WP1 Consortium Members:

An overview of key contributions and roles

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ROLE IN WP1

CERTH will lead:

- WP1 EU-Global T&L Networks [EGTN]. CERTH leads the first Work Package of the project with the objective of providing a Simulation Capability for assessing the impacts of emerging trade routes, national strategies and technological concepts on the TEN-T corridors and the Principal Entry Nodes (PENs) interfacing TEN-T to global trade.
- T1.5 EGTN Reference Specification.
- Deliverables D1.10 (v1) and D1.11 (final version) EGTN Reference Specification.
- Subtasks ST1.3.2, ST1.5.2 and T1.5.4.

CERTH's main contribution by now is the deliverable D1.10.

OTHER ROLES

CERTH will also lead:

- D3.10 EGTN Impact Assessment, ST3.4.3 and ST4.1.2.

KEY CONTRIBUTIONS TO PLANET

- CERTH has a long participation history in EU-funded projects mainly acting as Project Coordinator or Work Package Leader.
- By utilizing cutting-edge know-how and accumulated professional experience on state-of-the-art research and innovation, CERTH methodically approaches the particularities of the parameters of PLANET project with the aim of assessing the impacts of future scenarios in the development of the Green EU-Global Integrated T&L network [EGTN] and give answers to fundamental questions regarding the three interacting layers of EGTN structure: physical, technological and governance.

CERTH

CERTH
CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

The Centre for Research and Technology Hellas (CERTH), founded in 2000, is a leading research centre in Greece, with high participation in competitive research grants. The Hellenic Institute of Transport (HIT) is one of CERTH's five Institutes, devoted to the promotion and undertaking of transport research. Its main mission is to provide state-of-the-art research and create innovation in the field of transport at a national, European and international level, addressing issues related to transport policy, planning, management, operations and infrastructure.

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ROLE IN WP1

ITAINNOVA will lead:

- T1.1 EGTN Modelling & simulation capability. This task will: (a) Consolidate the initial view of EGTN, in the form of four Foundational Position Papers, (b) Formulate EGTN simulation scenarios based on the LL requirements and the Foundational Papers to guide and support work in WP1 and WP2 tasks, (c) Develop an EGTN modelling and simulation capability for a comprehensive analysis of the impact of emerging trade routes, national strategies and technological concepts on trans-continental freight flows and modal split to/from Europe and on the required interfaces to the TEN-T.
- Deliverables D1.1 EGTN Foundational Position Papers and Simulation Scenarios, D1.2 (v1) and D1.3 (final version) Modelling & Simulation Capability.
- Subtasks ST1.1.1, ST1.1.2, ST1.1.3, ST1.1.5.

ITAINNOVA's main contribution by now are the deliverables D1.1 and D1.2.

KEY CONTRIBUTIONS TO PLANET

- ITAINNOVA is going to develop a multi-agent model to simulate the behaviour of corridors under the Physical Internet paradigm. ITAINNOVA will extend its core Advanced Planning applied to production, transport and logistics through data analysis and simulation in the direction of PI.

ITAINNOVA

ITAINNOVA is the Aragon Institute of Technology, a non-profit centre. Our mission is to support companies through technological research and innovation. The "Transport, Sustainable mobility" line of innovation within the ITAINNOVA strategic framework applying current technologies and knowledge to the development of new transport and personal mobility models , applying Open Data philosophy to re-use information in the field of transport and personal mobility (Advanced planning on production, transport and logistics, Modelling and simulation of logistics processes and supply chain agent integration).

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ROLE IN WP1

PAN will lead:

- T1.2 TEN-T focused modelling and simulation so as its subtasks ST1.2.1. and ST1.2.2. This task aims to: a. build upon the analysis undertaken in T1.1, and use modelling and simulation in order to assess in more detail the expected impact of new trade routes on the TEN-T network b. assess the potential impact regarding disadvantaged regions and their inclusion into the international trading system and integration in the TEN-T network.
- S1.1.4 Model extensions and customization implementation, and ST1.5.1 Defining the EGTN vision for 2030.
- Deliverables D1.4 (v1) and D1.5 (final version) Simulation based impact of new trade routes on the TENT- T and disadvantaged regions.

PAN's main contribution by now is the deliverable D1.4.

OTHER ROLES

PAN will also lead:

- T4.1 Recommendations for TENT-T interfacing to Global Trade Routes.
- D4.1 Recommendations for TENT-T interfacing to Global Trade Routes.
- Subtasks ST4.1.1, ST4.1.4 and ST.4.2.1.

PAN leads and participates in Living Lab 2: Synchromodal dynamic management of TEN-T & intercontinental flows promoting rail transport. To that end, it also leads:

T3.2 LL2: China–Rotterdam/USA focusing on rail transport so as it related subtasks ST3.2.1, ST3.2.2 and ST3.2.6.

- D3.3 LL2 Specification and Baseline measurements and D3.4 LL2 EGTN Solution description and test results.

KEY CONTRIBUTIONS TO PLANET

Panteia will develop new models and knowledge to extend its capability on modelling TEN-T support to be used in its consultancy engagements supporting decision makers to formulate, monitor and evaluate strategies for addressing the impact of new trade routes on infrastructure development.

PANTEIA

Panteia
Research to Progress

Panteia (PAN) is a consultancy firm, which supports policy and decision makers, helping them to formulate, monitor and evaluate strategies for effective policy in different fields. These fields comprise economy, transport, labour market, health and education. To do so, they apply unique knowledge bases and innovative methods, supported by independent market and policy research. Together with their clients they aim to contribute to sustainable, social and economic progress. Panteia's offices are staffed by specialists who focus on specific fields of research.

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ROLE IN WP1

UIRR will lead:

- T1.3 Legislation and EU policy to impact EGTN. This task aims to define the impact of forthcoming international, EU and national legislative initiatives and EU policy initiatives on the development of the EGTN.
- Subtasks ST1.2.3, ST1.3.1 and ST1.3.3.
- Deliverables D1.6 (v1) and D1.7 (final version) Legislation and EU policy to impact EGTN.

UIRR's main contribution by now is the deliverable D1.6 Legislation and EU policy to impact EGTN v1.

OTHER ROLES

UIRR will lead:

- T5.4 Policy recommendations and Impact Assessment.
- Deliverable D5.7 Policy framework analysis.

UIRR will participate in Living Lab 2: Synchromodal dynamic management of TEN-T & intercontinental flows promoting rail transport.

KEY CONTRIBUTIONS TO PLANET

The UIRR Association:

- Has experience in providing advice and expertise at national, European and other supranational organisations.
- Has a constant interest to improve the overall efficiency and development of Combined Transport.
- Is also very active in the implementation of the nine rail freight corridors and has been also appointed as the coordinator of the Terminal Advisory Groups (TAG) to ensure a coherent and harmonised approach within the corridors.

UIRR

The **International Union for Road-Rail Combined Transport (UIRR)** was created in 1970 and has a liaison office in Brussels since 1988. Its main objective is to represent the interests of Combined Transport Operators and Terminal Managers mainly offering Road-Rail solutions to the freight logistics market. The UIRR currently represents 40 operators in 20 countries representing yearly about 8.5 million TEU or a share of around 50% of all cross-border's volume in Europe. The UIRR member companies concentrate a variety of functions and roles within the Combined Transport chain: the commercialisation role, the transhipment task, the rolling stock function and the traction role.

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ROLE IN WP1

EUR will lead:

- T1.4 and its subtasks in WP1 (EU-Global T&L Networks [EGTN]) related to Simulation-based analysis of T&L and ICT innovations (ST.1.4.1, ST.1.4.2, ST.1.4.3). This task aims to further develop and deploy quantitative models, based on a variety of methodologies, including econometrics, statistical learning ('machine learning'), optimization and simulation.
- Deliverables D1.8 (v1) and D1.9 (final version) Simulation-based analysis of T&L and ICT innovation technologies.

EUR's main contribution by now is the deliverable D1.8.

OTHER ROLES

EUR will also lead:

- WP4 Steering innovation & building capacity towards EGTN. It will provide Open Source Libraries as part of the Transferability Framework and Capacity Building Programme.
- Subtask ST4.1.3, ST4.2.2, ST4.3.3, ST4.4.3, and ST4.5.2.

EUR participates in Living Lab 2: Synchromodal dynamic management of TEN-T & intercontinental flows promoting rail transport. For that will lead the ST3.2.3 Synchromodality on Blockchain platform.

KEY CONTRIBUTIONS TO PLANET

EUR will extend its research in Simulation-based analysis of T&L innovation technologies and will develop new synchromodality models utilising blockchain technologies which will be used by industry and for further research.

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ERASMUS UNIVERSITY

Rotterdam School of Management, Erasmus University (RSM/EUR) founded in 1913 is an international knowledge institute for critical thinking and academic training, driven by a strong focus on current social issues.

RSM is the largest business school in the Netherlands and consistently ranked among the top 10 business schools in Europe. RSM is placed among the 1% of schools worldwide with Triple Crown accreditation. With 197 senior researchers and 88 PhD students RSM is one of the world's largest and most cited business school faculty.

WP1 Deliverables submitted

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D1.1 EGTN Foundational Position Papers and Simulation Scenarios

This document contains the description of the main aspects of the four foundational Position Papers of the Planet project and the design of scenarios intended to assess their potential impact. The primary objective is to analyse, understand and assimilate the global, geopolitical, commercial, and economic imperatives of the main European trade routes.

Purpose of those 4 foundational Position Papers generated by the PLANET project is to provide a compendium of the research and study results related to the main aspects of the development of the EGTN and thus provide an initial view of it.These aspects namely include the geo-economic dimension which drives the emergence of new trade routes to EU, the impact of these routes on the existing EU transportation network (TEN-T), the existing land interconnection issues of the TEN-T to networks outside EU concerning rail infrastructure and finally, the emerging of the Physical Internet concept which has the potential to guide the shaping of the EGTN and the role of the PI enabling innovative technologies as tools for the enhancement of transport operations.

These, foundational Position Papers since the beginning of the project consolidated the contextual framework of PLANET, building upon concepts introduced as part of the proposal submission process, incorporating prior research work, and providing a common understanding of key issues. The areas covered, included: (1) geoeconomic analysis of the dynamics and potential impact of new trade routes for EU covering both macro and microeconomic perspectives, (2) impact analysis of New Trade Routes on TEN-T: A preliminary impact analysis on the TEN-T corridors and multimodal transfer nodes (termed Principal Entry Nodes) are performed from economic and environmental perspectives, (3) focused analysis on railway transport-corridors to/from the EU: Interconnection problems relating to economic, information, scientific, technical, and ecological aspects will be studied, and (4) analysis of the transition towards the Physical Internet paradigm: Current thinking models and use cases are consolidated in our position paper.

A multi-step scenario definition methodology has been proposed. This mainly analyses the external forces that are expected to affect transport in the coming years along with the main uncertainties that may have an impact. It defines a scenario logic that allows the creation of narratives of the evolution of possible scenarios. Based on the definition of the individual scenarios, a consolidating exercise has been conducted to establish the integrated scenarios to be considered in the following tasks of the project.

This document also contains the definition of important indicators. Central is the role of the Corridor Connectivity Index (CCI) as introduced by PLANET proposes for each EGTN transport node. The Corridor Connectivity Index considers a transport node’s level of integration in the global transport network, as manifested by its position in port capacity, efficiency and ease of processes, service frequency, service quality, and digital connectivity. This indicator together with other indicators such as transport costs, reliability, and emissions will be used to analyse the different proposed scenarios.

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D1.2 Modelling & Simulation Capability

Objective of this document is to provide a detailed description of the available models for representing the freight transport processes in the intercontinental corridors examined in PLANET. It addresses the characteristics of those models along with their main functionalities, exploring complementarity and analyzing the data necessary to assess the use cases as realized in the project's living labs.

The report also covers the main models used to simulate and analyze transport operations on intercontinental corridors along with an overview of ten specific models developed by seven project partners.

The information requirements of all models have been thoroughly analyzed in order to achieve harmonization of the required data. Various categories of input data, parameters and results have been specified as they will be used across all models along with the main data sources needed to build the living lab models. The deliverable also addressesthe initial description of the analysis requirements and the principal scenarios currently evaluated in the living labs.

Finally, this report specifies the first steps towards the integration of the various models enabling analysis at different levels (both micro and macro) considering interaction both as regards with input as well as output data level. Follow-up work (under T1.4) will define in further detail the integration of those models.

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D1.4 Simulation based impact of new trade routes on TEN T and disadvantaged region

Since 2014, the European Union has taken on a leading role in further expanding and improving the quality of the transport networks of the European Union. The EU's long-term TEN-T policy belongs to the world's vanguard in terms of ambition, geographical scope and network density. Further advancing the EU's leadership in global transport flows and logistics starts with establishing a sound and fundamental understanding of the impact on the TEN-T network of global transport and geo-economic trends. In order to achieve this, Task 1.2 performs a strategic analysis of the most relevant emerging trade routes which are expected to gradually change global transport patterns, and a simulation of their potential impacts on the TEN-T. This relates to the intercontinental rail freight connections between China, Russia and Europe (Belt and Road Initiative) and the Middle East and Northeast Europe (International North-South Corridor).

The findings of Task 1.2 are published in two deliverables: D1.4 (present document) and D1.5. This report establishes the baseline scenario (year 2019) for the three new tade routes. The second report will explore the 2030 and 2050 simulations and link the usage of the corridors to changes in the disadvantaged regions (e.g. accessibility, economic growth, population).

For Eurasian rail freight transport, rail services coming from China and arriving at the European border in 2019 overwhelmingly used Malaszewicze as principle entry point (PEP). The 200.000 TEU per year coming from China translated into some 55 trains per week. About 12% of this flow branched off towards Lodz. Some 23% went to Hamburg and some 44% went on to Duisburg. Smaller flows went to Liege, Ghent, Tilburg and Madrid. Export flows also travel in the opposite direction, but to a lesser extent.

For the International North-South Corridor, we see a current potential of over 86.000 TEU, which could increase to 125.000 TEU in 2030 and 206.000 TEU in 2050. It remains to be seen how long it will take for these volumes to be realised if the route is completed. Only a fraction of the cargo is related to Europe. This concerns 8.500 TEU if the route would be opened right now, which could increase to 13.500 TEU in 2030 and 24.000 TEU in 2050. The corridor is therefore most interesting as a European trade route if European trade can be combined on INSTC trains with Russian cargo.

Regarding the Arctic Route, we have found that its greatest potential lies in the transport of raw materials that come from this region, especially energy-related raw materials. In 2019, approximately 6 ships per week arrived in Europe from this region. Russia has plans to more than triple the amount of raw materials extracted by 2030. However, Russia also plans facilities to be able to process the raw materials on its own soil, so that transport to Europe will no longer be necessary. It is therefore not expected these commodity flows to increase, thus keeping the impact on the European TEN-T network negligible.

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D1.6 Legislation and EU Policy to impact EGTN

This deliverable D1.6 on 'Legislation and EU Policy to impact EGTN' addresses the results of the analysis of ongoing and forthcoming legislative and policy initiatives that might impact the design and realisation of the EGTN within the PLANET project.

The research on legislative initiatives focuses on the impacts of international and EU initiatives (national level will be covered in the final version of the deliverable). For both levels, the consortium has identified actions that regulate topics such as infrastructure, greening of transportation, digitalisation, operations and intermodal (modal shift). All these measures might affect at least one of the EGTN dimensions (infrastructure, technology and governance). Most of the inventoried initiatives are impacting the infrastructure components and operations of the EGTN whereas some actions concentrated on the governing rules and on the digitalisation of transport-related documents (consignment note, customs). The first preliminary impact assessment demonstrates that nearly the entire catalogue is EGTN-relevant and will influence the EGTN attributes (Geo-economics aware, Innovation, Impact, Integrated, Inclusive).

The review of policy initiatives concentrated on the activities carried out under the Digital Transport & Logistics Forum (DTLF), the recently published Sustainable and Smart Mobility Strategy and the Sustainable Finance (EU taxonomy) policy. For the DTLF, the impacts of the e-FTI Regulation (as part of the group 1 on paperless transport) and of the development of federated platforms on the EGTN have been analysed and evidences show a clear impact of those policies on the realisation of the EGTN.

For both aspects (legislative and policy initiatives), a preliminary selection of impacts to be fed into PLANET simulation models has been identified and can be handed over to the partners in charge of these models. It is also recommended to share the outputs of this analysis to the coordinators of the three living labs for further analysis and validations (in particular for the review of national legislative and policy initiatives).

The key implementation barriers per legislation and/or per EGTN dimension have proven that a full interoperable EU network does currently not exist and that additional actions need to be undertaken to achieve the initial objectives of the TEN-T or Rail Freight Corridor Regulation. All preconditions for a solid EGTN foundation have also been identified and could be used as part of the policy recommendations to be drafted within work package 5 of PLANET.

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D1.8 Simulation-based analysis of T&L and ICT innovation technologies

The objective of the research reported in this deliverable is (a) to define the impact of ICT and T&L innovation on EGTN, (b) to assess the impact of emerging concepts and technologies on freight transport corridors and hubs and (c) to position emerging technologies as contributors to the Physical Internet.

Both transportation and decision making depend on the available technology, as well as the performance of the deployed transport solution. For instance, think of the maritime container and digital platforms. The first induced a drastic change in handling operations changing the transport means themselves and their operational planning as well. The second allowed booking and sharing platforms for freight transport to exists. In this case, we see that both a hardware and a communication technology changed transportation both by opening the way for new physical means as well as new decision-making solutions. On the one side, adoption of technology and ICT solutions is moderated by several factors (geographical, economic, social, etc.), leading to a different degree of implementation and, as a result, changed performance. On the other side, successful technological adoptions can result in macroscopic changes in the performances of transportation networks and supply chains.

In the context of PLANET, the intention is to assess how innovation can impact the development of the EGTN concept. How do new technologies impact corridor performance? How does the context where a certain ICT innovation is deployed affect the adoption and the impact of the innovation itself? We address these questions by crafting a prototype PLANET integrated modelling capability, by building on top of the work done in previous deliverables which listed the models and modelling scenarios (such as D1.2) and by combining the effort and perspectives of different modelling partners and the Position Papers' authors.

With the goal of supporting the development of the EGTN concept, this deliverable reports the first steps taken in building PLANET's integrated modelling capability aiming at answering the opening set of three research questions. Concretely, this deliverable: 1) showcases a multi-model quantitative pipeline based on a LL that shows how microscopic (operational) and macroscopic (generalized utility) models can be jointly deployed to assess quantitatively the effect of technology at the macroscopic level; 2) considers and models the effect of containerized commodities having multiple entry points on national transport chains; 3) supports the development of the EGTN concept by estimating the impact of integrated innovations in a TEN-T networks setting.

This deliverable sets up the cornerstone for PLANET's joint planning capability which is a pipeline of quantitative models inspiring the innovation, impact and integrated attributes of the EGTN concept. This prototype made its first run and showed that multiple complex models can be successfully integrated. This is a two-fold result: first, it paved the way for further model integrations and enhancements, leading to the evaluation of different IT and T&L innovations in various scenarios; second, it provided an approach to address and model a range of operational contexts, future scenario logics and a range of emerging technologies.

As a final remark, what has been developed in the current deliverable will be continued and reported in Deliverable D1.9. The research work reported here is in progress, preliminary results have been obtained and the feasibility of the approach has been proved.

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D1.10 EGTN Reference Specification v1

The present deliverable builds on the results of the work undertaken in WP1 tasks in order to provide the initial specifications for defining the Green EU-Global Transport & Logistics Network (EGTN). The EGTN aims to become the realization of the EU Commission vision for Smart, Green and Integrated Transport and Logistics by efficiently interconnecting infrastructure (TEN-T, Rail-Freight Corridors) with geopolitical developments, as well as optimising the use of current & emerging transport modes and technological solutions, while ensuring equitable inclusivity of all T&L participants, increasing the prosperity of nations, preserving the environment, and enhancing Citizens quality of life.

EGTN consists of three interactive layers, the physical, the technological and the governance layer, the specifications of which are defined in the present and the last version (D1.11) of this document. The physical layer includes the physical infrastructure of the network in terms of revised/new TEN-T corridors and nodes while the technological layer includes the required digital infrastructure in order for the network to leverage innovative technologies and concepts and operate under a Physical Internet paradigm. The governance layer includes the proper governance form that will ensure that the EGTN members engage in collective and mutually supportive action, that conflict is addressed, and that network resources are used efficiently and effectively.

With respect to the physical layer of the EGTN, the initial results from the establishment of the base year scenario (2019) for the impact of the three new trade routes (Eurasian land bridge, Arctic route and International North-South corridor) on the TEN-T network showed that the intercontinental rail freight connections between China, Russia and Europe (belonging to the Belt and Road Initiative) and more specifically the corridor that runs through Kazakhstan, Russia, Belarus and Poland appears to be the most mature route and the only one that will be of significant importance in the near future. The main entry point to the EU through this route is located in Małaszewicze while the most important start and end point for trains to and from China is the inland port of Duisburg. As for the main identified bottlenecks that hinder and delay flows on this route, the Małaszewicze /Brest border crossing is identified as the most important one mainly due to time-consuming custom procedures, followed by the congestion phenomena of the European rail network. The International North-South trade corridor (INSTC) has the potential for serving significant cargo loads but its implementation time horizon is uncertain and also it will be more interesting as a European trade route if European trade can be combined on INSTC trains with Russian cargo. Finally, the freight flows through the Arctic route are not expected to increase significantly, thus keeping the impact on the European TEN-T network negligible.

Regarding the governance model of the EGTN, it appears that a bottom-up approach is the only viable strategy for a more progressive growth of the PI network. According to this approach, different stakeholders will agree among themselves to develop parts of the PI while a central body will be needed to establish common standards for the PI in order to bring these parts together. Moreover, the governance framework will need to support collaboration and asset sharing in horizontally integrated supply networks and also the removal of boundaries between vertically integrated supply chains to allow asset sharing and opportunistic routing and re-planning of shipments across PI nodes belonging to different networks. The legislative and policy initiatives which are prerequisites for the development of the EGTN, including mainly initiatives towards the achievement of interoperability, the greening of investments and the digitalisation of transportation, are also presented.

Finally, the technological layer of the EGTN will be the backbone of the network, supporting and connecting all of its aspects, namely the planning of its development, its governance and its operationalisation, through the implementation of innovative PI enabling technologies and logistics concepts. This will be achieved through the development of a cloud-based Open digital infrastructure that will include proper tools and models but also through a strategic modelling capability which however will be developed outside the Open digital infrastructure.

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