FOSTER RAIL

Future of Surface Transport Research Rail

Coordination and Support Action

Grant Agreement No 605734

Date of Annex I against which the assessment will be made: 23-05-2013

Deliverable D4.1

Delivery of the final template for Technology and Innovation Roadmaps

WP	4	Technology Roadmaps, Exploitation & Implementation
Task	4.1	Technology and Innovation Roadmaps

Dissemination level[1]	PU
Nature[2]	R

Due delivery date	M12
Actual delivery date	M21

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Document Version	Date	Author(s)
0.1	01/10/2013	Dennis Schut/ Vytautas Kinderis
0.2	25/06/2014	Vytautas Kinderis
0.3	29/09/2014	Dennis Schut
0.4 Final	28/01/2015	Dennis Schut

[1] Dissemination level: **PU** = Public, **PP** = Restricted to other programme participants (including the JU), **RE** = Restricted to a group specified by the consortium (including the JU), **CO** = Confidential, only for members of the consortium (including the JU)

[2] Nature of the deliverable: **R** = Report, **P** = Prototype, **D** = Demonstrator, **O** = Other

Table of Content

1. Executive Summary

The FOSTER RAIL project is addressing the challenge to strengthen and support research and innovation cooperation strategies in the European rail sector. The project's work plan foresees to enhance coordination among main stakeholders and actors in the European rail sector and rail industries and integrate the work done so far by ERRAC and its working groups. Starting with the already published ERRAC-ROADMAP, the FOSTER RAIL project will continue to coordinate the research and innovation agenda and priority setting process among the wide range of relevant stakeholders in the rail sector. The outcome of FOSTER RAIL will be a Rail Business Scenario as basis for new Strategic Rail Research and Innovation Agenda (SRRIA) and specific Rail Technology & Innovation Roadmaps aimed at 2050. The output will among others be used to advise the European Commission, Shift2Rail and other research programmes on their content.

Task 4.1 "Technology and Innovation Roadmaps" of the Work Package 4 will deliver updated and upgraded technology and innovation roadmaps in line with the SRRIA's strategic alignment and fill the gaps in the existing ERRAC Roadmaps. The new set of roadmaps (fully taking into account the work performed under the ERRAC Roadmap project) will be a plan that matches short-term and long-term goals with specific solutions to help meet those goals. The roadmaps will apply to a new product or process, or to emerging technologies. One of the aspects of this task is to summarise, cluster, prioritise and publish the sector's R&D needs. On the basis of this work, ERRAC advises the European Commission annually on the sector's R&D needs & priorities. This deliverable D4.1 provides the unitary template for each of the part-roadmaps in order to arrive to 10 compatible part-roadmaps.

2. Description of the Deliverable

The previous EC funded project "ERRAC ROADMAP" has developed 9 research & technology roadmaps in support of ERRAC. Not all of these roadmaps were built up along the same structure, which made it sometimes difficult to combine or integrate related priorities or to compare issues. In order to avoid this, the WP4 team has identified in an early stage the main elements for the new Technology & Innovation Roadmaps. During the course of the work inWP 4 this template has been updated several times.

This Deliverable D4.1 defines the unitary template as it has to be used by each of the Roadmap leaders for the drafting of their part-Roadmap.

The final FOSTER-RAIL Research & Innovation Roadmap will consist of 10 new part-roadmaps and this template has been developed and agreed in order to have a common structure and description for each of the part-roadmaps, facilitating the integration and interoperability.

3. Part Roadmap on xxx (name the Topic of the part-Roadmap *(for instance: "Rolling Stock")*

3.1 Introduction

In this chapter please give a short Introduction and description of the area which is being coveredwithin this part-Roadmap and include a short description of the every day present situation.

Refer directly to the corresponding part of the vision as described in the SRRIA.

3.2 Key issues and objectives

In this chapter please describe the most important issues to be developed in this Roadmap – the key issues and objectives referring to the SRRIA specific area for this part-Roadmap.

NOTE: **Example** for the topic "Rolling Stock"
The priorities are:

- Promoting the increase of capacity by creating more space for passengers and reducing weight of vehicles through smaller and lighter subsystems and components, improving vehicle performance through enhanced braking and flexible coupling, and addressing technologies for better accessibility in order to reduce dwell times. Increased operational reliability, mentioned below, will also automatically increase real line capacity.
- Increasing vehicle operational reliability by the combination of new, more reliable components and technologies along with fundamentally more reliable architectures for the key subsystems.
- Reducing the life cycle cost of the vehicles through the combined effect of simpler architectures, less energy consumption, cheaper and more agile certification processes.
- Extending the benefits in LCC reduction to the infrastructure through the development of track-friendly rolling stock technologies
- Developments that reduce energy consumption of vehicles by the combination of more energy efficient equipment and lighter vehicles, which is achieved both by employing incipient technologies and materials and by simplifying system architectures
- Technical standardisation of high-level architectures and interfaces between train sub-systems for cost effective procurement and retrofitting
- Environmentally friendly rolling stock with special emphasis in the reduction of the emission of noise and vibrations
- New paradigms for cost efficient freight rolling stock designs with improved capacity and optimised weight and suitable functionalities for different types of freight.

END of Example!

3.3 State of the Art and on going research and innovation within and outside rail

In this chapter please describe the present state of the art of the present knowledge. There is no need to mention a listing of previous projects but describe the current situation and mention clearly which are the problems with the current situation, why is there a need for progress and innovation in this area. It is ok to mention that certain aspects have been addressed in a recent project but explain why further development is needed and what that should result in. It can be useful to check the progress within "rail research" but also be aware of research, development and technologies outside the direct rail environment which might be useful for rail.

3.4 The Roadmap

In this chapter please describe per priority area the needs, priorities and recommendations for research and innovation activities.

The research and innovation priorities included here should be clear and based on the previous ERRAC Roadmap priorities which are still up to date and actual priorities, complemented with priorities from possible "gap' areas, not covered in the previous Roadmaps.

Explain in detail for every priority: what is the challenge, why does it have to be addressed, why is this a priority, what exactly is meant by it.

Include a simple timeline pictorial with 3 milestones on the timeline till 2050. Describe clearly how these milestones can be reached. Include and address the TRL levels.

3.5 Implementation Plan

Please describe in this chapter the possible ways to implement the Roadmap. Discuss the possibilities of introducing the priorities for example as part of the European Commission's research framework H2020 and its themes, or within SHIFT²RAIL supported by its financial instruments or through other programs and initiatives. Give an indication of how the implementation might be financed in order to reach the envisaged innovation.

The implementation plan should be supported by the work of the ERRAC Standards Recommendation & Exploitation group *Mainline* and *Urban* which where appropriate will give an indication of where and which standards will be needed and where there might be a potential for them to be developed during research.

3.6 Visual Roadmap, milestones and deliverables overview

In this chapter please give a pictorial overview – following the given template below – of the milestones and deliverables against a timeline towards 2050.

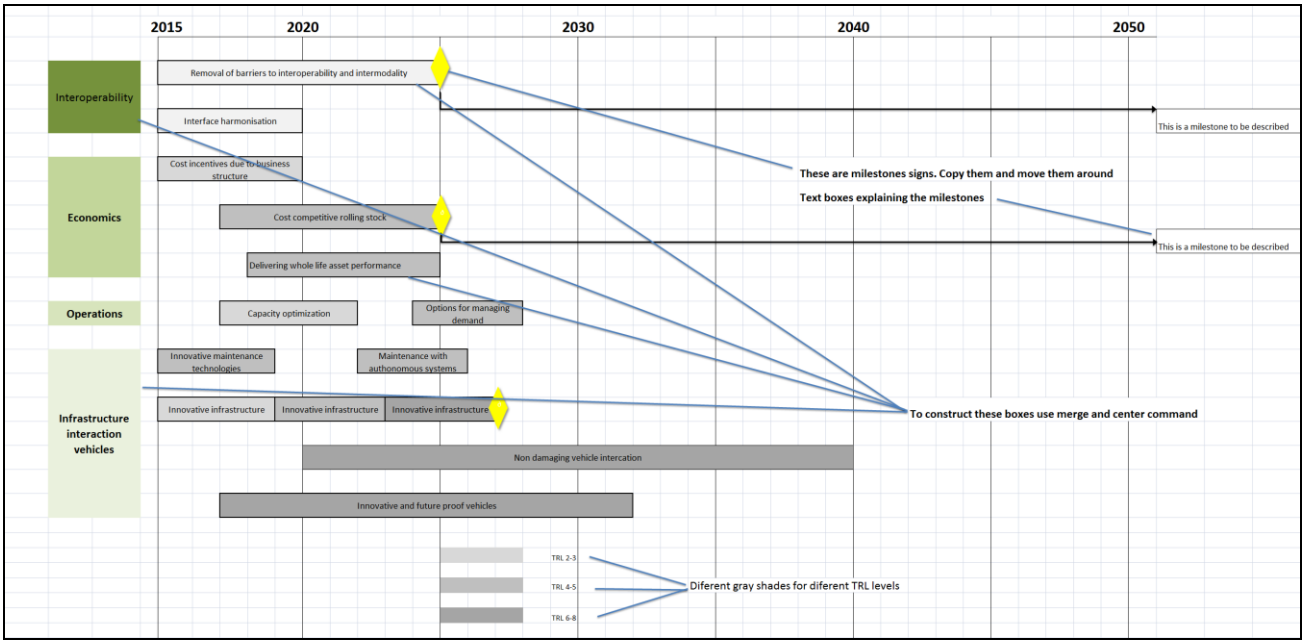

Fig. 1 - Visual Roadmap, milestone and deliverables overview

4. Conclusions

In this chapter please describe the main conclusions of this part-roadmap on this topic