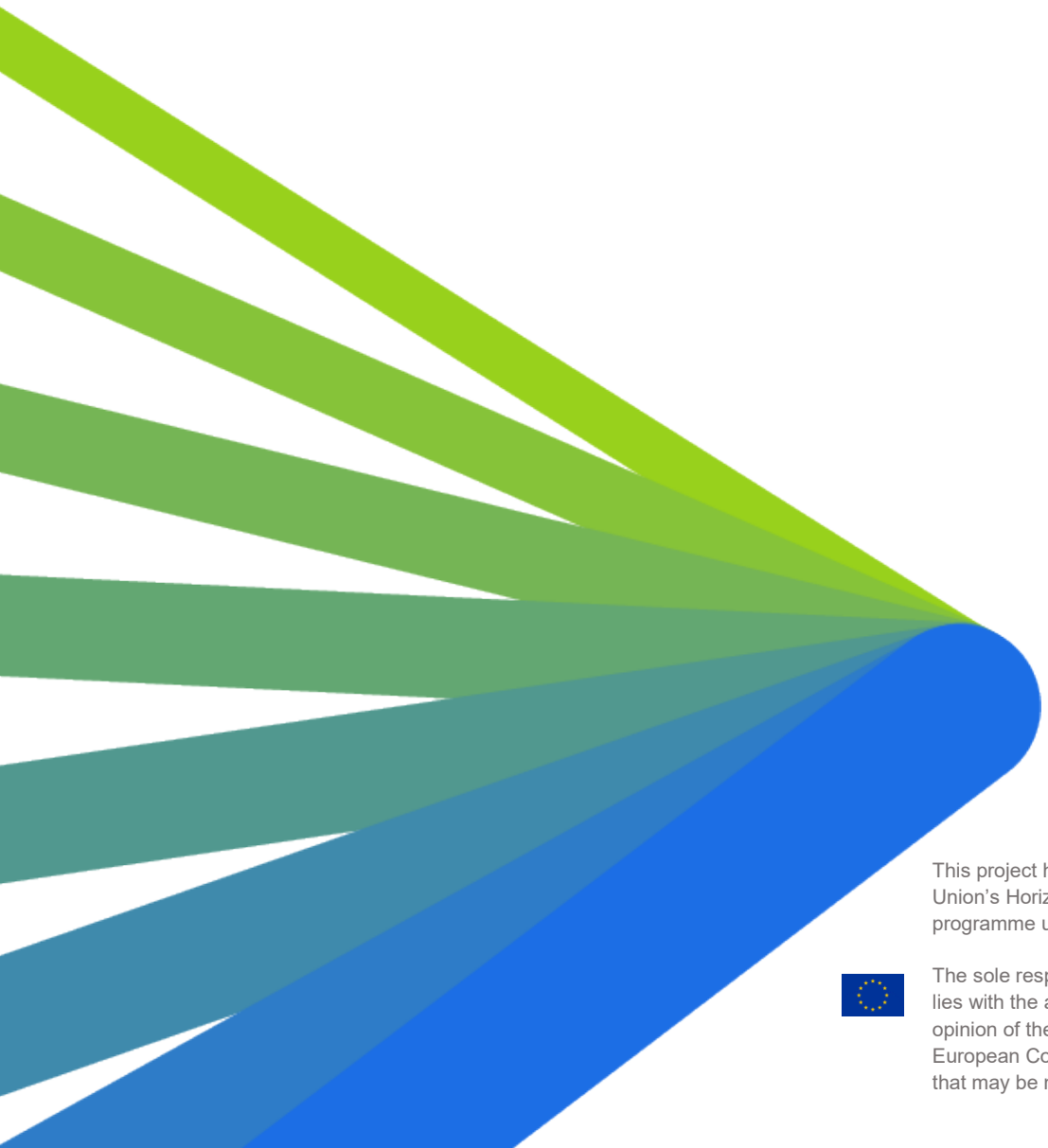
STREnGth_M
Strengthening EU
Road Transport R&I

Deliverable D2.2

Timing for Roadmap Updates



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Summary sheet

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Project acronym	STREnGth_M
Project starting date	1st February 2023
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List of abbreviations and acronyms

Acronym	Meaning
ALICE	The Alliance for Logistics Innovation through Collaboration in Europe https://www.etp-logistics.eu/
CAD	Cooperative and Automated Driving
CCAM	The European partnership on Connected, Cooperative and Automated Mobility https://www.ccam.eu/
CEDR	Conference of European Directors of Roads https://www.cedr.eu/
CSA	Coordination and Support Action
D	Deliverable
EC	European Commission
EGVIA	European Green Vehicles Initiative Association
ERRAC	European Railway Research Advisory Council https://errac.org/
ERTRAC	European Road Transport Research Advisory Council The ETP for Road Transport https://www.ertrac.org/
ETP	European Technology Platform
EU	European Union
EUCAR	European Council for Automotive Research and Development https://www.eucar.be/
LCA	Life-Cycle Analysis or Assessment
LDFT	Long Distance Freight Transport
M	Month, in relation to the start of a project
MaaS	Mobility as a Service
MS	Milestone
ODD	Operational Design Domain (used in this case as related to the operation of connected and automated vehicles).
OEM	Original Equipment Manufacturers (often used as a synonym for automotive vehicle manufacturers and/or tier 1 suppliers thereto)
POLIS	The network of cities and regions cooperating for innovative transport solutions https://www.polisnetwork.eu/
R&I	Research and Innovation
RTR	Road Transport Research
Q	Quarter, as in a period of a year
SDGs	Sustainable Development Goals
SM	Social Media
SRA	Strategic Research Agenda
SRIA	Strategic Research and Innovation Agenda
STRIA	Strategic Technology Research and Innovation Agenda
TEN-T	Trans-European Transport Network (https://transport.ec.europa.eu/transport-themes/infrastructure-and-investment/trans-european-transport-network-ten-t_en)
ToC	Table of Contents
ToR	Terms of Reference
TRA	Transport Research Arena
UM	Urban Mobility
UN	United Nations
WG	Working Group
WP	Work Package
2ZERO	European partnership on green vehicles (towards zero emission vehicles) and mobility solutions https://www.2zeroemission.eu/

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1 Introduction

1.1 Project Abstract and Reference to the Work Plan

STREnGth_M is a coordination and support action (CSA) co-funded by the European Commission (EC) under the call for project proposals topic HORIZON-CL5-2022-D5-01-11. The objective of this topic is to promote sustainable road transport in Europe and at international level. This CSA will contribute to a further harmonisation of research and innovation activities and, therefore, to European strategies for future transport systems. The action should also help reduce the time to market of new mobility solutions, by stimulating a wider participation in EU activities and supporting worldwide dissemination of the results therefrom. In addition, this CSA will support climate action and air quality improvement in line with the Green Deals objectives and contribute to the United Nations (UN) Sustainable Development Goals.

The STREnGth_M project will contribute to the planning of research and innovation in Europe by identifying future research needs in the field of road transport, by updating and supporting the coordination of strategic research agendas and roadmaps in the field, and by facilitating continuous exchange between road transport research related Horizon Europe partnerships and platforms. Further, STREnGth_M will analyse research, innovation and cooperation capacities in Member States, explore funding instruments at national and regional levels, and assess national and regional roadmaps. Within STREnGth_M, the global progress of electric mobility will be tracked whilst measuring the feasibility of innovative solutions for prospective and emerging markets in Africa, Asia and Latin America. Thus, STREnGth_M will strengthen existing and even forge new links between European, national and regional programmes, and support structures for international cooperation task forces. The project partners will also identify barriers that may exist for the deployment of research results at European and international levels, and they will identify education and training actions to contribute to capacity building. In order to inform and engage the stakeholder community, policy makers, the civil society, the consortium will develop dissemination strategies, support the dissemination and organisation of European and international road transport research related events. This way, the dissemination of the contribution from road transport to the realization of the European Green Deal targets and the Paris Agreement can be ensured. Via the establishment of the Multiplier Group, the engagement of the various stakeholders will be facilitated during the project.

Designing road transport for 2050 is a long-term process that requires collaboration between all stakeholders in both the public and private sectors. Flexibility and adaptability to emerging technologies and societal changes are key to ensuring the success of such activities. However, only proper investment in research and development for existing and emerging transport technologies can meet societal and economical goals. Moreover, designing road transport in Europe for the future involves considering a wide range of factors, including sustainability, technological advances, population growth, urbanization and the environment. As an example, to show the complexity of the road transport research and innovation roadmapping, a short, not comprehensive, list of factors involved in the design of road transport of the future is indicated: green safe and resilient transport; sustainability and environmental impact;

electrification and alternative energy carriers (vectors, fuels); autonomous and connected vehicles; high-speed, energy-efficient and well-connected public transport systems; sustainable urban mobility; mobility as a service (MaaS), road infrastructure; regulation and policy; circular economy; and, public engagement.

From the considerations above, the importance of appropriate planning for the timing of various roadmap updates evident.

1.2 Connection to European Technology Platforms and/or Horizon Europe Partnerships

As reported on the ERTRAC web site, the STREnGth_M CSA is directly connected to ERTRAC, the European Technology Platform (ETP) for Road Transport recognized and supported by the European Commission.

Preceded by EAGAR (2008-2010), FURORE (2009-2013), SAFIER (2009-2012), FOSTER-ROAD (2013-2016), FUTURE-RADAR (2017-2020) and FUTURE-HORIZON (2021-2023), STREnGth_M aims to contribute to the planning of research and innovation in Europe by:

- Specifying future research needs in road transport
- Updating and supporting the coordination of strategic research agendas and roadmaps in the field
- Facilitating continuous exchange between road transport research-related Horizon Europe partnerships and platforms
- Identifying existing barriers to the deployment of research results at European and international levels
- Measuring the feasibility of innovative solutions for prospective and emerging markets in Africa, Asia, and Latin America.

In particular, this contribution is towards the activities of ERTRAC. However, other partnerships are of relevance to the project, these are, for example, the 2ZERO partnership and the CCAM partnership.

1.3 Related STREnGth_M Work Package and Task

In line with the goal of the STREnGth_M project, Work Package 2, entitled “Research and Innovation Planning”, has the objectives to:

- Ensure harmonized research and innovation plans in order to strengthen the European road transport research arena and Europe’s future transport systems
- Identify future research needs in road transport
- Layout the plan needed for the roadmapping activities at the ERTRAC Working Group level
- Support ERTRAC Working Group (and CO_2 Evaluation Group) activities
- Facilitate cooperation between ERTRAC and road transport research related Horizon Europe partnerships
- Support the Horizon Europe mid-term review of the partnerships’ Strategic Research and Innovation Agendas.

This work package is divided into three tasks:

Task 2.1: Identify future research priorities in road transport (M1-M22);
Task 2.2: Update and coordinate strategic research agendas and roadmaps in the field of road transport (M1-M36);
Task 2.3: Facilitate exchange between road transport related platforms and partnerships (M1-M36).

Each of these tasks has a deliverable at its ending. However, for Task 2.2, to assist with the overview and coordination of research planning activities during the project, there is an additional deliverable, D2.1, “Timing for Roadmap Updates” during the first year of the project. As such, this deliverable report contributes to the achievement of, in particular, the first three objectives given above.

1.4 Scope of this Report

This report will give some background to the role of ERTRAC, in relation to research planning, and how this role has been fulfilled during the first 20 years of the Technology Platform’s existence. Based upon this background, a projection of the likely activities related to research and innovation planning, in particular those from the ERTRAC Working Groups, will be given. Thereafter, the details of the proposed working group activities over the coming months will be recorded, together with related activities, e.g. those for the update of the ERTRAC Vision and its Strategic Research Agenda (which is being covered in Task 2.1 and, partly in Task 2.2a), the ERTRAC CO_2 Evaluation Group (which is being covered in Task 2.2b), and Road Transport Related partnerships (which are covered in Task 2.3). As such, this report will give an overview of the planned activity of much of ERTRAC during the mid-part of the Horizon Europe framework programme.

This report should not be read nor considered in isolation. There are related reports being generated for the deliverable of other parts of STREnGth_M, in particular from Work Package 1 related to the methods of research planning, for roadmapping. Furthermore, there are publications planned within the Working Groups of ERTRAC or from the ERTRAC Plenary, which will provide further content to the plans outlined in this report. Similarly, the publications from the partnerships, such as 2ZERO and Member States or international bodies.

It should be recalled that research and innovation needs, as represented in roadmaps, are an essential tool for the stakeholder community to formulate the demands of and opportunities offered by the ever growing scientific and technological landscape in the road transport domain. Further, that these roadmaps are one of the instruments for funding bodies at European, Member States and international levels to properly orient the allocation of resources for such research and innovation in this domain.

1.5 Method

The activity which has led to this deliverable report took place in several steps:

1. Review of the documents created at the outset and during the first ten years of ERTRAC, to better understand the formal definition of the role of the technology platform and the intention of how that was to be fulfilled.
2. A review of the timing of the publication of the various documents from ERTRAC, in particular those related to road transport research and innovation, e.g. the working

group roadmaps, and that in relation to the timing of the EU framework research programmes, to better project the timing needs for the delivery of the coming research plans.

3. An ERTRAC Strategy Meeting, wherein the activity plans, in particular of each working group but also related partnerships, was presented, discussed and agreed.
4. The generation of this deliverable report on the basis of the above.

The findings of each of these activities will be reported in the following chapters of this deliverable report.

In parallel with the above steps the activities, e.g. of the individual working groups and of work packages and tasks within STREnGth_M yet outside of Task 2.2a, have continued and had some bearing on what is reported here.

1.6 Outcome

Based upon the activities above and, naturally, following discussion with the Chairman, Board members and Director of ERTRAC, it was recognised that several aspects of the research and innovation mapping activities of ERTRAC needed to be planned and enacted within the duration of STREnGth_M:

1. Given the timing and duration of the Horizon Europe Framework Programme (2021-2027), it was clear that activities to support the input of ERTRAC towards the planning of the second half of Horizon Europe and beyond, i.e. through to Framework 10, needed to be initiated during M9-M12 of STREnGth_M. In particular, these activities were:
    a. An update of the ERTRAC Vision 2050 since this was last created in 2016/17 (M9-M18, as part of STREnGth_M Task 2.1).
    b. An update of the ERTRAC CO_2 Evaluation Group study, which estimated the road transport system energy needs and make-up in 2050, by including equivalent estimations related to the “photo-years” 2030 and 2040 (M9-15, as part of STREnGth_M, Task 2.2b).
    c. Updates of the majority of the ERTRAC working group roadmaps, to a greater or lesser degree depending upon the working group (in part of STREnGth_M, Task 2.2a).

    Additionally, activities within the partnerships (e.g. related to STREnGth_M Task 2.3), in particular their monitoring, the update of their SRIA and the determination of possible research topics for 2025ff, were initiated.
2. The preceding step was expected to be completed around M18 of STREnGth_M (mid. 2024), such that an update of the ERTRAC Strategic Research Agenda (last updated in 2018) could start and be completed, ready for public dissemination by M36 of STREnGth_M (end of 2025).

These aspects are represented on a simplified Gantt chart in Figure 1, below.

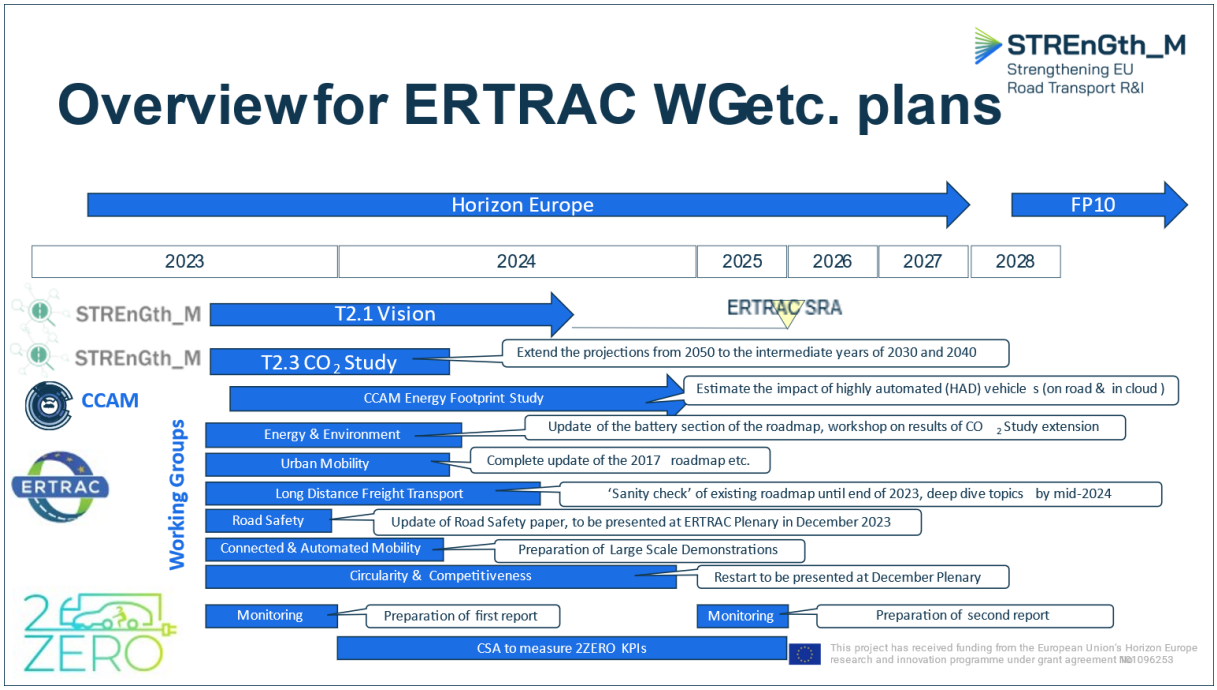

Figure 1. RTR Planning Activities during STREnGth_M

During step 2 of the Method, noted above, it was found that the update frequency reported for ERTRAC, at just over every two years, is consistent with practice in other regions and countries. Further, it was noted that updates of the roadmaps will include cooperation between working groups, to aid consistency between them. More generally, it is to be recognised that the activities of the ERTRAC working groups in particular, but naturally ERTRAC as a whole and of the other partnerships, will not end during STREnGth_M or immediately thereafter. Rather, the period from M18 of STREnGth_M onwards is beyond the detailed planning horizon of, e.g. the working groups: a possible update of this planning overview could be generated during the second half of STREnGth_M. Such an update might also include a brief review of the need or otherwise of further, individual working groups.

2 A Review of Past Documentation and Activities of ERTRAC

2.1 The Overall Relationship and Development of ERTRAC Documents

ERTRAC was officially launched in June 2003, following preparatory discussions between EUCAR, CONCAWE, CLEPA, EARPA and FEHRL during 2002. In line with the general objectives for Technology Platforms (see reference [1] from 2005, "European Technology Platforms. Knowledge for growth", Janez Potocnik), it had been recognised that road transport is a complex, multi-stakeholder system, such that benefit could be achieved through improving the links between industrial and public research and development in that domain. All road transport stakeholders were represented in ERTRAC, through associations, companies, Member States, cities and regions, as shown in Figure 2, below.

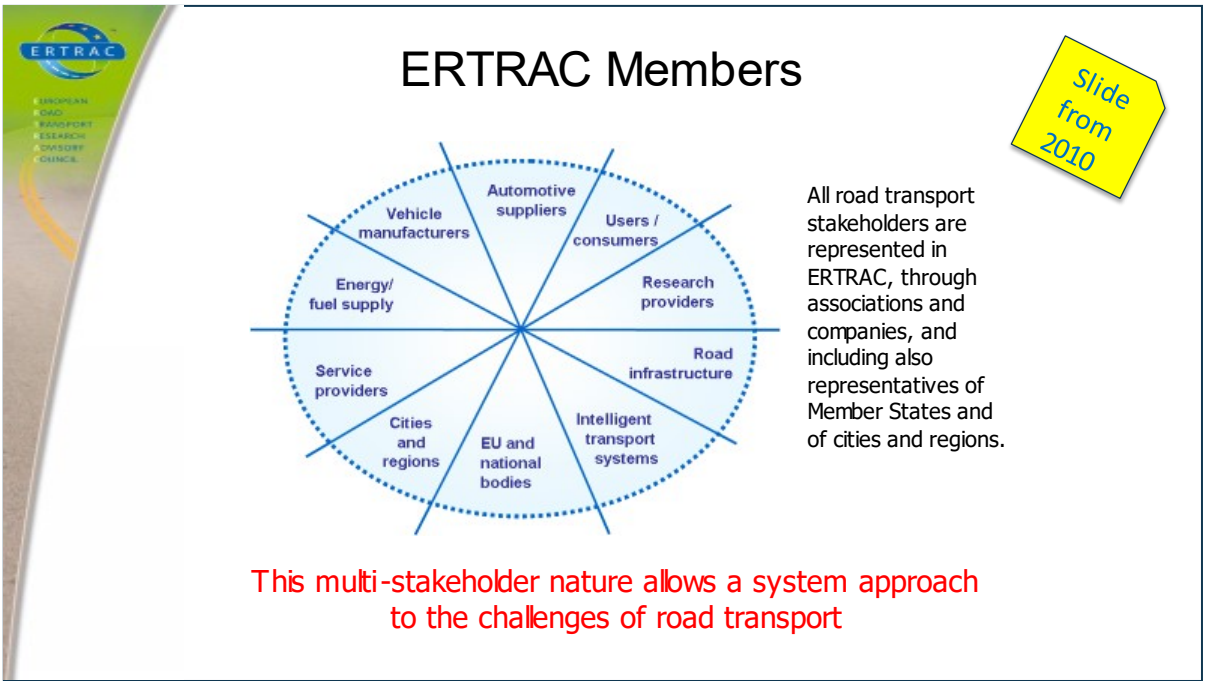

Figure 2. ERTRAC Member Groups (from 2010)

Hence, ERTRAC was founded as a forum to address all challenges facing European road transport research: to establish and carry forward a common Vision for 2020 and a Strategic Research Agenda (SRA). The operation of ERTRAC was defined within its Terms of Reference (ToR) (see [2]), which determined various documents that would be produced. This linked-chain of documentation, to address the individual needs of the various actors, is shown as presented in 2006, in Figure 3, below. This operation might also be considered a heierachy: with the Vision above the SRA above multiple different roadmaps. Alternatively, this operation might be viewed as a circular, with the later findings in the different roadmaps also being the spur for a timely update of the Vision, hence restarting the process.

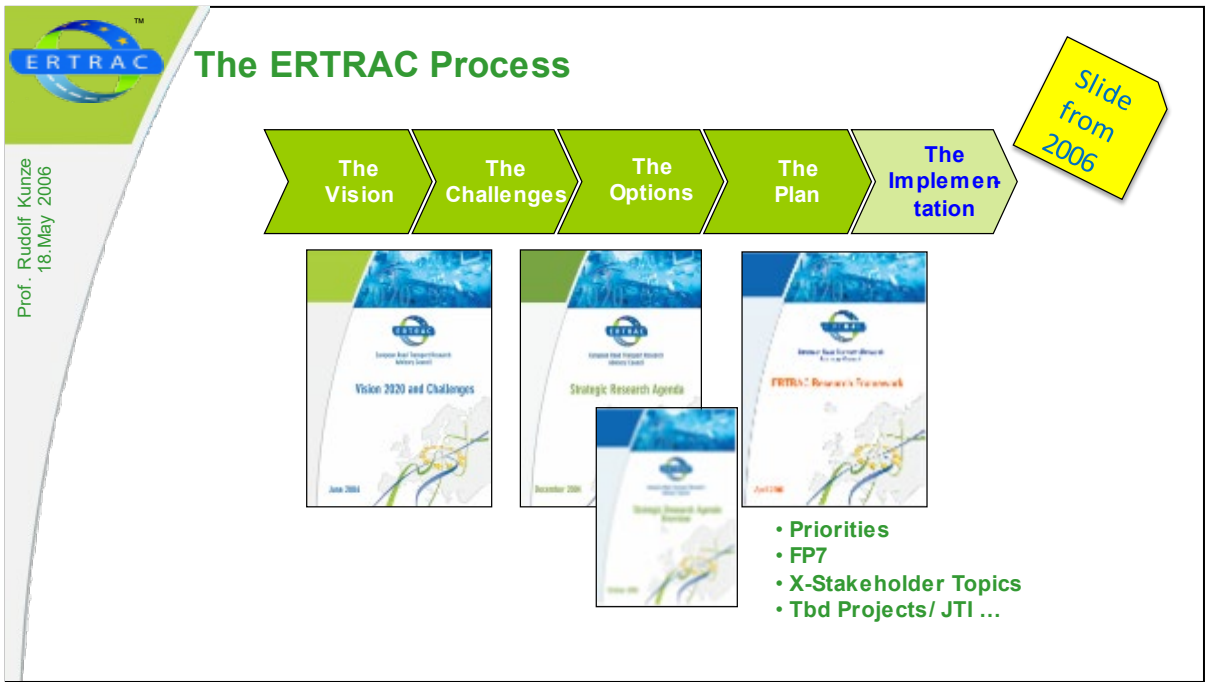

Figure 3. The ERTRAC Process (from 2006)

Envisioning a road transport system at a specific, "photo-year" in the future (in this case 2020) was a means to identify the likely challenges to reach such a goal. From these challenges, the necessary research and development, the SRA and the plans, could be logically developed. For reference, the introduction for the 2004 SRA [3] is given below, in Figure 4: what is pertinent, from today's perspective, is that, whilst the vocabulary might now be different, the general challenges identified therein remain equally valid today.

Introduction of SRA 2004:

Envisioning Europe in 2020 from the threshold of this new millennium has made us keenly aware of both the hopes for our new and expanding European Community and the challenges confronting our society and environment.

Road transport is woven throughout these hopes and challenges. It links us to each other, to our schools, employment and leisure activities. Freight transport is the lifeblood of our economy. The road transport industry provides employment across several sectors, and it is a source of both new technologies and manufacturing innovation.

However, road transport also faces unprecedented challenges as demands for both personal mobility and goods transport continue to grow. At the same time, preservation of our natural environment is a growing challenge, energy supply is of heightened concern, and global competitive pressures demand ever increasing efficiencies.

Figure 4. Introduction to the SRA from 2004 (part 1)

For the past two years, research managers, technical experts and public authorities associated with the European road transport sector have been discussing these challenges and the possibilities for moving forward. We have reached three conclusions:

- *Significant social, economic and environmental benefits can both be gained through improved knowledge and continued investment in research in the road transport industry.*
- *Both technical and non-technical research domains are key to finding solutions and making soundly based investment decisions for improving road transport within an intermodal system.*
- *The solutions required for our society can only be achieved through a multi-disciplinary, systems approach to research activities and the subsequent development and implementation by the private and public sectors at the European and national levels.*

Figure 5. Introduction to the SRA from 2004 (part 2)

With an update of the SRA in 2010 the visual images used to describe the road transport system became more defined; the (energetic) efficiency and the effectiveness of the system to address societal needs more discretely expressed, via guiding technical objectives for change (improvement): see Figure 6, 7 and 8.

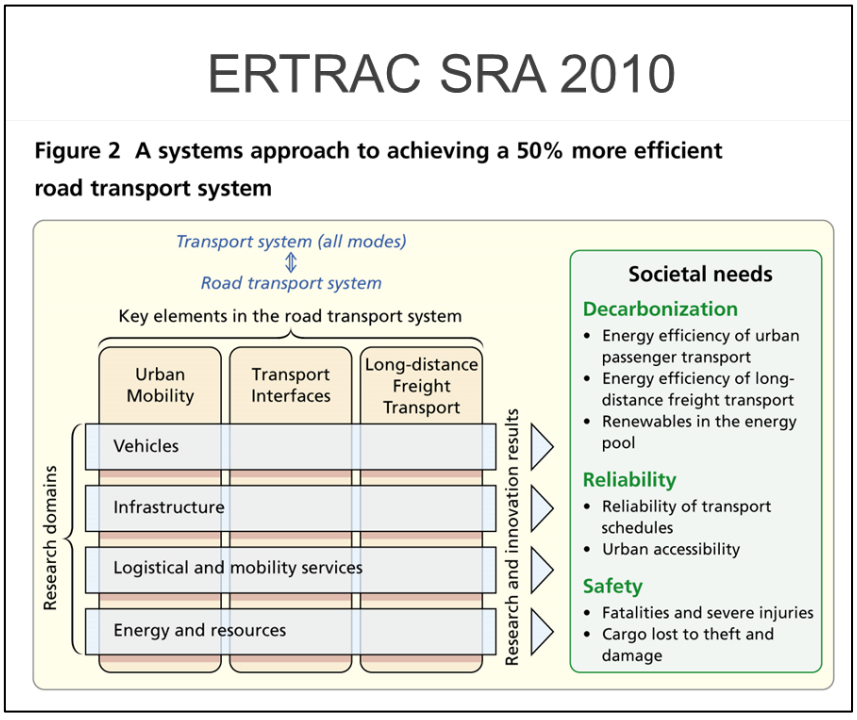

Figure 6. Aspects for improved system efficiency (2010)

ERTRAC SRA 2010

Table 1 Guiding objectives for 2030

	Indicator	Guiding objective
Decarbonization	Energy efficiency: urban passenger transport	+80% (pkm/kWh) *
	Energy efficiency: long-distance freight transport	+40% (tkm/kWh) *
	Renewables in the energy pool	Biofuels: 25% Electricity: 5%
Reliability	Reliability of transport schedules	+50% *
	Urban accessibility	Preserve Improve where possible
Safety	Fatalities and severe injuries	-60% *
	Cargo lost to theft and damage	-70% *

* Versus 2010 baseline

Figure 7. Guiding Objectives for the Photo-year 2030 (from 2010)

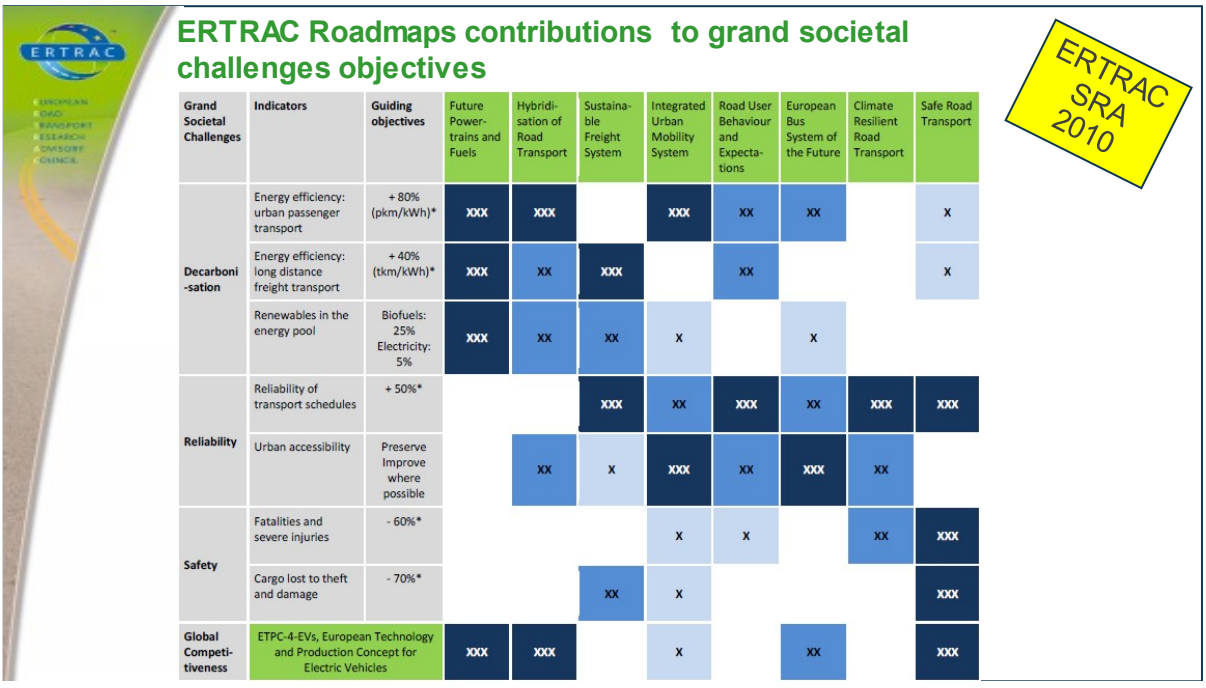

Figure 8. Roadmap Topics related to Societal Challenges and Guiding Objectives (2010)

It is pertinent to note that the regular use of the “roadmap” concept (see STREnGth_M D1.2) occurred during this time (as prescribed within the SAFIER project (2009-2012), although some ERTRAC members had been using regularly since a couple of decades), together with the realisation that, independently to the formulation, each roadmap in for road transport had not the goal to predict the future, but rather to draw pathways to design and enable a future that meets the societal goals.

Additionally, specific topics were addressed, such as powertrain technology development, with projections of how the European vehicle parc might develop over a longer time period, to 2050: see Figure 9.

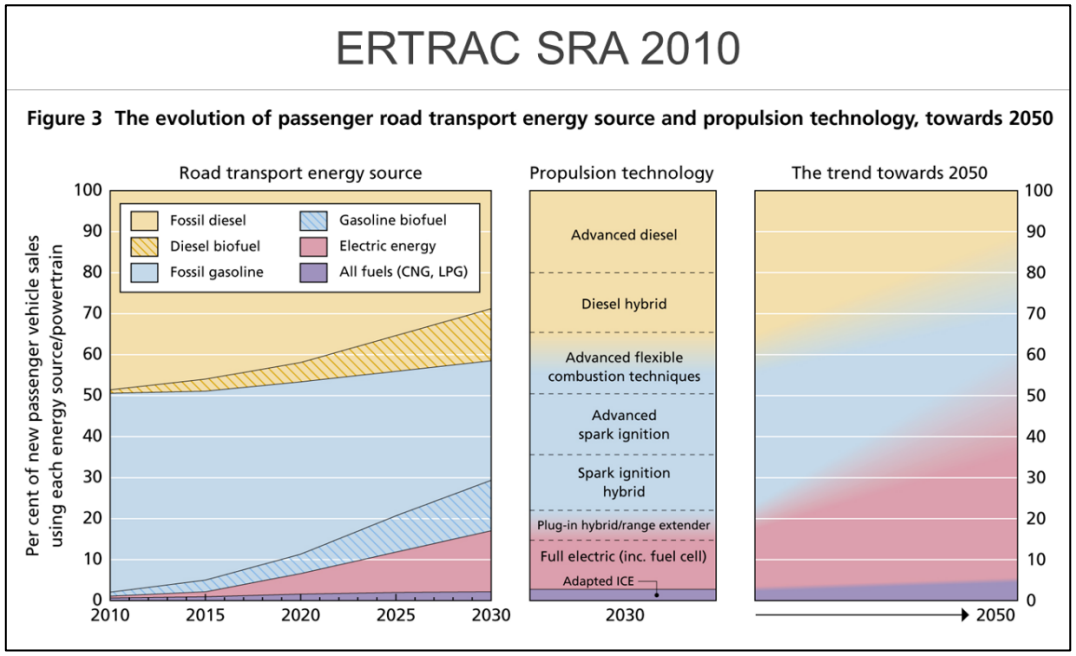

Figure 9. Projections for the Development of Vehicle Powertrain Technology Prevalence to 2050 (from 2010)

Today, with reference to the most recent European Union´s Strategic Transport Research and Innovation Agenda (STRIA), see https://research-and-innovation.ec.europa.eu/research-area/transport/stria_en, it is realised that a research and innovation need in the road transport domain is a pathway for the actions to develop technologies and support their swift deployment. Further, that this development and deployment must be made whilst ensuring the competitiveness of the European industry and enabling potentially disruptive innovation, which may lead to new transport services. Such that a regular series of specific technology, application or service roadmaps are produced by ERTRAC, see Figure 10.

Figure 10. Recent ERTRAC Roadmaps Published (status 2023)

2.2 The Occurrence of ERTRAC Publications

ERTRAC published its “Vision 2020” in June 2004 [4], followed by its first Strategic Research Agenda (SRA) in October of the same year [3]. Its first research framework was published in April 2006 [5]. Subsequently, plans or roadmaps were regularly produced. Thereafter, updates to the Vision, SRA and roadmaps were made and occasionally, papers on particular themes, e.g. the Timeline to Carbon Neutrality (reference [6]) or an energy analysis of the road transport system in 2050 [7]. A brief exercise to determine and represent the publication date of each of these documents, aligned to its purpose (e.g. Vision, SRA, Roadmap or otherwise), its source (which Working Group or otherwise) and their relationship to the European Research Framework Programmes was made. This result of this exercise is shown, together with an expansion of the vertical and horizontal fields, for illustration in Figure 11, below.

What was noted was that, over the years, in a somewhat regular process, around fifty documents have been published by ERTRAC. This would equate, on average to about four a year: not many until it is realised all the drafts and revisions that were made to achieve consensus for each document, before it reached publication. Just deciding to do this amount of planning and preparation, regularly with sometimes between fifty to one hundred partners, to support the work programmes, has been ambitious in itself, let alone the goals of the research needs suggested thereby.

The timing, the frequency and extent of the updates of the Working Group roadmaps was found to have a wide variation, between 1 and up to 10 years (the latter in one (outlier) case only, when a Working Group was inactive for an extended period of time). Excluding that exceptional case, the Working Groups were found to have updated their roadmaps, in some form, on average in just over every two years.

A discussion on the necessary frequency of the updates of Working Group roadmaps is given in STREnGth_M Deliverable 1.2, “Roadmapping methods on European, Member State and International levels”, where the methods of the various WGs are reported. Whilst each WG has autonomy to determine the need for, how and when a roadmap should be updated, there are some general trends that can be determined, in part:

- In the context of the ever-increasing rate of research, innovation and technology development, the ERTRAC roadmaps should be easy to update in limited time
- Further, that, in a context of disruptive changes, e.g. due to regulatory interventions, the time horizons of ERTRAC roadmaps should be realistic and/or the reduced confidence level related to the longer-term aspects noted.

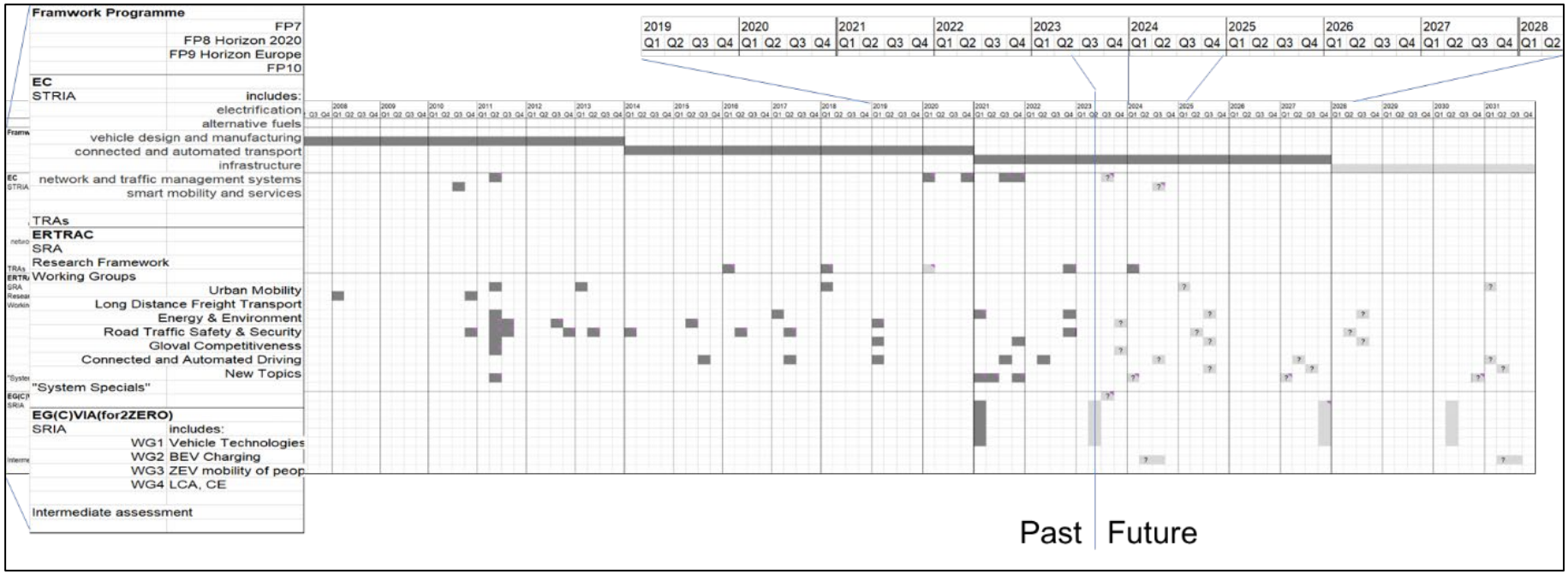

Figure 11. A Brief Analysis of the Publication Timing of the Documents from ERTRAC (and EGVIA) over the Preceding 20 Years, together with an Estimation of what might come in the Future

A brief comparison of the frequency of update of these documents was made with those equivalents produced in other regions as countries, where data was available as reported in STREnGth_M D1.2. The briefest time for document updates, at one year, was reported for Korea and for Austria (although in Austria there is also one body reporting that updates are every two to three years). Italy reported that updates are typically every one to two years and, in the USA, it is reported that the updated reflect a two-year budgeting cycle. The UK noted that the general roadmap is updated every three to five years, but that the position papers of the working groups including short and mid-term research requirements are updated every one to two years. For China an update period of up to four years has been recorded but this was for the activities during the pandemic period, so a briefer update period might normally be expected. Consequently, the update frequency reported for ERTRAC, at just over every two years, is consistent with practice in other regions and countries.

2.3 A Projected Timing for Future ERTRAC Publications

What the brief analysis reported in Section 2.2 made clear is that, following the practice aligned with that during previous Framework Programmes:

- An update of the ERTRAC SRA would need to be completed by the end of 2025, to support the preparation of FP10
- Consequently, reflecting the linked-chain of publications noted above, an update of the ERTRAC Vision would be needed in 2024
- Furthermore, to support the creation of these two documents updates of the ERTRAC CO_2 Evaluation study might be pertinent within the same time
- Finally, that updates of many of the Working Group roadmaps might be completed around the middle of 2024, so that they may be used as a reference within the ERTRAC SRA update.

These timing suggestions were presented and provisionally agreed at an ERTRAC Strategy Meeting at the end of Q3, 2023. Some of the proposed activities of the 2ZERO and CCAM partnerships were also discussed during this meeting. In Chapter 3, below, the outlines of these plans are given.

3 ERTRAC Working Group Immediate Plans

3.1 Introduction

The ERTRAC Working Groups are currently those of:

- Urban Mobility
- Long Distance Freight Transport
- Energy & Environment
- Road Transport Safety and Security
- Circularity and Competitiveness (formerly known as Global Competitiveness)
- Connected Automated Driving.

Once a year the co-leaders of the WGs, together with the ERTRAC Board and the leaders of associated partnerships, i.e. 2ZERO and CCAM, come together to discuss pertinent topics: during such a strategy meeting in Q3, 2023, i.e. M8 of the STREnGth_M project, on the basis of the timing needs identified in Chapter 2, each of the WG presented their immediate plans. In this chapter, the context of these plans, where available, together with those relevant aspects from the partnerships and within STREnGth_M WP2, are reported. This information determined the immediate timing for the update of the roadmaps etc., as given in Figure 1, above.

3.2 Urban Mobility

The UM WG last published their research and innovation roadmap in 2017, although there were publications about New Mobility Services and Resilience in the meantime, in 2021. An update of the roadmap is now being made, taking into account:

- The Mission for Climate Neutral and Smart Cities
- The urban aspects of the 2ZERO and CCAM partnership SRIAs
- The Driving the Urban Transition Partnership
- The particular needs of rural areas and their interface with urban and suburban areas
- Previous roadmaps on resilience and new mobility services
- The input papers on the 15-minute city and on light electric vehicles.

Further, the update will consider the possible future policy related to:

- Electromobility, the phase-out of internal combustion engine vehicle sales by 2035
- Zero-emission city logistics, as per the POLIS-ALICE Zero Emissions position for 2030
- The increasing availability of data and the regulated sharing of this
- The TEN-T urban nodes policy
- etc.

There is an approach considering solutions at four layers: infrastructure; service; management related; and integrated solutions. There will be a common activity on these considerations, under STREnGth_M, together with ALICE, ERRAC and the possible input of the Waterborne TP.

The timing of the update plan during 2023 is shown in Figure 12, below.

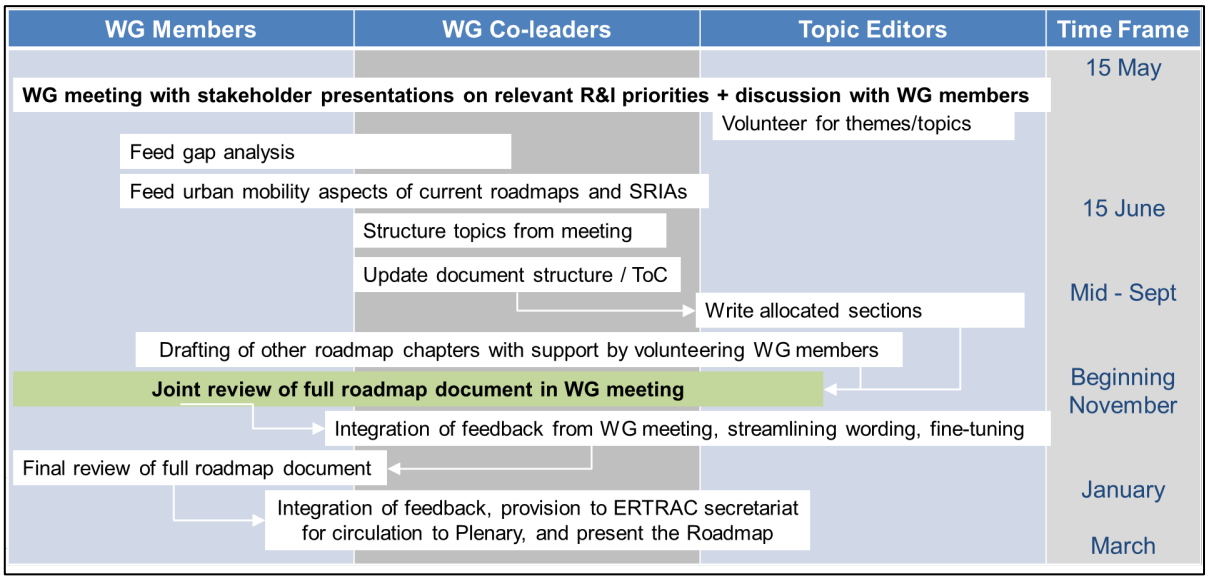

Figure 12. Urban Mobility Working Group Roadmap Update Process

The Table of Contents for the new roadmap has been agreed. The major chapters' content defined and contributing partners identified. During the Strategy Meeting mentioned above, the accomplishments to date and the next steps were reported. Feedback was requested, from other ERTRAC WG leaders and, in particular, vehicle OEMs.

3.3 Long Distance Freight Transport

The last Long Distance Freight Transport (LDFT) roadmap was published in 2019, an update has been initiated during the second half of 2023, for likely publication by the middle of 2024. The update will be in two steps.

The first step will be a sanity check of the existing document: the existing structure and principle will be retained (i.e. the use-case based approach; the perspective from the transport logistics service providers; and the systemic approach). Some slight updates are expected, possibly in the areas of: policies; vehicle technologies; CCAM use cases; new service opportunities related to open-source data; infrastructure developments, including parking places, hubs and terminals; charging and refuelling infrastructure developments; digital roads; safety; sustainability in an LCA perspective; and key competence needs for the future.

The second step will involve deep dives on selected research topics, which should lead to brief additional papers. These topics are to be:

- Decarbonising LDFT with the available and affordable green energy (in cooperation with ALICE, EUCAR and the ERTRAC Energy & Environment WG)
- Paving the way for LDFT and infrastructure cooperation (in cooperation with CEDR and CCAM).

During the Strategy Meeting more details of the deep dives were given and discussed: the background; the objectives; an initial proposal; and the expected outputs. These are to be developed further during workshops in during Q4 of 2023.

3.4 Energy and Environment

The Energy and Environment WG had recently (2022) published a major, extensively updated version of its roadmap, which, along with the themes of energy carriers and powertrain technologies towards net zero carbon road transport, also took into account infrastructure and road transport users plus system aspects. Hence, activities during STREnGth_M will take a smaller scale. In 2022 a workshop on hydrogen fuelled internal combustion engines for road transport had been made. Similarly, following the roadmap release, a workshop on non-exhaust emissions was made in 2023, which is leading to proposals for further research on brake, tyres and other non-exhaust emissions.

Updates to the roadmap document will be limited to time-critical elements, e.g. where the rate of change of technology development is particularly great, such as with battery technology, or to other technology state of the art changes. These updates are expected to be completed by Q1, 2024 and may include input from the planned ERTRAC CO_2 Working Group, as noted below.

In addition to the roadmap updates and workshops, an update of the ERTRAC CO_2 Working Group findings is planned through to Q2, 2024. Previously, the ERTRAC CO_2 Evaluation Group has conducted two studies on European road vehicle system energy consumption projects for 2050:

- Tank to Wheels (~FUTURE-RADAR~)
- Well to Wheels (~FUTURE-HORIZON~)

This analysis has been published in two scientific journal papers (and several conference presentations), see for example [7] and [8]. Through STREnGth_M, ERTRAC plans that the analysis methods and findings, will be used as a basis for making further projections for the transition years towards 2050 (i.e. at 2030 and 2040). For the new study, the possible energy and emissions consequences of the decarbonization of road mobility towards 2030 and 2040 will be evaluated on a well-to-wheels basis and, at least in the specific areas of “Urban zero-emission mobility”, “Air quality and climate change” effects will also be considered. The decarbonisation evolution will be related with the research activities at European level, such that the work can feed into the monitoring and measuring aspects of the 2ZERO partnership. Thereafter, it is suggested that the study techniques be extended to include: life-cycle effects (over the same time period); emissions (CO_2 etc. but possibly also tyres and brakes); material flows and circularity; resource needs; other critical resource requirements (e.g. water). However, the timing and detailed extent of this subsequent activity still has to be determined.

3.5 Road Transport Safety and Security

The latest roadmap from the ERTRAC safety WG was published in 2021. This document presented eleven research and innovation needs for the time period 2023 to 2027: four of these were reflected well in the Horizon Europe Work Programme for 2023 and 2024. The WG has also contributed to papers on the long-term research needs (beyond 2035) and international cooperation needs in road safety, as part of recent FUTURE-HORIZON activities (see the deliverables D1.1 and D2.3 therefrom).

An update paper to the latest roadmap is being worked on during 2023, for completion by the end of the calendar year. This will consider research needs for 2025 onwards. Hence the following topics are being considered in detail:

- Safe human-technology technology interaction in the coming decade (particularly related to the developments in CCAM and in-vehicle sensor technologies)
- The safety of bicyclists and users of other micro-mobility devices (particularly related to risk detection and analysis, behaviour, passive safety (e.g. infrastructural) and data analytics, leading to possibly new concepts, designs and regulatory approaches)
- The safety of users of small electric vehicles (those from L6 to above L7) (particularly related to in-vehicle and infrastructural safety aspects, minimum safety requirements, protective systems and operational domains thereto).

3.6 Circularity and Competitiveness (previously Global Competitiveness)

This working group is transitioning, now looking at the topics of Circularity and Competitiveness. However, as such the plans and activities of the WG are still being defined: an update of these plans is expected by the end of 2023. This update can take account of the findings being reported in the STREnGth_M deliverables D1.2 and D2.1.

3.7 Connected and Automated Driving

There is a clear complementarity between the activities of the ERTRAC CAD WG, which is that of an independent TP considering the long-term picture and concrete next-steps for realistic and ambitious use cases, and the CCAM Partnership (see below), whose SRIA identifies both research and innovation priorities as well as their expected impacts and key performance indicators.

The ERTRAC CAD roadmap is being updated, particularly the Chapter 2 on use cases, considering the opportunities from further infrastructure developments with the goal of reducing the fragmentation of the ODD. The CCAM partnership is now defining the criteria for next large-scale demonstrations: determining which use-cases are ready for such demonstrations. The aspects of the research, development and innovation the connected services and the different ODD (confined areas, urban and highway) are being determined. The ambition of these large-scale demonstrations is to get lasting effects after the project has ended, achieving sustainable impacts.

4 Related Partnership Activity Plans

4.1 EGVIAfor2ZERO

The 2ZERO SRIA is being updated during 2023, given the coming mid-timing of the Horizon Europe Framework Programme and the work of the partnership therein. Similarly, the full monitoring report of the partnership will be conducted during Q4 2023 to Q1 2024. Thereafter the projected impact of the partnership towards its targets as measured by its key performance indicators (KPI) will be assessed during a complementary CSA named "*Le*Mesurier", which will kick-off in January 2024.

4.2 Connected and Cooperative Automated Mobility

The CCAM SRIA, whilst being updated at the moment of writing, shows the current focus of the research planning, as mentioned above, i.e. that of large-scale demonstrations. This is illustrated in Figure 13, below.

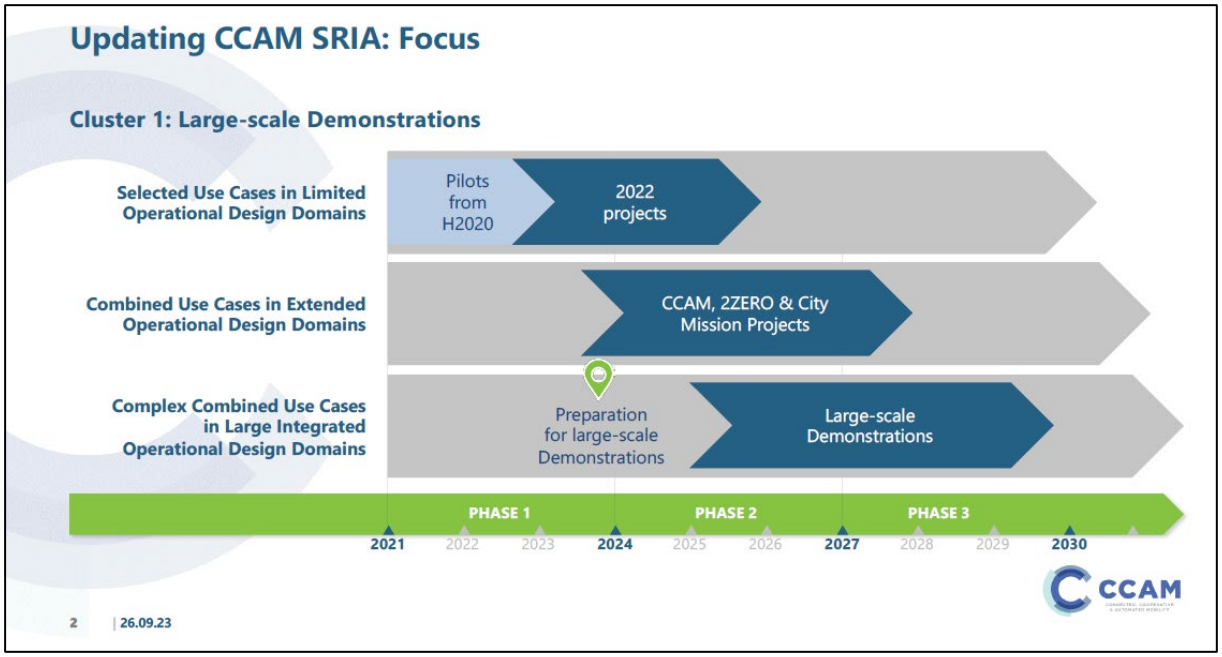

Figure 13. The Upcoming Focus for the CCAM Partnership Activities

The partnership has also identified the need to research (to investigate, to examine) the net energy impact of introducing automated vehicles in the road transport domain. A study to do this has been defined and initiated. It is expected that this study will run through 2024. There are complementarities with the ERTRAC CO_2 Evaluation Group studies, that need to be realised through cooperation within the STREnGth_M project.

5 Updating the ERTRAC Vision and Strategic Research Agenda for FP10

This activity will be supported throughout 2023 to 2025 by partners within the STREnGth_M project. Since policy targets require fundamental changes to the transport system, STREnGth_M will make use of a cross-thematic high-level approach complementing the established bottom-up approach for the identification of research priorities. This will be based on a common vision of the future European road transport system. This may effectively be considered as a preparatory step, perhaps even a prerequisite, for an update of the ERTRAC SRA. Three workshops are currently planned:

- Workshop 1: Preparing a vision of the future European road transport system (a two-day event)
- Workshop 2: Deriving challenges from the Vision
- Workshop 3: Deducing road transport research priorities at the transport system level plus necessary actions in education and training

The workshops shall be complemented by online stakeholder consultations collecting feedback from the ERTRAC community.

These activities will be conducted as part of Task 2.1 of STREnGth_M, during the time period Q4, 2023 to Q2, 2024 as an initial feed into the ERTRAC SRA update. As such, they will be the subject of other deliverable reports and documentation.

6 References

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[6] “The Timeline to Carbon Neutrality in Road Transport – a long-term effort, with different phases, multiple technologies and interdependences”, 2020.

[7] Jette Krause, Christian Thiel, Dimitrios Tsokolis, Zissis Samaras, Christian Rota, Andy Ward, Peter Prenninger, Thierry Coosemans, Stephan Neugebauer, Wim Verhoeve, “EU road vehicle energy consumption and CO_2 emissions by 2050 – Expert-based scenarios”. Energy Policy, Volume 138 (2020) 111224, doi.org/10.1016/j.enpol.2019.111224.

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