

Optimise time and resources when testing ERTMS

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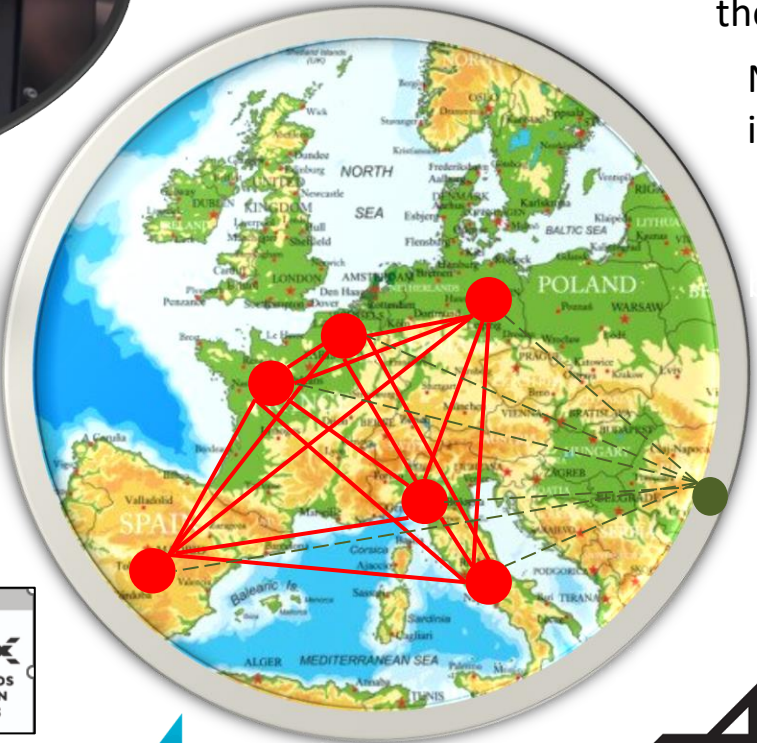
ERTMS European Accredited Labs Association: The importance of an independent network



EAL network of laboratories has representatives distributed throughout the European territory: this permits to fuse together very different expertise.

These labs have contributed to solve interoperability issues in their countries, by testing the real ETCS lines at lab

Now when ETCS is much more stable and interoperability issues became less and less, the role of the labs can be focused on testing new ETCS functionalities and reduce at maximum the tests on track to speed up ETCS deployment.



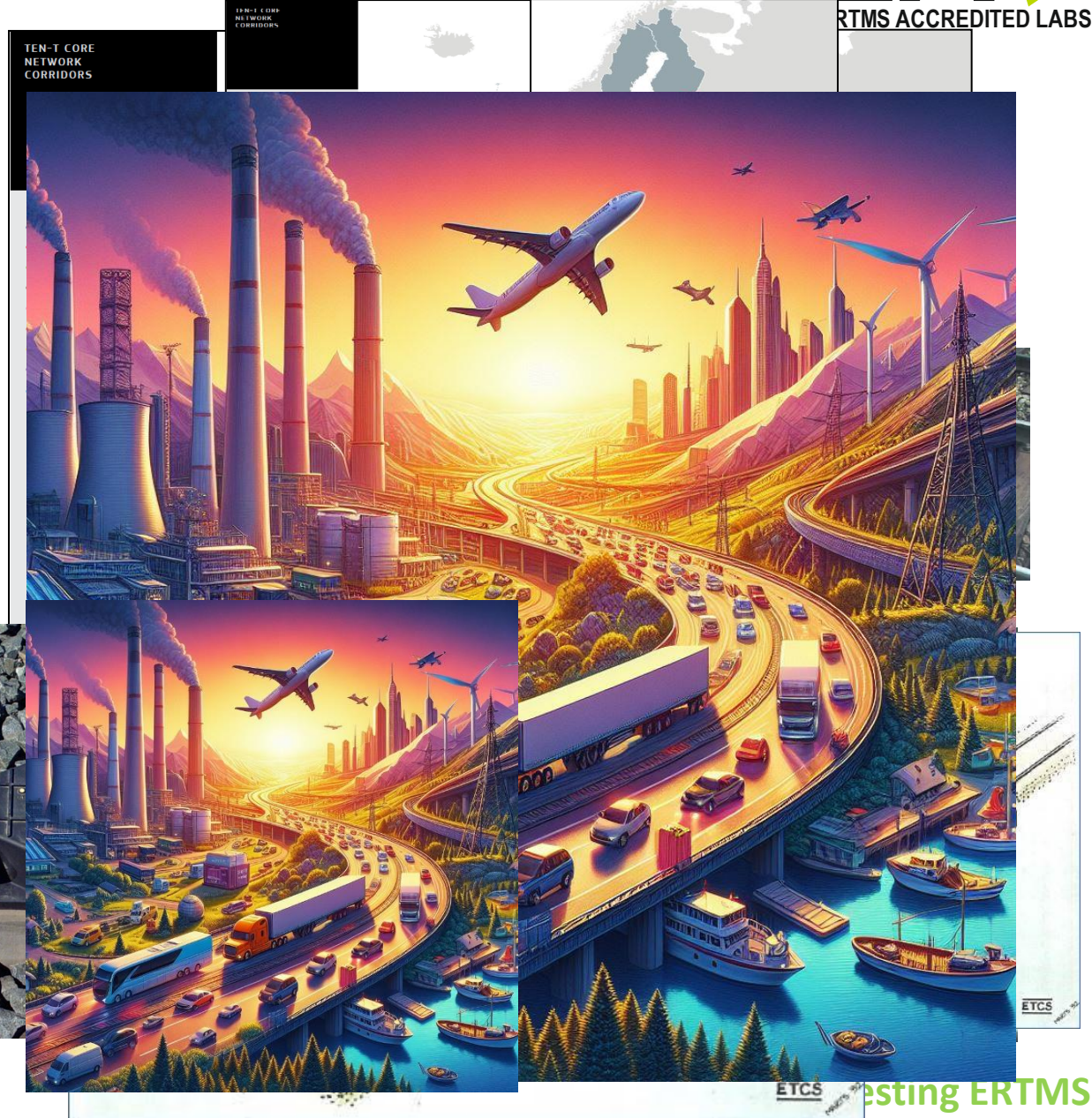
The main requirement to be EAL member is being **accredited** for testing ERTMS components or subsystems. This accreditation is the guarantee of **neutrality and independence**.

EAL has been recognised by the EC as a representative body from the railway sector.



ERTMS has to face many relevant challenges

- 1.- Very low speed of ETCS deployment in Europe
- 2.- Very low level of Class B decommissioning, with the corresponding lack of safety in some countries
- 3.- Cross border issues
- 4.- Decrease of rail transport market share
- 5.- Operational Rules Harmonization and.....



Ways of solutions

1. Increasing member states' willingness to change
2. Accelerate the harmonisation of Operational Rules
3. Reduce the risk of new interoperability issues derived from the new introduced technologies
4. Reduce the cost
5. Reduce the time to place in Service

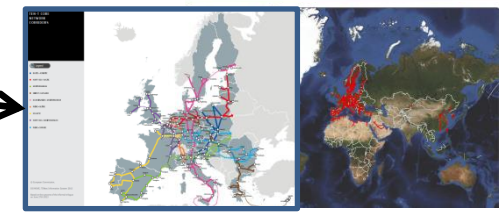


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ETCS labs role to speed up ETCS deployment


1
ERTMS costs are too high

- Develop low cost solutions for regional lines ✓
- Increase market scale ✓
- Increase competition ✓ (multiple suppliers)



2
Too long process to place in service

New solutions in ERJU-FP6 to be tested initially at lab



Siemens S103-350
 ERTMS Siemens

tested
 L2 already in operation

EAL labs have capacity to help in this process

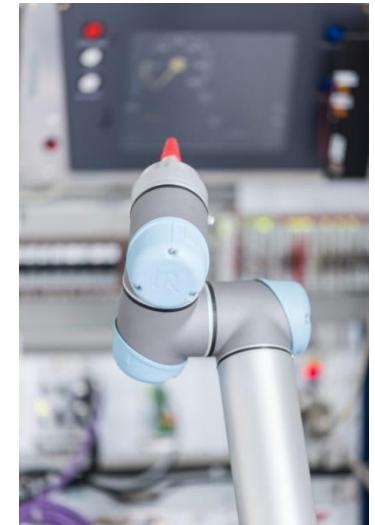
1. ETCS deep knowledge and experience (some labs testing ETCS since more than 20 years)
2. Ability to move tests from the track to the lab (Digital twins and/or through Zero on Site Testing)
3. Neutrality and Independence
4. Capacity for testing in advance ESC tests or tests to put in service new lines before the system is installed on track
5. Participation in Europe's Rail for testing new ETCS functionalities (ATO, HL3, ASTP, Regional lines etc....)
6. EAL labs can be a very good link between IMs and Suppliers for ETCS system tests



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Subset 076

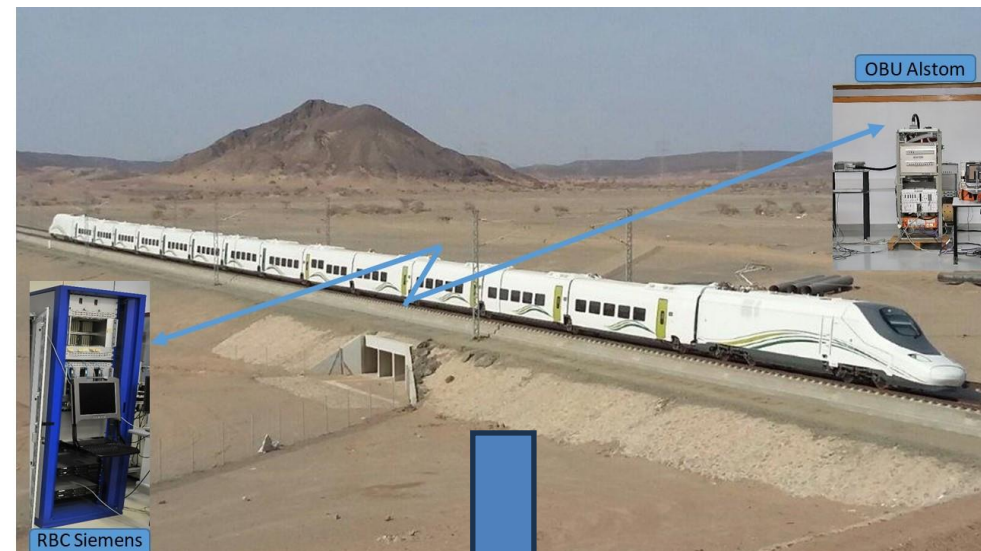
1. Since more than 20 years EAL labs have dedicated a lot of resources to create and maintain SS-076
2. This SS 076 guarantees full conformity of the OBU
3. All EAL labs are involved in several test campaigns with all the ETCS suppliers
4. But EAL lab are not limited to SS-076 and Conformity tests (SS-85/SS-116 and whole system tests)



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ESC and Operational Tests

1. The possibility of translating these tests from track to lab is one of the keys to accelerate ETCS deployment in Europe
2. EAL labs have run many tests based on real lines before the line enter in service or even before the construction is finished
3. Also test over reference lines (not real) for modelling their peculiarities (e.g. engineering rules, ETCS/class B transitions...)
4. ESC tests should be maintained, rationalized and more and more be translated to the lab
5. Remote tests among labs will be key to accelerate the process, avoiding the shift of equipment among labs and the related integrations
6. EAL labs have tested many European lines (Spain, Belgium) as well as lines from UK, Korea, Senegal, Saudi Arabia....



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Example 1 : Simulation at lab of Dakar ERTMS line (2018)

TER DAKAR line, DAKAR- DIAMNIADIO



Route Map Controller

1966.87m 14:07:58 < S 1966.87m L 15:07:58 >

DDO

Time	Name	Comments
15:01:45.165	Sahara : Point Status Report	TVS->DDO, ProjectID = 10, StationID = DDO, ElementID = p50050, GrpID/SubGrpID = 0/0, ADA=1, Locked=1, Right=1
15:01:45.174	Sahara : Point Status Report	TVS->DDO, ProjectID = 10, StationID = DDO, ElementID = p5004, GrpID/SubGrpID = 0/0, ADA=1, Locked=1, Right=1
15:01:45.191	Sahara : Point Status Report	TVS->DDO, ProjectID = 10, StationID = DDO, ElementID = p5002a, GrpID/SubGrpID = 0/0, ADA=1, Locked=1, Right=0
15:01:45.204	Sahara : Point Status Report	TVS->DDO, ProjectID = 10, StationID = DDO, ElementID = p5001b, GrpID/SubGrpID = 0/0, ADA=1, Locked=1, Right=1
15:02:36.959	Sahara : Signal Status Report	TVS->DDO, ProjectID = 10, StationID = DDO, ElementID = s5042, GrpID/SubGrpID = 0/0, ADA=1, CSO=0, ESO=0, EST=0
15:05:25.306	Sahara : Signal Status Report	TVS->DDO, ProjectID = 10, StationID = DDO, ElementID = s5042, GrpID/SubGrpID = 0/0, ADA=1, CSO=0, ESO=0, EST=0
15:06:10.974	Sahara : Signal Status Report	TVS->DDO, ProjectID = 10, StationID = DDO, ElementID = s5032, GrpID/SubGrpID = 0/0, ADA=1, CSO=0, ESO=0, EST=0
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15:07:09.057	Sahara : Signal Status Report	TVS->DDO, ProjectID = 10, StationID = DDO, ElementID = s5024, GrpID/SubGrpID = 0/0, ADA=1, CSO=0, ESO=0, EST=0

DDO DKR RFQ SMR TRY Log

(JPEG Image, 640 x 480 pixels) - Scaled (91%) - Mozilla Firefox

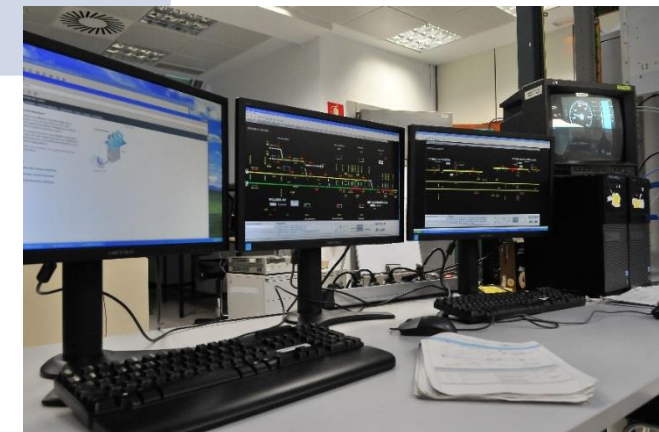
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Example 2: Cost and duration reduction by performing Operational Tests (Place in Service Tests) at lab

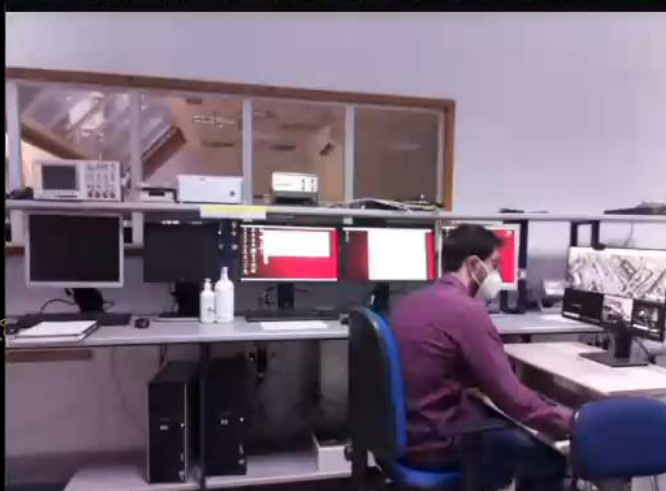
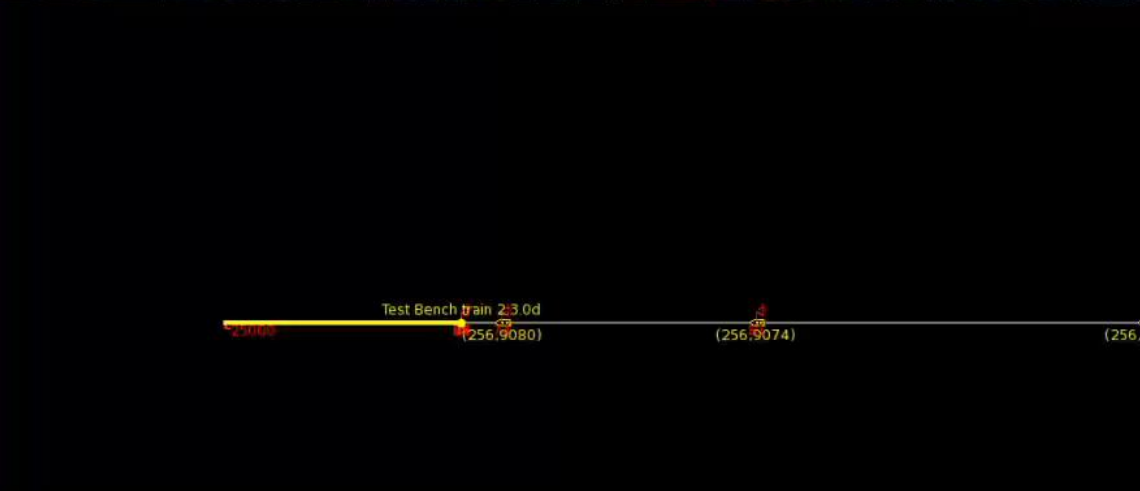
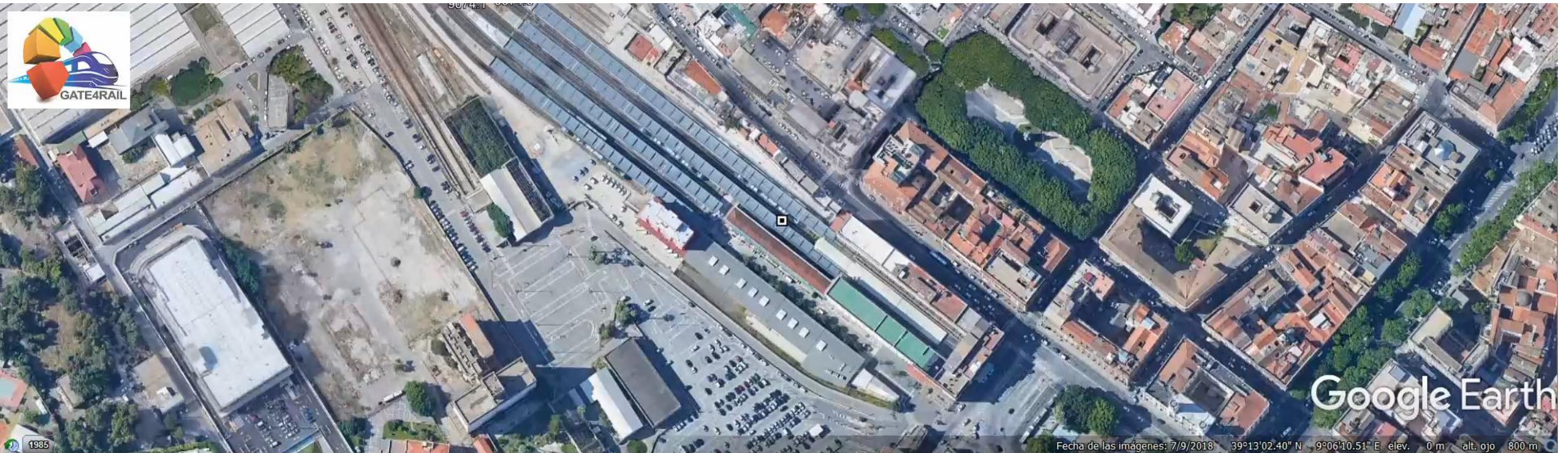
Scenario . Test campaign with 3 OBUs	Cost (k€)	Duration (months)	Duration after finishing the construction (months)
1.- Test campaign only on track	1,328	10,5	10,5
2.-Test campaign only at lab	180 (13%)	3	0
3.- Test campaign first in the lab (debugging) and later on track	824 (62%)	5	2

* Article “ **Are ERTMS Lab Tests Time-Saving and cost-Effective?**” I.J. Iglesias, J. Bueno, D. Molina, S. Herranz, R. Cáceres, M. Fernandez, M. López, N. Sanchez. Review “Ingeniería Civil”, Ner 189/2017. pp 65-72



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Example 3: Simulation at lab of a ETCS line equipped with virtual balises and a real EVC integrated in the lab running over the line



Collaboration of all entities involved

The challenge is so big that we need the collaboration of all the involved actors

1. We are very in favor of the use of other labs. We can all contribute to overcoming the challenge :
2. Suppliers' labs and remote connection among them, IMs' labs...
3. Collaboration of EAL labs with the rest of the labs.
4. The main goal is to reduce at maximum tests on track by testing almost all the possible ETCS routes at lab and leaving an small sample to be tested on track (as it is done with IxL or old Class B systems)
5. Testing new CCS functionalities (ERJU Innovation Pillar) at lab



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Conclusions and final thoughts

1. Independent labs grouped in EAL a has a great experience in testing ERTMS both componentes and subsystems at lab
2. This knowledge can be used to translate more and more tests from the track to the lab as a needed tool to accelerate ETCS deployment in Europe by decreasing cost and time.
3. The challenge to achieve the Single European Railway Area is so great that it requires the collaboration of all parties involved: suppliers, inframangers and independent laboratories can collaborate in the ERTMS testing process.
4. ESC tests must be rationalised and reduced but they will never disappear because it will always be necessary to check the correct train-track interoperability. IMs are responsible of these tests, but anyway the network of EAL's Labs would be a great support for executing them.



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