European Global Navigation Satellite Systems Agency

ERSAT GGC

WP6 - Demonstration

Radiolabs

ERSAT GGC Final Event

Praha, November 26th 2019

WP6 Organization and participants

WP6 - Demonstration

WP6 Tasks

- WP 6.1 - Track Survey Execution on the field
- WP 6.2 - Execution and Field Data Analysis in the RFI and CEDEX Laboratories

WP6 Participants

Radiolabs (WP leader)

RFI	CEDEX	Hitachi Rail STS (support)
Trenitalia	INECO	
ADIF	IFSTTAR	
SNCF	DLR	

WP6 Key Objectives & Starting Point

Objectives

- **Organize** a demonstration of the **application of the classification process and the related toolset** on field.
- **Organize** a demonstration of the **data analysis to classify the track area by using** the data acquired on field.

Starting Point

- **Process and methodology** defined in WP4 and assessed in WP5.
- **Toolset** designed and developed in WP4 and assessed in WP5.
- **Dataset** acquired during the WP4 measurement campaign and the demonstration done in WP 6.

WP6 Challenges

Organization of the event from all the point of view:

- **Demonstration scenarios selection**
  - Route selection within Cagliari San Gavino line
  - Organize the demonstration on both on-board and trackside.
- **Preparatory Work Plan**
  - Train internal equipment deployment layout
  - Preliminary test runs and dress rehearsal plan
- **Logistic Work Plan**
  - Train rides scheduling and management
- **Demo execution**

Properties of the Used Trail Site

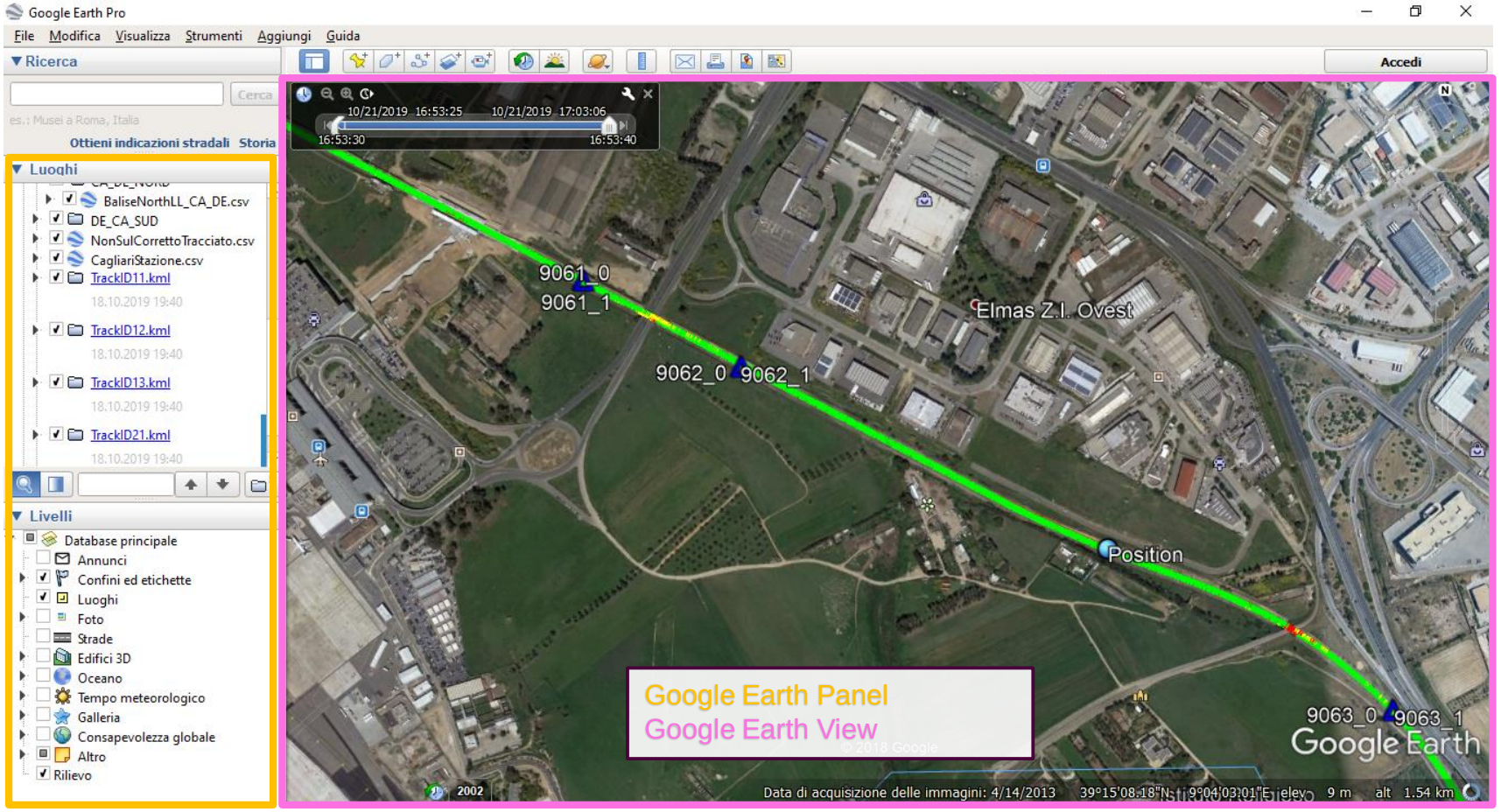
Cagliari – San Gavino line

- Total Length: ~ 50 km (Cagliari-San Gavino) Double Track
- Network Augmentation with two Reference Stations in Decimomannu and Samassi (not relevant for the execution of ERSAT-GGC)
- Cagliari Control Room with RBC & TALS (not relevant for the execution of ERSAT-GGC)

Section selected:
Cagliari - Decimomannu

Work performed:

Classification Results



Work performed:

Classification Results

Yellow area

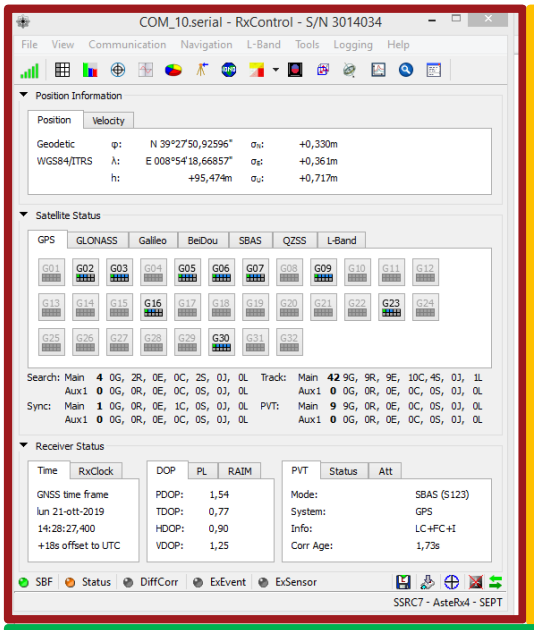
Virtual balises

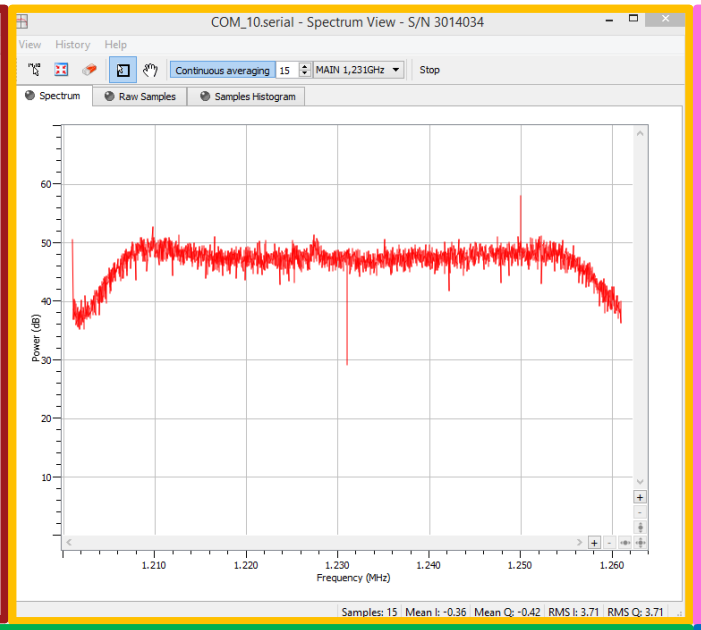
Current train position

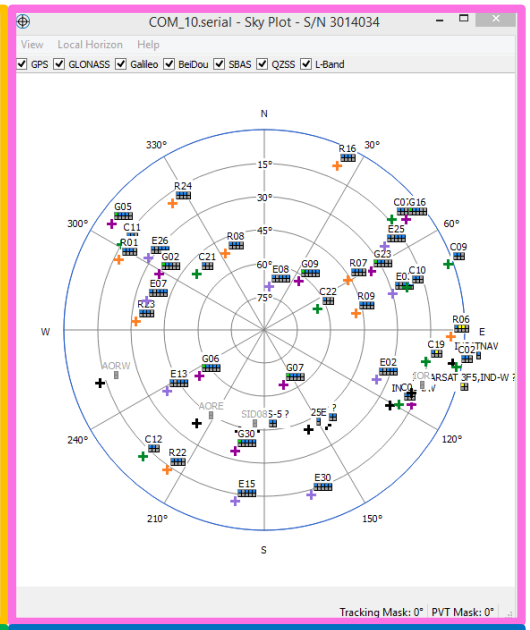
Red area

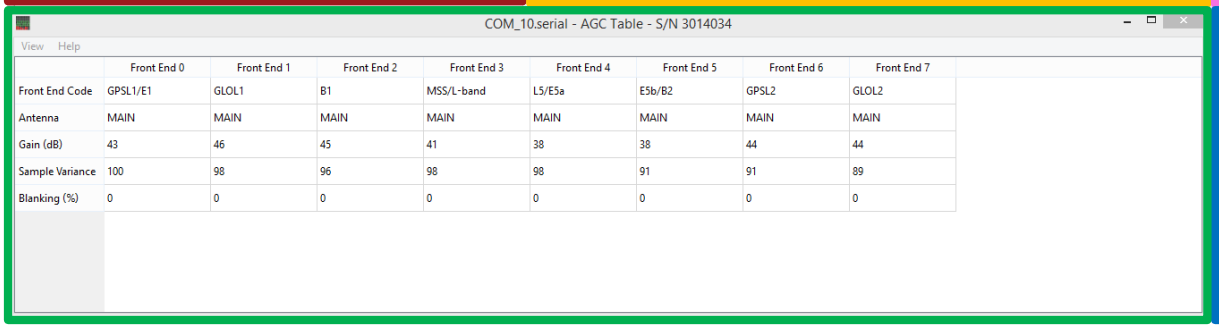
Work performed:

Measurement Control Panel

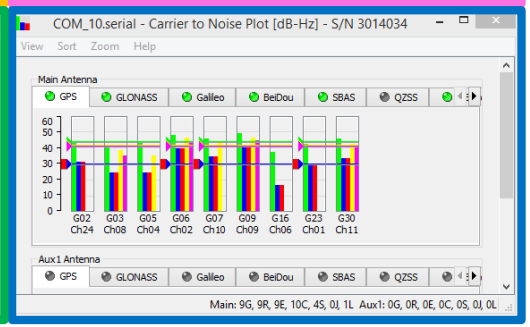








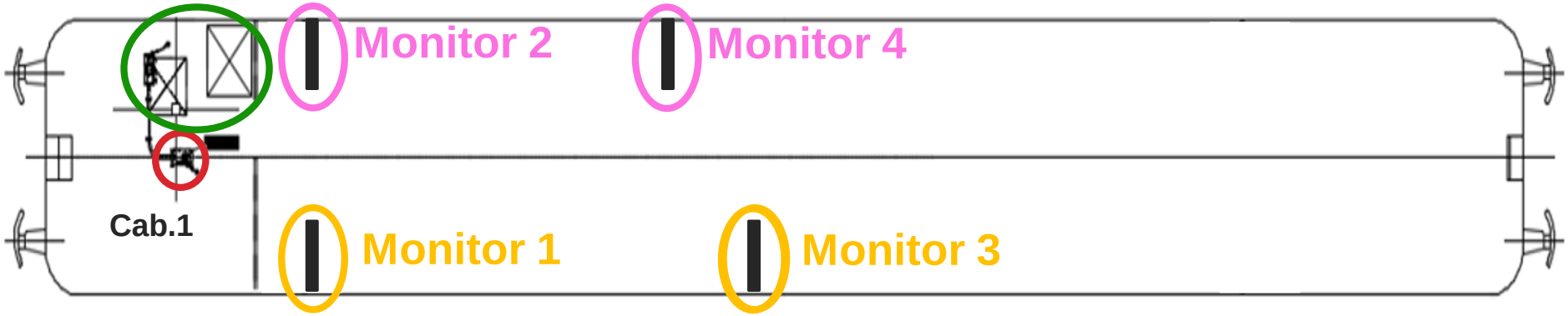
	Front End 0	Front End 1	Front End 2	Front End 3	Front End 4	Front End 5	Front End 6	Front End 7
Front End Code	GPSL1/E1	GLOL1	B1	MSS/L-band	L5/E5a	E5b/B2	GPSL2	GLOL2
Antenna	MAIN	MAIN	MAIN	MAIN	MAIN	MAIN	MAIN	MAIN
Gain (dB)	43	46	45	41	38	38	44	44
Sample Variance	100	98	96	98	98	91	91	89
Blanking (%)	0	0	0	0	0	0	0	0



Rx Control Pannel | Spectrum View | Sky Plot | AGC | Carrier to Noise

Work performed:

Train Layout



Monitor 1, 3 - Classification Results

Monitor 2, 4 - AsteRx4 Receiver

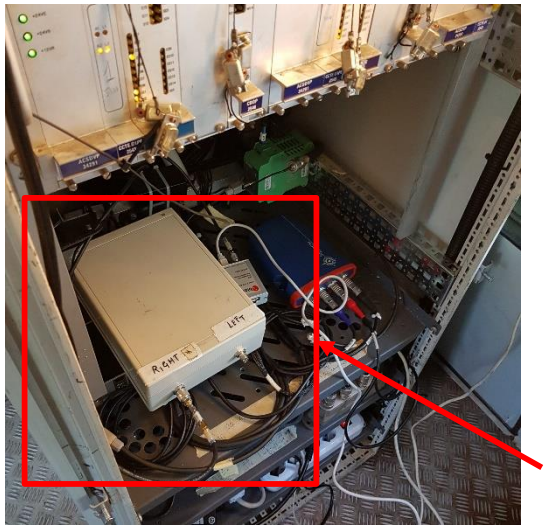
Main Rack & Box Battery

GNSS Antenna (G5Ant-3AT1)

Work performed:

Hardware equipment

GNSS Antenna

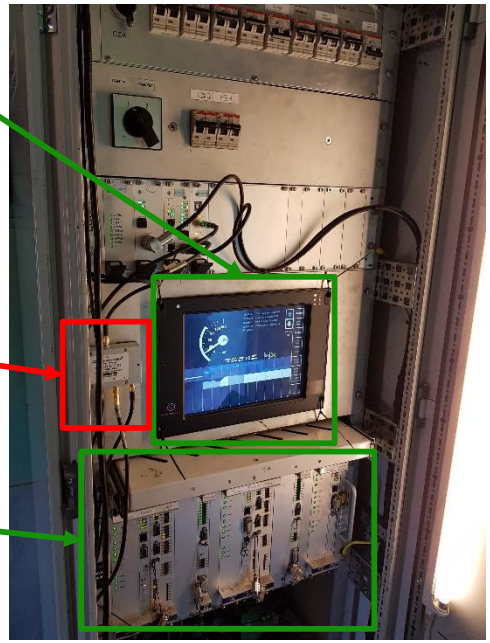


AsteRx4 Receiver

DMI

Splitter

ERTMS On-Board



Measurement chain

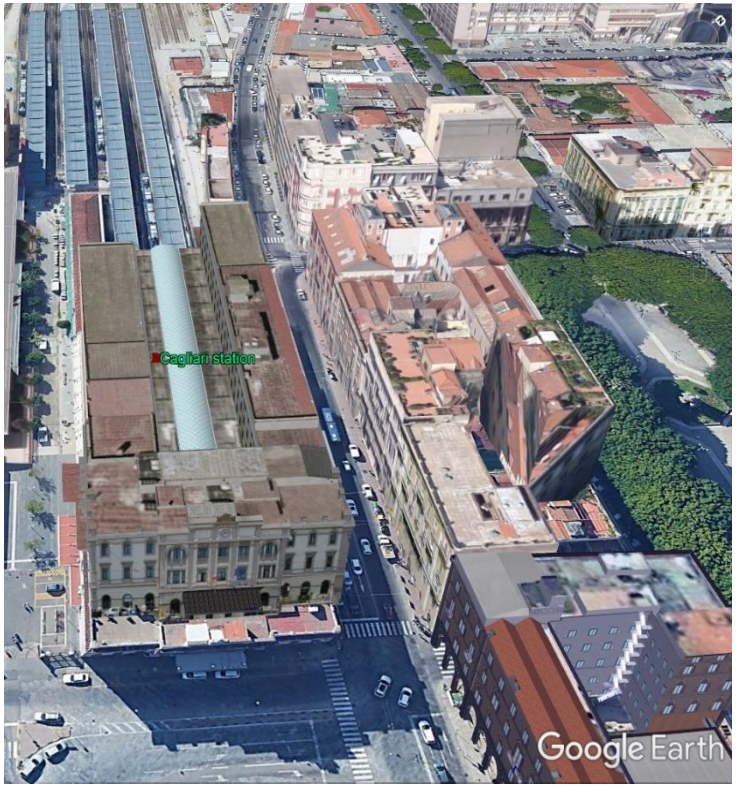
Already Installed ERTMS equipment

Work performed:

Test rides and dress rehearsal

Preparatory work:

- 6 test rides



Dress rehearsal:

- 3 rides on Cagliari-Decimomannu
- 3 rides on Decimomannu-Cagliari

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Work performed:

Logistic organization

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DEMONSTRATION EVENT

CAGLIARI, 24-25 OCTOBER 2019

Thursday 24th October		
Time Slot	Topic	Speaker
14:00-14:15	Welcome to the attendees	RFI/STS
14:15-14:30	WP4 main objectives and current status	DLR
14:30-14:40	WP5 main objectives and current status	BVI/ITCF
14:40-14:50	WP6 main objectives and current status	RDL
14:50-15:30	Presentation of the Trackside Classification Process and related procedure	DLR
15:30-15:45	Organization of the Demonstrations	STS/RDL
16:10- 17:10	Train rides	
20:30	Social dinner	

Friday 25th October		
Time slot	Topic	Speaker
09:00-10:00	Description of the process classification toolset	DLR
10:00-11:00	Presentation of the Result Analysis related to the Sardinia line	RFI/STS/RDL/ RINA
11:00-11:20	Coffee break	
11:20-12:30	Presentation of the Result Analysis related to the Spanish line	CEDEX/INECO/ IFSTTAR
12:30-12:45	Conclusions and remarks	RFI/STS

DEMONSTRATION VENUE: CAGLIARI RAILWAY*

*Meeting Point at the Steam Locomotive in the main terminal

Travel information

How to get to Cagliari Station:

Cagliari Station is located in the city centre and can be reached directly from Elmas Airport with a 5 minutes train ride. Train timetable can be found here: https://www.trenitalia.com/en.html

Trial site:

The line selected is between Cagliari and Decimomannu (green segment on the map)

Rolling Stock:

Aln 668-3136

Social dinner venue:

Ristorante Lapola,

Vico Barcellona, 10 Cagliari

For more information on the project, visit: http://www.ersat-ggc.eu

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Work performed:

Demo execution

Thursday	Standstill train					
	Train Number	From	Departure time	To	Arrival time	Notes
24/10/2018	98506	Cagliari	16:10	Decimomannu	16:28	Dedicated ride without specific speed profile
	98507	Decimomannu	16:45	Cagliari	17:00	Dedicated ride without specific speed profile

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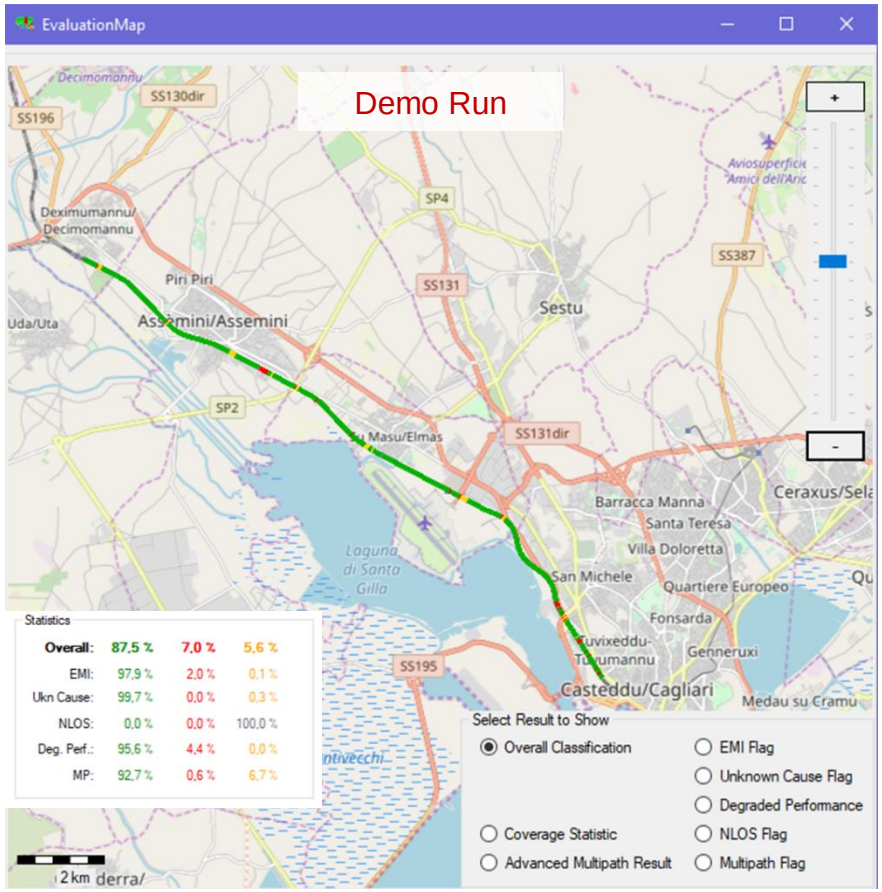
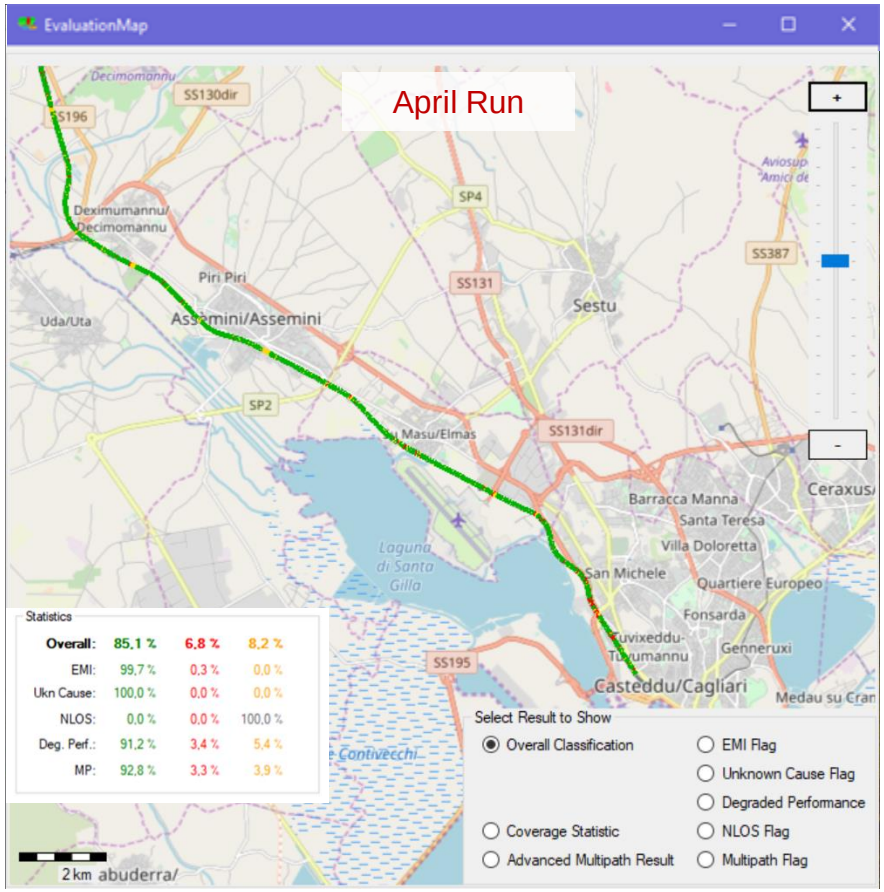
Comparative analysis among the April and October campaigns

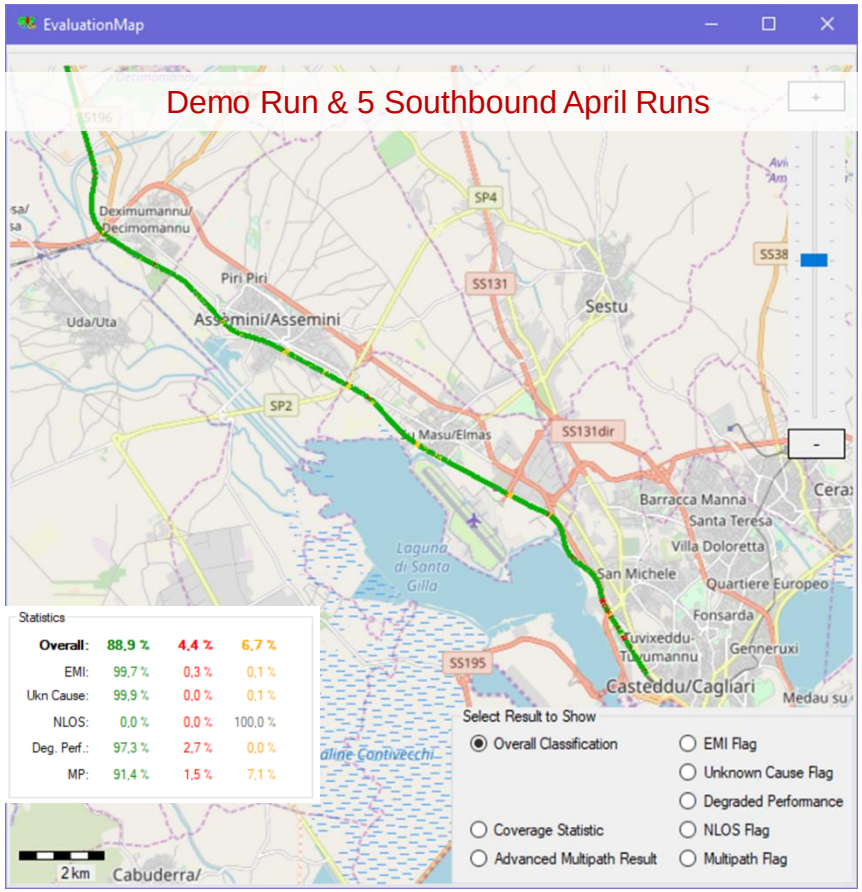
The toolset has been launched with both dataset acquired in the demo and the dataset acquired in April.

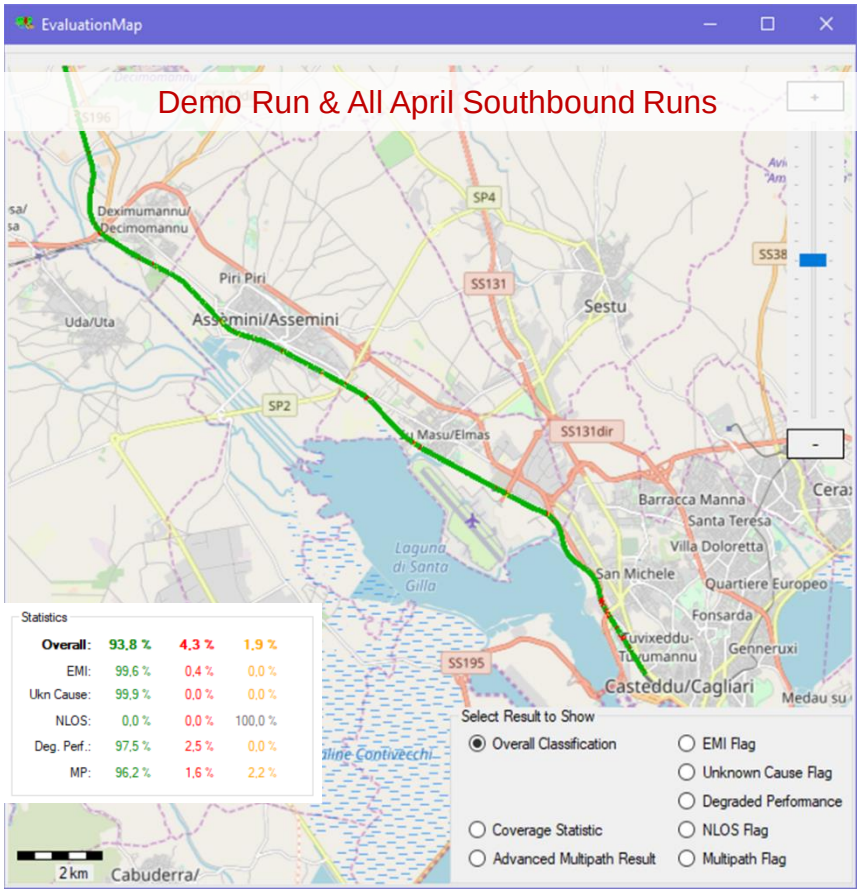




Integrating more runs including the Demo and April runs

The toolset has been launched with both dataset acquired in the demo and dataset acquired in April integrating more runs.

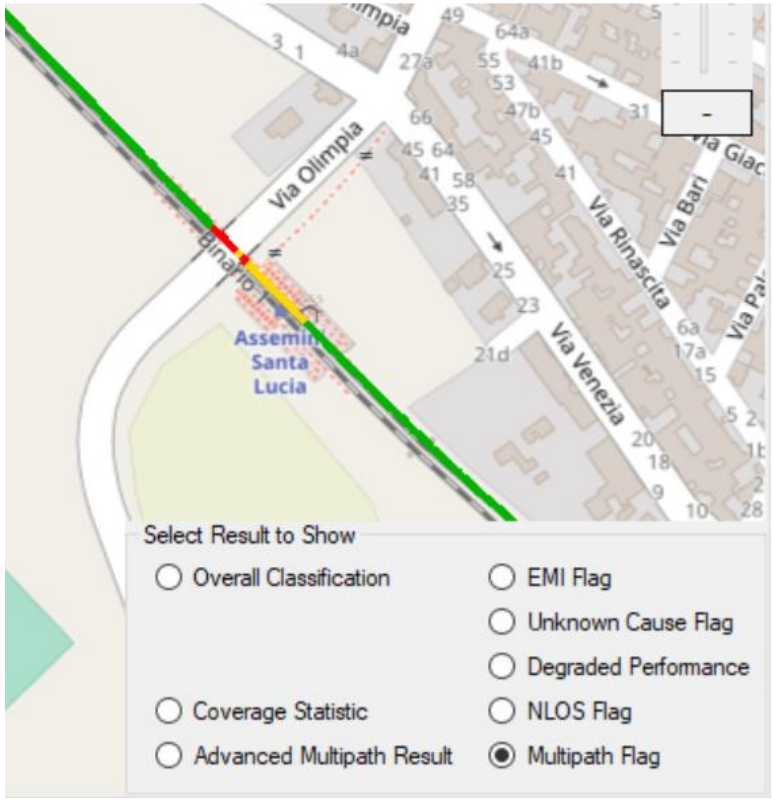




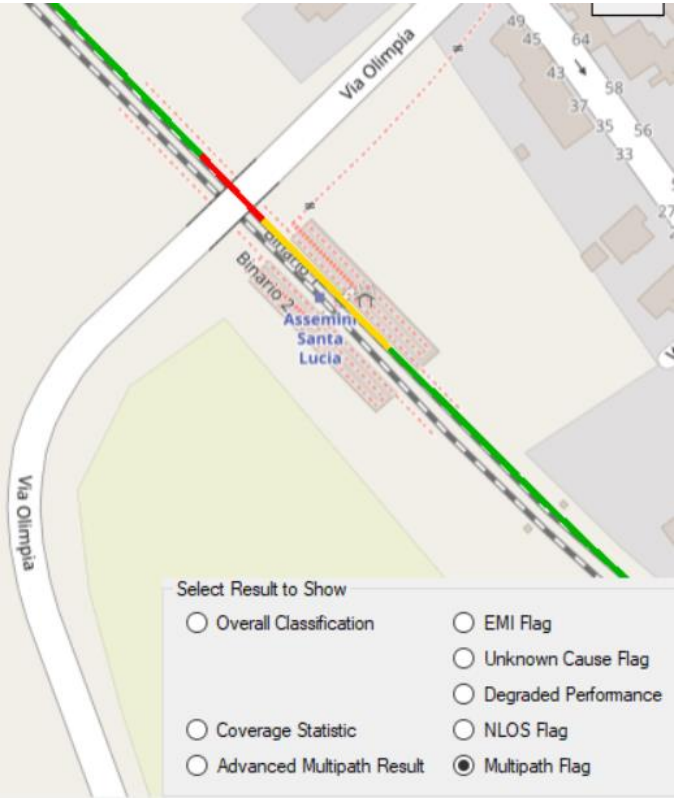
Multipath Comparison

The toolset has been launched with both dataset acquired in the demo and dataset acquired in April.

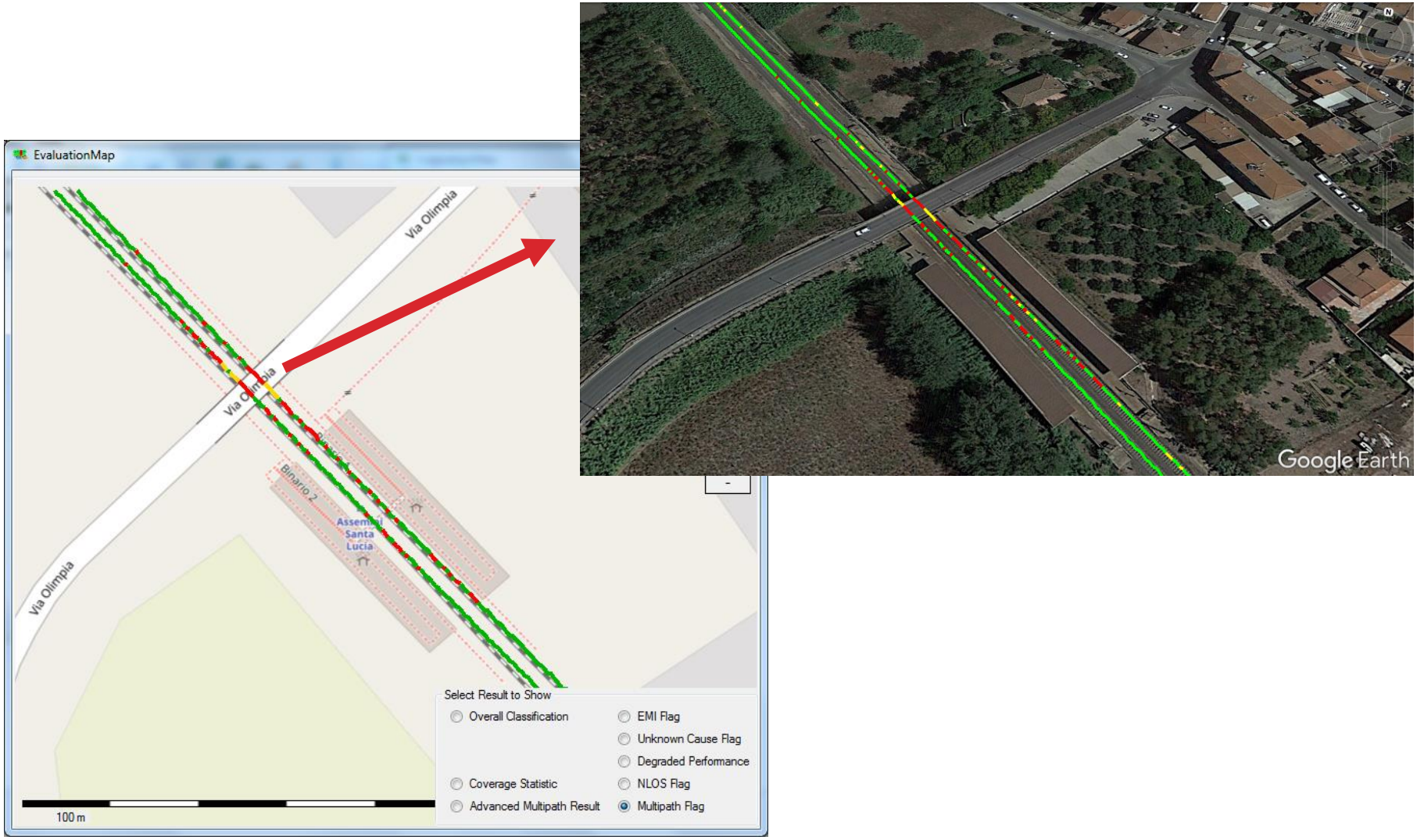
April run multipath classification (1 run)



Demo run multipath classification



Multipath due to obstacles



Conclusions

- Both datasets acquired during the demo and during the Italian campaign performed in WP4 were processed with the software Toolset.
- The results obtained by processing a single dataset (i.e. run) acquired in the demo are in line with the analysis of a single run provided in WP4.
- Combining a single run acquired in the demo with multiple runs gathered in WP4 campaign, the results showed a reduced percentage of areas classified as yellow confirming the trend identified in the WP4 analysis.
- The process (defined in WP4 and assessed in WP5) has been successfully verified.

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Thank you for your kind attention

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