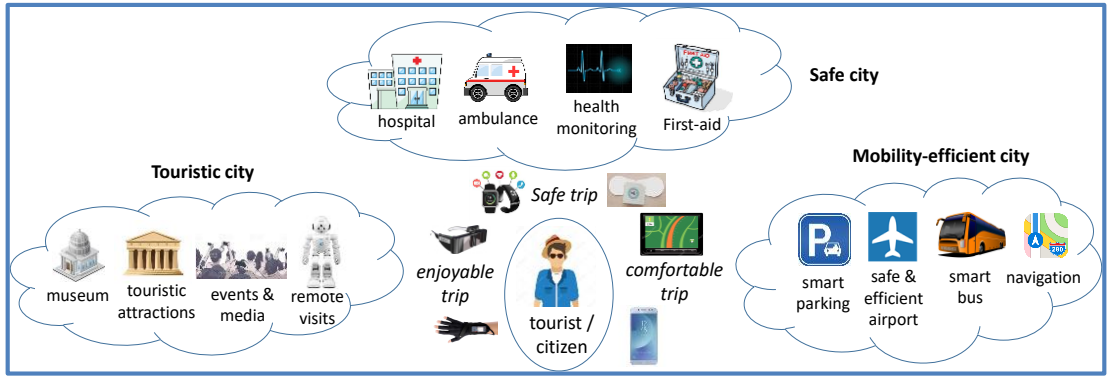
5G-TOURs key facts

Project name: 5G smarT mObility, media and e-health for toURists and citizenS
Project short name: 5G-TOURS
Project duration: 3 years; June/July 2019-May/June 2022
Project Coordinator: Ericsson (Italy); deputy: Telecom Italia (Italy)
Technical Manager: Samsung (UK); deputy: University Carlos III of Madrid (Spain**)**
Innovation Managers:

RAI (Italy) for touristic and media sector
Philips (Netherlands) for e-health sector
Airport of Athens (Greece) for transportation sector

Vision

- **Motivation**: 5G moves from horizontal services to a vertical one where the services provided by the network are tailored to specific industry sectors and verticals.
- Most of the efforts conducted so far to evaluate 5G have focused on individual vertical use cases.
- 5G-TOURS aims to fill this gap by demonstrating the ability of 5G to support multiple vertical use cases concurrently on the same infrastructure.



- **Vision**: Improve the of **citizens** and **tourists**, making **cities** more attractive to **visit**, more efficient in terms of **mobility** and **safer** for everybody. The industry segments within this vision can greatly benefit from 5G technology and account for a very large fraction of Europe's economy.

5GTOURS overall Goal

- The goal of 5G-TOURS is to get the European 5G Vision of “5G empowering vertical industries” closer to commercial deployment with highly innovative use cases involving cross-industry partnerships.

- 5G-TOURS addresses technological and business validation of 5G technology from two perspectives:
  - (i) within the set of requirements specific from one application domain, and
  - (ii) across all sets of heterogeneous requirements stemming from concurrent usages of network resources by different vertical domains

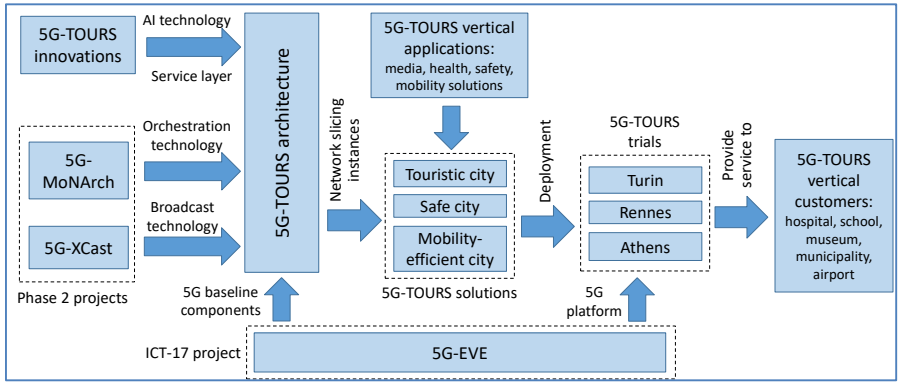
Three cities – Trial platform sites:

Turin-Italy,
The Touristic City

Rennes-France,
The Safer City

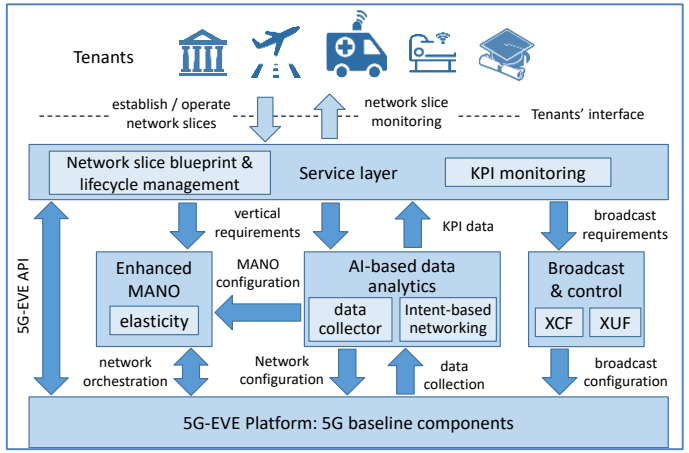
Athens-Greece,
The Mobility city

5GTOURs Approach



- *Design and deployment of an architecture* composed of the pre-commercial components brought by the **5G-EVE** platform along with the innovations coming from Phase 2 projects and 5G-TOURS
- *Implement the 5G-TOURS solution*s combining the use of the network slicing instances of the architecture and the vertical solutions relying on 5G communication that is needed for the use cases
- *Deployment of trials* to evaluate the 5G-TOURS vertical solutions on top of the **5G-EVE** nodes.

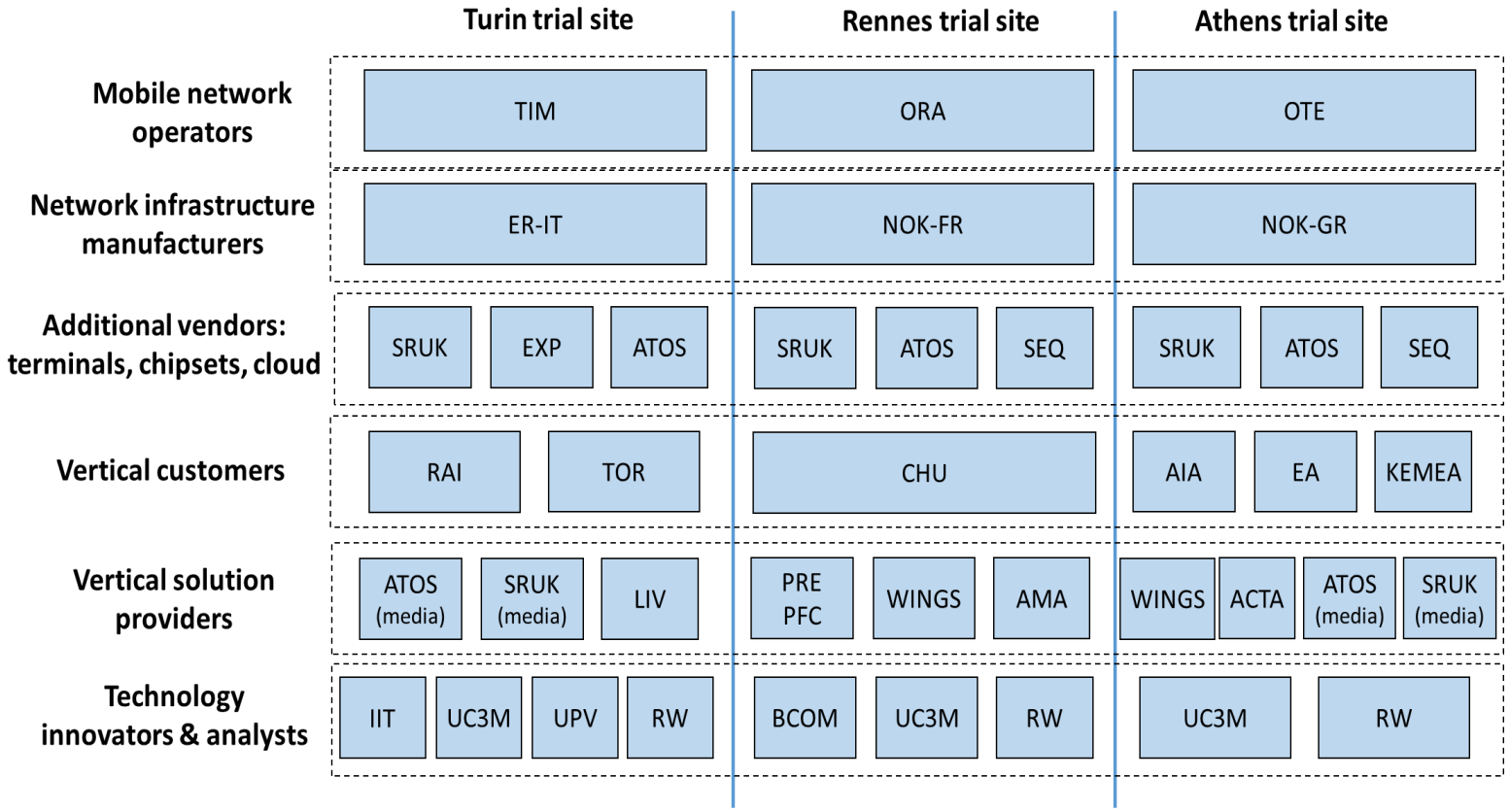
5GTOURs Architecture



- The architecture lies on top of the 5G-EVE platform.
- Consists of pre-commercial equipment compliant with 3GPP Rel'15 (upgraded to Rel. 16 soon)
- On top of the pre-commercial equipment, 5G-TOURS implements some modules that provide functionality required for the use cases addressed that is not available within the underlying platform.
- These modules employ standard interfaces of the equipment to configure and manage the underlying modules.
- On top of the 5G baseline components, the 5G-TOURS architecture envisions three different functions:
  - Enhanced MANO includes the algorithms responsible for orchestrating the different network functions and resources, based on the vertical requirements as well as elasticity considerations.
  - Artificial intelligence modules take care of the overall management and configuration of the network.
  - broadcast modules implement control and user plane broadcasting functions.

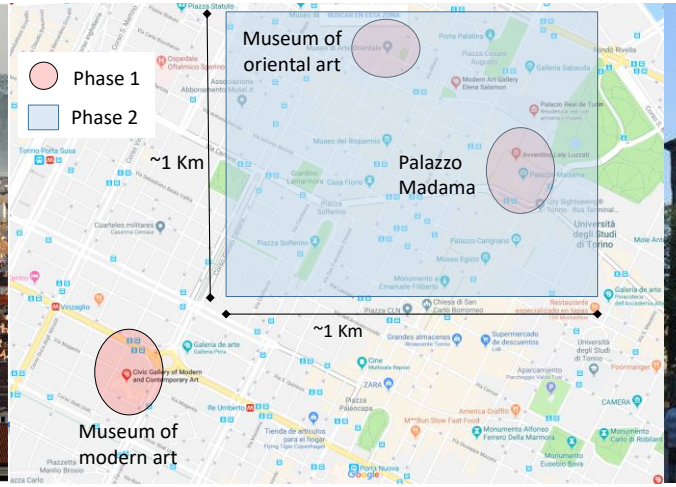
Consortium Partners

Partner involvement in trial sites



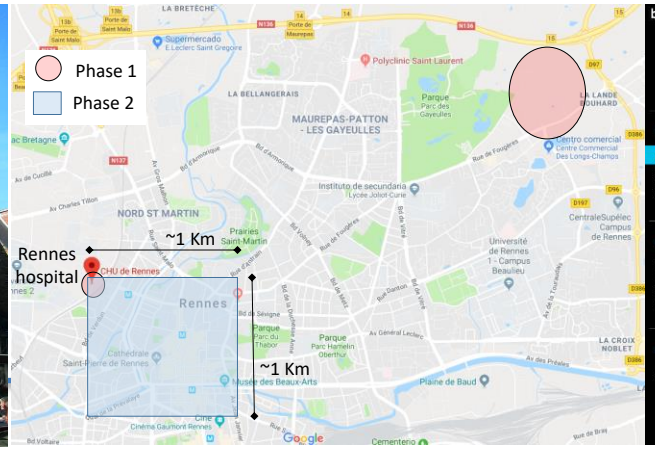
Use cases: Touristic City - Turin

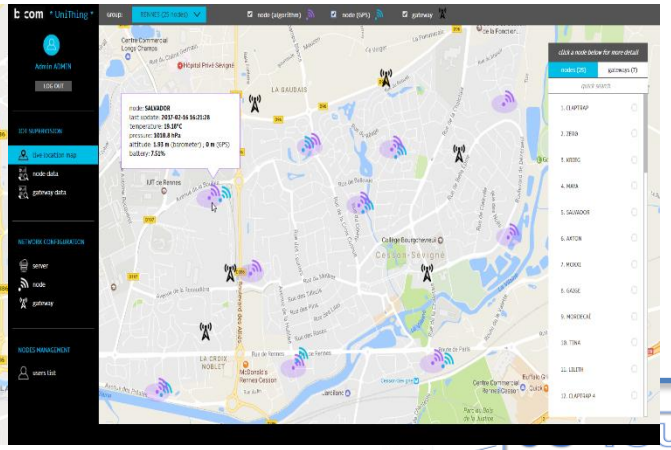
Use case	Vertical customer	Slice type(s)	KPI requirements	Improvements provided	Vertical solutions
Touristic city (Turin)					
Augmented tourism experience	Museum	eMBB, URLLC, mMTC	Per-user data rate up to 500 Mb/s, latency < 10 ms	Improving visitor's experience	XR application (AR/VR/MR)
Telepresence	Museum	eMBB, URLLC	Latency < 10 ms	Remote museum visit	Robot & remote interface
Robot-assisted museum guide	Museum	URLLC	Latency < 10ms	Improved visitors' experience and safety	Robot
High quality video services distribution	TV broadcaster	eMBB	Per-user data rate of 25 Mb/s, several users/m^2	Improved video user's experience	App for content / video distribution
Distributed video production	TV broadcaster	URLLC, eMBB	Latency < 5 ms Reliability > 99.99%	Concert by distributed orchestra	Media production backpack



Use cases: Safe city - Rennes

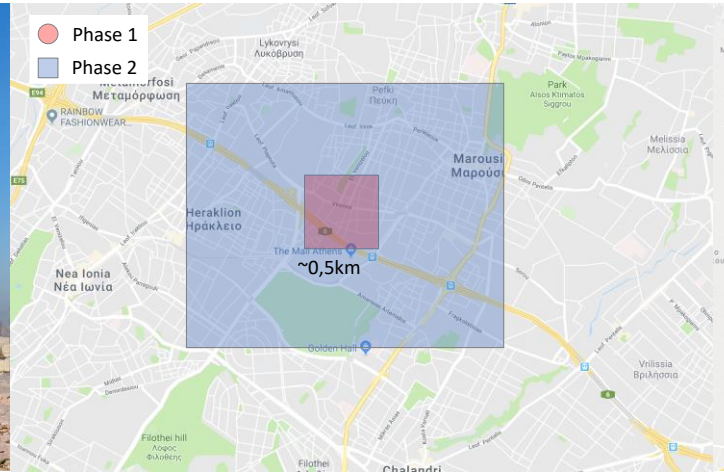
Use case	Vertical customer	Slice type(s)	KPI requirements	Improvements provided	Vertical solutions
Safe city (Rennes)					
Remote health monitoring & emergency mgmt.	Hospital	mMTC, URLLC	Several devices/m^2, reliability > 99.99%	Prompter safety reaction upon an anomaly	Wearables & patches for health monitoring
Teleguidance for diagnostics and intervention support	Hospital	URLLC, eMBB	Speeds above 100 Km/h, 2 Gb/s, latency < 10 ms, reliability > 99.999%	Saving lives through improved assistance	Remote treatment & diagnostics, smartglasses
Wireless operating room	Hospital	URLLC, eMBB	Latency < 5ms, reliability > 99.9999%, total data rate > 10Gb/s	Saving lives in the operating room	AR & Cobotic assisted surgery, smartglasses
Optimal ambulance routing	Hospital	mMTC		Faster journey to hospital	City sensors & navigation app





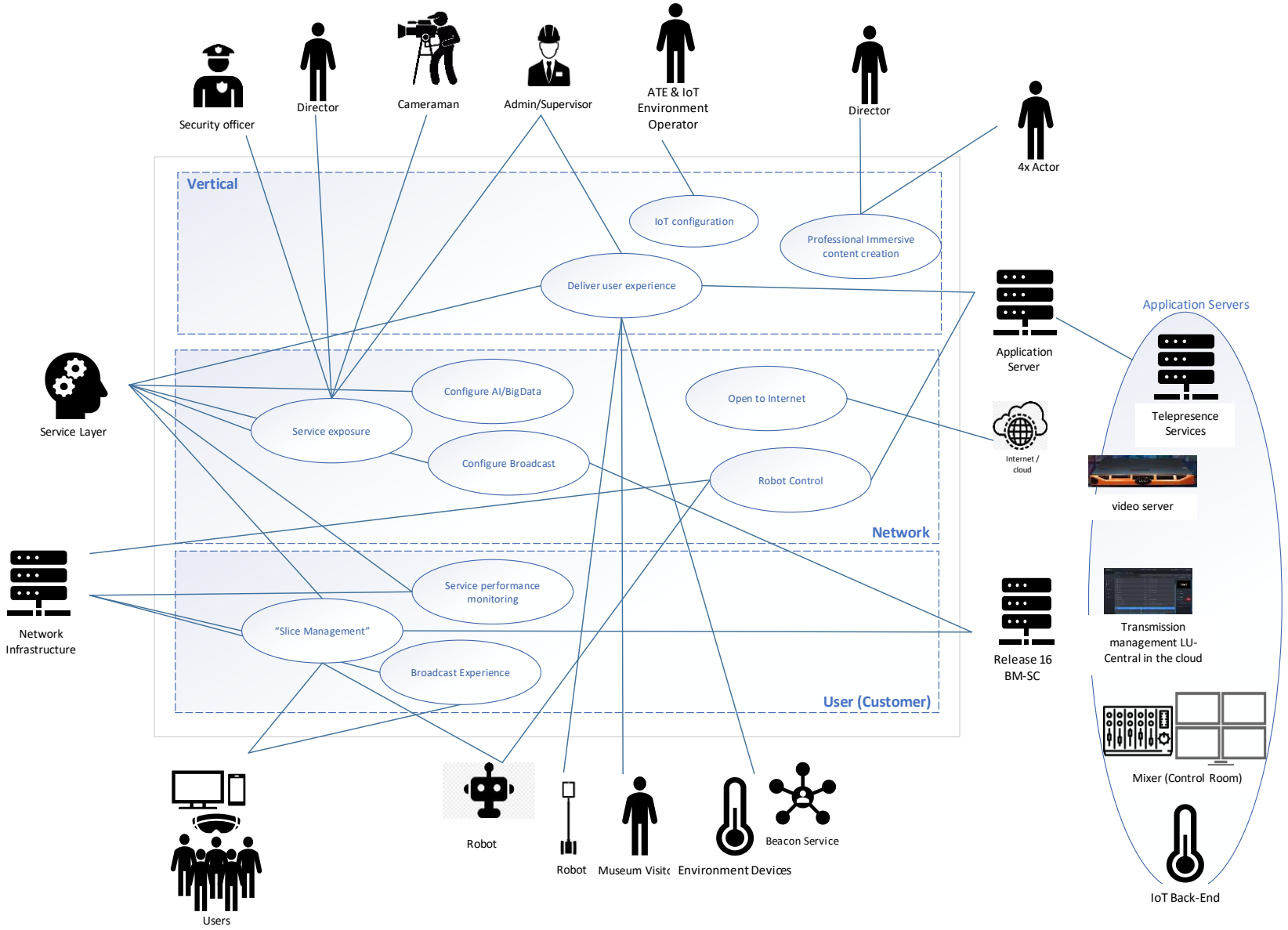
Use cases: Mobility–efficient city (Athens)

Use case	Vertical customer	Slice type(s)	KPI requirements	Improvements provided	Vertical solutions
Mobility-efficient city (Athens)					
Smart parking management	Airport	mMTC	Density of 50,000 devices/Km^2	Fast & personalised parking for drivers	Parking sensors & driver app
Video-enhanced ground-based moving vehicles	Airport	eMBB	Per-user data rate above 25 Mbps, speeds up to 100 Km/h	Improved airport logistics	Live video feeds application
Emergency airport evacuation	Airport / Security agency	URLLC, mMTC	Reliability > 99.99%, location accuracy ≤ 1m, several devices/m^2	Safer emergency handling for travellers	Personalised evacuation application
AR/VR-enhanced educational bus excursion	School	eMBB	Per-user data rate up to 500 Mb/s, latency < 10 ms, speeds of 100 Km/h	Improving students' educational experience	AR/VR application



Example

Touristic city Context Diagram



Current status

- The use cases requirements and description was intiated in deliverable D2.1 and refined in deliverable D2.2
- The architecture objectives were defined in D3.1 and progress in technologies and deployment progress described in D3.1
- The three nodes have described the use cases implementation in Deliverables D4.1 (Turin), D5.1 (Rennes) and D6.1 Athens.
- The evaluation methodology is described in D7.1
- The innovations of the project and the dissemination is escribed in deliverable D8.1.

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