



autostrade // *per l'italia*

Autostrade per l'Italia C-ITS System

Vincenzo Ciccarone



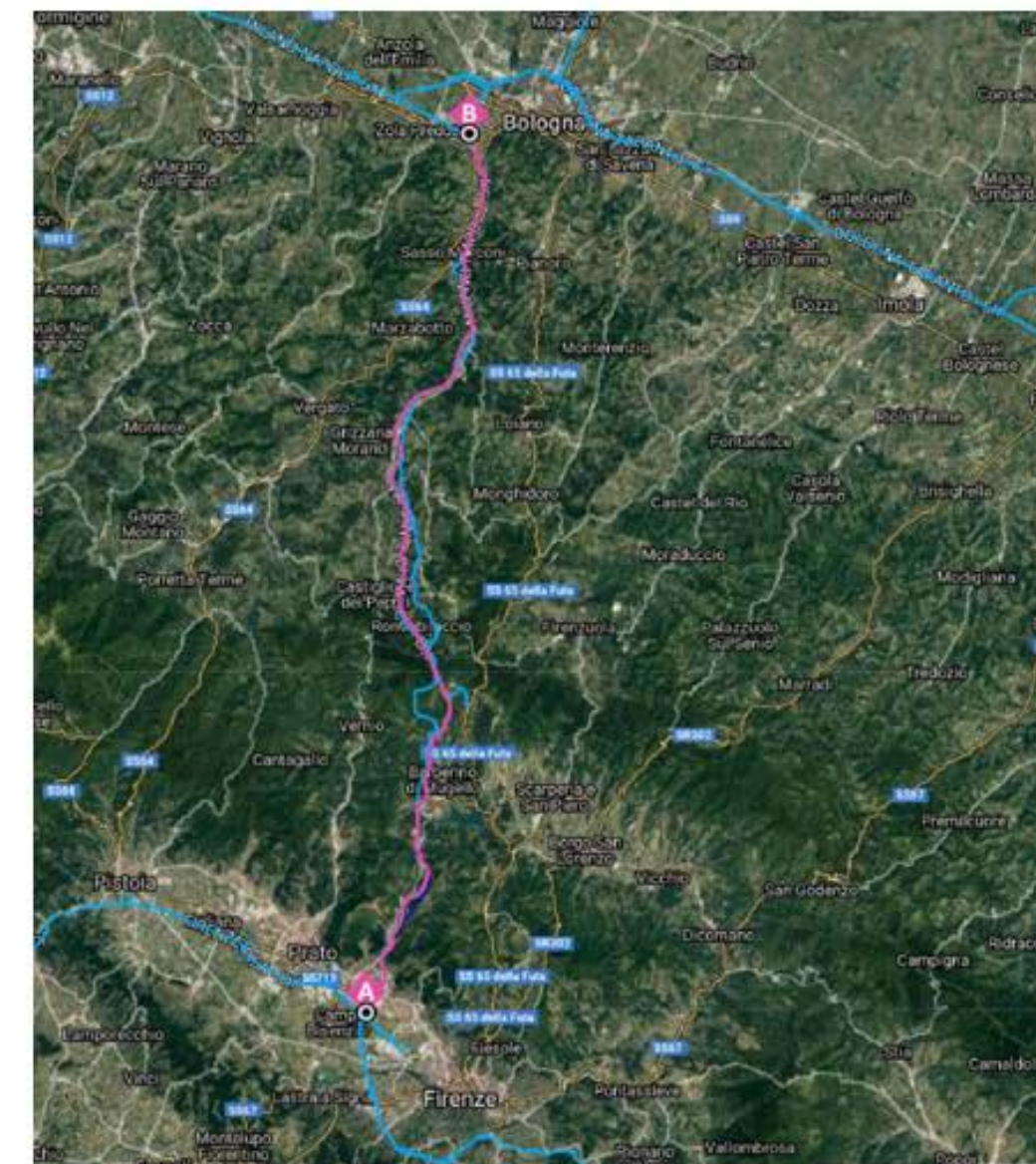
Co-funded by
the European Union

C-ITS system

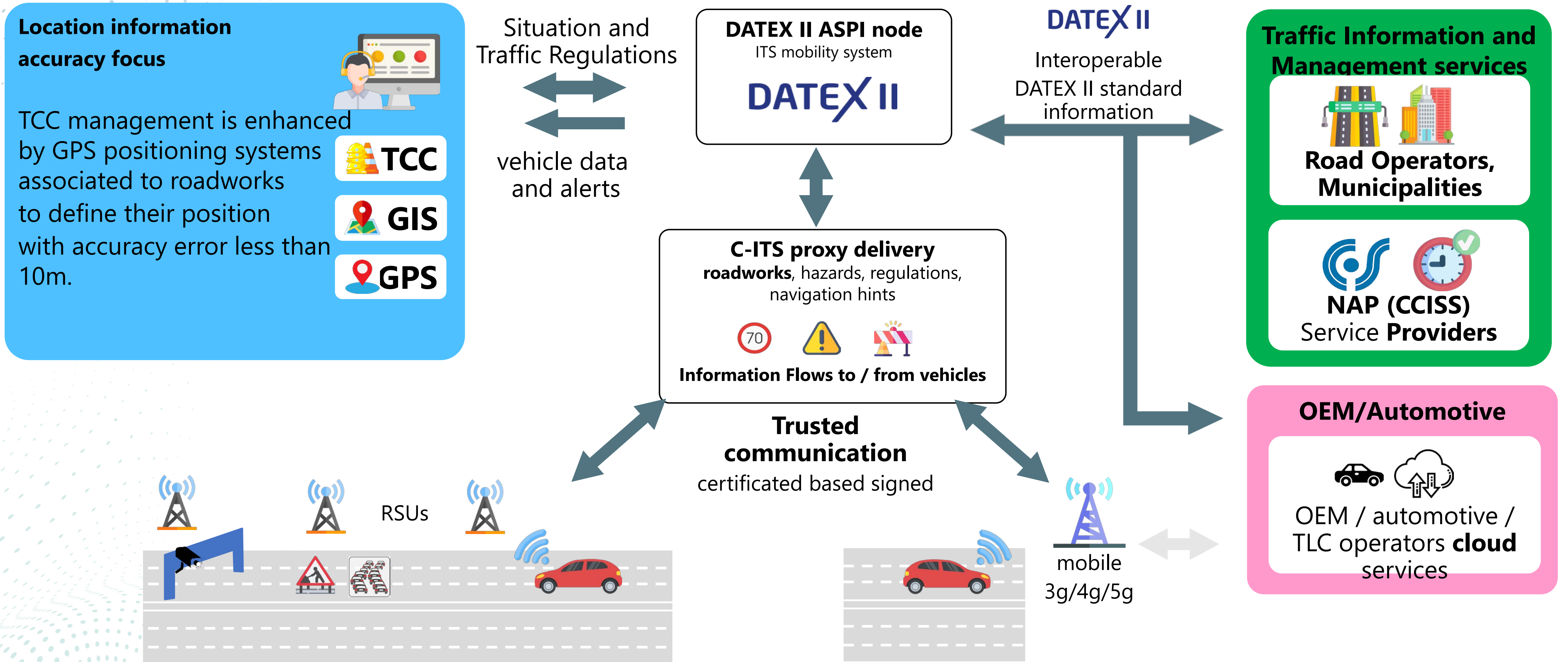
C ROADS ITALY 3

C ROADS projects are EU-funded initiatives for the development of C ITS systems. The C ROADS Platform is the coordination initiative of C ROADS projects at a European level which defines the methods of using the standards for the provision of C ITS services in Europe.

In this context, Autostrade per l'Italia has started participating in the C-Roads Italy 3 project finalized at implementing and testing C-ITS services in real traffic conditions, through the creation of a system on a stretch of approximately 90 km on the A1 motorway between Casalecchio di Reno at km 194 and Firenze Nord at km 280.



C-ITS Services Delivery Architecture in ASPI



C ITS Services delivered

Referring to the V2I (Vehicle to Infrastructure) services communications to be implemented on smart roads, the European C-ITS platform has defined a list of services named as "day 1", as shown below.

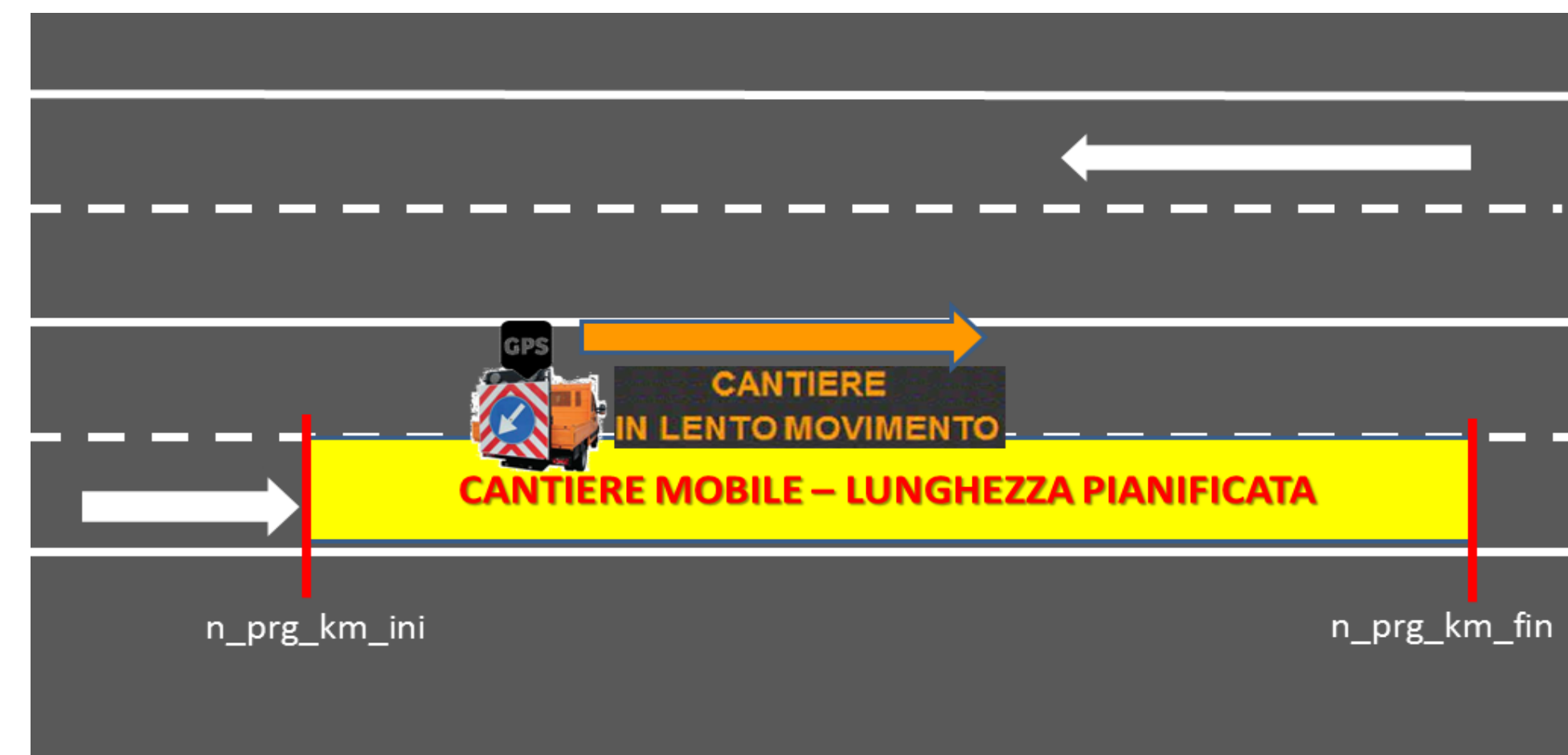
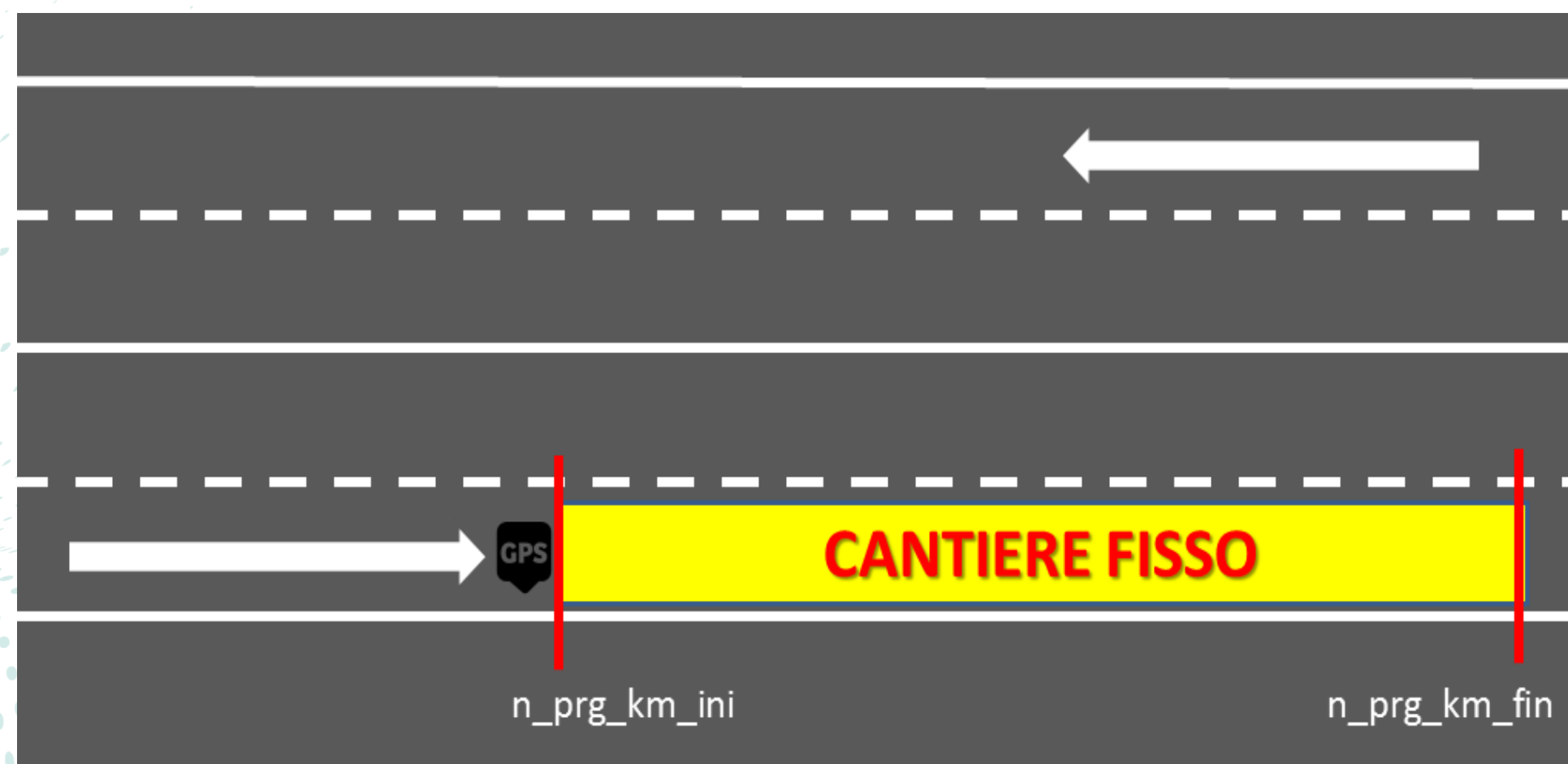
Autostrade per l'Italia has tested all of them.

Day-1- services	Implementati
Slow or stationary vehicle(s)	✓
Traffic jam ahead warning	✓
Hazardous location notification	✓
Road works warning	✓
Weather conditions	✓
In-vehicle signage	-
In-vehicle speed limits	-
Probe vehicle data	✓

C-ITS System ConoX

Referring to the **Road Works Warning** service, included in the list of **day 1** services, to provide valid and certified information on the starting position of construction sites, ASPI has decided to integrate the service by the **ConoX** device.

The **ConoX** device is essentially a self-powered tracking device, it must be positioned at the beginning of the road works site to automatically obtain the GPS position via the **ConoX**.

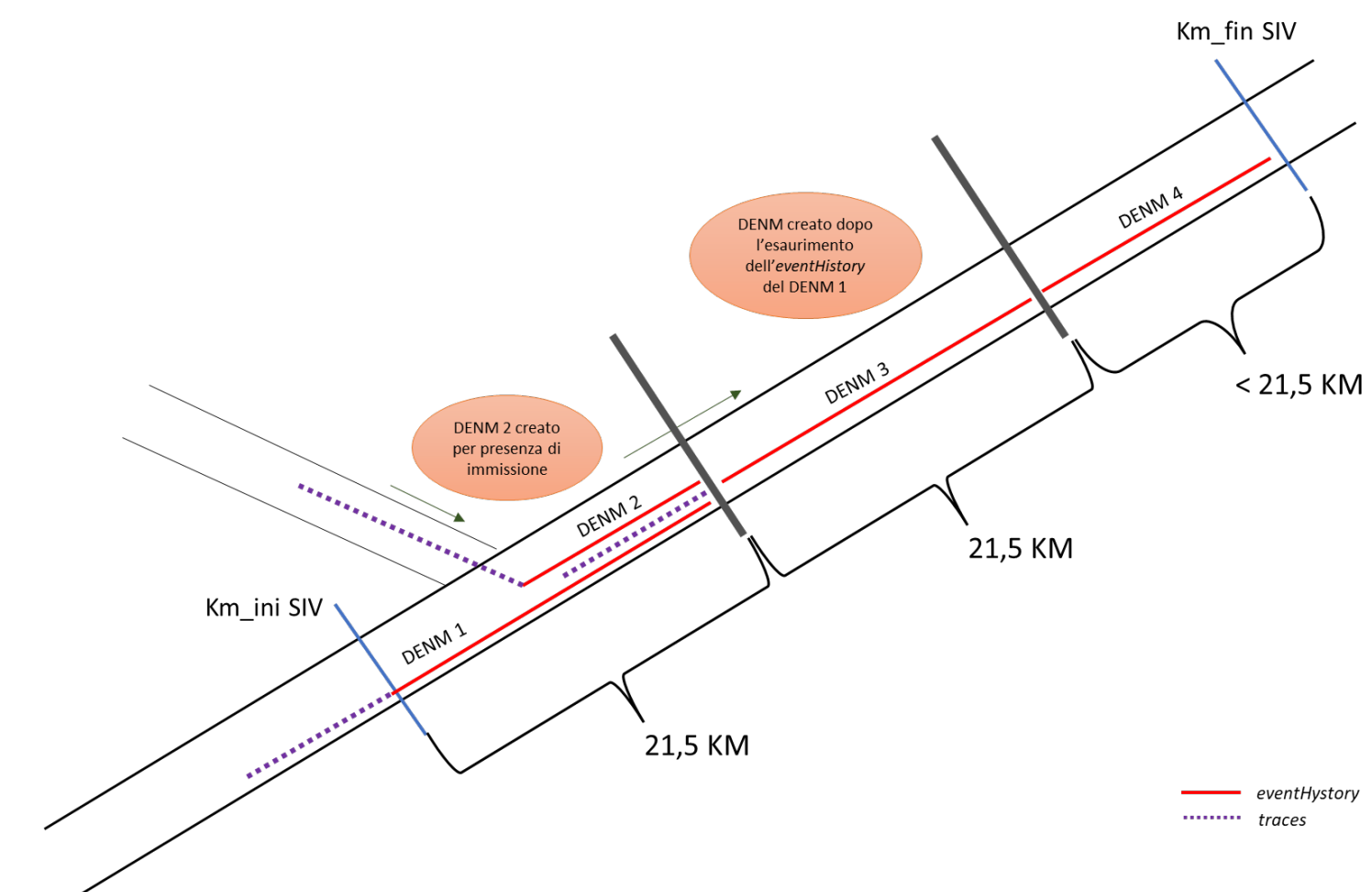
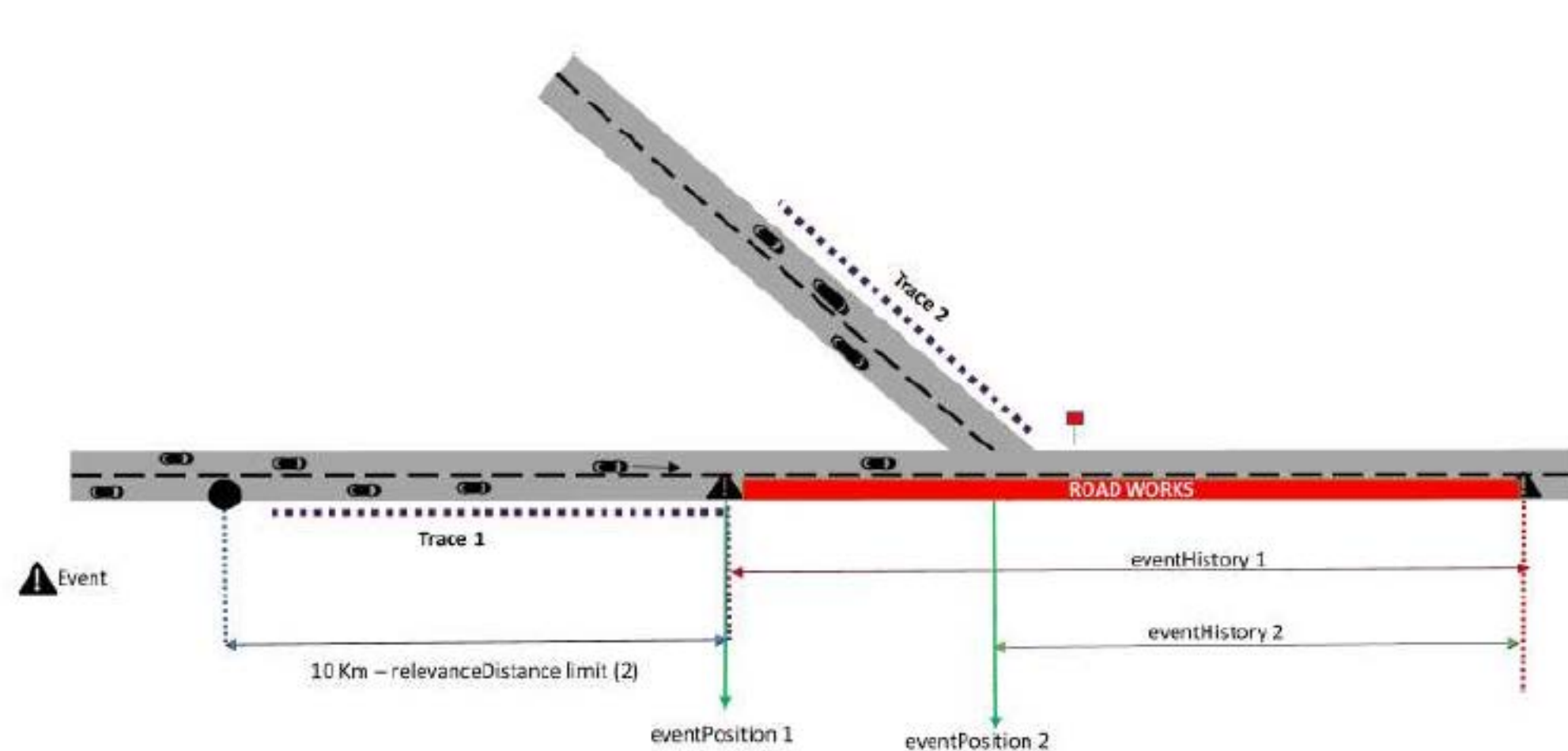


C-ITS System

Insertion of a new road-work warning event in a road section

The integration with more flexible systems such as Open Maps will allow to insert traffic events and construction sites and make it possible to map C-ITS service coverage areas precisely, even in areas approaching the motorway, so that the user can be informed well in advance.

The proxy will generate a single event on the section involved, managing the dissemination of the message DENM (Decentralized Environmental Notification Message) and using the graph within its trace. Then, it will disseminate an event that starts at the beginning of the Road Works (RW) and along the road for 10 km, distributing traces backwards on the same road and along the route joining the motorway.

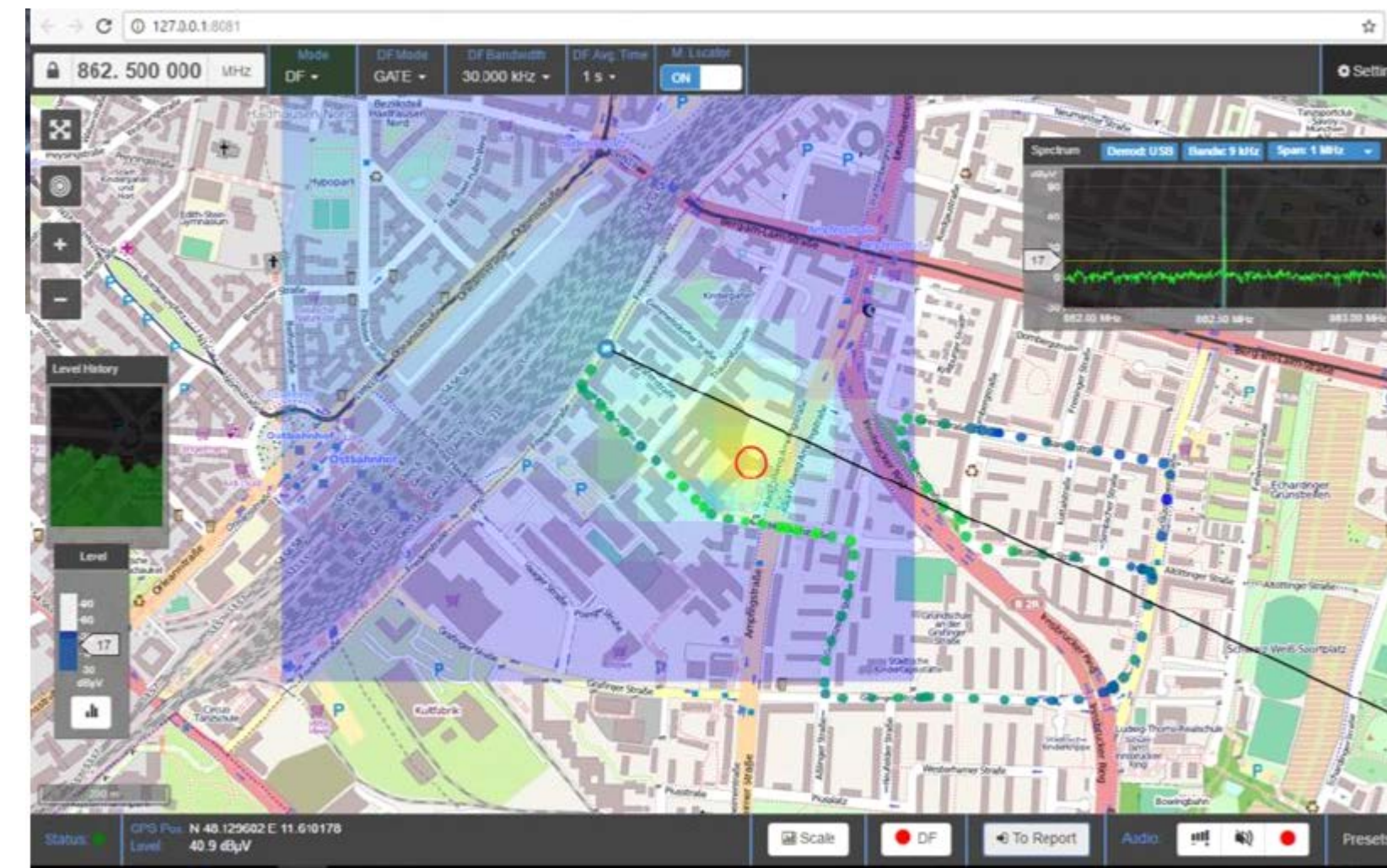
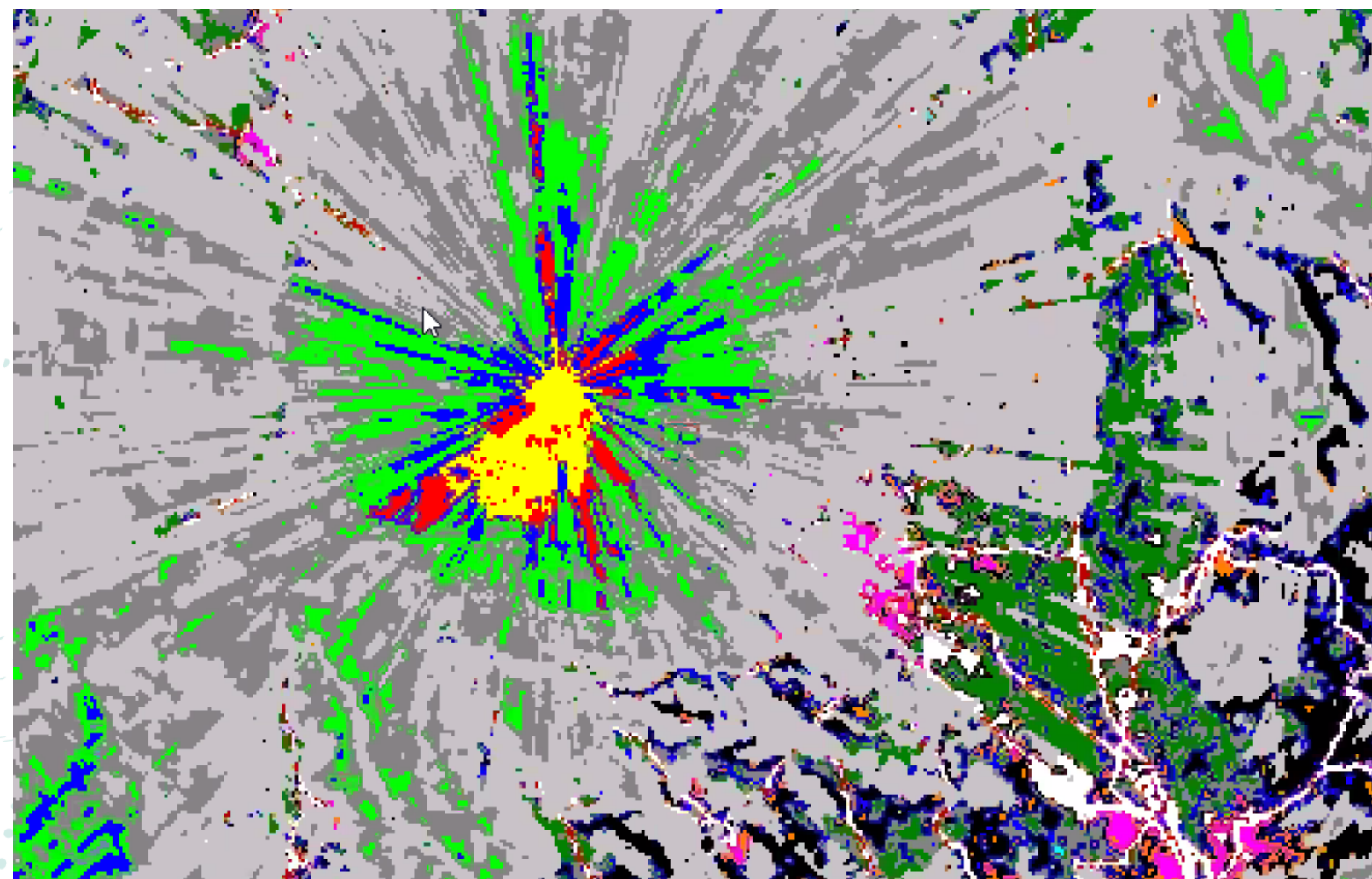


Verification and Design tools and software

Provisional Software EDX and Radio Frequency Instruments RHODE SCHWARZ

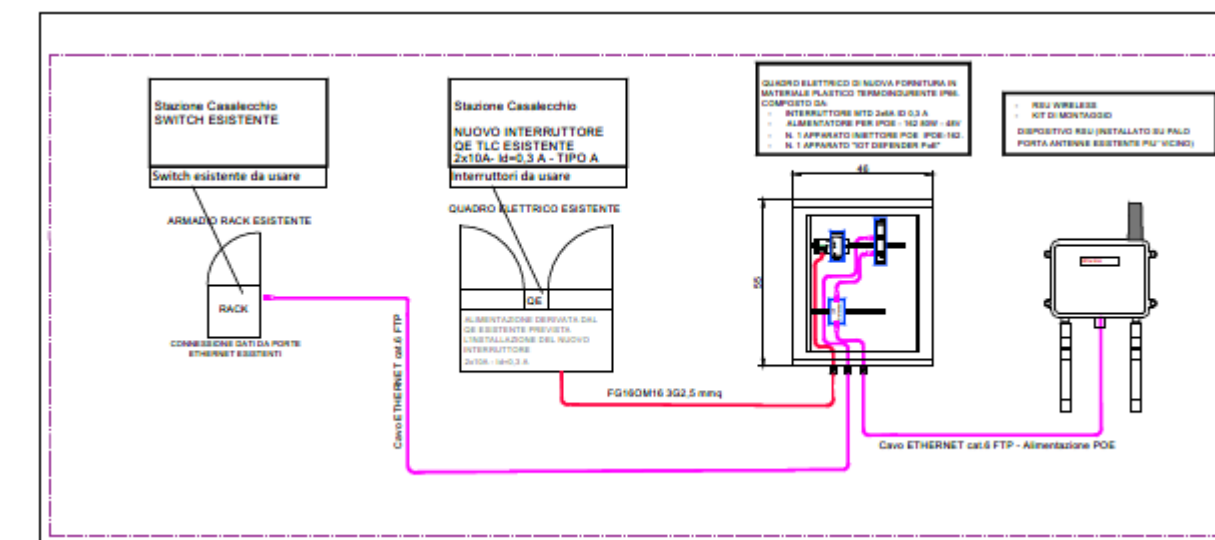
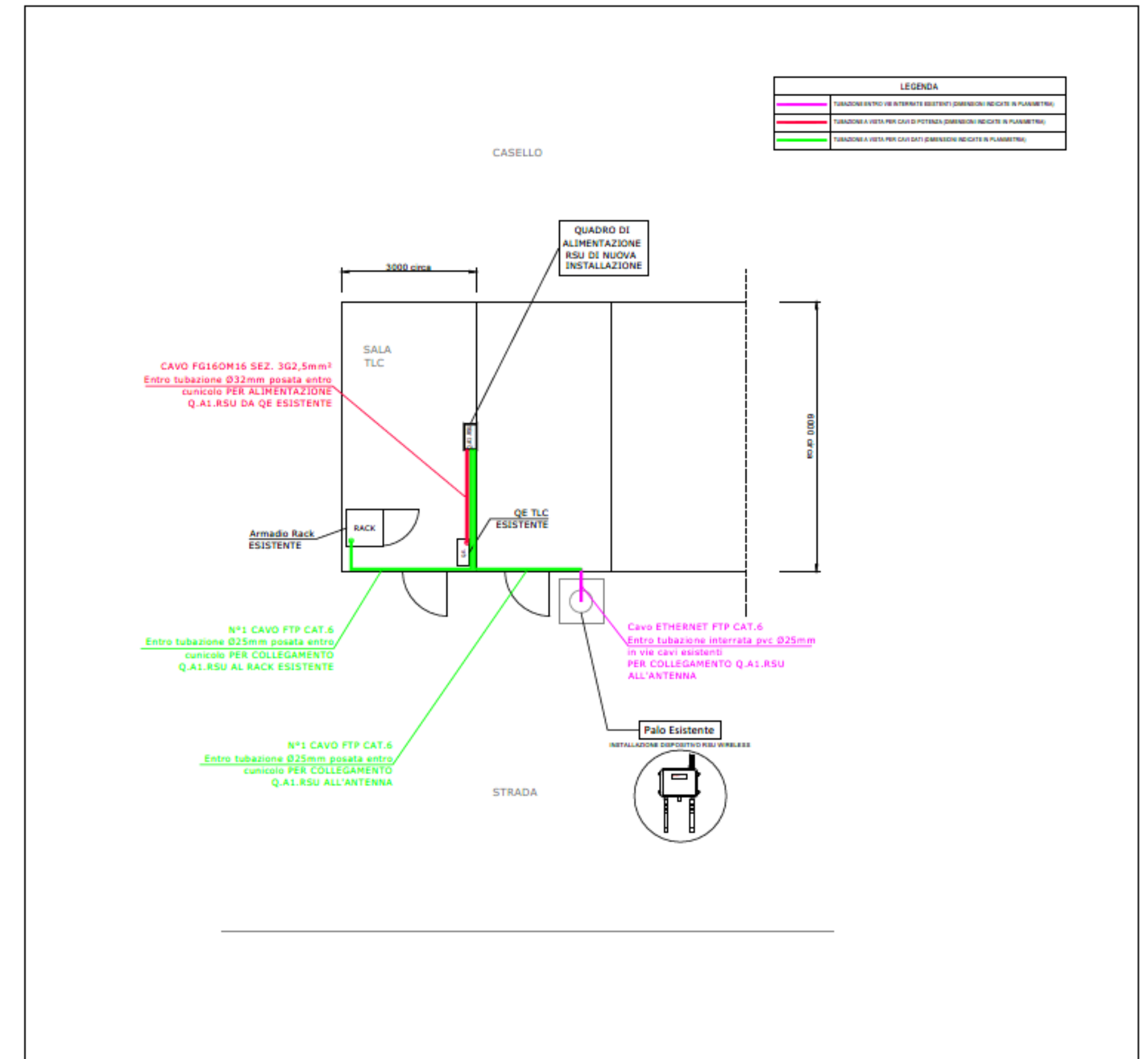
This provisional software is the tool with which we carry out coverage simulation to determine the site where RSU can be installed to provide the best coverage at 5.9 GHz.

The Radio Frequency instruments are the tool to carry out field measurements to measure the real effective coverage and to verify the interference between the RSUs and the existing DSRC electronic toll systems.



System Installation Executive Project

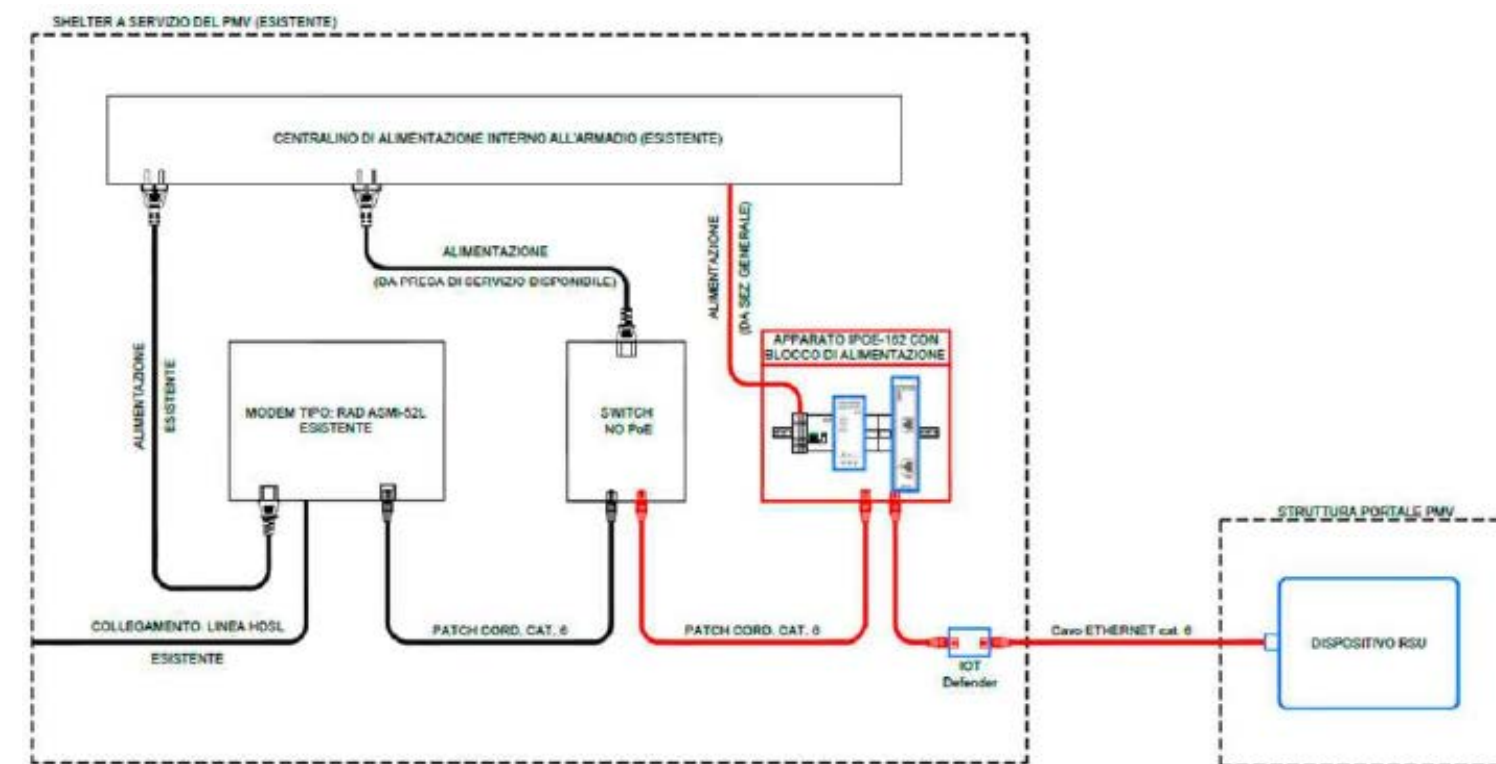
- Project started in January 2022 and reassigned in September 2022;
- Surveys completed in January 2023;
- Executive project delivered in June 2023;
- Executive project validated in October 2023.



Type of system

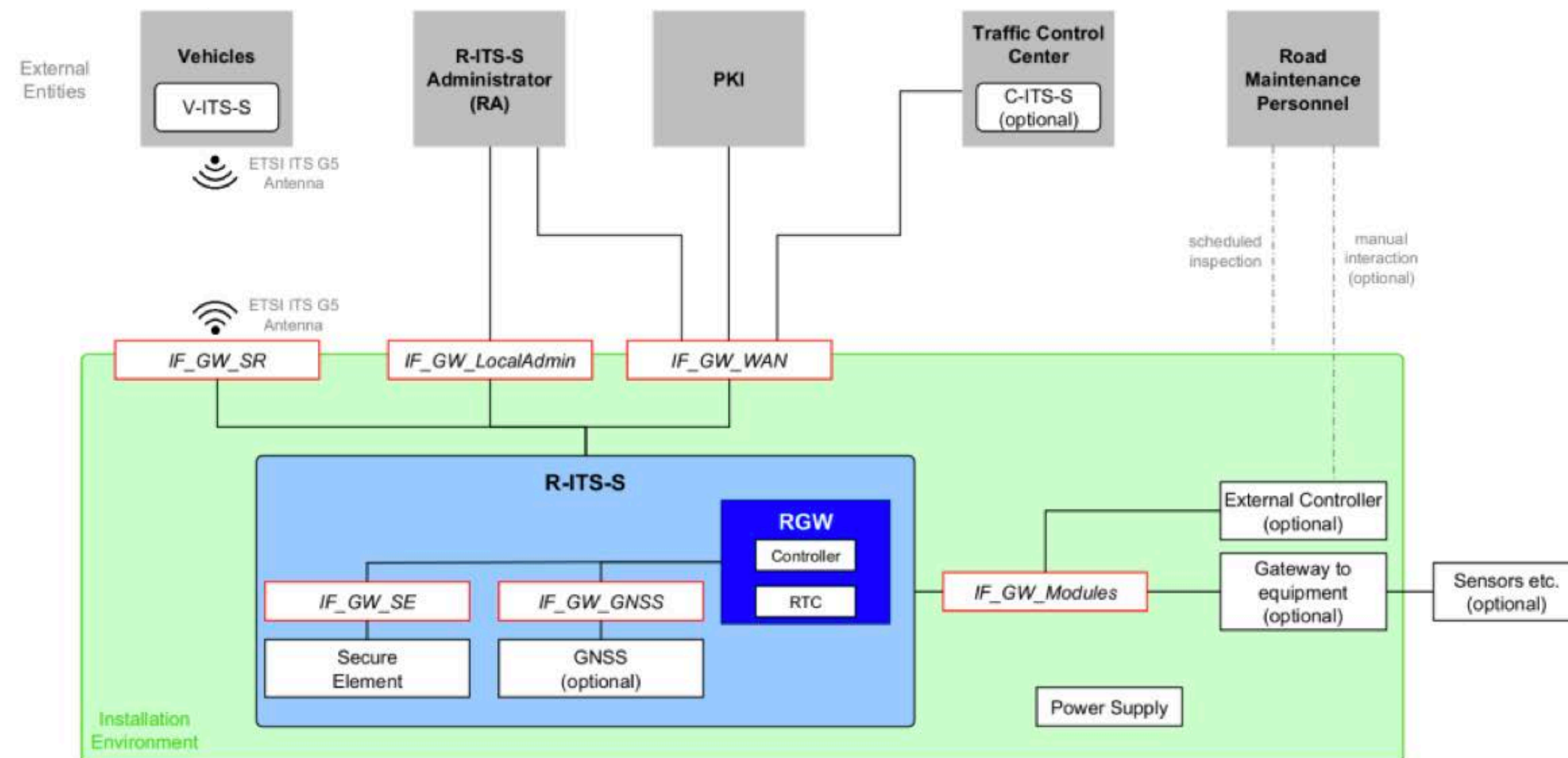
To allow the correct functioning of the system it is necessary to provide the following devices installed on a DIN bar inside the box:

- Differential circuit breaker model SIEMENS 5SU1356-1KK06;
- Power block MDR-40-24;
- Power injector IPOE-162;
- IoT Defender.



CYBERSECURITY ARCHITECTURE & GOVERNANCE

- ASPI self-issued the statement for L1 relaxations in 2022 , in compliance with the EU security policy
- ASPI RSUs are enrolled with L1-like PKI (Escrypt)
- The IoT defender implements the segregation assumptions required by the current version of the Protection Profile



Declaration of Conformity

according to ISO/IEC 17050-1 and ISO/IEC 17050-2

Company's Name: Autostrade per l'Italia SpA (ASPI) **VAT:** IT-07516911000

Company's Address: Via Alberto Bergamini, 50 – 00159 Roma

Service Name: Cooperative Intelligent Transport System (C-ITS) Road Operator

EU CMSS level: 1

This declaration of conformity is issued under the sole responsibility of the Company

Object of Declaration:

Supporting the C-ITS Road Operator ASPI' service operates an Information Security Management System – ISMS in accordance with ISO/IEC27001:2013 and in accordance with EU EC “Security Policy & Governance Framework for Deployment and Operation of European Cooperative Intelligent Transport Systems (C-ITS)” Release 2.1 June 2022.

The scope of the ISMS is defined into “Provision of the C-ITS Road Operator - Cooperative Intelligent Transport Systems - inclusive of C-ITS fixed stations and supporting IT systems”.

Regulations:

- **ISO/IEC 27001:2013** - Information technology — Security techniques — Information security management systems — Requirements
- **EU-EC C(2019) 1789 Annex 4** - supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the deployment and operational use of cooperative intelligent transport systems

Additional Information:

A 1st part compliance audit of C-ITS ISMS was performed by a team of qualified ISO/IEC27001 Auditors.

Audit report and ISMS documentation is available on request.

Thanks for the
attention