HELLENIC REPUBLIC
MINISTRY OF INFRASTRUCTURE AND TRANSPORT

Innovation in the Railways - Workshop

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Introduction – It ‘s all about Innovation

The efficient introduction of innovative projects and techniques would facilitate and promote the effective use of railway transport.

The latter is an environmentally friendly mode and its further progress would allow significant steps towards the fulfilment of major objectives related to:

-sustainable mobility and growth, mainly by accommodating rising traffic flows,

-reducing the environmental impact and achieving energy efficiency.

The application of advanced and innovative technology is an important prerequisite for the prosperity of the railway market, which has constantly adapting needs.

The utmost goal is further modernization of the rail industry by introducing innovations and technology that increase **customer satisfaction, improve safety, and drive operational efficiency.**

Digitalization

The application of advanced and innovative technology is an important prerequisite for the efficient and sound operation of **green and safe transport**.

Policies should be coordinated and legislation should gradually become harmonized. The railway sector has been increasingly adopting digital technology to ***streamline the customer service, improve customer journeys and ticketing, as well as to enhance the management of the infrastructure***.

Digitalization and automatization are setting the pace with respect to the improvement of the efficiency for rail transport.

To this end, the main initiatives and steps at an international level may be briefly presented as follows:

A.Shift to Rail (S2R) (1):

- is the first European rail initiative to seek **focused research and innovation (R&I) and market-driven solutions** by accelerating the integration of new and advanced technologies into **innovative rail product solutions.**

- **promotes the competitiveness of the European rail industry and meets changing EU transport needs.** R&I carried out under this Horizon 2020 initiative develops the necessary technology to complete the Single European Railway Area (SERA).

The S2R Joint Undertaking will be providing a platform for cooperation that will drive innovation in the years to come. The S2R JU will pursue research and innovation activities in support of the achievement of the Single European Railway Area and improve the attractiveness and competitiveness of the European rail system.

A.Shift to Rail (S2R) (2):

•**Cutting the life-cycle cost of railway transport** (costs of building, operating, maintaining and renewing infrastructure and rolling stock) by as much as 50%;

• **Doubling railway capacity**;

• **Increasing reliability and punctuality by as much as 50%.**

S2R aims at boosting the competitive edge of the rail supply industry, opening new market perspectives and offering significant employment and export opportunities.

Railway undertakings, infrastructure managers and public transport operators **may also benefit from innovations that drastically reduce infrastructure and operating costs.**

Passengers and freight service users will experience a step change in the reliability and quality of services.

Improved competitiveness and attractiveness of rail services, combined with increased capacity, will help rail take on an increased share of transport demand, **thereby contributing to the reduction of traffic congestion and CO_2 emissions**.

A.Shift to Rail (S2R) (3):

is expected to contribute to the following:

S2R will develop and implement a new way of addressing the challenges for innovation in railway technology.

Two key objectives have been identified by the initiative, the first one is **increasing capacity** so as to enable rail to absorb a greater share of traffic growth and the second is to **attract business and improve the efficiency** of the rail transportation mode as a whole.

The initiative will contribute to an increase in the overall efficiency of the rail transport system, **satisfy transport user's needs,** and at the same time help **foster the competitiveness** of the European manufacturing industry, through the implementation of technological innovation.

A.Shift to Rail (S2R) (4):

The 2019 Annual Work Plan foresees the following operational activities:
launch of calls for proposals for a total foreseen value of the action of 149.2 M€:
other activities include: monitoring and review of the R&I activities.
Globally the activities of the S2R JU aim among others to:

- ***Continue to raise awareness about the S2R JU.***
- ***Promote stakeholder engagement.***
- ***Promote S2R JU within the EU Institutional arena.***
- ***Promote the S2R vision.***
- ***Lead a coherent dissemination strategy regarding projects' activities and achievements.***
- ***Support and promote the recognition of results at global level.***

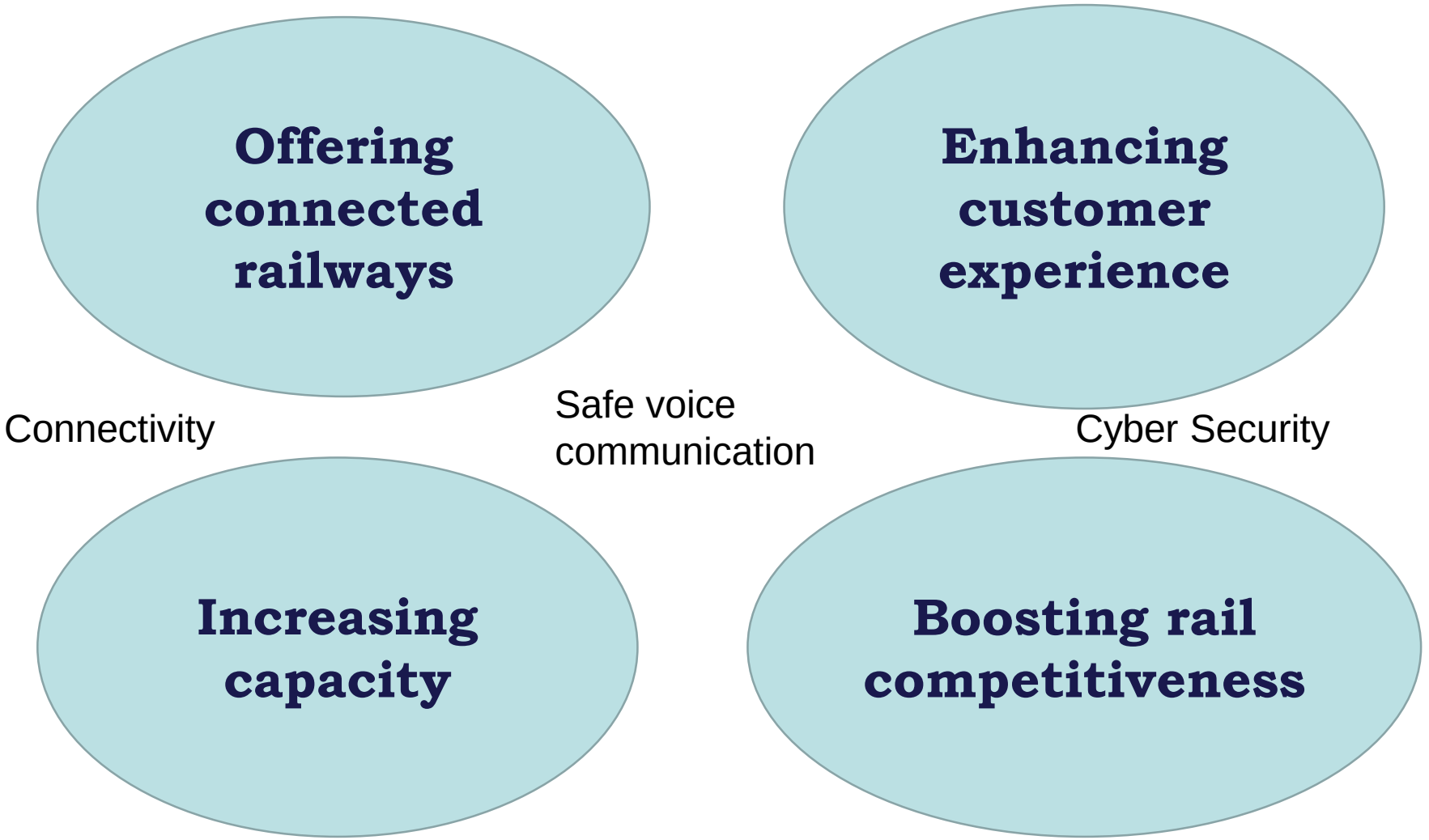
B. Roadmap for Digital Railways (1)

In April 2016, CER, CIT, EIM and UIC presented a Joint Roadmap for digital railways, highlighting the opportunities and challenges of rail digitalization.

The roadmap outlines a commitment to a digital transformation by strengthening cooperation, both within the sector and with third parties, and by calling on the help of EU institutions to collectively deliver on the objective of making railways digital.

Further actions calling on EU institutions and especially the European Commission to help to collectively deliver on the objectives of making railways digital **were identified as follows:**

B. Roadmap for Digital Railways (2)



B. Roadmap for Digital Railways (3)

Further to the initiative regarding the Joint Roadmap, in November 2017, CER, EIM, ERFA, UIP, UITP and UNIFE signed the Joint Rail Sector Declaration on Digitalization of Railways, **through which:**

-They called on the European Commission to **uphold digitalization as one of its key priorities** and to ensure that the political importance of the topic would be reflected in the funding commitments in the next Multi Annual Financial Framework (2021- 2027).

-reaffirmed their commitment **to provide products and services that use the digital technologies for the benefit of people**

-They noted that to ***tackle the ongoing mega-trends and place railways as the backbone of future digital sustainable mobility in cities and outside,*** it would be of great importance to increase the European funding instruments for rail research-development-innovation-deployment, following Shift2Rail, by including a "Shift2Rail 2.0", with digitalization at its heart, in the 9th Framework Programme for R&I.

C.Proposal for a new EU Regulation establishing the CEF (1)

The new Multi Annual Framework for the period 2021 - 2027 promotes clean, smart, sustainable, inclusive, safe and secure infrastructure that will provide tangible benefits to European citizens and businesses, allowing them to travel, ship goods, have access to energy and high-quality digital services in an efficient way.

The new CEF proposal supports investment in transport, energy and digital infrastructure through the development of the trans-European networks (TEN).

The future needs for decarbonization and digitalization of the Union economy will imply a growing convergence of the transport, energy and digital sectors. Synergies between the three sectors should thus be harnessed to the full extent, optimizing the effectiveness and efficiency.

C.Proposal for a new EU Regulation establishing the CEF (2)

There are several legislative initiatives under preparation. The new CEF proposal has the general objective to **develop and modernize the trans-European networks in the fields of transport, energy and digital and to facilitate cross-border cooperation in the field of renewable energy**, considering the long-term decarbonization commitments and with emphasis on synergies among sectors.

One of the specific targets for the digital sector is to ***contribute to the deployment of very high capacity digital networks and 5G systems***, to the ***increased resilience and capacity of digital backbone networks on EU territories*** by linking them to neighbouring territories, as well to the digitalisation of transport and energy networks.

D.Proposal for an EU Regulation on electronic freight (e-freight) transport information

The general objective of the Regulation is to enable wider use of digital technologies to contribute to:

(i) the removal of barriers to the smooth functioning of the single market

(ii) the modernization of the economy

(iii) the greater efficiency of the transport sector. The establishment of uniform conditions for the further development and deployment of digital technologies for electronic exchange of freight transport information would also contribute to the development of the Digital Single Market.

The use of electronic means to make regulatory information on freight transport available to the authorities throughout the territory of the EU should be ensured.

E.The Declaration of Graz

Multimodality and infrastructure is a key priority of the Graz Declaration which was presented to the EU Ministers of Transport in October 2018. The Declaration points out the following:

-Grasping the opportunity that multimodality presents at the European level both for goods and passengers ensuring the digital evolution of our networks, including the promotion of electronic freight transport information, and building the economic case for sustainable alternatives to road transport.

-Increasing the efficiency and attractiveness of rail transport, with particular emphasis on strengthening and continuing initiatives towards the progressive digitization and automation of rail transport.

Brief Reference to the following:

1.THRIASIO PEDIO – RAILWAY FREIGHT CENTER

2.CONSTRUCTION OF THE NEW HIGH SPEED DOUBLE TRACK RAILWAY LINE TITHOREA- LIANOKLADI- DOMOKOS

1.Thriasio Pedio

1. It is the first Integrated Multimodal Transport Freight Center in Greece, the creation of which will contribute to the concentration of railway activities that are currently being implemented in different areas of the capital.
2. The connection between Thriasio Pedio and the port will contribute to make the freight center a place of utmost importance activities such as: servicing, storage and transhipment of the goods that enter the port, in order to handle them both in the Greek territory and in the rest of Europe. At the same time, the new freight center is directly linked to the PATHE/P road and Attiki Odos as presented to the following map.

Connection with PATHE/P

PATHE/P:

- Interconnects the big urban centres of the country and areas with significant growth in the primary and secondary sectors
- Links to the major freight centres, main ports and Trans-European corridors
- Part of the Core TEN-T network and of Orient – East Mediterranean (OEM) Corridor

Thriasio Pedio Image

Source: ERGOSE S.A

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2. Construction of the new high speed double track railway line Tithorea-Lianokladi-Domokos

The project consists of two parts:
First part, among RS Tithorea - RS Lianokladi of 54 km length
Second part, among RS. Lianokladi - RS Domokos of 52 km length
Along the line are encountered:

A.Five (5) Railway Stations in the areas of Tithorea, Molos, Lianokladi, Agios Stefanos (Xyniada area) and Domokos.

B.Two (2) Railway Stops at Aggies and Thavmakos

C.Two (2) twin tunnels (Kallidromo and Othrys).

Budget of the Total Project: ~ 1,6 mil. EUR – Partly co-financed by EU

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TITHOREA – DOMOKOS PROJECT
Under construction

The section Tithorea – Lianokladi is under operation from February 2018

Completed double-track railway line with signaling, tele-communications & electrification

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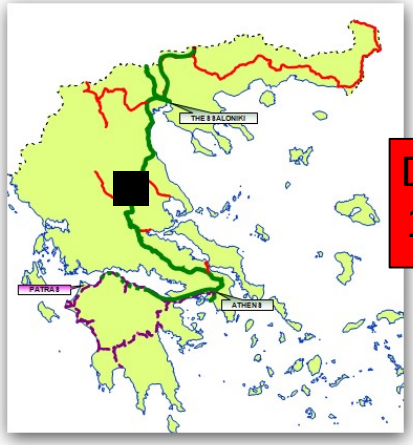
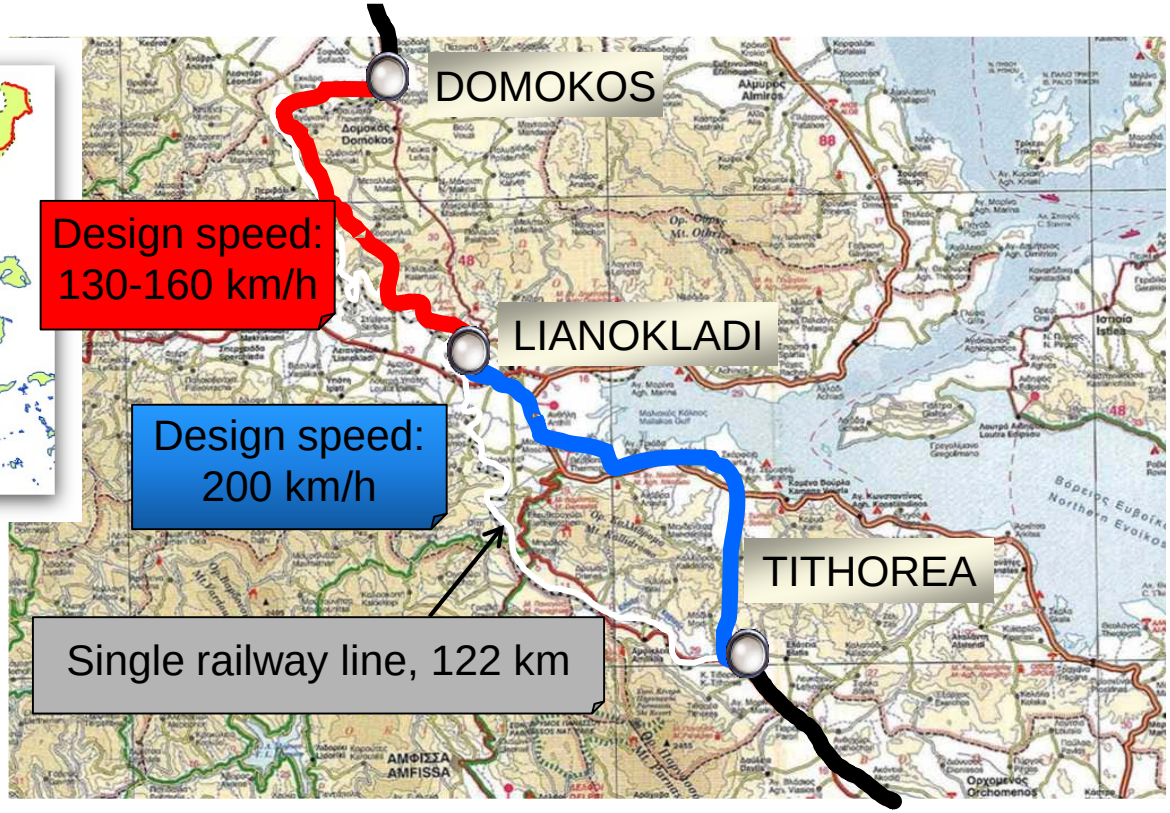




SECTION TITHOREA-DOMOKOS (106 Km)

New high speed railway line
with signalling ETCS Level 1, tele-communications &
electrification systems fulfilling the interoperability requirements

Current Project Progress

- Infrastructure works ~ 85% completed
- Slab track superstructure works (in Kallidromo & Othris tunnel): 100% completed
- Ballast track superstructure works:

  Section Tithorea – Lianokladi: ~ 100% completed

  Section Lianokladi - Domokos: ~ 97% completed
- Signalling, telecommunications and electrification works:

  Section Tithorea – Lianokladi: ~ 95% completed

  Section Lianokladi - Domokos: ~ 65% completed

SLAB TRACK IN KALLIDROMO

Source: ERGOSE S.A

Entrance of Kallidromo Tunnel

Source: ERGOSE S.A

Tithorea Railway Station

Source: ERGOSE S.A

Othrys Tunnel

Source: ERGOSE S.A

Northern Exit of Othrys Tunnel

Source: ERGOSE S.A

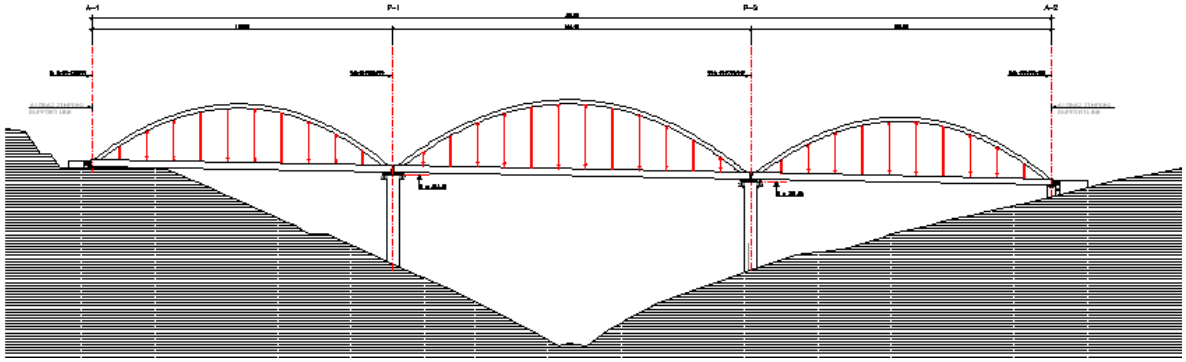
Railway Bridge No 26(405 m)

Source: ERGOSE S.A

Railway Bridge No 26(405 m)

Source: ERGOSE S.A

A few words about the Railway Bridge No 26



Total length: 404,80m, which will consist of three pairs of curved arches, paraboloid form.

The manufacturing method that was selected for the construction is the **incremental launching**. This method is appropriate due to:

- the geometry of the deck
- the alignment of the mapping of the bridge in plan view and
- due to the uniformity of the inclination along the whole technical project.

VIDEO: source- ERGOSE S.A

Project Update

Tithorea – Lianokladi section:

in use from *31-01-2018.*

Full operation (with electrification, signaling and ETCS Level 1)

Lianokladi - Domokos section:

Full operation (with electrification, signaling and ETCS Level 1)

estimated at the *end of 2018.*

Benefits:

- Savings in trip time costs: Athens – Thessaloniki travel time reduction ~ 50 min.
- Increase of capacity.
- Increased safety in transportation.
- Savings in environmental and operational costs because of the electrification.
- Increased railway transportation demand.

Thank you for your attention!

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