

**ANNEX 14 TO THE DECISION**

**HORIZON 2020**

**WORK PROGRAMME 2014 – 2015**

*11. Smart, green and integrated transport*

**(DRAFT 31/10/2013)**

*(European Commission Decision C(2013)XXX of 10 December 2013)*

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## INTRODUCTION

The specific objective of the Transport Challenge ‘Smart, green and integrated transport’ is “to achieve a European transport system that is resource-efficient, climate- and environmentally-friendly, safe and seamless for the benefit of all citizens, the economy and society”.

The Specific Programme is structured in four broad lines of activities aiming at:

- a) **Resource efficient transport that respects the environment.** The aim is to minimise transport's systems' impact on climate and the environment (including noise and air pollution) by improving its efficiency in the use of natural resources, and by reducing its dependence on fossil fuels.
- b) **Better mobility, less congestion, more safety and security.** The aim is to reconcile the growing mobility needs with improved transport fluidity, through innovative solutions for seamless, inclusive, affordable, safe, secure and robust transport systems.
- c) **Global leadership for the European transport industry.** The aim is to reinforce the competitiveness and performance of European transport manufacturing industries and related services including logistic processes and retain areas of European leadership (e.g. such as aeronautics).
- d) **Socio-economic and behavioural research and forward looking activities for policy making.** The aim is to support improved policy making which is necessary to promote innovation and meet the challenges raised by transport and the societal needs related to it.

These activities are addressed in this Work Programme by three Calls for proposals:

1. **Mobility for Growth**
2. **Green Vehicles**
3. **Small Business and Fast Track Innovation for Transport**

Each Call for proposals contains a scene setter and the description of topics. Each Call ends with a section where the conditions for the Call are indicated (deadlines, budgets, eligibility criteria, etc.).

In addition to the three Calls for proposal, other actions will be implemented by calls for tenders or by other instruments (see section ‘**Other actions**’). These actions are part of the Transport Challenge envelope and complement the content of the three Calls.

## CALL ‘MOBILITY FOR GROWTH’

*H2020-MG-2014/2015*

Transport is on the brink of a new era of "smart mobility" where infrastructure, transport means, travellers and goods will be increasingly interconnected to achieve optimised door-to-door mobility, higher safety, less environmental impact and lower operations costs. In order to

achieve efficiency at system-level, targeted efforts are needed to develop and validate new solutions that can be rapidly deployed, notably on corridors and in urban areas. They will address transport means and infrastructure and integrate them into a user friendly European transport system of smart connected mobility and logistics. Research and innovation on equipment and systems for vehicles, aircraft and vessels will make them smarter, more automated, cleaner and quieter, while reducing the use of fossil fuels. Research and innovation on smart infrastructure solutions is necessary to deploy innovative traffic management and information systems, advanced traveller services, efficient logistics, construction and maintenance technologies.

A thorough and mature research and innovation agenda for this call has been defined taking into account the other calls and initiatives where the Transport Challenge is concerned, i.e. the calls on ‘Green Vehicles’, ‘Small Business and Fast Track Innovation for Transport’, ‘Blue Growth’, and ‘Smart Cities and Communities’, and the ‘Clean Sky 2’, ‘SESAR’, ‘Shift2Rail’ and ‘Fuel Cells and Hydrogen 2’ Joint Undertakings (in different degrees of preparation). In addition, European GNSS will provide new opportunities for the localisation and the guidance of vehicles. It is intended to create synergies with all these initiatives as well as with other parts of Horizon 2020, namely Information and Communication Technologies (ICT), Energy and Space. Special attention is dedicated to innovation aspects not covered in the other parts of the Transport Challenge, as well as to SMEs.

As indicated in the Specific Programme, the “activities [see Introduction, bullet points a to d] will be organised in such a way as to allow for an integrated and mode-specific approach as appropriate”. Therefore, the contents of the “Mobility for Growth” call has been organised as follows:

Areas addressing mode-specific challenges (technical and socio-economic)

1. Aviation
2. Rail
3. Road
4. Waterborne

Areas addressing transport integration specific challenges (technical and socio-economic)

5. Urban
6. Logistics
7. Intelligent Transport Systems
8. Infrastructure

Areas addressing cross-cutting issues

9. Socio-economic and behavioural research and forward looking activities for policy making

## **1. AVIATION**

Aviation, which comprises aeronautics and air transport, is vital for our society and economy. It provides mobility to passengers and freight, establishing links between citizens and regions of Europe and beyond. Aviation generates around 2% of EU GDP and accounts for 3.7

million direct and indirect jobs. European aeronautics is a high-tech sector, which employs highly qualified people and delivers technology spillovers to other industrial sectors. It has made considerable progress over the last decades providing Europe with a leadership position world-wide. However, in the current context of globalisation, this position is challenged. Aviation has also an impact on the environment and the EU citizens due to its emissions (CO<sub>2</sub>, NO<sub>x</sub>, particulate matter, contrails) and the noise to which the population is exposed. In the coming years, the world air transport is expected to continue growing by 4 to 5% every year. We should therefore seize all opportunities associated with this growth while mitigating the negative impacts.

For all these reasons, it is important and urgent to act at EU level through research and innovation actions, in particular contributing to the ambitious goals set out for European aviation in its new vision ‘Flightpath 2050’. The EU level response includes contributions from public-private partnerships such as Clean Sky and SESAR complemented by Research and Innovation Actions, Coordination and Support Actions and Other Actions, which are the subject of this Work Programme. The Clean Sky Joint Undertaking and its successor programme target primarily the reduction of the impact on the environment through integration and validation of existing technologies up to Technology Readiness Level 6 (TRL; please see part G of the General Annexes). For that purpose, it will also include the type of work which was carried out in Integrated Projects under the Seventh Framework Programme. The SESAR Joint Undertaking develops solutions for a seamless, efficient and cost effective management of air traffic, including services of European GNSS and covers the full range of TRL from 1 to 6.

This first Work Programme addresses therefore mainly medium to long term research and innovation actions with a bottom-up approach for innovative technologies not covered by Clean Sky and outside the scope of SESAR, and calls for their maturation in a range of TRL of typically 1-4.

The proposed Topics are in line with the Horizon 2020 Specific Programme and the Strategic Research and Innovation Agenda (SRIA) of the Advisory Council for Aviation Research and Innovation in Europe (ACARE):

- Competitiveness of European Aviation through cost efficiency and innovation
- Enhancing the environmental performance of aviation
- Seamless and customer oriented air mobility
- Coordinated research and innovation actions targeting the highest levels of safety for European aviation

While the above Topics lend themselves to an evolutionary approach to research and innovation, this Work Programme also leaves place to more revolutionary approach with a Topic on ‘Breakthrough innovation for European aviation’ which is intended to make proof of concepts and technologies in the TRL range 1-2. In addition, actions are proposed to improve the skills and knowledge base of European aviation, to support its research and innovation policy and to create durable links with targeted international cooperation partners.

Note that aviation security is addressed in the ‘Secure societies’ challenge and that generic research on materials and manufacturing techniques is encompassed in the Leadership in Enabling and Industrial Technologies part of Horizon 2020 under NMP and Factories of the Future, respectively. Recycling of materials and replacement of critical raw materials are normally addressed by the Climate action, resource efficiency and raw material’ societal

challenge. A number of actions related to the production of alternative fuels for aviation will be found under the ‘Secure, clean and efficient energy’ challenge and novel high-risk research of a more interdisciplinary nature is addressed in the Future and Emerging Technologies (FET) under the Excellent Science part of Horizon 2020.

Proposals are invited against the following topics:

### **MG.1.1-2014. Competitiveness of European aviation through cost efficiency and innovation**

Specific challenge: The aviation sector contributes 2% to the EU GDP. It is also an important source of jobs creating directly 1.7 million jobs (among which 480 000 skilled jobs in aeronautics) and supporting another 2 million indirect jobs. The aeronautics sector alone generates a turnover of EUR 70 billion and exports 60% of its production. With 12% of its turnover invested in research and innovation, aeronautics is one of the most research intensive sectors and is one of the world leaders in terms of production, employment and exports. The long life cycle of aircraft requires long term investments with high risks. In order to preserve its leadership and jobs, the European aviation industry must have the capacity to deliver the best products and services in a time and cost efficient manner and to offer new and innovative products, vehicles and services, with improved environmental performance.

Scope: Regarding aircraft, research and innovation actions could target the development of technologies and methodologies which have the potential to save costs and time across the whole life cycle of the aircraft (design, production, maintenance, overhaul, repair and retrofit), including for certification aspects. Research and innovation actions could also target the integration of additional functions (e.g. sensing, actuating) or materials in structural components of the aircraft, the increased use of automation and artificial intelligence in control systems allowing versatility and new capabilities or to provide passenger with additional services on-board of the aircraft or at the airport.

Regarding air transport operations, research and innovation actions could target cost efficiency of ground operations, as well as innovative approaches which can reduce the needs or accelerate the pace of the training of personnel.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 8 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Actions will demonstrate in a quantified manner their potential to mature the Technology Readiness Level (TRL; please see part G of the General Annexes), typically in the range 1-4, of technologies and concepts that can make a significant contribution towards the following high level goals by 2050 with reference year 2000:

- The whole Europe aviation industry is strongly competitive and retains leading edge design, manufacturing and system integration capabilities and associated jobs thanks to significantly decreased development costs (including a reduction of costs of certification by 50%).



Actions will also provide ad-hoc indicators to measure the expected progress in terms of, for example, reduction of production or certification times and costs, when comparing the situation before the start of the action and after the implementation of its results. In the case of novel products and services, the potential markets will be identified together with the potential corresponding volumes / value.

Type of action: Research and Innovation Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

## **MG.1.2-2015 Enhancing resource efficiency of aviation**

Specific challenge: Aviation has an important impact on the environment and EU citizens due to emissions such as greenhouse gas (CO<sub>2</sub>), pollutants (NO<sub>x</sub>), particulate matter (e.g. black carbon), contrails, cirrus cloud and noise, some of them potentially affecting the health of the exposed population. Aircraft manufacturing also makes use of a variety of materials and chemicals. If no actions would be undertaken, the impact of aviation on our environment in Europe would significantly grow due to the expected increase of air transport traffic by 5% every year. While Clean Sky and its potential successor programme address the reduction of the environmental impact of aircraft with a targeted entry into service in 2025, there is a need to work on significant improvements for aircraft that will enter into service after 2025.

Scope: The proposed research and innovation actions could target the reduction of emissions and noise at the source, i.e. accelerating the development of green technologies for the aircraft and its engines, including the impact of the use of alternative and more sustainable energy sources than those currently used.

Research and innovation could also target new approaches to an environmentally friendly overall aircraft lifecycle which require the insertion of the environmental concern in all the successive phases: design, production, assembly, maintenance, overhaul, repair, retrofit, recycling and disposal.

Finally, research and innovation could target greener ground operations, technologies and procedures, including the integration of larger quantities of sustainable fuels and better use of power from the terminal.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 8 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Actions will demonstrate in a quantified manner their potential to mature the Technology Readiness Level (TRL; please see part G of the General Annexes), typically in the range of 1-4, of technologies and concepts that can make a significant contribution towards one or several of the following high level goals:

- To reduce CO<sub>2</sub> by 75%, NO<sub>x</sub> and particles by 90% (per passenger and per kilometre), perceived noise by 65% in 2050 (baseline year 2000), to reduce the emission of local atmospheric pollutants.
- To contribute to reduce the impact of Europe's air transport operations on the environment.

- To produce by 2050 competitive air vehicles that are designed and manufactured in a resource efficient way and are recyclable.

Actions will also provide ad-hoc indicators to measure the expected progress in terms of, for example, reduction of CO<sub>2</sub>, NO<sub>x</sub>, noise, sustainability criteria, etc. when comparing the situation before the start of the action and after the implementation of its results.

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### **MG.1.3-2014 Seamless and customer oriented air mobility**

Specific challenge: The European air transport system plays an essential role in creating links between people and exchanges for business, leisure and culture within Europe and worldwide. In 2010, it was capable of transporting over 750 million passengers within the EU airspace relying on 450 airports. It carried also around 22% of EU trade with the rest of the world by value. Today, the typical duration of intra-European flights is short, but the overall time spent in travelling from door to door could be significantly shortened and the accessibility could be improved. In the case of disruption, the response of the air transport system is not yet satisfactory. The challenge is to enhance the time efficiency, seamlessness, robustness and accessibility of the European air transport system.

Scope: The proposed research and innovation actions could target products and services which can enhance customer experience, minimise the duration of the travel of air passengers and provide them with integrated and comprehensive information so as to make informed decisions in selecting, modifying or reconfiguring their travel. They could also target improved accessibility to airports and aircraft, including for passengers with reduced mobility, as well as methods and systems to be put in place in case of major disruption, e.g. volcanic ash clouds, allowing an organised and efficient re-routing of passengers, making the best use of all transport modes.

Research and innovation could target optimised landside operations which can decrease aircraft turnover time, enhance predictability, minimise the time needed for aircraft operations at the airport and maximise freight fluxes.

The SESAR Joint Undertaking addresses research and innovation actions targeting the increase of the capacity of the Air Traffic Management System and airport ATM dependent processes, including for intermodality purposes. Therefore such actions are excluded from this Call.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 to 5 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Actions will demonstrate in a quantified manner their potential to mature the Technology Readiness Level (TRL; please see part G of the General Annexes) typically in the range of 1-4, of technologies and concepts that can make a significant contribution towards one or several of the following of the high level goals by 2050:

- 90% of the travels involving air transport within Europe can be completed in 4 hours door to door.
- Passengers can make informed decisions.
- Air transport is well connected to other modes.

Actions will also provide ad-hoc indicators to measure the expected progress in terms of, for example, reduction of the travel time, increase in airport capacity, etc., when comparing the situation before the start of the action and after its completion. In the case of novel products and services, the potential markets will be identified together with the potential corresponding volumes / value.

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### **MG.1.4-2014. Coordinated research and innovation actions targeting the highest levels of safety for European aviation**

Specific challenge: Safety is embedded in aircraft design and operations making air transport the safest transport mode. In Europe, accident rates involving passenger fatalities are of the order of 1.6 accidents per million flights (EASA<sup>1</sup>, 2011). Nevertheless, existing risks (e.g. cabin air quality) and new risks (e.g. arising from the integration of new technologies, new operations or emerging potential hazards) must be actively monitored and mitigated; continuous efforts are necessary to maintain the excellent records Europe has achieved over the last 60 years. Furthermore, the aviation community pursues a further decrease of accident rates by one order of magnitude and further significant progress will be achieved only if safety is addressed at system level. Therefore actions are needed using an integrated approach to safety.

Scope: Proposals will encompass research and innovation actions in targeted areas of aviation safety. The proposed research and innovation actions should be part of a broader safety roadmap established at system level, identifying and prioritising practical actions to be undertaken in the next seven years. It should be consistent with other roadmaps (e.g. European Aviation Research Partnership Group thematic programme, Strategic Research and Innovation Agenda (SRIA) of the Advisory Council for Aviation Research and Innovation in Europe (ACARE). Coordination with key European organisations which have a mandate in aviation safety (e.g. EASA, EUROCONTROL) and key European Initiatives (e.g. ACARE Working Group 4 on ‘Safety and Security’, OPTICS Coordination Action on safety research) should be ensured.

Proposals should also demonstrate that the research and innovation actions for which EU-funding is requested will be complemented by other research and innovation actions on safety carried out by the proposal partners with at least an equivalent magnitude in terms of estimated resources (e.g. cumulated effort in person-months) in a time frame which matches

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<sup>1</sup> European Aviation Safety Agency.

that of the project. A methodology should be put forward to evaluate this leverage effect during the project and at its end. The proposal should describe how links will be established with the other research and innovation actions from the partners and how the project will contribute to coordinate these.

The composition of the consortium should reflect openness and the fact that the partners have been selected in the light of the nature of the proposed actions. The overall management of the initiative could be designed for a longer term than the duration of the project with a potential to be extended to other activities after a first review of the concept. Where relevant, actions could include networking with projects from leading entities from third countries, to leverage resources and global impact (e.g. with US and Canada).

Proposals should demonstrate in a quantified manner their potential to mature the Technology Readiness Level (TRL; please see part G of the General Annexes) of technologies and concepts in the range 1-6. Proposals should also provide ad-hoc indicators to measure the expected progress in terms of reduction of the number of accidents when comparing the situation before the start of the project and after the implementation of results. Also an indicator assessing the magnitude of the leverage effect resulting from the coordination of the research based on both the EU-funded part and the part of the work relying on partners in-house resources should be provided.

Expected impact: Actions will contribute to reach by 2050 less than one accident per 10 million commercial aircraft flight departures and an 80% reduction of the accident rate compared to 2000 for specific operations, where weather hazards are evaluated and mitigated, in a system which includes all types of air vehicles, manned and unmanned, while preserving cost and time efficiency. It is also expected that the proposal will gather critical mass on a pan-European scale, overcoming gaps, duplication and fragmentation, create a leverage effect, enhance coherence and efficiency of aviation safety research in Europe and underpin the development of future safety regulations, operations and technology.

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## **MG.1.5-2014 Breakthrough innovation for European aviation**

Specific challenge: A number of very ambitious goals have been set by the sector at horizon 2050 in the Strategic Research and Innovation Agenda (SRIA) of the Advisory Council for Aviation Research and Innovation in Europe (ACARE). Many of these goals will not be reached through an evolutionary approach only. Breakthrough innovations are needed, i.e. new solutions which rely on a disruption with respect to current approaches.

Scope: The proposed research and innovation actions could address the vehicles as well as the air transport system. Regarding vehicles, research and innovation actions could target new technologies and concepts that are not currently used in aeronautics or that have not yet being put in combination in the aviation sector. This could be, for example, radical new approaches to propulsion, to the use of energy, new types of vehicles, etc.

Regarding the air transport system, the proposed research and innovation actions could address radical new concepts for the way vehicles, passengers and freight are handled in airports, the type of handling and servicing equipment used, the way airports are organised

and connected to other modes, the way information is shared, used and handled on the landside part of the airport.

The proposals should aim at demonstrating the validity of the technologies and concepts following a sound technical and scientific approach. The performance should be assessed preferably quantitatively against the relevant criteria such as for example economic viability, time efficiency, safety, potential to cope with evolutions of regulations, passenger friendliness, social acceptance, etc. Considering that a large fraction of air pollution on airports is caused by handling and servicing, aspects of environmental friendliness and energy sustainability should be taken into account. The actions should also assess at the end of the project the potential of the technologies to be developed at further technology readiness levels and barriers that could prevent such developments.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 to 4 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Actions will demonstrate their potential to mature the Technology Readiness Level (TRL; please see part G of the General Annexes) in the range 1-2, to prepare the ground for future highly innovative breakthrough products and services for European aviation which will contribute to decrease the environmental impact, enhance the competitiveness, the mobility and the levels of safety. Actions will also provide ad-hoc indicators to evaluate the potential improvements that the breakthrough technology / concept is capable of bringing, using realistic hypothesis and scenarios.

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## **MG.1.6-2014. Improving skills and knowledge base in European aviation<sup>2</sup>**

Specific challenge: The European aviation sector should have access to a highly skilled workforce which can rely on a strong scientific knowledge base to be able to properly address the environmental and competitiveness challenges facing both the aeronautics and the air transport sectors. Two specific domains have to be addressed:

1. To analyse and define the evolving skill needs of the sector and propose changes to the education of aviation engineers accordingly, and to attract more young people to aviation careers.
2. To reduce the fragmentation in the dissemination of scientific and technical knowledge in Europe and enhance its global impact.

Scope: Proposals should address fully one of the two following domains:

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<sup>2</sup> This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the Innovation and Networks Executive Agency (INEA) and will be implemented by the Commission services.

1. Regarding the education of aviation engineers in Europe, the scope of the action is to identify the skill needs in the sector, propose improvements including on gender issue and further contribute to the harmonisation of the content of the curricula for aviation engineers towards the creation of a Europe wide system. The action should also develop and share outreach material and organise events to attract young people to studies leading to aviation careers. The initiative should build on existing mechanisms and associations. The consortium should include representatives from the aviation industry, research establishments and education institutions so that the proposed solutions can acquire recognition and support from these different stakeholders.
2. Regarding the dissemination of scientific and technical knowledge, the scope of the action is to create a Europe wide coordination mechanism gathering a representative group of associations active in the field of aviation to harmonise and rationalise conferences, events and publications. The action will contribute to enhance the impact and accessibility of publications relevant to European aviation, in particular those issued from EU funded projects. The actions should aim at being self-supportable after the end of the project.

Expected impact:

Regarding domain 1, the proposed actions will demonstrate their capacity to contribute to increase the attractiveness, quality, coherence and relevance of the curricula, enhance teaching methods and the profile of engineers matching the evolving and growing needs of the sector. The potential impact should be expressed in the light of the number of engineers which could benefit from the improvements and time / manpower savings when compared to the extra time young engineers need to adapt / train under the current situation before they can be operational.

Regarding domain 2, the proposed actions will contribute to raise the impact and visibility of European conferences and events, to optimise the number and the yearly calendar of events and enhance the impact factor of scientific publications, their availability and access, in particular for those created in EU funded projects. The impact should be expressed in terms of: the time that could be saved for scientists / researchers when participating to conferences resulting from an optimised calendar of events, the time that could be saved in the search of information resulting from a centralised and structured approach to publications repository and the potential gain in impact factor resulting from an organised approach to EU-based journals. The gain of attractiveness of the European scientific dissemination system (compared to the US or other regions of the world) should be assessed qualitatively.

Type of action: Coordination and Support Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## **MG.1.7-2014. Support to European aviation research and innovation policy<sup>3</sup>**

Specific challenge: The Strategic Research and Innovation Agenda (SRIA) of the Advisory Council for Aviation Research and Innovation in Europe (ACARE) identified a number of domains where policy support is needed. The following two domains call for urgent actions:

1. Door-to-door travel involving air transport is currently far from being seamless and therefore, based on the analysis of the current system, conceptual foundations of a novel system should be studied and proposed.
2. Certification, which is a key element to guarantee the safety of the air transport system, can be time consuming and costly; in addition, new approaches to certification have to be found to cope with novel technologies never used before. Therefore, innovative approaches to this process should be envisaged and studied.

Scope: Proposals should address fully one of the two following domains:

1. Regarding seamless door to door travel involving air transport, the proposed actions should investigate the profile of customers and better understand their expectations, needs and requirements by collecting data and analysing the current European air transport system and its connections from a user's perspective. The current effectiveness of traffic flows should be assessed and metrics developed in order to identify the main areas to be improved (information to passengers, luggage handling, predictability, etc.) as well as the drivers and choice parameters such as infrastructure, connectivity, income level, regional aspects, etc. which influence the travel behaviour. On this basis, the action should then develop a concept for a system that is capable of providing a door-to-door service to the customers, establish the broad lines of the architecture of this system, assess the feasibility and economic viability of the concept (cost-benefit analysis) and propose key performance indicators.
2. Regarding certification, the proposed actions should aim to review the current existing approaches (i.e. including outside of Europe) and identify which new tools and new methods could be used to accelerate the certification process (e.g. alternative means of compliance, adaptability to new concepts or technologies), lower its costs while ensuring the requested level of safety. The action requires the involvement of the key stakeholders who have authority and the capacity to act on the certification process, notably EASA (this does not necessarily require that these stakeholders are participants to the Proposal).

Expected impact: The proposed actions will pave the way for future research and innovation actions contributing to the following high level goals for the 2050 time horizon:

1. 90% of the travellers within Europe are able to complete their journey within 4 hours door to door. In order to guarantee its impact, the proposal should give indication on the methods and sources of data that are planned to be used to study customer profiles and traffic flows and assess the statistical representativeness. It should also present a sound

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<sup>3</sup> This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the Innovation and Networks Executive Agency (INEA) and will be implemented by the Commission services.

dissemination plan, demonstrate that the results will be communicated to the appropriate stakeholders and, in particular to the potential partners that would be needed to initiate the first research and innovation actions.

2. The certification process is time efficient, its costs have been reduced by 50% (with reference to year 2000) while ensuring the required levels of safety and gaining global acceptance. In order to guarantee its impact, the proposal should demonstrate that the results will be communicated to the appropriate stakeholders and that the dissemination mechanism is capable of gaining endorsement and commitment at high level.

Type of action: Coordination and Support Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### **MG.1.8-2014-2015. International cooperation in aeronautics<sup>4</sup>**

Specific challenge: In order to leverage resources, mitigate risks and establish long term relationships, the European aeronautics sector should identify topics of common interest and mutual benefit with other regions of the world, in particular where these address societal challenges such as a worldwide safe air transport system, common standards (including for environmental aspects) and win-win situations for technological development. Aeronautics has inherently and increasingly an international dimension because almost all current aircraft programmes involve stakeholders from many different countries. Relations with a number of countries have already been initiated<sup>5</sup> with different levels of maturity and experience, calling for ad-hoc approaches which respect the different situations. For the coming years, actions are called in the two following domains:

1. To establish or deepen links with countries, building on previously established cooperation where relevant, with the aim to identify subjects of common interest and mutual benefit.
2. To perform jointly research and innovation actions on topics of common interest, involving the appropriate funding from both sides.

Scope: Proposals should address fully one of the two following domains, the first is opened in 2014 and the second domain is opened in 2015:

1. Set up platform of communication between EU and Japan including research and innovation stakeholders (industry, research establishments, and academia) and aviation research and innovation funding authorities to maintain a common research and innovation roadmap. This could include organisation of workshops and short term

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<sup>4</sup> This activity directly aimed at supporting the promotion of coherent and effective cooperation with third countries is excluded from the delegation to the Innovation and Networks Executive Agency (INEA) and will be implemented by the Commission services.

<sup>5</sup> Seventh Framework Programme support actions with Canada (CANNAPÉ), Brazil - Latin America (Coopair-LA), Japan (SUNJET), China (Aerochina, GRAIN), South Africa (AeroAfrica-EU), Ukraine (AeroUkraine) and United States of America (CooperateUS) plus EU-US Memorandum of Cooperation on civil aviation research and the multinational aviation research forum (IFARs).



studies to identify preferred areas of common interest and win-win situations, barriers and solutions for improved cooperation in research and technology development, and recommendations for future actions. Proposals should demonstrate good knowledge of research mechanisms in the EU and Japan and take into account past and on-going cooperation initiatives.

2. The proposed research and innovation actions should address topics of common interest between Europe and the international partners<sup>6</sup>. This may include joint development of technologies which can enhance safety, reduce the impact of aviation on the environment (e.g. innovative aircraft configuration, drag reduction, environmentally friendly aero engines, understanding the mutual impact of aviation on the environment and the climate), mature new materials and manufacturing processes for aeronautics components and structures (e.g. composite materials) and develop numerical and experimental tools for aircraft design (e.g. advanced measurement techniques, use of supercomputing for large scale multidisciplinary applications, modelling of flow physics).

Expected impact:

Regarding domain 1, the action will contribute to deepen and widen cooperation with Japan and maintain a common research and innovation roadmap. Actions could assess their impact by estimating the volume / funding of research and innovation actions which could be undertaken in cooperation between EU and Japan.

Regarding domain 2, actions will demonstrate their potential to mature the level of readiness of technologies and concepts, identify how the project results will be of mutual benefit and evaluate the leverage effect resulting from the coordinating research and innovation funding of EU and international partner (Russia, Japan, Canada or China).

Type of action: 1) 2014: Coordination and Support Actions; 2) 2015: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

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<sup>6</sup> Discussion have been initiated with Russia, Japan, Canada and China; these actions are pending agreements between the EU and international partners and the content of the actions will be further specified in the light of the arrangements currently being defined with them.

## **2. RAIL**

In order to fulfil its potential of playing a significant role in meeting future transport needs, while at the same time adapting to increasingly constrained public finances, the rail industry will need to radically progress in terms of service, costs, interoperability, capacity, noise reduction and competitiveness, and further develop its advantages in terms of carbon footprint. Set against such an uphill challenge, crafting the right innovation strategy will require a step well beyond just technology. Novel business, organisational and logistic solutions as well as new partnerships with service and technology providers from more advanced sectors are deemed essential to support new economies of scale and the much needed search-for-excellence by rail. The goal will be to rapidly address the weaknesses that hamper rail services and operations and to engage in a number of game-changers in rail services and operations.

Proposals submitted under the topics below can be designed as a preparation for a fast and smooth start-up of large-scale initiatives as announced in the Commission Communication on 'Public-private partnerships in Horizon 2020: a powerful tool to deliver on innovation and growth in Europe'. In this context, the scope of the proposals could include an assessment of the feasibility of specific solutions or applications, proof-of-concepts, fast-prototyping or any relevant work conducive to prototyping a product or process in an operational environment – cf. the elaboration of a business case, the definition of technical, operational or service requirements, enabling planning or standardisation activities, critical technologies development or the set-up of validation/certification strategies. The selected proposals will contribute to the objectives of the initiative to be implemented under a public-private partnership as they will later be integrated into the activities of this partnership.

Proposals are invited against the following topics:

### **MG.2.1-2014. I<sup>2</sup>I – Intelligent Infrastructure**

Specific challenge: Taking into account the expected growth in transport demand and the ever-increasing customer expectations on quality of service, there is a need for a step change in the productivity of the infrastructure assets. These assets will need to be managed in a more holistic and intelligent way, using lean operational practices and smart technologies that can ultimately contribute to improving the reliability and responsiveness of customer service and the whole economics of rail transportation.

Scope: The research and innovation activities should evolve within the following three complementary work streams:

- *Smart, cost-efficient, high-capacity, user-friendly rail infrastructure*: proposals should aim at identifying relevant infrastructure-related challenges and developing solutions that result in reduced investment and recurring operational costs, improve the reliability and availability of rail operations and increase the attractiveness and usability for all passenger categories (including persons with reduced mobility), while also guaranteeing the respect of strict safety standards. Infrastructure requirements stemming from new solutions for smart rail services (see MG.2.2) should be properly taken into account.

- *I2M – Intelligent mobility management*: proposals should focus on the development of intelligent, automated and flexible rail traffic dispatching systems, supporting an integrated approach to the optimisation of railway architecture and operational systems at network, route and individual train level (including interactions with switches). These should reconcile business and operational requirements (namely customer service, capacity, speed, timekeeping, energy, asset management) with real-time field and asset condition monitoring and intelligent traffic planning (including cross-border), to deliver normal or near-normal services during all but the most exceptional circumstances. Particular emphasis should be given to real-time data collection and analytics from trains and infrastructure for the purposes of goal-oriented predictive and adaptive control of the traffic and to minimise disturbances with a view to ensuring a minimum impact on services delivered. The interfaces and compatibility between the different rail modes (light/urban and mainline/inter-regional rail), as well as with other transport modes shall be guaranteed, including with regard to information systems. Full compatibility with European Rail Traffic Management System (ERTMS) must be ensured.
- *Energy management*: the work should address innovative approaches to improve the efficiency of energy usage in rail systems, embracing vehicles, infrastructure and operation within a whole-system perspective. This will imply notably the development of smart concepts in intelligent design and management of energy systems for rail applications which should be pursued from a whole-of-life perspective - from concept to implementation through the design, procurement, manufacturing, construction, operations and maintenance phases.

The Commission considers that proposals requesting a contribution from the EU of between EUR 16 to 18 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Research and innovation activities are expected to result in an indicative surge in the utilisation of capacity within a range 70-90% as well as a reduction in the recurrent costs of rail operations within a range of 25-45%. Part of the lower operating costs will evolve from reductions in the power supply operational and maintenance costs (~25%), reductions in transmission and distribution losses (~20%) and increases in reliability of operation (~20%). This is to be considered, in parallel, with potential savings in investment costs for the delivery of major infrastructure projects and related systems through the adoption of lean design and implementation strategies (that may amount up to 30% of total costs).

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## **MG.2.2-2014. Smart rail services**

Specific challenge: There are two main specific challenges concerning seamless travel and logistic services.

1. *Seamless multimodal travel*: The challenge is to enhance the rail traveller experience centred on solutions that respond to customer needs to support anytime, anywhere door-to-door intermodal journeys encompassing distinct modes of transportation, including factors as travel planning, one-stop-shop ticketing and booking transactions, en-route travel companion, real-time re-accommodation.
2. *Logistic services*: The challenge is two-fold:
  - To acquire a new service-oriented profile for rail freight services based on excellence in on-time delivery at competitive prices, interweaving its operations with other transport modes, addressing the real needs of the clientele while incorporating innovative value-added services.
  - To increase productivity, by addressing current operational and system weaknesses and limitations, including interoperability issues, and finding cost-effective solutions to these problems. Fostering technology transfer from other sectors into rail freight will be crucial for these innovation strategies to be put in place.

Scope: Proposals should address one of the two main challenges mentioned above.

Regarding *Seamless multimodal travel*, research and innovation activities should aim at conceiving and prototyping an on-line, mobile, suite of integrated facilities providing a whole new traveller experience throughout the journey (namely planning and reservation of user-friendly multimodal trips and services, including information related to the specific needs of persons with reduced mobility and to the environmental impact of user choices), easily accessible entitlements, validation and control for all transport modes, en-route assistance including re-accommodation. The whole process should be further supported by the necessary business analytics providing relevant feedback of traveller data with the aim of ensuring more robust and responsive transport operations. Developments should evolve on the basis of robust business models capable of guaranteeing the economics of these e-services in the long-term.

Regarding *Logistic Services*, proposals should aim at addressing the key challenges of freight through a systematic "top-down" approach that backtracks from the performance indicators to be achieved – either in a geographical reach perspective (i.e. applicability of the solutions on a European scale) or in market segmentation (e.g. trainload/intermodal/wagonload or commodity-based segments) - and define the optimal combination of business, operational and technological solutions that are required for their delivery. In view of the significant financial fragility of the sector, priority should be given to those aspects that maximise potential returns in the short-term and require only moderate investment.

The Commission considers that proposals requesting a contribution from the EU of around 12 million euro for the first challenge (Seamless multimodal travel) and around 6 million euro for the second challenge (Logistic services) would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

Regarding *Seamless Travel*, actions will aim at increased rail attractiveness through a new service profile for rail focused on customers by providing them with an integrated end-to-end solution for their travel needs – from transaction support to en-route assistance.

Regarding *Logistic Services*, actions will eventually be aimed at reaching 98% level on-time delivery, with improved loading capacity, placing rail amongst the "best-in-class" of logistic operators and guaranteeing multimodal operations. This over-arching goal will imply achieving significant gains from a diversification of the freight business, re-engineering production processes towards a leaner, more service-focused stance capable of delivering significantly higher levels of productivity (e.g. a doubling of both the revenue per employee and the annual load-runs per wagon, reduction of up to 50% in dwell times and a two-fold increase in the load factor for trains/wagons).

Type of action: Research and Innovation Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

### **MG.2.3-2014. New generation of rail vehicles**

Specific challenge: A combination of rail customers' ever-evolving requirements regarding quality of service, mounting energy costs, more stringent emissions standards, and increasing stress on the economics of rail operation is generating a new wave of challenges to rail vehicle development – notably imposing the delivery of enhanced functionality, comfort, safety, operational performance, interoperability and reduced life cycle costs. Reconciling such requirements will imply a departure from the traditional, incremental approach to vehicle development to a whole new way of thinking on product development.

Scope: Research and innovation activities should focus on innovative system approaches leading in the longer-term to the development and demonstration of a new-generation of railway vehicles and passenger trains, characterised by significant improvements in product reliability, cost-effectiveness, user-friendliness, safety and security, environmental impacts, ease of manufacture and interoperability. This will demand not only the development and integration of higher-performance technologies for critical structural components and traction, command-control and cabin environment applications (e.g. new materials, smart power and wireless technologies) but also the design and production solutions (e.g. modular, "commercial off-the-shelf" or adaptive concepts) that best contribute to the lean manufacturing and more efficient and safe operation of such vehicles. Proposals should also consider the development of innovative solutions to extend vehicle lifetime, or simplify retrofitting and will ensure interoperability through better Electro-Magnetic Compatibility (EMC) between the railway vehicles and the electrical installations of the network.

Attention should also be paid to the development of innovative, modular and customisable solutions for comfortable and attractive train interiors as an integral part of the whole passenger train concept. In particular, these should focus on delivering a unique traveller experience, facilitating accessibility, notably for persons with reduced mobility, fast boarding for commuters, as well as other on-board value-added services.

The Commission considers that proposals requesting a contribution from the EU of between EUR 14 to 16 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The key goal will be to deliver a reduction of up to 40% in life cycle costs of rolling stock products, an increase in passenger train capacity up to 15%, reductions of

downtime by increased reliability (up to 50%), a reduction of energy consumption (up to 30%) and an improvement in environmental performance, whilst delivering superior performance in terms of overall service quality, safety and customer experience in rail transport.

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### **3. ROAD**

This important section of the work programme addresses research and innovation for road transport which is complementary to the “Green vehicles” call. It includes activities in the field of Internal Combustion Engines based on conventional fuels (not included in the scope of the Green Vehicle call), in support of the air quality policy, safety of road transport, production technologies (from conceptual design to manufacturing) and new vehicle concepts for road and urban transport. The “Green vehicles” topics address the application of new types of energies to road transport and the improvement of the energy efficiency of road vehicles and their power trains. Whilst “Green vehicles” looks primarily at breakthrough research that will lead to a step change in road transport energy use, topics in this section will also address the necessary incremental improvements in road transport (e.g. advances in conventional internal combustion engines and safety) that will support the attainment of short to medium term EU policy targets.

Proposals are invited against the following topics:

#### **MG.3.1-2014. Technologies for low emission powertrains**

Specific challenge: Growing road traffic in Europe entails detrimental effects on the environment and public health to a level that is becoming unsustainable, while generating a large contribution to climate change, this in spite of increasingly stringent emission standards. The challenge is therefore to develop a new generation of transport technologies able to comply with stricter post Euro 6 limits under real world driving conditions while complying with future legislation on CO<sub>2</sub> emissions and air quality with significant less noise. At the same time, with the progressive reduction of particle emissions due to the introduction of particle filters, the contribution of brake components wear to air quality deterioration is increasing in relative terms, and it is important to deepen the understanding of the health risk that this constitutes and find ways of reducing these emissions in parallel to engine exhaust ones.

Scope: Proposals for research and demonstration activities should address one or more of the following domains:

- Future spark-ignited non-hybrid engines and their pollution abatement systems for gasoline and bio-based liquid fuels for passenger cars and light freight vehicles focussing on the optimal combination of innovative engine and after-treatment technology and of modelling, sensing on-board emission monitoring and testing to improve the design and control capability.
- Future diesel non-hybrid engines for cars and vans also focussing on the combination of the most appropriate engine and after-treatment technologies and on modelling, sensing on-board emission monitoring and testing to improve the overall design and control capability.
- Preparation of the life-cycle assessment of proposed technology combinations to quantify their environmental impacts along the entire well-to-wheel chain if not already covered by existing studies in the field.

- Low environmental impact brake systems to reduce micro and nano particles emissions while improving the measurement and understanding of their effects on health and the environment.

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 to 10 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Cleaner, more efficient road transport activities through advances in powertrains and brake concepts, strengthening the leading role of European industries in the automotive sector. Demonstration vehicles incorporating the new engine technologies must prove, by independent testing, real driving emissions below upcoming Euro 6 limits, targeting a 70% NO<sub>x</sub> reduction in view of the establishment of a future 'Super Low Emission Vehicles' standard for vehicles cleaner than legal standards that will facilitate the gradual phasing out of conventionally fuelled vehicle from urban. The research will show the feasibility of these stricter limits and contribute to the development of European emission standards beyond 2017. At the same time they should demonstrate a 15% improvement in fuel consumption for gasoline and 5% for diesel in comparison to the best vehicles on the market in 2013. For brakes, where no current legislation is applicable, at least a 50% reduction of particle emissions should be demonstrated. Thereby the project can contribute to improving urban air quality in the midterm and strengthen the competitiveness of the EU car industry by providing a platform for the sales of super-clean cars on the international market.

Type of action: Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### **MG.3.2-2014. Advanced bus concepts for increased efficiency**

Specific challenge: The challenge is to increase the modal share of public passenger transport, in particular by bus, and also promote co-modality. In addition, the economic situation today is highlighting the importance to study solutions for all segments of the urban bus market, capable to improve the attractiveness through innovative solutions for increased efficiency of the system. In particular energy consumption of auxiliaries in a bus represents a significant part of the overall consumption, heavily impacting energy efficiency performances.

Scope: Key innovative solutions should be developed and tested in real operational scenarios with the joint collaboration of industries and authorities/operators, adopting a system approach. This will entail research and demonstration activities for the vehicle and its interfaces with the transport system addressing all aspects below:

- Testing of strategies for energy and thermal management of buses, in particular auxiliaries such as climate systems for electrified vehicles lacking engine waste heat while excluding powertrain development. Such strategies should be based on real driving measurements of the contribution of auxiliaries to emissions in buses.
- Specific drive assistance technologies, to encourage a driving style aiming at improving both fuel consumption and passenger comfort.



- New solutions for the exterior and interior design and layout of buses (seating, passenger boarding/alighting, modularity and capacity, etc).
- Tools and applications for the efficient introduction of IT standards in an existing bus operation scenario, in particular for what concerns the co-existence of different IT solutions in the same fleet.
- Interface with the system: intelligent garage/maintenance of bus fleets (e.g. IT standard solutions for predictive maintenance); infrastructure (e.g. management of road space, bus stops and urban elements to work as an optimised interface with the bus).

A strong involvement of the supply chain, in particular SMEs, is highly suitable.

The Commission considers that proposals requesting a contribution from the EU of between EUR 8 to 10 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Improvement of public transport in Europe through more attractive buses that contribute to strengthen the leading role of European industries in the sector, in particular through the development of standard components by the bus manufacturers and by the demonstration of at least a 30% reduction of energy needed for climate control while complying with Real Driving Emissions limits set by the established Euro VI procedures.

Type of action: Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### **MG.3.3-2014. Global competitiveness of the automotive supply chain management**

Specific challenge: The market environment for the European automotive sector is characterised by weak economic growth, limited investments and declining sales of new vehicles in the mature markets. The accelerating introduction of electrified and other alternatively fuelled vehicles puts an additional challenge to the European automotive industry, in particular to its related supply chain. As a consequence production and supply strategies need to contemplate a mix of new products combined with innovative services, able to respond to customer needs in a flexible way. In the area of electrified vehicles this requires specific designs and the introduction of new technologies and service innovation for vehicles (e.g. electric batteries, e-components and systems, integration of high pressure CNG and H<sub>2</sub> tanks and supply components) in manufacturing chains which must be matched by innovative production methods and processes in order to make them affordable and competitive compared with conventional cars.

Scope: Research and innovation activities will address:

- Advanced combinations of organisational and service innovation, advanced design, manufacturing and testing technologies as means of increasing flexibility and near-real time reactivity to changing market demand while allowing for large numbers of

different configurations (mass customisation), optimising low volume production and reducing costs.

- Specific concepts for innovative multi-powertrain platforms and flexible methods and processes for their integration into these flexible and responsive chains.
- Integration of the full spectrum of components needed for the production of electric, hybrid and alternative fuel driven cars into such multi-variant chains taking into account the global nature of the new supply framework structures.

The Commission considers that proposals requesting a contribution from the EU of between EUR 8 to 10 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Actions will demonstrate their potential to mature the Technology Readiness Level (TRL; please see part G of the General Annexes) of technologies and processes against sector specific competitiveness goals, in particular:

- Retaining leading edge European automotive product and process capabilities and jobs, boosting industry's share of GDP to 20% by 2020 by transitioning to a low-carbon, zero pollution and resource efficient road transport.
- Developing advanced collaboration schemes on a global scale integrating OEMs and suppliers (all level of tiers, greatly benefiting SMEs) across new worldwide supply chains deriving from the growth of electrified vehicles and their components in newly designed multi-powertrain, multi-interface vehicle models.

Type of action: Research and Innovation Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

### **MG.3.4-2014. Traffic safety analysis and integrated approach towards the safety of Vulnerable Road Users**

Specific challenge: Despite the improvement in road safety in recent years, road accidents and their consequences remain a serious social problem – on average 75 people lose their lives every day on European roads and 750 are seriously injured. Pedestrians, cyclists, motorbike and moped riders represent a particularly serious safety concern, since they account for a disproportionately high percentage of the total number of road fatalities and serious injuries. At the same time, measures aimed at improving safety often imply significant economic cost, and tend to become more incremental over time. The challenge is therefore to assess the societal benefits of such measures, to improve the safety of Vulnerable Road Users (riders of Powered Two Wheelers, cyclists, pedestrians, children, the elderly and Persons with Reduced Mobility) and to update existing knowledge of accident causation in Europe for all road users.

Scope: Research and innovation activities should address one or both of the following:

- Advanced safety measures involving vehicles, infrastructure and its environment, protective systems, training and development of behavioural knowledge to reduce the number and severity of accidents involving Vulnerable Road Users. All proposals

should include assessment of the effectiveness, and demonstration of relevant technologies, in real-life conditions.

- Developing an in-depth understanding of road accident causation for all road users, covering all aspects of road safety (vehicle, driver and infrastructure) together with appropriate actions for their prevention and mitigation. This shall include methods for conducting a comprehensive assessment of socio-economic costs related to road accidents, taking into consideration secondary costs related to congestion, material damage, vehicle uptime etc. as a basis for robust cost-benefit analysis of safety countermeasures at a transport system level.

Research will fill knowledge gaps at both European and national levels, and take into account regional differences. International cooperation is strongly encouraged. In line with the Union's strategy for international cooperation in research and innovation<sup>7</sup> international cooperation is encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 7 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Research in this area will contribute to delivering essential knowledge for the design and implementation of an efficient strategy to make European road users (particularly Vulnerable Road Users), vehicles and infrastructure safer, and so promote the development of the European Road Safety Observatory. Overall, research will contribute to the achievement of the European policy objective of halving road deaths by 2020, and, in the longer term, to the Transport White Paper's "Vision Zero" objective.

Type of action: Research and Innovation Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

### **MG.3.5-2014. Cooperative ITS for safe, congestion-free and sustainable mobility<sup>8</sup>**

Specific challenge: Europe would be closer to solving problems related to congestion, traffic safety and environmental challenges if people, vehicles, infrastructure and businesses were connected into one cooperative ecosystem combining integrated traffic and transport management with new elements of ubiquitous data collection and system self-management. Significant technological progress in this area has been made in the past years; however, large scale deployment is in its infancy. Additional research is needed to improve and demonstrate at a European scale the effectiveness and efficiency of integrated smart mobility solutions based on human-vehicle-infrastructure communication. Seamless integration of the benefits

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<sup>7</sup> COM(2012)497

<sup>8</sup> The Coordination and Support Actions of this activity are excluded from the delegation to the Innovation and Networks Executive Agency (INEA) and will be implemented by the Commission services.

offered by the European Global Navigation Satellite System (European GNSS) in ITS applications will play an important role.

Scope: Coordination and Support Actions should support the accelerated take-up and deployment of cross-systems/cross-border innovative services and global reach-out

- by fostering further ITS standardisation in the EU and beyond in view of interoperability;
- by raising awareness and campaigning for cooperative ITS.

Research and innovation actions should address the development of one or several of the following domains:

- Open in-vehicle platform architecture for provision of real-time ITS services and mechanisms to provide seamless connectivity, interoperability and secure flow of information across stakeholders, including convergence of Dedicated Short-Range Communication (DSRC) and 4th generation mobile communication technologies.
- Improved positioning technology, building on innovative features of European GNSS systems, with standard interfaces to serve different ITS applications and new concepts for flexible charging based on guaranteed positioning.
- Highly accurate, dynamic maps for transport applications, leveraging technologies based on advanced GNSS and cloud computing.
- Innovative solutions for cooperative network management, multimodal transport services, safety applications and hazard warnings.
- Tailor-made solutions for heavy duty vehicles, integrating as much as possible tachograph, tolling, inspection and (dynamic) route guidance functions, etc.

The activities should support development of European Wide Service Platforms (EWSP). Proposed solutions should be demonstrated in real-life conditions, based on which the assessment of their effectiveness and their respective deployment requirements should be carried out. They have to propose robust built-in data privacy and security measures.

The scope of the work should extend towards full-scale early deployment, and should address issues related to suitability for public procurement, identification of (multi-stakeholder) business cases and value-added scenarios, users' acceptance and willingness to pay.

Priority will be given to proposals with strong participation of innovative SMEs and to proposals boosting international cooperation. Robust and convincing commercialisation strategy in view of market roll-out of proposed solutions will be an advantage.

In line with the Union's strategy for international cooperation in research and innovation international cooperation is encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 10 million euro for Research and Innovation Actions would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The establishment of an integrated transport "info-structure", relying on vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) communications, but also on the availability of open and quality transport data, will improve transport systems

- safety level, by reducing the number of crashes
- efficiency, by offering efficient and cost-effective solutions for curbing congestion
- flexibility, by providing alternative options to drivers in case of traffic disruptions
- sustainability, by cutting down GHG and other pollutant emissions

Type of action: 1) Research and Innovation Actions; 2) Coordination and Support Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### **MG.3.6-2015. Safe and connected automation in road transport<sup>9</sup>**

Specific challenge: Automated and progressively autonomous driving applications in road transport, actively interacting with their intelligent environment could provide an answer to the EU objective of reconciling growing mobility needs with more efficient transport operations, lower environmental impacts and increased road safety.

Automation in road transport should make best use of the evolution of Cooperative ITS and the benefits made available by satellite navigation systems, such as the increased accuracy and robustness. Connectivity and cooperative mobility will be the key driving force for integrating automation into novel mobility concepts enabled by the European Wide Service Platforms (EWSP).

Scope: Proposals could be Research and Innovation Actions or Coordination and Support Actions.

Research and innovation activities could address one or more of the following aspects to support gradual progress towards full automation:

- Dedicated supporting technologies for individual pre-emptive compensation of human errors, or even taking over the vehicle control in case of imminent collision. This could include: Advanced Driver Assistance Systems (ADAS) to support drivers in accident avoidance and to mitigate the consequences of collisions, including tools to detect and measure undesirable or unusual driver condition (such as drowsiness) and warn, control and correct that behaviour at different levels; better optimised Human Machine Interfaces (HMI), providing tailor-made information which the driver is capable of processing in continuously changing conditions.
- Novel transport, service and mobility concepts in real-life situations enabled by automated driving and connectivity. These services and concepts could benefit from cloud computing and data management and data aggregation techniques for road transport big data. They could also include automation specific to the road freight sector, including smart, secure on-board and infrastructure based-systems and seamless integration with other modes. In this context, particular attention could be given to

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<sup>9</sup> The Coordination and Support Actions of this activity are excluded from the delegation to the Innovation and Networks Executive Agency (INEA) and will be implemented by the Commission services.

demonstrating freight services/road trains. Attention should be paid to understanding and addressing the responses of users.

All proposals should include an assessment of the effectiveness of the relevant solutions in real life conditions.

Coordination and Support Actions could address one or more of the following aspects:

- Dissemination and take-up of results, including the development and consensus building on business models to progress towards full automation in road transport.
- Liability and standardisation policy and regulatory framework recommendations could be formulated as appropriate.

In line with the Union's strategy for international cooperation in research and innovation<sup>10</sup> international cooperation is encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 10 million euro for Research and Innovation Actions would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Projects should contribute to:

- Reduction of the automated driving systems' development costs, as well as raising competitiveness of the European industry in developing breakthrough technological solutions.
- Enhanced robustness and performance of sensor and data analysis systems and optimised HMI and advice strategies together with unobtrusive methods for measuring workload, distraction and fatigue.
- Improved efficiency, safety and traffic flow through better use of the existing infrastructure capacity, and reduction of emissions.

Type of action: 1) Research and Innovation Actions; 2) Coordination and Support Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

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<sup>10</sup> COM(2012)497

## **4. WATERBORNE**

A modern, safe, secure and resource efficient waterborne transport system, encompassing deep sea shipping, coastal shipping around Europe and the use of the internal waterways, is an essential requirement for an economy which aims at succeeding on the global scale and supporting a truly integrated internal market.

Today's challenges for the sustainable development of such a system are defined by the optimal use of energy sources and the minimisation of its environmental impacts, in particular with regard to pollutant and greenhouse gas emissions. The waterborne sector is still lagging behind in these respects as compared with other transport modes.

Europe remains a world leader in the design, production and operation of waterborne assets, but its industry is facing ever fiercer global competition. To stay ahead, the entire value chain needs an accelerated creation and deployment of research and innovation solutions whilst at the same time there is a need to explore new frontiers in terms of vessels, operational paradigms and the industrial use of the oceans.

Proposals are invited against the following topics:

### **MG.4.1-2014. Towards the energy efficient and very-low emission vessel**

Specific challenge: The challenge is to support developments that make new and existing vessels used in maritime operations (including leisure) and in inland navigation significantly more efficient and less polluting through solutions addressing four ship sub-systems: engine, pollution abatement systems, propulsion, energy sources and management including the efficient operation of on-board systems.

Waterborne transport still offers an enormous potential for pollution reduction and energy efficiency gains. The reduction of pollutant and greenhouse gas emissions is far removed from the progress made in road transport, particularly in the category of older, small to medium-size vessels which make up a large proportion of intra-European waterborne transport, including inland navigation.

Since vessels have a long life expectancy, developing technologies for clean retrofit and fuel conversion solutions is a key aspect of the challenge.

Scope: In order to meet this challenge, proposals should address one or several of the following aspects:

- Optimisation of conventional ship engines, including fuel flexibility, new materials, lifetime performance and near zero emissions engines.
- Development of low-maintenance, affordable off-the-shelf retrofit solutions for emission reductions of existing engines.
- Development of Liquefied Natural Gas/dual fuel powered engines for small and mid-size ships, including the specific aspects of retrofitting, fuel supply and storage, safety (on-board and on-shore) and classification, and solutions to address the risks of methane slip.

- Design and demonstration of new and improved propulsion means and vessel configurations that include the entire drive train and the propeller and hull optimisation for vessels, including applied research in Computational Fluid Dynamics (CFD).
- Use of new energy sources including renewables, alternative fuels, hybrid and electric solutions with the aim to demonstrate the feasibility of the zero or near-zero emissions vessel.

Solutions that are sufficiently close to market take-up so that ship owners will consider these concepts in their future investment plans should be demonstrated. This applies in particular to the existing fleet and retrofitting solutions which must be cost-effective and present a considerable societal return on investment.

Research and innovation efforts should enable pilot applications for new engines, new pollution abatement technologies, new propulsion trains and alternative fuels solutions to enter the market by the end of the research period.

The Commission considers that proposals requesting a contribution from the EU of between EUR 8 to 17 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: It is expected to:

- Achieve efficiency gains and emission reductions that go significantly beyond normal technological progress and the benchmarks of the existing regulatory regimes at lowest costs.
- Achieve fuel efficiency gains of at least 15% for retrofitting per type of solution (engine or propulsion) and at least 30% per type of solution for new concepts.
- Accomplish a 25% decrease in greenhouse gas emissions and a reduction of, on average, 80% in air pollution compared with Best Available Technology (BAT).

Experience acquired in this innovative field should be broadly made available to ship owners requiring improvements in the environmental performance of their vessel.

Type of action: Innovation Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

#### **MG.4.2-2014. Safer and more efficient waterborne operations through new technologies and smarter traffic management**

Specific challenge: Ensuring and enhancing the safety of waterborne operations is of high importance for the EU since past and recent maritime disasters, and accidents in inland navigation, have shown that accidents come with high costs in terms of loss of life, environmental damage, economic impact, and the overall image and public perception of the waterborne sector. Whilst the safe operations of cargo vessels remain a challenge to be addressed (also in the light of the increasing use of Northern sea routes), the significant and continuing growth in the size of cruise ships and the expansion of their operating areas to remote regions (and particularly difficult environments such as the Arctic) has created a new and increasing risk. More research is needed to develop and demonstrate innovative solutions



for ship design and waterborne operations in order to avoid and mitigate passenger risks, ensure high levels of safety, whilst at the same time preserving increased passenger expectations of comfort and on-board amenities.

Enhanced or new technologies for maritime traffic management will be key for safer and more secure operations as well as to lower emissions, whilst supporting a more competitive maritime transport as part of an integrated transport chain. To reduce congestion in ports and port fairways, port traffic guidance systems need to be at the same time cost efficient and easily deployable. Synergies with existing systems should be ensured, with the aim of integrating the use of port traffic guidance tools by all relevant authorities and ensuring the full interoperability between Information and Communication Technologies (ICT) systems, which monitor vessels, freight and port services.

Scope: Proposals should address one or several of the following aspects:

- Safer shipping through innovative conceptual (hull, general arrangement) and detail designs (exterior and interior) of vessels and systems, and through a new approach to emergency response, to risk-based maintenance, and to the human factor.
- New safety devices and their demonstration, including new technologies and operational solutions for the evacuation of large passenger ships, black-out mitigation, fire proofing and making ships more salvage friendly.
- New and improved systems for the surveillance, monitoring and integrated management of waterborne transport and other activities (commercial and non-commercial).
- New and cost effective European Global Navigation Satellite System (European GNSS)-based procedures for port approach, pilotage and guidance, ICT-enabled shipping lanes and maritime services that will reduce the risk of accidents and incidents in port approaches and dense traffic lanes, and minimise both delays and turn-around times.
- For traffic management, solutions that support the extension, integration and optimisation of waterborne transport information and communication systems with the aim of contributing to build a comprehensive "e-maritime" environment (including e-Navigation components that are compatible with existing or emerging international standards). They should serve the overall objective of building the European Maritime Transport Space without Barriers allowing waterborne transport (including inland navigation) to be used to the full potential of the integrated intermodal logistic chain. Solutions should also provide the foundation for the deployment of autonomous and actively guided ships as well as the possibility to verify all related safety certificates before the vessel enters the port.

Inputs to EU and international regulatory regimes, standardisation and international research co-operation are expected for the above areas, in particular regarding safety devices and e-Navigation solutions.

In line with the Union's strategy for international cooperation in research and innovation<sup>11</sup>, international cooperation is encouraged.

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<sup>11</sup> COM(2012)497

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 to 9 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: It is expected to:

- Achieve significant improvements in terms of navigational safety and efficiency (in particular emission reductions) along the entire waterborne transport logistic chain, and decrease administrative burdens.
- Facilitate the transfer of new safety concepts from passenger shipping to other areas of maritime operations.
- Show a statistically relevant decrease in the number of fatalities caused by maritime accidents, the number of ship losses and specific incidents such as fires or black-outs accompanied, where relevant, by operational empirical evidence.
- Support the upgrading of international maritime safety regimes through relevant inputs.

Type of action: Innovation Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

### **MG.4.3-2015. System modelling and life-cycle cost and performance optimisation for waterborne assets**

Specific challenge: The European maritime technologies industry is facing fierce global competition on price in its traditional markets which forces it to shift its focus to profitable (existing and new) markets where technical excellence and smart custom-made solutions are the key to market success. In order to develop these niche markets and exploit them successfully, research and innovation efforts are required that introduce new design and production processes with the aim of having minimal total costs over the useful economic life of the product which, for waterborne assets (vessels and maritime structures), is particularly long (20-50 years).

Scope: Proposals should address one or several of the following aspects:

- New design and mathematical modelling tools and paradigms supporting the full understanding of operational practices and situations covering the entire useful economic life of a vessel or maritime structure ("from cradle to grave") in terms of costs and performance.
- A comprehensive and detailed approach to system integration and optimisation for vessels which is multi-objective driven, based on virtual product (digital mock-up) methodologies (with virtual reality capabilities). The resulting model must include all technical systems and sub-systems and must cover all operational conditions of the complete system over the entire life cycle (thus taking into account the uncertainties of the future operating context). Modelling should cover the majority of ship types produced in Europe and should be based on the new tools and paradigms, allowing for short lead times and the optimised use in SME yards building complex vessels.

- A large scale virtual demonstrator for smart, adaptive and multi-material complex ships and structures, based on the design tools and concepts for minimised life-cycle costs and using the complete product model.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 8 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: It is expected:

- Achieve measurable cost reductions in design, production and lifetime maritime asset management.
- Facilitate a shorter time for assessment and integration of sub-systems on board vessels and a better integration of complex systems, in particular in relation with energy issues and efficient operations. This should lead to efficiency gains of 20% in terms of energy consumption and of 10% in terms of other operational costs.

Type of action: Research and Innovation Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

#### **MG.4.4-2014. Advancing innovation in the Inland Waterways Transport (IWT) sector**

Specific challenge: The maritime and inland waterways sectors have different dynamics as regards policy developments and policy-making cycles. The Inland Waterways Transport (IWT) sector cannot benefit from the same economies of scale as the maritime sector, also because it is largely dominated by SMEs. The global dimension is practically absent; the sector has a stronger regional focus, is more driven by EU legislation and is more integrated into the internal market. Moreover, IWT is affected by climate change effects in terms of water levels.

New priorities for inland navigation policy have emerged, including those coming from the NAIADES II action programme, which require RDI support as a key building block for exploiting synergies and bringing about an integrated, comprehensive, and sustainable waterborne transport system. This will improve the competitive position of IWT and give it a better environmental performance.

Scope: In order to drive an innovation agenda for the sector (covering vessels, infrastructure, and modal links and integration), proposals should address the following three issues together:

- Support a massive introduction of a range of alternative energy concepts and technologies for a more efficient energy use and for emission reductions in IWT. New technological solutions are to be developed and deployed (also as retrofitting solutions), which aim at achieving emission levels in IWT that reflect the state of the art and are at least similar to those of road transport. Research and innovation efforts should focus on new concepts that are tested through real-life pilot deployments which are accompanied by a thorough assessment of operational and environmental performance, including

cost-efficiency. The certification of solutions should be addressed in order to stimulate widespread take-up. Experience acquired in this innovative field must be made available to ship owners wishing to green their vessels.

- Establishment of a testing and monitoring regime for the application of strict emission limits to various categories of existing vessels/engines, including certification, implementation and type approval of retrofit solutions, appropriate test cycles and procedures for compliance monitoring.
- Develop digital, including simulator-based, tools for education/training and cost-efficient navigation following inter alia, the assessment of manning and training/qualification requirements with regard to vessel operation and cargo handling (including modal links).

As inland navigation in Europe also affects non-EU and non-EEA countries, international co-operation aspects in research and deployment of results should be addressed. Inputs to standardisation efforts should be made in terms of technical requirements for navigation and qualifications.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 to 6 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Major progress will be made regarding the environmental performance and the energy efficiency of the IWT sector, improving its competitiveness as part of the Single European Transport Area.

New qualifications should allow for a more mobile and up-skilled work force.

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## **5. URBAN MOBILITY**

The start of Horizon 2020 means the launch of CIVITAS 2020: innovation in resource-efficient and competitive urban mobility and transport. Improving the efficiency of urban transport and mitigating the negative effects of transport effectively, while taking into account technological, socio-economic and urban development trends, is crucial for the performance and attractiveness of Europe's urban centres. Urban mobility figures prominently in the 2011 Transport White Paper which calls for achieving essentially CO<sub>2</sub>-free city logistics in major urban centres by 2030, and for phasing out the use of conventionally-fuelled cars in cities by 2050. This requires a transformation in the use of vehicles, more efficient and lower impact city logistics, and a reduction in urban road congestion, combined with a broad take up of cleaner vehicles powered by alternative fuels and drive trains.

CIVITAS 2020 seeks to drive the innovative policies and technologies needed for the transformation towards cleaner and better urban mobility and transport following a user-oriented approach. CIVITAS 2020 is structured around five complementary challenge-topics. It will put in place a framework for coordinated evaluation, dissemination and information exchange, as outlined at the end of this section. CIVITAS will continue to support local partnerships in implementing and testing new approaches under real-life conditions. Participating cities work together and exchange experiences while they undertake a process evaluation and impact evaluation and investigate the transferability of the tested solutions. This results in a developing knowledge-base, technical capacity and support for up-scaling and transfer which are available to all European cities.

Proposals are invited against the following topics:

### **MG.5.1-2014. Transforming the use of conventionally fuelled vehicles in urban areas**

Specific challenge: Significantly reducing the use of fossil fuels in urban mobility, whilst improving air quality and increasing the accessibility and attractiveness of urban areas will, in addition to advances in vehicle technology, require new, cost effective policy measures and tools. In particular the increased use of non-conventionally fuelled vehicles for passenger and freight transport in urban areas is a key challenge. Special attention should be paid to issues related to vulnerable groups of citizens and gender issues.

Scope: Proposals should address one of the following domains:

- Comparing innovative policies, measures and tools that will, inter alia, halve the use of conventionally fuelled vehicles in cities, while increasing accessibility of urban areas and improve air quality and road safety. This could include:
  - Assessing the role of regulatory measures, demand side measures, innovative mobility services and the promotion of alternative modes as part of wider package of technologies, policy-based and soft measures with a strong potential for replication. The related consensus building, information and communication activities should be fully integrated in the work.

- Exploring how changes in mobility behaviour, individual choices, and social norms can be catalysed, accelerated and guided towards modal shift, changing vehicle use or ownership, reducing the need for travel, new mobility patterns, or their combination. Relevant drivers and barriers could be identified. The research should gather, evaluate and disseminate techniques that can be employed, including approaches that use social media.
- Exploring policy frameworks and measures to ensure the uptake of alternative fuelled vehicle fleets in urban areas. This could include:
  - Assessing the opportunities for large scale deployment of alternative fuel distribution infrastructure, including for electric vehicle recharging. This could include a comparative assessment of deployment approaches combined with the adequate vehicles. Research on partnerships, business models and planning/rollout approaches could be undertaken and standardisation aspects could form part of the work. Pre-commercial procurement initiatives could be facilitated.
  - Analysing the potentials for upgrading and/or regenerating electric public transport systems (i.e. trolleybus, tram, light rail and metro) while ensuring the safe integration of electric vehicles into infrastructure, in line with the trend towards electromobility. This could include the evaluation of costs and benefits of development schemes, also addressing noise aspects, as well as knowledge transfer, exchange of experience and preparing policy recommendations. Activities to improve the operational potential and energy performance of electric public transport may be included.

This topic complements topic GV.8 of this work programme as well as work under the ‘Smart Cities and Communities’ Call of the Energy Challenge.

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 to 6 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The project(s) should lead to increased knowledge and awareness of cost effective strategies, policies and approaches contributing to halving the use of conventionally fuelled vehicles in different types of cities through a variety of approaches. This should result, through increased acceptance by users, operators and policy makers, in their accelerated rollout. Clear commitments from participants, and leadership for an ambitious Europe-wide take up and rollout of results during and following the project(s) are expected.

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## **MG.5.2-2014. Reducing impacts and costs of freight and service trips in urban areas**

Specific challenge: In addition to advances in vehicle technology, achieving essentially CO<sub>2</sub>-free city logistics will require significant improvements in the efficiency of goods, waste and service trips to reduce negative impacts and costs. This will require, among others, an

improved knowledge and understanding of freight distribution and service trips and the development of best practice guidance on innovative approaches and how to replicate them.

Scope: Proposals should address one or several of the following aspects:

- Improving basic knowledge and understanding on freight distribution and service trips in urban areas. This could address research on indicators, measurement and data (e.g. delivery/service characteristics, operators, movements, and impacts); economic and behavioural modelling; impacts of urban planning; effects of logistics sprawl (e.g. impact of decentralisation of logistics facilities on transport movements); freight mitigation strategies; effectiveness of partnerships and stakeholder engagement; and comparative analyses and evaluation of policies and experiments.
- Assessing innovative policies and solutions to ensure a better use of infrastructure (e.g. delivery spaces, off peak deliveries, non-road modes, urban waterways) and vehicles (types, load factors); improve network management; address demand side measures, innovative use of transport modes, new ways of stakeholder collaboration; and provide policy frameworks that allow sustainable business models for urban logistics solutions.
- Assessing innovative policies and solutions on consolidation and distribution centres in urban areas, including design (e.g. cross-docking); business models for consolidation schemes (including fleet and freight sharing and pooling and adequate collaboration frameworks); integration of direct and reverse logistics; tools to identify and measure consolidation opportunities; and governance models.

This topic complements the work under topic MG.6.1 of this work programme.

In line with the Union's strategy for international cooperation in research and innovation<sup>12</sup> international cooperation is encouraged, in particular with the United States.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 to 4 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Actions will result in a clear understanding of cost effective (non-vehicle technology based) strategies, measures and tools to achieve essentially zero emission city logistics in urban centres by 2030. Particular attention will be paid to significantly increased load factors and reduced vehicle movements resulting in cost and emission benefits. Practical guidance will result in a better integration of city logistics in urban policies. Clear commitments from participants, and leadership for an ambitious Europe-wide take up and rollout of results during and following the project(s) are expected.

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## **MG.5.3-2014. Tackling urban road congestion**

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<sup>12</sup> COM(2012)497

Specific challenge: Significantly reducing urban road congestion and improving the financial and environmental sustainability of urban transport will bring major benefits for the economy, the attractiveness of cities and citizens' wellbeing. This requires an improved understanding of measures to reduce urban road congestion whilst increasing urban accessibility for passengers and freight and contribute to the achievement of broader sustainable urban transport policy objectives. It also requires new thinking and innovative business models and service concepts for public transport, walking and (safe) cycling, adapted to increasingly limited public budgets. Special attention should be paid to issues related to vulnerable groups of citizens and gender issues.

Scope: Proposals should address one of the following domains:

- Analysing measures and tools to understand and secure a long term reduction in urban road congestion. This should include sub-urban and peri-urban areas. In particular the links with other aspects of urban mobility, e.g. public transport services; mobility management and travel awareness, cycling and walking strategies; parking management and information; traffic and travel avoidance; reallocation or multimodal use of road space; infrastructure development including integration of underused links; capacity management; and access or road user charging could be addressed.
- Exploring how a favourable environment can be created for a significant growth in public transport at limited extra costs. The research should provide an overview and analysis of innovative approaches in areas such as fares, taxes and levies; infrastructure investment; rolling-stock renewal; customer orientation; operational service concepts; synergies with other modes; demand management; organisational setup; and regulatory frameworks. Recommendations, tools and guidance material could be developed and tested to support operators and authorities in developing business models that match their needs and circumstances. The work could be accompanied by a platform with stakeholders from different organisational, economic and social contexts.
- Assessing how the role of walking and (safe) cycling in the urban modal split can be increased, for example through awareness raising activities, financial/tax incentives, allocation of infrastructure space, planning approaches/provisions, service concepts, intermodal links, and human-centred environments. The role of partnerships and the active involvement and commitment of public administrations require special attention. Recommendations, tools and guidance material could be developed and tested.

This topic complements work under several topics of the Road and the Intelligent Transport Systems areas of this work programme.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 to 4 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Actions will result in improved understanding of proven policy measures and tools and technology options that can contribute to a significant reduction of congestion whilst improving mobility and access. They will also produce insights on the feasibility of new public transport business models with long term financial sustainability. The action(s) on walking and cycling will produce new insights on impacts, success factors and benefits. Clear commitments from participants, and leadership for an ambitious Europe-wide take up and rollout of results during and following the projects are expected.



Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### **MG.5.4-2015. Strengthening the knowledge and capacities of local authorities**

Specific challenge: Achieving sustainable urban mobility requires the adoption of new strategic planning approaches at the local level. However, very few authorities undertake a sound analysis of trends, develop scenarios and provide the necessary long term policies and focus. Without strengthening of authorities' knowledge and capacities, a transformation of urban mobility planning will not be achieved.

Scope: Proposals should address one of the following domains:

- Promoting take up of the innovative concept of Sustainable Urban Mobility Plans (SUMPs). Proposals from large networked groups of local authorities should include instruments and mechanisms for information exchange to assist them in preparing and implementing SUMPs. The plans should build on a solid methodology<sup>13</sup> and include quantified targets. Proposals should ensure that the plans comprise a long-term vision, build on local consultation and interdepartmental coordination, include monitoring and evaluation, address financing options, and consider a wide range of measures, including newly-emerging technologies, policy-based, and soft measures.
- Enhancing the capacities of local authorities and other stakeholders to successfully plan and implement innovative sustainable mobility measures, technologies and tools, on the basis of reliable data and analysis. Sustainable financing should play a key role, which means that special attention should be given to setting up business cases, innovative procurement, the development of bankable projects and partnerships.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 to 4 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The action(s) on Sustainable Urban Mobility Plans will generate a high leverage factor, especially in regions and cities where take up is so far low and the impacts from transport are severe. Participants should show a strong commitment on the preparation and implementation of the plans. The action(s) on capacity building will produce validated, practical and replicable tools and methods with guidance and training material, resulting in a maximum reach of the target audience.

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

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<sup>13</sup> See for example [www.mobilityplans.eu](http://www.mobilityplans.eu)

### **MG.5.5-2015. Demonstrating and testing innovative solutions for cleaner and better urban transport and mobility**

Specific challenge: Many of Europe's urban areas are struggling to address the transport-related challenges they are facing. New technologies and innovative measures are emerging, but they are not taken up at a scale that is necessary to meet the targets of the Transport White Paper. Cities are hesitating to implement innovative solutions because little information is available on their effectiveness and on how to overcome the barriers to successful implementation. Special attention should be paid to issues related to vulnerable groups of citizens and gender issues.

Scope: The first part of the topic addresses Innovation Actions to be carried out by city-led consortia, composed of four to five cities, led by at least two advanced cities, which are committed to establish living laboratories where innovative solutions can be implemented. The participating cities should demonstrate their common interests and their vision on how they will ensure a meaningful and close cooperation. Proposals should outline how the work will support effectively the cities' efforts to follow a viable path towards sustainable mobility.

Each city should follow an integrated approach by demonstrating and testing under real life-conditions a set of complementary and reinforcing mobility solutions. The solutions should combine newly-emerging technologies, policy-based, and soft measures with a strong replication potential. They should cover an appropriate sub-set of the eight 'CIVITAS measure categories': collective passenger transport; demand management strategies; mobility management and travel awareness; safety and security; urban freight logistics; information systems and services; and clean fuels and low emission vehicles; car-independent lifestyles.

A thorough impact and process evaluation, on the basis of a common framework using a clear baseline in each city, will provide qualitative and quantitative information on the results of the local solutions implemented. The effectiveness of proposed measures in achieving local policy objectives should be evaluated and the barriers to broad deployment identified together with recommendations on how to overcome them. This should be accompanied by effective mechanisms for cross-fertilisation of knowledge and best-practises among the consortium members and beyond.

Proposals may include preparatory, take up and replication actions, research activities, as well as tools to support local planning and policy making. A demonstrated contribution to the development or revision of Sustainable Urban Mobility Plans as well as furthering the Union's strategy for international cooperation in research and innovation, especially with China<sup>14</sup>, will be an advantage.

The Commission considers that proposals requesting a contribution from the EU of between EUR 12 to 18 million euro for Innovation Actions would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Funding for major infrastructure works is not foreseen.

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<sup>14</sup> According to EU-China High Level Dialogue on Transport agreement of 24/09/2012 and 'Joint Declaration on EU-China Urbanisation Partnership' (subject to finalisation of the appropriate arrangements).

The second part of the topic addresses a Support Action to facilitate cooperation between stakeholders involved in the projects under this topic, and from across CIVITAS 2020. It should further elaborate the common ‘CIVITAS Process and Impact Evaluation Framework’, support its implementation and contribute to local capacity building in deploying innovative mobility solutions. The action should include a clear communication and dissemination strategy to maximise impact and ensure the continuity of the ‘CIVITAS Secretariat’ as well as links with the CiVi-Net networks.

This topic complements work under the ‘Smart Cities and Communities’ Call of the Energy Challenge.

Expected impact: The Innovation Actions will produce added-value inputs to the development of European knowledge base on the effectiveness and impacts of innovative mobility solutions and approaches to their successful implementation. Clear commitments and contribution from participants to Europe-wide take up during and beyond the project are expected.

The Support Action will help to promote take up of innovation by strengthening the mechanisms for urban transport policy making and planning as well as the technical capacity building in the participating cities. Dissemination, training and exchange activities will aim at a maximum reach of the target audience.

Type of action: 1) Innovation Actions; 2) Coordination and Support Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## **6. LOGISTICS**

Freight transport logistics is an industry sector responsible for managing the flows of goods and information between a point of production and a point of destination in order to meet the requirements of clients and consumers. As regards the supply chain, logistics focuses on the planning, organisation, management, control and execution of freight transport operations.

In 2010, EU-27 freight transport was close to 3.9 trillion tonne-kilometres (tkm), of which about 45% was on the road and 40% by sea. Currently, only 5% of internal EU freight traffic flows through intermodal routes. Eurostat surveys estimate that 24% of good vehicles in the EU are running empty and that the average loading of the rest is 57% giving an overall efficiency of 43%. Flow imbalance can only explain half of this loss.

The total volume of logistics expenditures in the EU was estimated at €930 billion in 2010. A 10% to 30% improvement in efficiency in the EU logistics sector has been estimated to give savings of between €100 billion and €300 billion per year.

The aim of the topics in this section is to increase efficiency and hence sustainability in the logistics supply chain, removing the communication bottlenecks in the interaction between the different stakeholders and thereby improve the potential for collaboration, the effective utilisation of equipment and seamless connectivity across the transport modes. The topics complement relevant topics in the sections on Rail, Urban Mobility and Intelligent Transport Systems.

Proposals are invited against the following topics:

### **MG.6.1-2014. Fostering synergies alongside the supply chain (including e.commerce)**

Specific challenge: The global challenge is to find the right business models for a number of separate activities that when brought together can foster synergies that satisfy the seemingly mutually exclusive objectives of decoupling the growth of urban and inter-urban freight transport demand from its consequences on traffic and the environment. This can be done by horizontal collaboration between retail, distribution, logistics, traffic management, vehicles and their users whilst exploiting synergies from the vertical integration down-stream to the customer in a more intelligent chain. Moreover, mutually compatible collaboration should not be restricted to inter-urban/urban relations and enhanced regional logistics is necessary where joint use of regional logistic platforms, the set-up of new transport structures/networks (like consolidated rail cargo; improved trans-shipment terminals especially for rail, etc.), multi-level logistics, ecological supply chain design including modal shift, are all considered. The following trends need to be considered:

- Redesigned global logistics processes, including the last mile component of the logistics chain. The redesign requires a sound information infrastructure for retailers, consumers and utility service providers and collaboration of authorities, shippers and logistics service providers along delivery chains.

- E-commerce developments with the subsequent need for personalised, secure and efficient order fulfilment and delivery, by establishing collaborative and mutualised business cases.
- Unit loads and packages that create a more efficient handling of products in the supply chain and thereby support the last mile delivery, especially in response to e-commerce.
- The transition from the current independent supply networks to open global networks where resources are compatible, accessible and easily interconnected.

Scope: The work should establish and demonstrate mechanisms to foster synergies through:

- Improved collaboration and concerted actions between all authorities, shippers, retailers and logistics service providers for door-to-door transport.
- Co-operative Intelligent Transport Systems (C-ITS) and cloud based services, integrated into an on-line planning platform that offers new means of communication amongst vehicles, between delivery vehicles & traffic management and to end users.
- The design and delivery of a proof of concept model for e-commerce logistics execution.
- Developed tools and test cases for the mutualisation of truck use. An example would be to provide a mechanism for the public internet auction of logistics services (e-bay type) centres on the trading of back-loading opportunities.

Participation of SMEs with proven experience in these areas will be considered an asset.

Ethical aspects referring to the transport of livestock should be duly considered where appropriate. The work should assess social implications, especially the effect on employment and the economic effects of the solutions envisaged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 16 to 20 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Actions will contribute to:

- Reduce the number of delivery vehicles by at least 10% and hence limit congestion, pollution and GHG emissions.
- Improve truck and container load factors (+ 50% in test cases and overall stabilise load factors) and provide new 'back-load' possibilities.
- Serve as an inspirational example for future market collaboration.

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## **MG.6.2-2014. De-stressing the supply chain**

Specific challenge: The challenge for industry is to overcome the stress caused through dealing with the increasing length, complexity and vulnerability of supply chains while

enhancing the performance, quality and knowledge needed to plan seamless transports of goods. To this end, a better understanding is needed of the technological and operational opportunities that 'slow steaming' and synchro-modal operations and other relevant concepts provide.

Scope: The work should assess the added value of, and the technical, economic, political, social (including the effect on employment and safety) and organisational aspects of the whole transport and logistics supply chain (both inland and overseas, long and short haul) regarding:

- The impact of slow steaming on supply chains, production processes, storage and warehousing availability and trade lanes including opportunities that exist to de-stress other transport modes and make slow steaming and de-stressing a positive economic as well as environmental success.
- Information systems including e-Freight tools, infrastructures, smart coordination mechanisms, policies, and legal possibilities to be able to use different transportation modes flexibly to deliver maximum value to the shipper or end customer. This should demonstrate through implementation the added value of synchro-modality in networks and services.
- The work should focus on technology specifications, business models and governance structures for both 'slow steaming' and synchro-modal vehicles/vessels and technologies as well as the provision of technologies for communication to the transport mode and its driver/operator, in order to fulfil logistics paradigms and new business models, including collaboration regimes. A profound benefit to sustainability is expected.

The Commission considers that proposals requesting a contribution from the EU of between EUR 6 to 8 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Slow steaming offers a strong potential to reduce operating costs of a liner shipping company. A limited reduction in speed may lead to almost halving the costs of bunker fuel and environmental impacts. Both synchro-modality and 'slow steaming' will enable logistics to operate more sustainably, at lower costs and at higher quality. This will bring benefit to freight intermodal transport by significantly improving freight transfer efficiency and hence help replace road only transport by incorporating other modes with less external negative effects, as well as improving the utilisation of existing infrastructures in order to meet expected increased demand.

Type of action: Research and Innovation Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

### **MG.6.3-2015. Common communication and navigation platforms for pan-European logistics applications**

Specific challenge: Today, new international and intermodal repositories and data pipelines are being created, management systems are deployed and new data mining capabilities are being developed to deal with the data flood needed for logistics decision making.

Unfortunately, these data uses involve different information systems, different user requirements, different business models and different deployment trajectories. This constitutes an obstacle for the deployment of pan-European logistics solutions.

The challenge is to develop architectures and open systems for information sharing and valorisation, connecting key stakeholders with information and expertise enabling exploitation on the basis of trusted business agreements and with the relevant authorities (transport authorities and customs being the most eloquent player, but there are also other authorities in relation to health, safety, etc.). These architectures and systems need to accommodate feedback loops that allow for deviation management and corrective and preventive action (CAPA).

Scope: The work should focus on solutions to enable actors to take fast and well-informed decisions inside and cross-companies. This implies that information with the right quality, reliability and content is made available to concerned actors and shared between them even in difficult conditions such as ship-to-shore and ship-to-ship communication. The work will develop an open system and architecture that facilitates real time information exchange and co-operation between agents in the network. It will facilitate collaboration and give good confidence that a significant number of cases of horizontal shipper collaboration can be established within the horizon of the project and have a high expectation of continuance after the project ends.

Proposals should cover the development and integration of several or all of the following issues:

- Mobile communications for secured information exchange among actors (users, service providers, operators, communities) paying particular attention to the role of the driver and the vehicle as part of the vehicle to infrastructure architecture.
- Secure, resilient and trusted communications and information storage and processing including adequate information delivery infrastructures for future customs, other controlling authorities and international transport & trade.
- Provision of position and spatial information regarding goods on the move through European GNSS applications, RFID and 3G/4G (and future network development) services.
- Web-based open platforms to enable information exchange across suppliers, manufacturers, logistics providers and retailers without necessitating costly interfaces.
- Technical and organisational guidelines for data and information system governance, technical aspects of IT solutions, business models and processes
- Deployment roadmaps for the application of collaborative systems and services—the legal and business outstanding aspects of such collaborations will be fully assessed and recommendations made as to how to split the costs of collaboration and make it attractive for users to buy into the proposed collaborative system.
- Operational and business models that include the participation of SMEs in the voluntary sharing of data and participation in collaborative business services.

The Commission considers that proposals requesting a contribution from the EU of between EUR 16 to 18 million euro would allow this specific challenge to be addressed appropriately.

Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Cloud-based data and services infrastructure, underpinned by common information models, will give all logistic stakeholders opportunities to collaborate on both an operational and strategic level. The creation of an architecture for logistics information sharing and valorisation will speed up the formation of a single logistics information space in Europe, that is accessible for the transport sector, its users and, in addition, public authorities.

Once deployed, the platform for pan-European logistics application is expected to reduce energy consumption and thus greenhouse gas emissions of the supported supply chains by at least 30% compared to the current situation.

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***



## **7. INTELLIGENT TRANSPORT SYSTEMS**

ITS provides the key to achieving the vision of seamless transport both in passenger and in goods transport markets. For passengers, seamless transport across modes and across countries will better meet their mobility needs by ensuring a wider choice of transport services. Seamless transport will also allow European citizens to make better use of the existing infrastructure when travelling and may lead to a shift to more environmentally friendly modes of transport. To reach the goal of seamless transport, at least two problems have to be solved. Firstly, a transport information system has to be developed on a European basis that provides real-time data for trips throughout Europe, combining up-to-date information from each relevant transport mode source. Secondly, the customer should have easy (one-stop-shop) access to online booking, payment and ticketing services.

The availability of open and high quality transport data will provide substantial improvements for the performance of transport networks by raising their efficiency, facilitate visibility, resilience and facilitate collaboration.

In addition to the topics of this section, other topics of this call address to some extent ITS-related issues, particularly topics MG.3.5, MG.3.6 and MG.6.1.

Proposals are invited against the following topics:

### **MG.7.1-2014. Connectivity and information sharing for intelligent mobility.**

Specific challenge: The complexity of the travel experience for individuals, including the difficulties associated with analysing and negotiating multiple available options/services, accessing the right information at the right time, and tackling the different needs of logistics services and operations, has increased significantly over the past years becoming ever more challenging and stressful.

The challenge is to come up with new, efficient, affordable, safe, secure and accessible solutions taking advantage of the ever growing connectivity of people and objects, the availability of European GNSS based location, the advances in cloud computing, big, linked and open data and the propagation of Internet and social media, that will help solve the mobility problems European citizens and businesses are facing today. Indeed, 'Big Data' management (availability, collection, storage, distribution and use) will progressively become a major challenge in intelligent transport communications as will the wider issues related to data ownership, user acceptance and privacy concerns.

Scope: Proposals could address one or several of the following activities:

- Measures to improve and maximise the availability and (cross-border/cross-system) interoperability of transport data, fostering open data policy, definition and monitoring of data quality, while considering data security and integrity related challenges to enable an open market for mobility as a service.
- Communication network architectures and solutions for real-time information exchange; new generation forecasting models to deliver high-quality traffic and travel information as well as business services to support travellers.

- Green driving support systems; active traffic management based on European GNSS location data; solutions for integrated, customised and accessible mobility services for various end-users with robust built-in predictive analytics capabilities and ways to utilise these solutions to induce positive behavioural changes in citizens to opt for more eco-friendly choices etc.

The work should extend well beyond a purely technology-driven perspective and needs to include a comprehensive understanding of the relevant market structures and business segmentation, including the identification of the key drivers and barriers that shape technology development. The integration of social media for data crowd sourcing and increasing user acceptance is core for success. Stakeholders from all sectors along the value chain have to be involved. The proposed solutions should be tested in real life conditions to prove the concepts' validity and business case.

Establishment of the right regulatory/legal framework as well as standardisation issues should, where appropriate, build on what has been developed and is operational in the various transport modes used in the logistical chain.

In line with the Union's strategy for international cooperation in research and innovation<sup>15</sup> international cooperation is encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 8 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Unlocking the potential of vast amounts of transport data and solving problems related to transmission, interoperability, storage, processing and security.
- Provision of new environmentally-friendly mobility solutions for European citizens, reducing the commuting times and improving transport system's quality and accessibility and utilisation.
- Alleviating congestion, reducing pollution levels and emergency-response times.

Type of action: Research and Innovation Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

## **MG.7.2-2014. Towards seamless mobility addressing fragmentation in ITS deployment in Europe**

Specific challenge: Although the application of technology has been the primary means of reducing the environmental impacts of transport in the last two decades, technical solutions alone cannot solve all the economic, environmental and societal problems Europe is currently facing.

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<sup>15</sup> COM(2012)497

Multimodal integrated travel information, planning and ticketing services could play a significant role in improving modal integration, thus increasing the attractiveness of collective mobility and transport modes alternative to road and hence be inclusive of user group specific needs (including cyclists or pedestrians). However, the current fragmentation of the landscape in this field, including dispersed knowledge and lack of cooperation between various stakeholders involved in service provision, does not allow the user to easily organise a door-to-door pan-European intermodal trip while taking into account the emissions that will be caused by a specific travel choice.

It also constitutes a major barrier in developing and enacting a truly comprehensive and cohesive strategy for ITS deployment in Europe.

Scope: Proposals should focus on one or several of the following domains:

- Interoperability and linking of the existing services, including necessary interfaces, in order to achieve the widest possible geographical and modal coverage to enable an open single European market for mobility services. The scope of the work should extend towards full-scale early take up and solutions should be tested on large scale.
- Developing EU-wide common minimum standards for interoperable navigation and ticketing services, thereby facilitating regional solutions compatible with generic nomad devices (smart phones etc.).
- Exploring more effective and more efficient cooperation and decision making mechanisms between stakeholders, including coordination of the existing European, national and regional initiatives, to foster EU-wide consolidation and deployment of high-quality integrated multimodal travel information, planning and ticketing services. This could encompass setting up a cooperation platform.
- Exploring mechanisms and structures for consensus building among stakeholders to foster EU-wide consolidation and deployment of cooperative ITS. This could encompass setting up a cooperation platform.
- Exploring ways to overcome the fragmentation of knowledge with regard to ITS deployment across the EU, by setting up a dedicated observatory monitoring all major developments in ITS deployment across Europe, to facilitate fact-based policy making at all levels and to engage a large number of local authorities and industrial stakeholders. Special attention should be paid to broad coverage both in geographical and thematic terms.

The Commission considers that Research and Innovation proposals requesting a contribution from the EU of between EUR 2 and 4 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The work should contribute to:

- Better modal integration by providing travellers with information about various options to travel from A to B according to their needs, thus improving European citizens' mobility in general with increased awareness of the ecological footprint of their journey.
- Increased travel time reliability.
- More efficient use of the existing transport infrastructure.

- More inclusive transport services across Europe by better responding to the special needs of population groups such as the elderly and disabled travellers.
- Better informed and more efficient policies for ITS deployment based on consolidated knowledge on the state of play across Europe and thus accelerated roll-out of the related services and technologies.

Type of action: 1) Research and Innovation Actions; 2) Coordination and Support Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## **8. INFRASTRUCTURE**

Efficient and high quality transport infrastructure is fundamental for the mobility of people and goods and for Europe's economic growth, competitiveness and territorial cohesion. Although transport infrastructure as such is well-developed within Europe, it is still fragmented, both geographically and between transport modes. Besides missing links, in particular at cross-border sections, a considerable disparity in the quality and availability of infrastructure persists within Europe.

The whole of Europe is also faced with a growing need to make infrastructure more resilient, including to climate change, to keep pace with the growing mobility needs and aspirations of people and businesses and to reduce the impact of infrastructure on the environment (air pollution, fragmentation of ecosystems, health and noise). At the same time the resources available to maintain and upgrade transport infrastructure have been declining. As a result, many elements of the surface transport infrastructure are in a deteriorating condition.

In view of the expected growth in traffic between Member States, the investment required to complete and modernise the transport network is substantial. However, infrastructure investment will face a number of important challenges in the coming years, including constrained public budgets, shortages in lending capacity and more stringent regulation in the banking system. Besides, transport infrastructures are facing growing impacts induced by climate change, including changes in frequency and intensity of extreme weather events.

Set against these multifaceted challenges, key in the future will be to find innovative solutions to increase the performance, robustness and efficiency of infrastructure for all modes of transport.

Proposals are invited against the following topics:

### **MG.8.1-2014. Smarter design, construction and maintenance**

Specific challenge: Increasing the performance of multi-modal transport infrastructure can be achieved through improving the productivity of the assets. In this context, key in the future will be to reduce drastically traffic disruptions of transport flows from inspection, construction and maintenance activities to accommodate increasing/changing traffic demand. This means fewer, faster, more sustainable and better planned interventions with maximum safety for the workers and other traffic participants. Proposals could also include, when suitable, novel design concepts, such as shared space, self-explaining infrastructure, forgiving road sides.

Scope: Proposals could address one or several of the following activities:

- Advanced, quick, cost-effective and flexible (modular) design, manufacturing, construction, maintenance, rehabilitation and retrofitting systems/techniques and materials.
- Self-monitoring, self-reporting, non-intrusive inspection and testing methods, including advanced predictive modelling.
- Reuse and recycling methods for low energy construction and maintenance of existing infrastructure.

Research in this domain should aim at validation of innovative solutions, targeting specific European geographical areas where either new construction for the completion of an efficient transport network is needed, or advanced maintenance systems are necessary to improve and extend the capacity of the existing network.

In line with the Union's strategy for international cooperation in research and innovation<sup>16</sup> international cooperation with third countries is encouraged, both with international partners willing to share advanced know-how, and with third parties (in particular neighbouring countries) needing technology transfer.

SME active participation is strongly encouraged with the aim of fostering open innovation.

New procedures and technologies in using Green Infrastructure to make transport infrastructure more resilient, less-carbon intense, maximising multiple ecosystem services and minimising fragmentation effects should be developed and tested.

Proposals can either focus on technological progress and further advancement in knowledge (Research and Innovation Actions) or on reinforcing networking among operators in all modes with a view to enhance the effectiveness of the sector (Coordination and Support Actions). Proposals should ensure coherence and avoid duplication of efforts with the INFRAVATION EraNet+.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 to 5 million euro for Research and Innovation Actions, and 0.5 to 1.0 for Coordination and Support Actions, would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Proposals are expected to deliver the following results:

- Monitoring and management systems increasing infrastructure capacity and optimising maintenance costs for all transport modes.
- New construction and maintenance techniques that enhance the performance and reliability of infrastructure.
- Provide innovative and cost-saving approaches to use Green Infrastructure for transport.
- Extending the life span of ageing transport infrastructure.
- Development and application of effective and efficient materials, technologies and tools to meet cost-effectiveness and sustainability goals.
- Reduction of multi-modal infrastructure construction and maintenance energy intensity and subsequent CO<sub>2</sub>, pollutants and noise emissions.

The work in this area should support the transition towards zero traffic disruption from inspection, construction and maintenance by 2030 and boost the overall performance of European transport infrastructure and reduce nuisances generated by transport, such as noise.

Type of action: 1) Research and Innovation Actions; 2) Coordination and Support Actions

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<sup>16</sup> COM(2012)497

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

### **MG.8.2-2014. Next generation transport infrastructure: resource efficient, smarter and safer**

Specific challenge: In order to increase the performance of infrastructure to accommodate increasing transport demand, the 21<sup>st</sup> century transport infrastructure needs to be more resource efficient, smarter and safer. This requires a range of innovative solutions, including for intelligent traffic management, low-carbon construction and energy-harvesting. In order to implement effective infrastructure management in all transport modes, advanced methods for data collection (including automatic sensing) and analysis have to be developed. In addition, a better integration of infrastructure in its natural habitat with a reduced intrusion of noise, air pollution and vibration should be achieved. Another challenge consists in developing solutions for infrastructure to actively contribute to enhancing the safety level of the European roads.

Scope: Research and innovation actions could address any of the following domains:

- Infrastructure specific solutions for enhanced cross-modal inter-connectivity and active traffic management, leveraging European GNSS enabled real-time location data, capable of providing optimal responses to changes in conditions of the network (e.g. weather, works, incidents) by all actors in the value chain (infrastructure operators, owners and users).
- Innovative concepts and methods for alternative fuels infrastructure (in particular for roads and ports) to facilitate its deployment in Europe.
- Energy harvesting infrastructure.
- Infrastructure-based pro-active safety systems, including advanced predictive models and simulations.
- Methods for preventing disruption of critical infrastructure from malicious acts.

Proposals can either focus on technological progress and further advancement in knowledge (Research and Innovation Actions) or on reinforcing networking among operators with a view to enhance the effectiveness of the sector (Coordination and Support Actions).

In line with the Union's strategy for international cooperation in research and innovation<sup>17</sup> international cooperation is encouraged.

Effective integration of SMEs in the value chain is strongly recommended.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 to 5 million euro for Research and Innovation Actions, and 0.5 to 1.0 for Coordination and Support Actions, would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

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<sup>17</sup> COM(2012)497

Expected impact: The work is expected to contribute to:

- Improvement of infrastructure capacity and incident management by means of added-value mobility services across different modes.
- Deployment of alternative fuels infrastructure in Europe according to the Clean Power for Transport Package objectives.
- Reduction of infrastructure operation energy intensity and subsequent CO<sub>2</sub>, pollutants and noise emissions.

Type of action: 1) Research and Innovation Actions; 2) Coordination and Support Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

### **MG 8.3-2015 Facilitating market take up of innovative transport infrastructure solutions**

Specific challenge: The White Paper ‘Towards a Single European Transport Area’ aims at the completion of efficient, interoperable and integrated transport infrastructure network by 2050. These long term goals can only be achieved when infrastructure innovation, supported by targeted up-stream research activities, is deployed at integrated system level. However, testing and implementing solutions at system level is much more challenging than at component level in view of the number of technological and organisational parameters involved, their interdependency, the scale of investment and the potential impact on stakeholders.

Although many technological solutions relative to transport infrastructure are already available for all transport modes, the challenge consists in overcoming highly fragmented demand. Decision-makers (mainly from the public sector) are often unaware of the availability and efficiency of highly innovative solutions and are not familiar with the use of public procurement for innovation.

Scope: Actions should lead to the improvement and capacity building in the field of public purchasing of innovative solutions in transport infrastructure leading to implementation of best available solutions on cross-border TEN-T network business cases representative of typical European situations. Proposals should be driven by clearly identified procurement needs of infrastructure owners (the procurers), including life-cycle and cost-benefit assessments and should effectively control budget across various European regions. The work should contribute to the revision /development of relevant standards and regulatory framework. Good practises should be made available for replication.

The Commission considers that proposals requesting a contribution from the EU of between EUR 7 to 13 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The selected actions are expected to:

- Serve as pilot projects to demonstrate the effectiveness of advanced technological solutions in reducing the total cost of ownership of transport and the effectiveness of new supply chain models and contractual arrangements.



- Allow for a better coordinated dialogue between procurers and suppliers contributing to long-lasting stakeholder partnerships with clearly defined roles and responsibilities.
- Contribute to competence building in the sector by enabling public procurers to improve their knowledge about available innovative solutions and leveraging the benefits of European cooperation in exchanging experience in procurement practices.
- Build a coherent basis for progressive step changes to regulation, standardisation and public procurement practices fostering innovation and sustainability in transport infrastructure.

Type of action: Public Procurement of Innovative Solutions Cofund (a joint call for Public Procurement of Innovative Solutions will be organised by a consortium of public procurers).

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

### **MG.8.4-2015. Smart governance, network resilience and streamlined delivery of infrastructure innovation**

Specific challenge: Infrastructure owners and operators need to ensure the best possible return from increasingly limited transport infrastructure investment funds. The main challenge is to overcome the lack of a common framework for governance, management and finance of transport infrastructure projects (including methodologies and modelling) with the aim to enable transparent, risk-based optimisation of investments within and across the modes. This includes issues such as resilience against climate change and other disturbances. Additionally, it is necessary to enhance the industry's practices and capacities in order to raise the productivity, quality and timeliness of infrastructure projects.

Scope: Proposals could address one or several of the following aspects:

- Development of whole system planning environments (based e.g. on virtual design concepts) to support the streamlined delivery of infrastructure projects from concept to deployment. In this respect, the rail sector deserves particular attention.
- Innovative, harmonised and lean procurement processes, accompanied by adequate monitoring systems, contracting and tendering methods; management tools to provide help in innovation delivery.
- Solutions for advanced infrastructure capacity planning and modelling for all transport modes.
- Solutions for optimal cost-effectiveness, including network resilience, mapping of climate risk hot-spots, including under climate change, together with appropriate adaptation measures and cross-modal implementation strategies.
- Solutions for advanced asset management, advanced investment strategies and innovation governance, including smart monitoring systems (such as Structural Health Monitoring) and adequate indicators for cost and quality.

SME active participation is strongly encouraged.

The work will focus either on further advancements in knowledge where technological progress is still needed (Research and Innovation Actions), or on implementing innovative

technologies in real life conditions via large scale demonstration actions (Innovation Actions). The need for strengthening the network between infrastructure owners and operators in view of enhancing the effectiveness of the sector could be approached through appropriate coordination schemes (Coordination and Support Actions).

Expected impact:

- Accelerated delivery of transport infrastructure through improved, transparent and harmonised investment decision making at a European level, balancing performance with cost (in terms of Total Cost of Ownership) and risk.
- Improved predictive capacity and maintenance planning of the European transport infrastructure network, including determination of the optimal balance between long-term renewal and short-term maintenance.
- Improved assessment of risks related to impacts of climate change and evaluation of possible measures of adaption.
- Faster adoption of innovation as a result of reinforced coordinated public-private partnerships, for example through (pre-competitive) innovation procurement procedures.
- Competence building in the area of transport infrastructure management, resulting in strong (public-sector) capabilities across the value chain of planning, delivery and operations.

Type of action: 1) Research and Innovation Actions; 2) Innovation Actions; 3) Coordination and Support Actions.

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## **9. SOCIO-ECONOMIC AND BEHAVIOURAL RESEARCH AND FORWARD LOOKING ACTIVITIES FOR POLICY MAKING**

Socio economic, behavioural and forward looking activities – including user needs and behaviour, transport economics, data, models, scenarios and policy support actions – are necessary to tackle effectively the transport related challenges.

To help generate the innovative solutions that Europe needs for smarter, greener and more integrated transport and mobility, the 'social sciences and humanities' dimension is embedded as an essential component of the Transport work programme, across several research sections and topics of this call.

Section 9 addresses cross-cutting / cross-modal issues, which are intended to complement and underpin the activities covered in the other sections of this work programme. This section includes in particular topics aimed at understanding societal drivers, monitoring social trends, user behaviour and mobility patterns, strengthening the research and innovation strategies of the European transport industries, fostering transnational cooperation, and promoting the interest of students and researchers in Transport research and innovation.

In addition to the present section, socio-economic and forward looking activities are included also in 'Other actions'. In particular, two calls for tenders address the development of a public European environmental modelling for aviation, and the setting up of a platform for models, data collection, technology watch and scenarios, which will result in a better understanding of European transport and mobility patterns, trends and needs.

Proposals are invited against the following topics:

### **MG.9.1-2015. Transport societal drivers<sup>18</sup>**

Specific challenge: A sound understanding of behavioural and societal factors –including economic, social, demographic, cultural and gender issues where relevant- that influence transport demand and supply is needed to ensure that, in shaping transport policies and research and innovation activities, the values, needs and expectations of the society are met.

Scope: A forum for communication, collaboration, relationship-building should develop multi-stakeholder interactions and produce an action plan for innovative solution/options for transport and mobility to advance the agenda of the transport sector and society at large. The work should be inclusive of the state of the art of ideas, trials and business endeavours on new mobility concepts.

Stakeholders from within and outside the sector should be involved, in particular: policy makers, civil society organisations, end-users, industry including suppliers (vehicles and components – all modes) and transport service providers, academia and research

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<sup>18</sup> This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the Innovation and Networks Executive Agency (INEA) and will be implemented by the Commission services.

organisations. These actors, by being engaged in this collaborative and knowledge-mobilisation process, will learn to explore together the most appropriate and viable solutions. Links and synergies with transport-related European Technology Platforms (ETPs) and the on-going TRANSFORUM<sup>19</sup> project would add significant value.

The action plan should focus on:

- Understanding user needs, mobility choices, aspirations and behaviours.
- Assessing how new mobility concepts would contribute to the overall transport efficiency.
- Exploring implications for policies, regulations, standards, forms of governance.
- Analysing societal resistance to acceptance of emerging transport technologies and services.
- Exploring market opportunities alongside the innovation chain, including services.
- Foster consensus-building and public-engagement, thus facilitating the dissemination of good practices and the deployment of innovative transport and mobility solutions.

Dedicated outreach activities to foster awareness and engagement of transport users and of the young generations in particular should be undertaken, in order to enable the development of responsible and innovative attitudes as regards their mobility behaviour.

In view of an appropriate potential impact, the Commission will positively evaluate proposals having a minimum duration of three years, partners coming from at least 10 different countries and from all the above-mentioned types of organisations. The maximum EC contribution cannot exceed EUR 3 million.

Expected impact: The setting up of this participatory framework is expected to:

- Ensure an inclusive approach in providing a comprehensive overview of new forms of mobility and transport, and their implications for users, the environment, society as a whole and policy makers.
- Enhance and better target transport policies and research and innovation priority setting.
- Address the mobility needs of specific groups and communities (accessibility; affordability, inclusiveness, safety, ageing population, etc.).
- Promote innovative/alternative business models and social innovation.
- Enhance corporate social and environmental responsibility.

Type of action: Coordination and Support Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

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<sup>19</sup> <http://www.transforum-project.eu/>

## **MG.9.2-2014. User behaviour and mobility patterns in the context of major societal trends<sup>20</sup>**

Specific challenge: There is a lack of understanding of the role of user behaviour in modal choice and mobility patterns. For example, it is not clear which factors influence user behaviour and with what intensity. In addition, it is not clear how major societal trends, such as ageing or urbanisation, or trends in family composition, working and living patterns, impact on user behaviour. A better understanding of these issues and their complex interactions and impacts will support the development of innovative transport products and services. It will also underpin policy geared towards sustainable mobility at different spatial levels.

Scope: Proposals should build on existing knowledge and aim at establishing and progressing the state of the art in research on transport behaviour and its implications for modal choice and mobility patterns. Existing and possible future research and innovation avenues should be mapped. The work should rely as much as possible on available data. Proposals should at least address the following aspects:

- The factors that influence user behaviour in relation to the use of private and public transport, covering all transport modes as well as 'new modes' such as car sharing, bike sharing and tram-trains. The analysis should take into account the characteristics and specific needs of the various user groups (elderly, young, single parents, women, employed and unemployed, immigrants, etc.) in order to obtain insight on the relations between socio-economic conditions and mobility attitudes.
- The evolving mobility patterns at different spatial levels, taking into account the main socio-economic conditions and trends in Europe. Compare mobility patterns in different parts of Europe and/or different spatial levels (e.g urban, peri-urban, rural, regional, national, European, etc). The impacts on the requirements of the current and future European transport system should be considered.
- Taking into account the main societal trends, the possible ways to cater for future mobility needs through the provision of new or adapted transport products and services, including the assessment of the related business models, organisational models and identification of the appropriate policy context. The implications for the various user groups and on staff requirements and working conditions should be considered.
- The role of emerging information and communication technologies, including the opportunities provided by cloud computing, in collecting data on user behaviour and mobility patterns and in offering new, user-friendly products and services that may influence user behaviour through information provision, transport system management and changes in working and living locations.

Expected impact:

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<sup>20</sup> This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the Innovation and Networks Executive Agency (INEA) and will be implemented by the Commission services.

- The work is expected to collect and generate new knowledge on user behaviour and its impact on transport and mobility patterns, in the light of societal trends and the evolving user expectations; and to help facilitate acceptance of innovative more sustainable mobility options
- This will also enable transport policy makers, authorities and public and private product and service providers at various levels to design more effective and viable solutions, with a view to a more sustainable and user friendly transport system.

Type of action: Coordination and Support Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

### **MG.9.3-2014. Analysis of funding schemes for transport infrastructure<sup>21</sup>**

Specific challenge: Transport infrastructure has been traditionally considered as a precondition for economic development at various geographical levels (local, regional, national, European). At the same time the reduced capability of public budgets to fund directly transport infrastructure has led in recent years to the adoption of funding schemes involving private funds and contractual models known as public-private partnerships (PPP). These schemes have been in operation across Europe for several years already, in different arrangements and with varying degrees of success in each case.

This action should provide a comprehensive analysis of alternative funding schemes (public, PPP or other) based on the existing experiences in different transport sectors and geographical areas, and assess their impact with regard to economic development, value for public money, user benefits, life-cycle investment (including maintenance), efficiency, governance and procurement modalities, etc.

Scope: Proposals should address the following aspects:

- Drawing the lessons to be learned from the actual experience of different forms of PPP and other procurement practices for funding infrastructure projects across the different transport sectors and parts of Europe.
- Identify and analyse possible limitations of PPP and other funding schemes (such as: lack of flexibility, dependence on the banking sector, risk sharing, pricing and social acceptance, etc.) and suggest solutions in order to overcome them.
- Analyse the effects of the recent economic and financial crisis on funding transport infrastructure (including its operation and maintenance) throughout Europe and their impact on the different funding schemes.
- Assess the potential of transport investments and the related funding schemes, including innovative procurement schemes still in a pilot phase, to contribute to economic

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<sup>21</sup> This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the Innovation and Networks Executive Agency (INEA) and will be implemented by the Commission services.

recovery, growth and employment, in view of future infrastructure needs with a 2050 horizon.

Expected impact: The work is expected to give policy makers and providers of funding extensive comparative information on the advantages and limitations of different funding schemes for transport infrastructure projects, including innovative schemes still in exploratory phase, thus facilitating decision making on the design and implementation of future infrastructure projects.

It is also expected to improve the awareness of policy makers on the needs for projects serving an efficient and performing transport infrastructure network with the horizon 2050 and their potential contribution to economic recovery, growth and employment.

Type of action: Coordination and Support Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

#### **MG.9.4-2014. Research, technology development and market prospects for the European transport industries<sup>22</sup>**

Specific challenge: European transport industries across sectors are well positioned in the global market. However, they are faced with new challenges stemming from the need to move to smart, green and sustainable transport technologies and systems within a relatively short period of time as well as from increasing international competition, changes in mobility demand and development in the European workforce. The challenge is to provide an overview of research, technology development and innovation capacities and strategies of the European transport industries, and identify present and emerging market prospects at a global scale, making use of diverse data and information sources.

Scope: Proposals should address the following aspects:

- Analyse the investment trends, productivity levels, technology choices and options, industrial strategies, research and technology development capabilities and funding efforts of the European producers of transport means, including manufacturers of vehicles, equipment, components and systems, in the automotive, aeronautical, ship-building and rail vehicle industries; and transport service industries. In doing so, the analysis should build on existing knowledge, including previous Seventh Framework Programme projects.
- Assess the competitive advantages and disadvantages of those industries in relation to their main competitors world-wide; project their global market share prospects and consider the resulting employment impacts in terms of quantity and quality. Analyse the economic potential of new technologies, products, services and markets and their role in the determination of the industrial and commercial strategies of the major European players; and assess the success factors of those strategies.

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<sup>22</sup> This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the Innovation and Networks Executive Agency (INEA) and will be implemented by the Commission services.

- Consider the incidence of legislative and regulatory frameworks at national and supranational level on industrial practices, innovation potential and global competitiveness of European industries.
- Explore the specific areas and conditions under which targeted international cooperation activities can be usefully pursued in a way that is compatible with European industry needs, competition rules and the European interest.

Expected impact:

- The work is expected to provide a comprehensive picture of the research and technology development capabilities, innovation challenges and market prospects of the European transport industries, taking into account the heterogeneous nature, future demand and employment trends of the transport sector.
- It will enable stakeholders and policy makers to identify possible gaps in the research, technology development and innovation capacities and strategies of European transport industries, particularly with regard to emerging market prospects, and elaborate appropriate measures at a corporate and policy level.

Type of action: Coordination and Support Action

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

**MG.9.5-2015. Fostering transnational cooperation in European transport research and innovation – National Contact Point (NCP) network<sup>23</sup>**

Specific challenge: Facilitate trans-national co-operation between NCPs within the Transport Challenge with a view to identifying and sharing good practices and raising the general standard of support to programme applicants, taking into account the diversity of actors that make up the constituency of the Transport Challenge.

Scope: Support will be given to a network of formally nominated NCPs in the area of Transport. The activities will be tailored according to the nature of the area, and the priorities of the NCPs concerned. Various mechanisms may be included, such as benchmarking, joint workshops, enhanced cross-border brokerage events, specific training linked to the Transport Challenge as well as to gender dimension of Research and Innovation, and twinning schemes. Special attention will be given to enhance the competence of NCPs, including helping less experienced NCPs rapidly acquire the know-how accumulated in other countries.

The focus throughout should be on issues specific to the Transport Challenge.

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<sup>23</sup> This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the Innovation and Networks Executive Agency (INEA) and will be implemented by the Commission services.



Only NCPs from EU Member States and Associated Countries which have been officially appointed by the relevant national authorities are eligible to participate in and receive funding for this action.

The consortium should have a good representation of experienced and less experienced NCPs.

Submission of a single proposal is encouraged. NCPs from EU Member States or Associated Countries choosing not to participate should be identified and the reason explained in the proposal. These NCPs are nevertheless invited and encouraged to participate in the project activities, and are eligible for reimbursement of their participation.

The Commission will only fund one proposal under this heading.

Expected impact:

- An improved and professionalised NCP service across Europe, thereby helping simplify access to Horizon 2020 calls, lowering the entry barriers for newcomers, and raising the average quality of proposals submitted.
- A more consistent level of NCP support services across Europe.

Type of action: Coordination and Support Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### **MG.9.6-2014. Strengthening the research and innovation strategies of the transport industries in Europe<sup>24</sup>**

Specific challenge: The specific challenge is to strengthen the willingness and capability of European transport industries and other transport stakeholders to collaborate at European level in identifying their common research and innovation needs and defining the corresponding objectives, agendas and roadmaps.

Scope: Proposals could address some or all of the following activities:

- Updating of research agendas and roadmaps at modal and multi-modal level, taking into account user needs and policy requirements.
- Defining implementation plans, based on business scenarios, the research agendas and roadmaps.
- Monitoring the status of progress of transport research and innovation activities towards the commonly identified needs and agreed objectives.
- Developing links and coordination strategies between the transport-related ETPs and technology platforms existing at national level in Member States and Associated Countries, in order to ensure synergies and convergence.

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<sup>24</sup> This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the Innovation and Networks Executive Agency (INEA) and will be implemented by the Commission services.

- Increasing visibility of research and innovation activities, and contributing to the dissemination of results, through large conferences, thematic events, showcases, databases, website support, newsletters and other publications, including coordination with large transport events, such as Transport Research Arena conference, and cooperation with the Transport Research and Innovation Portal (TRIP) and relevant ERA-NETs.

The action will assist the transport-related European Technology Platforms (ETP), the European Commission (EC) and Member States and Associated Countries in defining research needs for their strategies and programmes in order to realise the objectives of the Europe-2020 strategy, especially the Innovation Union and Horizon 2020, as well as the vision of the White Paper 2011 ‘Roadmap to a single European transport area’.

Consortia must be made-up of leading European transport research experts from both industry and research providers. The implementation of this action requires close collaboration with the ETPs dealing with transport research and innovation, as well as with other related initiatives and entities. Cooperation with EU services will be an essential element.

Expected impact: This action is expected to optimise the research and innovation capacities of Europe in the Transport sector, to improve communication, dissemination and use of results, and to help defining relevant transport policies.

Type of action: Coordination and Support Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### **MG.9.7-2014. Innovation awards for students and researchers in the context of the Transport Research Arena conference - TRA 2016<sup>25</sup>**

Specific challenge: To promote the interest of students and researchers on research and innovation in the transport sector, by rewarding the best innovative ideas and research achievements in this field.

Scope: The objective of this action is to organise two competitions for transport research and innovation awards to be announced at the TRA conference in 2016:

- A competition for students and young researchers with the goal of stimulating the interest among young researchers/students in the field of transport.
- A competition for senior researchers in the field of innovative transport concepts based on results from EU-funded projects only.
- Both competitions will cover all transport modes and cross-cutting issues in line with the EU policy objectives for smart, green and integrated transport. The organisation of

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<sup>25</sup> This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the Innovation and Networks Executive Agency (INEA) and will be implemented by the Commission services.

these awards should ensure high-quality competition and very good media coverage before, during and after the TRA conference.

The action should give particular attention to gender issues.

Expected impact: This action is expected to increase the attractiveness of transport related studies and reinforce the pursuit of excellence in European transport research and innovation, by giving recognition and visibility to the best achievements. The TRA conference is expected to efficiently disseminate knowledge and results of European and national research projects in the area of transport and thus improve the development and deployment of innovative solutions for transport in Europe.

Type of action: Coordination and Support Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## CONDITIONS FOR THE ‘MOBILITY FOR GROWTH’ CALL

Publication date: 11/12/2013

Deadlines<sup>2627</sup>:

Topics	Dates	
MG.1.4, MG.1.6, MG.1.7, MG.1.8(CSA part) MG.9.2, MG.9.3, MG.9.4, MG.9.6, MG.9.7	Single stage 27/03/2014 at 17.00.00 Brussels time	
MG.7.2(CSA part) MG.8.1(CSA part), MG.8.2(CSA part)		Single stage 28/08/2014 at 17.00.00 Brussels time
MG.1.8(RIA part) MG.9.1, MG.9.5	Single stage [31/03/2015 at 17.00.00 Brussels time]	
MG.5.5(CSA part) MG.8.4(CSA part)		Single stage [27/08/2015 at 17.00.00 Brussels time]
MG.1.1, MG.1.3, MG.1.5 MG.2.1, MG.2.2, MG.2.3 MG.3.1, MG.3.2, MG.3.3, MG.3.4, MG.3.5 MG.4.1, MG.4.2, MG.4.4 MG.5.1, MG.5.2, MG.5.3 MG.6.1, MG.6.2 MG.7.1, MG.7.2(RIA part) MG.8.1(RIA part), MG.8.2(RIA part)	First stage 18/03/2014 at 17.00.00 Brussels time	Second stage 28/08/2014 at 17.00.00 Brussels time
MG.1.2 MG.3.6	First stage [31/03/2015 at 17.00.00	Second stage [27/08/2015 at 17.00.00

<sup>26</sup> The Director-General responsible may delay this deadline by up to two months.

<sup>27</sup> The deadlines provided in brackets are indicative and subject to a separate financing decision for 2015.

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MG.4.3 MG.5.4, MG.5.5(RIA part) MG.6.3 MG.8.4(RIA part)	Brussels time]	Brussels time]
MG.8.3		[27/08/2015 at 17.00.00 Brussels time]

Overall indicative budget: EUR 558.50 million from the 2014<sup>28</sup> and 2015<sup>29</sup> budgets (for 2014 – EUR 374.50 million and for 2015 – EUR 184.00 million).

The indicative distribution of the call budget is as follows:

Topics	2014 EUR million	2015 EUR million	
MG.1.1 MG.1.3 MG.1.5	52.00	–	All two stage
MG.1.4	15.00		Single stage
MG.1.2		20.00	Two stage
MG.1.6 MG.1.7 MG.1.8(CSA part)	3.00	–	All single stage
MG.1.8(RIA part)	–	16.00	Single stage
MG.2.1 MG.2.2	36.00	–	All two stage
MG.2.3	16.00		Two stage
MG.3.1 MG.3.2	46.00	–	All two stage

<sup>28</sup> The budget amounts for 2014 are subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget for 2014 by the budgetary authority or if the budget is not adopted as provided for in the system of provisional twelfths.

<sup>29</sup> The budget amounts for 2015 are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2015.

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MG.3.3 MG.3.4			
MG.3.5(CSA part)	1.00	–	Single stage
MG.3.5(RIA part)	19.00	–	Two stage
MG.3.6(CSA part)		1.00	Single stage
MG.3.6(RIA part)	–	22.00	Two stage
MG.4.1 MG.4.2 MG.4.4	56.00	–	All two stage
MG.4.3	–	18.00	Two stage
MG.5.1 MG.5.2 MG.5.3	40.00	–	All two stage
MG.5.4	–	9.00	Two stage
MG.5.5(RIA part)	–	54.50	Two stage
MG.5.5(CSA part)	–	3.00	Single stage
MG.6.1 MG.6.2	32.00	–	All two stage
MG.6.3	–	18.00	Two stage
MG.7.1 MG.7.2(RIA part)	28.00	–	All two stage
MG.7.2(CSA part)	3.00	–	Single stage
MG.8.1(RIA part) MG.8.2 (RIA part)	16.00	–	All two stage

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MG.8.1(CSA part) MG.8.2 (CSA part)	3.00	–	All single stage
MG.8.3	–	13.00	Public Procurement of Innovative Solutions
MG.8.4(RIA part)	–	3.00	Two stage
MG.8.4(CSA part)	–	1.50	Single stage
MG.9.1	–	3.00	Single stage
MG.9.2 MG.9.3 MG.9.4	5.00		Single stage
MG.9.5		2.00	Single stage
MG.9.6	3.00		Single stage
MG.9.7	0.50		Single stage

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following exceptions:

MG.8.1 MG.8.2 MG.8.4	Research and innovation actions proposals have to indicate the obligation to provide a plan for the exploitation and dissemination of results, which will be a clause in the grant agreement of the selected proposals.
MG.9.1	Minimum duration: 3 years. Participants: all types of organisations mentioned in the topic description, and at least 10 different countries. Maximum EU contribution: EUR 3 million.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme, with the following exceptions:

All two stage topics	The conditions for a proposal to succeed at first stage are the following: The proposal must pass all thresholds, and must be ranked equal or higher
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	to the rank where the cumulative requested budget equals 2.5 times the indicative available budget for the corresponding ranking list.
MG.1.4, MG.1.6, MG.1.7, MG.1.8(CSA part) MG.9.1, MG.9.2 MG.9.3 MG.9.4 MG.9.5, MG.9.7	Up to one proposal is expected to be funded per topic or domain (see topic text).

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes.

The full evaluation procedure is described in the relevant guide associated with this call.

- Indicative timetable for evaluation and grant agreement:

Topics	Information on the outcome of the evaluation ( <i>single or first stage</i> )	Information on the outcome of the evaluation ( <i>second stage</i> )	Indicative date for the signing of grant agreements
MG.1.4, MG.1.6, MG.1.7, MG.1.8  MG.3.5(CSA part), MG.3.6(CSA part) MG.5.5(CSA part) MG.7.2(CSA part) MG.8.1(CSA part), MG.8.2(CSA part), MG.8.4(CSA part)  MG.9.1, MG.9.2, MG.9.3, MG.9.4, MG.9.5 MG.9.6, MG.9.7	Maximum 5 months from the final date for submission		Maximum 3 months from the date of information applicants
MG.1.1, MG.1.2, MG1.3, MG.1.5	Maximum X months from the final date	Maximum 5 months from the final date	Maximum 3 months from the date of



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MG.2.1, MG.2.2, MG.2.3 MG.3.1, MG.3.2, MG.3.3, MG.3.4, MG.3.5(RIA part), MG.3.6(RIA part) MG.4.1, MG.4.2, MG.4.3, MG.4.4 MG.5.1, MG.5.2, MG.5.3, MG.5.4, MG.5.5(RIA part) MG.6.1, MG.6.2, MG.6.3 MG.7.1, MG.7.2(RIA part) MG.8.1(RIA part), MG.8.2(RIA part), MG.8.4(RIA part)	for submission	for submission	information applicants
MG.8.3			

Consortia agreements: In line with the Rules for Participation and the Model Grant Agreement, participants in Research and Innovation Actions or in Innovation Actions are required to conclude a consortium agreement prior to grant agreement.

## **CALL ‘GREEN VEHICLES’**

***H2020-GV-2014/2015***

This call of the Transport Challenge represents an essential component of road transport research and innovation. It includes research, technological developments, innovation and demonstration in support of improvements in energy efficiency of road transport vehicles and the use of new types of non-conventional energies into road transport such as electricity, CNG and LNG, renewable and tailored fuels.

The scope of the activities include both advanced power-train technologies and new vehicle architectures, weight reduction, improved aerodynamics and rolling resistance and component development for alternative fuel vehicles. Concerning new forms of energy, the interfaces between the vehicles and the recharging infrastructure will also need to be taken into account with particular attention to standardisation issues. Demonstration activities will play an essential role in ensuring a proper and timely deployment of the new technologies. In this respect, innovation activities linked with other EU funding mechanisms such as cohesion and regional funds should be considered.

This call has been defined taking into account the other calls and initiatives where the Transport Challenge is concerned, particularly the calls on ‘Mobility for Growth’ and ‘Smart Cities and Communities’, and the ‘Fuel Cells and Hydrogen 2’ joint undertakings. Multi-sectorial research involving other research and innovation areas such as Energy and Environment coupled with research on new materials, advanced production and Information and Communication Technologies will be encouraged, particularly in fields such as advanced energy storage systems and interfaces between vehicles and energy recharging infrastructures.

In addition to the topics of this call, a topic on post lithium ion batteries for electric automotive applications” (NMP 17 – 2014) is included in “Nanotechnologies, Advanced Materials and Advanced Manufacturing and Processing (NMP)” under “Leadership in Enabling and Industrial Technologies” (LEIT).

Proposals are invited against the following topics:

### **GV.1-2014. Next generation of competitive lithium ion batteries to meet customer expectations**

Specific challenge: It is important that next generations of electric and plug-in hybrid vehicles incorporate basic electric components, such as electric batteries and their constituent components, that are manufactured in Europe. This is not the case for the first generation of these vehicles that incorporate non-European battery technologies. The challenge to be addressed is the development of new materials, facilities and technologies for advanced Li-ion batteries to support the development of a strong European industrial base in this field. This challenge is complementary to the above mentioned battery electrochemistry topic pursuing longer terms solutions in the Advanced Materials Work Programme of 2014.

Scope: The activities should be based on a multidisciplinary approach to pursue the optimisation of the electrochemistry to hone parameters critical to customer acceptance: cost,

safety aspects, resistance to high-power charging, durability, recyclability and the impact of hybridisation with other types of storage systems (e.g. ultracapacitors), as well as consideration of scale-up for manufacturing.

In addition, better knowledge on the ageing mechanism and its modelling are needed in order to support test procedures and the development of standards. In line with the Union's strategy for international cooperation in research and innovation<sup>30</sup> international cooperation to establish world-level standard is encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 8 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Research and innovation activities will bring European industry to a stronger position on the world market making it possible to launch new production in Europe while at the same time addressing the shortcomings of electric cars as compared to conventional cars (e.g. cost and weight reduction, safety, reliability, longevity and fitness for charging under real world conditions). The proposed solutions should demonstrate industrial scale prototypes improving cell-level energy densities by at least 20%, and costs by 20%, with respect to the best cell chemistries currently on the market.

Type of action: Research and Innovation Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

## **GV.2-2014. Optimised and systematic energy management in electric vehicles**

Specific challenge: Range limitation, due to the limited storage capacity of electric batteries, is one of the major drawbacks of electric vehicles. The main challenge will be to achieve a systematic energy management of the vehicle based on the integration of components and sub-systems. The problem is worsened by the need to use part of the storage capacity in order to feed auxiliary equipment such as climate control. In extreme conditions up to 50% of the batteries' capacity is absorbed by these systems. The systematic management of energy in electric vehicles is a means to gain extended range without sacrificing comfort. The challenge is therefore to extend the range of electric vehicles in all weather conditions.

Scope: Proposals should address the combination of the following developments: comprehensive thermal management system (including thermal insulation, innovative heating and cooling approaches), battery life duration enhancement as a side effect of thermal management, electronic control of energy and power flows, energy efficiency of electrified accessories, energy harvesting functions and automated and eco-driving strategies.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 to 8 million euro would allow this specific challenge to be addressed appropriately.

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<sup>30</sup> COM(2012)497

Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Research and innovation activities will contribute to a faster introduction of electric and plug-in hybrid cars. Cars autonomy will be increased thanks to a reduction of at least 50% of energy used for passenger comfort and at least 30% for component cooling in extreme conditions with reference to electric vehicles currently on the market.

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### **GV.3-2014. Future natural gas powertrains and components for cars and vans**

Specific challenge: The challenge is to reach the fleet level of 95g CO<sub>2</sub>/km and 147g CO<sub>2</sub>/km emissions targets for passenger cars and light duty commercial vehicles respectively (according to the new Worldwide harmonised Light Vehicle Test Procedure), through the development of advanced engine and after-treatment concepts adapted and optimised to use natural gas. Significant reductions in terms of real driving emissions of NO<sub>x</sub> and PM are also expected.

The technology needs to be competitive with respect to current vehicles using conventional fuels. Therefore the challenge can only be reached if vehicles demonstrate a driving range of at least 600 km with no space penalty in comparison to gasoline vehicles.

Scope: Activities should focus on any combination of combustion process optimisation, variable compression, control systems, dual fuel operation, optimised fuel injection, adaptive systems and sensors to cope with different qualities and blends, after-treatment systems, advanced fuel tanks, ancillaries and overall powertrain optimisation.

The Commission considers that proposals requesting a contribution from the EU of between EUR 10 to 20 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: One demonstrator vehicle per platform/technology will prove, by independent testing, real driving emissions at least below upcoming Euro 6 limits, and will confirm the achievement of a reduction of at least 20% in CO<sub>2</sub> emission levels (including CO<sub>2</sub> equivalent unburned methane and N<sub>2</sub>O) compared with the best vehicles on the market in 2013. The research will develop technologies needed to progress towards the establishment of a future ‘Super Low Emission Vehicles’ standard expected to deliver 70% lower NO<sub>x</sub> emissions than Euro 6.

Type of action: Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### **GV.4-2014. Hybrid light and heavy duty vehicles**

Specific challenge: The competitiveness of European road vehicle manufacturers is based on technological leadership particularly on system optimisation and affordability, particularly with respect to powertrains. The challenge is to recover a leading position in hybrid technology. The technology will also have positive effect on the reduction of CO<sub>2</sub> emissions from road transport and air quality.

Scope: The research should develop new knowledge on hybrid components (storage system power electronics, etc.) and system engineering, simulation and technology integration with the aim of achieving hybrid powertrain weight and cost reduction, increased functionality, simplification of complex systems, efficiency and affordability while decreasing emissions and improving performance, comfort and functional safety. For light vehicles, preference would be given to concepts providing significant zero emission ranges. The research should be validated through at least one demonstrator for each platform subject of research.

The Commission considers that proposals requesting a contribution from the EU of between EUR 10 to 20 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The research will achieve a 20% powertrain efficiency improvement and a 20% powertrain weight and volume reduction with respect to the best in-class full hybrid vehicles on the market in 2013, while having a maximum 10% cost premium on the conventional model on which the demonstrator is based. To meet air quality targets, the research will prove, by independent testing real driving emissions at least below upcoming Euro 6 limits. The research for light vehicles will develop technologies needed to progress towards the establishment of a future ‘Super Low Emission Vehicles’ standard expected to deliver 70% lower NO<sub>x</sub> emissions than Euro 6.

Type of action: Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## **GV.5-2014. Electric two-wheelers and new light vehicle concepts**

Specific challenge: Europe has to face tough challenges in the field of air quality, noise and environmental protection, traffic congestion, competitiveness and jobs preservation. This calls for new and more efficient mobility concepts. L category vehicles are well placed to answer the demands for less energy consumption and affordability. They represent an attractive solution in congested cities with scarce parking space. The challenge is to develop a new generation of electrified powertrains for L category vehicles that are quiet, clean, energy efficient and safe and to investigate radically new light vehicle concepts for personal mobility in urban areas.

Scope: The research should focus on energy efficiency improvements for a wide range of vehicle types (from mopeds to quads and light quadricycles). Research will address cost efficiency, integration and modularity of battery packs, electric and plug-in hybrid powertrains, system integration and innovative vehicle architecture. The scope also includes the development and proof of concept of new ultra-light vehicles for passengers taking into account their integration with infrastructure and, where appropriate, considering any

necessary changes to homologation requirements and regulations to allow their use. The project results will be validated through demonstrators.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 8 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The research will contribute to a significantly reduction of emissions (real driving emissions below Euro 5 level should be demonstrated for hybrids) and noise, congestion, greenhouse gas emissions and energy consumption. The research will also enhance the competitive position of the European industry. Research in this area will also support the implementation of the Clean Power for Transport strategy by developing the next generation of alternatively powered light urban e-vehicles.

Type of action: Innovation Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

## **GV.6-2015. Powertrain control for heavy-duty vehicles with optimised emissions**

Specific challenge: Reducing real driving emissions and consumption of heavy duty road haulage is one of the main societal challenges for the sector. Fuel efficiency and emissions reduction are sometimes dependent on how they interact with each other and with the specific vehicle application and operating conditions. The challenge is therefore to develop new means of flexible and global engine and emissions control in an optimal way for each application in order to maximise the potential utilisation of the individual systems.

Scope: Research should be performed on methods how to optimise the control of powertrains taking into account specific transportation tasks. This can be achieved by using the information provided by new generation navigation systems and emission sensors linked to the On Board Diagnosis/On Board Measuring system in combination with electronics and actuators. The strategy will use data such as transport assignment (total weight, vehicle configuration, etc.), traffic and weather conditions, topography and road network on the chosen route, driving patterns of the surrounding vehicles, the state of the combustion engine, after treatment and transmission, monitored emissions emitted, etc. The resulting technology should deliver a global optimum for consumption (for both fuel, electric energy and other consumables related to emission control such as urea or ammonia) and noxious emissions on each mission, to be validated through a demonstrator.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 7 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: A reduction of fuel consumption of at least 20% on the same vehicle with conventional control should be demonstrated comparatively, while not exceeding Real Driving Emissions limits set by the established Euro VI procedures.

Type of action: Innovation Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

## **GV.7-2014. Future natural gas powertrains and components for heavy duty vehicles**

Specific challenge: The challenge is the development of advanced non-hybrid powertrain concepts for heavy duty vehicles (either dual-fuel or optimised for pure natural gas operation), complying with the Euro VI standards and meeting the CO<sub>2</sub>/km emissions targets currently under definition.

This will deliver significant air quality improvements, particularly in terms of particle numbers and NO<sub>x</sub> in real driving conditions.

In order to achieve a real impact on the societal challenges, vehicles using the developed technology need to be competitive with current vehicles using conventional fuels. Therefore an additional technological challenge is to develop specific components (for instance better fuel tanks for liquefied natural gas with improved thermal insulation, optimised pressure handling systems and methane catalysers) for these types of fuels with lower cost, volume and weight while keeping high safety standards.

Scope: The research should include adequate combinations of combustion process optimisation, variable compression ratios, engine control, dual fuel operation, optimised fuel injection systems, adaptive systems and sensors to take into account different fuel qualities, new generation after-treatment systems (in particular for NO<sub>x</sub> and methane slip especially during transients and at low temperatures) and overall powertrain optimisation, advanced fuel tanks (high pressure gaseous, liquid or solid state) and any other innovative concepts and components for the different vehicle categories.

Ranges before fuelling should be demonstrated of at least 800 km on natural gas while keeping weight, volume and cost penalties to a similar level to current best in class vehicles.

All developed technology should be integrated on vehicles that should be tested by independent bodies on the World Heavy Duty Cycle (WHDC) test procedures, including the relevant Portable Emission Measurement System (PEMS) approaches.

The Commission considers that proposals requesting a contribution from the EU of between EUR 10 to 20 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Real driving emission levels respecting post-2020 emission limits and procedures shall be achieved in order to address the air quality challenge. The capability to maintain this performance during the engine life should be also demonstrated through accelerated ageing procedures.

As far as the climate change challenge is concerned, the research target is to achieve at least 10% lower CO<sub>2</sub>-equivalent emissions (i.e. including unburned methane and N<sub>2</sub>O) than the best vehicles on the market in 2013 using the same fuel (natural gas for pure methane engines, diesel in the case of dual fuel systems).

Type of action: Innovation Actions

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*

## **GV.8-2015. Electric vehicles' enhanced performance and integration into the transport system and the grid**

Specific challenge: The limited driving range of electric vehicles is one of the biggest deployment challenges for electromobility. A ground-up re-design is needed to fully take advantage of the design freedoms and the opportunities in defining and developing the electric and electronic architecture and components. This should result in increased efficiency and range and make a major contribution towards the transition to fully electric vehicles (FEV's).

A particularly important element that needs to be addressed is the battery management system (BMS), which is fundamental for many aspects of electrified vehicle performance, from energy efficiency (and therefore range) to safety, battery life and reliability.

Information and communication technologies (ICT) significantly contribute to enhancing the energy efficiency and thus the range of the vehicle by providing accurate prediction of the range and offering personalised options and services to the driver. Furthermore ICT supports recharging that is coordinated with the local electric grid capabilities. Such coordination must accommodate not only passenger EVs, but also meet the requirements of electric buses, vans or trucks, which are expected to require high-powered fast recharging.

Scope: Proposals should address one of the following complementing domains and could include interfaces between these domains:

- EV concepts featuring a complete revision of the electric and electronic architecture to reduce complexity and the number of components and interconnections, whilst improving energy efficiency, functionality and modularity. This may be supported by drive-by-wire or wireless communication, as well as advanced energy storage, transmission and conversion systems including miniaturisation. Challenges in safety, security, reliability and robustness, including electro-magnetic compatibility, are to be addressed. Work shall pursue a high degree of standardisation and cover the entire electric vehicle value chain.
- Concerning BMS research work will focus on a combination of the following aspects:
  - Novel BMS designs with improved thermal management, power density and life time, safety and reliability.
  - Improved modelling and simulation tools for BMS improvement.
  - Contribution to standardisation of BMS components and interfaces.
  - Test methodologies and procedures to evaluate the functional safety, reliability and lifetime of battery systems.
- In-vehicle integration of the overall cycle of EV energy management into a comprehensive EV battery and ICT-based re-charging system management, providing ergonomic and seamless user support. Such integration should build upon existing technology standards.



- Digital support for EVs such as common information model, market place interaction and service provision based on wireless / power line communication interfaces, roaming management, energy consumption and supply as well as cost aspects are in the scope.
- Interoperability of EVs with the communication infrastructure and electricity grid regarding locally deployed smart-grid and smart-metering systems while investigating arising operational issues and taking current developments into account. Specific requirements of various EV types and customer requirements should be addressed.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 10 million euro would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Improvements in the cost-performance ratio of EV contributing to quicker market take-up.
- Enhancements to vehicle range and/or weight, battery life and reliability without compromising on safety - delivering a more robust and well managed battery system.
- Standardised BMS components and interfaces
- Progress on ICT-based technologies for coordinated EV recharging.
- Improved attractiveness of EVs, achieved through a seamless and ergonomic energy management cycle (spanning the entire cycle from re-charging spot selection/reservation to plug-out after re-charging).
- Contributions to standardisation strengthening the competitiveness of the European industry.

Type of action: Research and Innovation Actions

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## CONDITIONS FOR THE ‘GREEN VEHICLES’ CALL

Publication date: 11/12/2013

Deadlines<sup>3132</sup>:

Topics	
GV.1, GV.2, GV.3, GV.4, GV.5, GV.7	Single stage 28/08/2014 at 17.00.00 Brussels time
GV.6, GV.8	Single stage [27/08/2015 at 17.00.00 Brussels time]

Overall indicative budget: EUR 159.00 million from the 2014<sup>33</sup> and 2015<sup>34</sup> budgets (for 2014 – EUR 129.00 million and for 2015 30.00 million).

The indicative distribution of the call budget is as follows:

Topics	2014 EUR million	2015 EUR million	
GV.1, GV.2, GV.3, GV.4, GV.5, GV.7	129.00	–	All single stage
GV.6	–	10.00	All single stage
GV.8	–	20.00	All single stage

<sup>31</sup> The Director-General responsible may delay this deadline by up to two months.

<sup>32</sup> The deadlines provided in brackets are indicative and subject to a separate financing decision for 2015.

<sup>33</sup> The budget amounts for 2014 are subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget for 2014 by the budgetary authority or if the budget is not adopted as provided for in the system of provisional twelfths.

<sup>34</sup> The budget amounts for 2015 are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2015.

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Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme.

Evaluation procedure: [*Link to the annex on standard evaluation procedure*]

The full evaluation procedure is described in the relevant guide associated with this call.

- Indicative timetable for evaluation and grant agreement:

Topics	Information on the outcome of the evaluation (single stage)	Indicative date for the signing of grant agreements
GV.1, GV.2, GV.3, GV.4, GV.5, GV.6, GV.7, GV.8	Maximum 5 months from the final date for submission	Maximum 3 months from the date of information applicants

Consortia agreements: In line with the Rules for Participation and the Model Grant Agreement, participants in Research and Innovation Actions or in Innovation Actions are required to conclude a consortium agreement prior to grant agreement.

## **CALL ‘SMALL BUSINESS AND FAST TRACK INNOVATION FOR TRANSPORT’**

*H2020-IT-2014/2015*

### **IT.1-2014-2015. Small business innovation research for Transport**

Specific challenge: The European transport sector must have the capacity to deliver the best products and services, in a time and cost efficient manner, in order to preserve its leadership and create new jobs, as well as to tackle the environmental and mobility defies. The role of SMEs to meet these challenges is critical as they are key players in the supply chains. Enhancing the involvement of weaker players in innovation activities as well as facilitating the start-up and emergence of new high-tech SMEs is of paramount importance.

Scope: The SME instrument consists of three separate phases and a coaching and mentoring service for beneficiaries. Participants can apply to phase 1 with a view to applying to phase 2 at a later date, or directly to phase 2.

**In phase 1**, a feasibility study shall be developed verifying the technological/practical as well as economic viability of an innovation idea/concept with considerable novelty to the industry sector in which it is presented (new products, processes, services and technologies or new market applications of existing technologies). The activities could, for example, comprise risk assessment, market study, user involvement, Intellectual Property (IP) management, innovation strategy development, partner search, feasibility of concept and the like to establish a solid high-potential innovation project aligned to the enterprise strategy and with a European dimension. Bottlenecks in the ability to increase profitability of the enterprise through innovation shall be detected and analysed during phase 1 and addressed during phase 2 to increase the return in investment in innovation activities. The proposal should contain an initial business plan based on the proposed idea/concept.

The proposal should give the specifications of the elaborated business plan, which is to be the outcome of the project and the criteria for success.

Funding will be provided in the form of a lump sum of EUR 50.000. Projects should last around 6 months.

**In phase 2**, innovation projects will be supported that address any area of the Transport Specific Programme (H2020 Specific Programme: Part III – 4. Smart, green and integrated transport), and that demonstrate high potential in terms of company competitiveness and growth underpinned by a strategic business plan. Activities should focus on innovation activities such as demonstration, testing, prototyping, piloting, scaling-up, miniaturisation, design, market replication and the like aiming to bring an innovation idea (product, process, service etc.) to industrial readiness and maturity for market introduction, but may also include some research. For technological innovation a Technology Readiness Levels of 6 or above (or similar for non-technological innovations) are envisaged; please see part G of the General Annexes.

Proposals shall be based on an elaborated business plan either developed through phase 1 or another means. Particular attention must be paid to IP protection and ownership; applicants will have to present convincing measures to ensure the possibility of commercial exploitation ('freedom to operate').

Proposals shall contain a specification for the outcome of the project, including a first commercialisation plan, and criteria for success.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 2.5 million would allow phase 2 to be addressed appropriately. Projects should last between 12 and 24 months.

In addition, in phase 3, SMEs can benefit from indirect support measures and services as well as access to the financial facilities supported under Access to Risk Finance of this work programme.

Successful beneficiaries will be offered coaching and mentoring support during phase 1 and phase 2. This service will be accessible via the Enterprise Europe Network and delivered by a dedicated coach through consultation and signposting to the beneficiaries. The coaches will be recruited from a central database managed by the Commission and have all fulfilled stringent criteria with regards to business experience and competencies. Throughout the three phases of the instrument, the Network will complement the coaching support by providing access to its innovation and internationalisation service offering. This could include, for example, depending on the need of the SME, support in identifying growth potential, developing a growth plan and maximising it through internationalisation; strengthening the leadership and management skills of individuals in the senior management team and developing in-house coaching capacity; developing a marketing strategy or raising external finance.

Expected impact:

- Enhancing profitability and growth performance of SMEs by combining and transferring new and existing knowledge into innovative, disruptive and competitive solutions seizing European and global business opportunities.
- Market uptake and distribution of innovations tackling the specific challenges of the Transport Specific Programme in a sustainable way.
- Increase of private investment in innovation, notably leverage of private co-investor and/or follow-up investments.
- The expected impact should be clearly described in qualitative and quantitative terms (e.g. on turnover, employment, market seize, IP management, sales, return on investment and profit).

Type of action: SME Instrument (70%)

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

## **IT.2-2015. Fast Track to Innovation**

**Placeholder:**

It is noted that the following information is provided at this stage only to facilitate the familiarisation with this topic. The Commission will provide in due course full details, together with the announcement of the relevant calls, on the Fast track to Innovation Topic.

The general aspects of this topic are as follows:

Under this Fast Track to Innovation (FTI) pilot, proposals for innovation actions linked to any technology field will be invited, on the basis of a continuously open call (with its first cut-off date in 2015) and a bottom-up-driven logic.

Any legal entity may participate and proposals may be submitted at any time. The Commission shall initiate three cut-off dates per year to evaluate proposals. Time between a cut-off date and signature of the grant agreement or notification of the grant decision shall not exceed six months. No more than 5 legal entities shall participate in an action. The amount of the grant shall not exceed EUR 3 million.

Proposals shall be ranked according to the impact, quality and efficiency of implementation and excellence, with the criterion of impact given a higher weighting. Factors such as time sensitivity and the international competitive situation shall be taken into sufficient account when evaluating the impact of a proposal, to allow for flexibility according to the various specificities within different fields of applied research.

## CONDITIONS FOR THE ‘SMALL BUSINESS AND FAST TRACK INNOVATION FOR TRANSPORT’ CALL

Publication date: 11/12/2013

Opening<sup>35</sup>: 01/03/2014 for phase 1 and phase 2

Deadline(s)<sup>36,37</sup>:

Topics	Dates			
	Phase 1	Phase 2	Phase 1	Phase 2
IT.1 Open call cut-off dates	18/06/2014 24/09/2014 17/12/2014	XX/10/2014 XX/12/2014	[18/03/2015 17/06/2015 17/09/2015 16/12/2015]	[18/03/2015 17/06/2015 17/09/2015 16/12/2015]
IT.2 [Fast Track to Innovation]				

Indicative budget: EUR 74.83 million from the 2014<sup>38</sup> and 2015<sup>39</sup> budgets (for 2014 – EUR 35.87 million and for 2015 – 38.96 million).

The indicative distribution of the call budget is as follows:

	2014 EUR million		2015 EUR million	
IT.1 [SME instrument]	35.87		38.96	
	out of which		out of which	

<sup>35</sup> The Director-General responsible may delay this date by up to two months.

<sup>36</sup> The Director-General responsible may delay this deadline by up to two months.

<sup>37</sup> The deadlines provided in brackets are indicative and subject to a separate financing decision for 2015.

<sup>38</sup> The budget amounts for 2014 are subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget for 2014 by the budgetary authority or if the budget is not adopted as provided for in the system of provisional twelfths.

<sup>39</sup> The budget amounts for 2015 are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2015.

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	3.59 for phase 1 31.56 for phase 2 0.72 for mentoring and coaching support and phase 3		3.90 for phase 1 34.28 for phase 2 0.78 for mentoring and coaching support and phase 3
	Single stage for both phase 1 and phase 2. The budget available for phase 1 and phase 2 will be divided equally between each cut-off date.		
IT.2 [Fast Track to Innovation]			

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following exceptions:

IT.1	A proposal for phase 2 shall include a first commercialisation plan.
IT.2 [Fast Track to Innovation]	

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme, with the following exceptions:

IT.1	<p>The criterion Impact will be evaluated first, then Excellence and Implementation. If the proposal fails to achieve the threshold for a criterion, the evaluation of the proposal will be stopped.</p> <p>For phase 1 the threshold for individual criteria will be 4. The overall threshold, applying to the sum of the three individual scores, will be 13.</p> <p>For phase 2 the threshold for the criterion Impact will be 4. The overall threshold, applying to the sum of the three individual scores, will be 12.</p> <p>The final consensus score of a proposal will be the median of the individual scores of the individual evaluators; and the consensus report will comprise a collation of the individual reports. There will be no Panel Review.</p> <p>Applicants can request during the electronic proposal submission that, due</p>
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	to competitive or other concerns, up to three specific persons should not act as an evaluator in the evaluation of their proposal <sup>40</sup> .
IT.2 [Fast Track to Innovation]	

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes.

The full evaluation procedure is described in the relevant guide associated with this call.

- Indicative timetable for evaluation and grant agreement:

	Information on the outcome of the evaluation ( <i>single or first stage</i> )	Information on the outcome of the evaluation (second stage)	Indicative date for the signing of grant agreements
IT.1	The full evaluation procedure is described in the relevant guide associated with this call.		One month from the date of informing applicants in phase 1 and two months from the date of informing applicants in phase 2.
IT.2 [Fast Track to Innovation]			

Consortia agreements: In the case of two or more SMEs submitting a proposal, in line with the Rules for Participation and the Model Grant Agreement, participants are required to conclude a consortium agreement prior to grant agreement.

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<sup>40</sup> If any of the persons identified is an independent expert participating in the evaluation of the proposals for the call in question, they may be excluded from the evaluation of the proposal concerned, as long as it remains possible to have the proposal evaluated.

## **OTHER ACTIONS<sup>4142</sup>**

### **1. Developing a public European environmental modelling suite for aviation**

Specific challenge: The existing European environmental models for aviation suffer from proprietary rights which are scattered over private industries, research institutes and public organisations. This leads to a situation where policy makers do not have direct access to a complete and unbiased set of models to cover their policy needs. In addition, there is a lack of publicly available datasets and methodologies upon which comprehensive models could be developed or validated. This is for example the case for particulate matter from engines or noise from helicopters.

Scope: The proposed action consists of five parts:

- Based on a review of existing models in the public domain, design of a complete and open European environmental model suite for aviation to support policy makers in policy development and in international negotiations (such as in the framework of ICAO).
- Collect new data and establish associated databases for the gaps identified, this should at least include the measurement of particulate matter from engines.
- Enrich existing public models with new modules, this should at least include noise from helicopters.
- Taking into account the contents of the model suite, develop new methodologies that could be applied to policies that require an environmental impact assessment.
- Prepare recommendations for the development of the contents, the public ownerships and the management of the model suite.

Expected impact: The proposed action should contribute to the development of environmental standards for aviation at European and global level; the monitoring of the progress made in European aviation research towards the Flightpath 2050 emission reduction targets; the collection and monitoring of environmental data from the aviation sector required by European environmental legislation; and an improved understanding and a quantification with improved accuracy of the effect of aviation on the environment, including noise, and the wider impacts on the climate.

Type of action: Public procurement, open tender

Indicative number of direct service contracts to be signed: one service contract

Indicative timetable:

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<sup>41</sup> The budget amounts for 2014 are subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget for 2014 by the budgetary authority or if the budget is not adopted as provided for in the system of provisional twelfths.

<sup>42</sup> The budget amounts for 2015 are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2015.

- Launch of call: second quarter of 2014
- Expected start of contract: fourth quarter of 2014

Indicative budget: EUR 2.00 million from the 2014 budget

## **2. Europe wide open source transport models, technology watch, data and scenarios**

Specific challenge: The challenge is to dispose of reliable and continuously updated information on the European transport system, to integrate the collected information in appropriate transport system models and to develop alternative medium-long term scenarios for the next 50 years.

Scope: The proposals should aim at developing new transport system models and associated databases, as well as alternative scenarios for the next 50 years. The selected proposal will set up a platform for permanent data acquisition and sharing, and will thus make available an extensive amount of information for the use of researchers, scholars, businesses, service operators, public authorities and policy makers. It should also contemplate the organisation model and the legal framework for governing, maintaining and exploiting the platform on a continuous and open basis. It should address the following core activities:

- Models:
  - Development of a new, integrated transport system model, of the freight and passenger networks covering all modes of transport as well as multimodal transport at the most detailed geographical level possible. To create synergies the model and the associated database will be developed in parallel.
- Database:
  - Definition of the data needed, analysis of the data available, either from private or public sources, and identification of the gaps in the data collection. The publicly available European Transport policy Information System (ETIS plus) data warehouse should be exploited and possibly built upon.
  - Development of viable procedures for the acquisition, quality control, validation, elaboration, regular update and public accessibility of data. Innovative ways of data collection characterised by low administrative burden should be pursued.
  - Europe-wide surveys to ascertain mobility patterns and user expectations.
- Technology and innovation watch for the new transport technologies, innovative mobility solutions and emerging socio-economic trends for incorporation in modelling activities and scenario development.
- Scenarios:
  - Integrated medium-long term scenario development to better underpin policy making.

Expected impact: The project will significantly improve the understanding of European transport and mobility patterns, trends and needs; will provide a solid empirical basis for decision making at European, national and regional level; and will thus ultimately contribute to making the transport system more efficient and user friendly.

Type of action: Public procurement, open tender

Indicative number of direct service contracts to be signed: one service contract

Indicative timetable:

- Launch of call: second quarter of 2015
- Expected start of contract: fourth quarter of 2015

Indicative budget: EUR 5.00 million from the 2015 budget.

### **3. External expertise for evaluation, monitoring, review and advice**

This action will support:

- The use of appointed independent experts for the evaluation of project proposals and, where appropriate, for the reviewing of running projects.
- The setting up of groups of independent experts to advise on or support the design and implementation of EU research policy.

Type of action: Experts contracts; expert groups

Indicative budget: EUR 3.30 million from the 2014 budget and EUR 3.80 million from the 2015 budget.

### **4. The cleanest engine**

**Placeholder: Subject to the outcome of the on-going study "Development and design of inducement prize competitions in key areas under Horizon 2020" undertaken by the Commission, which includes an item on the Transport Challenge.**

Specific challenge: Internal combustion engines have a major role in producing noxious emissions. One of the major targets of EU transport policy – in line with the other EU policy goals in the field of energy efficiency, environmental protection and climate change mitigation – is to achieve compliance with air quality regulations. These complement other policy goals, such as the reduction of CO<sub>2</sub> emissions from transport, which should deliver virtually carbon free cities by 2050. These objectives call for an ambitious mix of innovative policy measures and significant technological breakthroughs, notably for the engines. The transport challenge of the H2020 proposal is designed in a way as to help pursue both.

Expected impact: An inducement prize setting "at the horizon" targets for the lowest attainable real life noxious emissions from non-hybrid internal combustion engines (in particular diesel) would help accelerate the current slow improvements in air quality, and thus substantially enhance the prospect of achieving the ambitious EU policy goals, while at the same time strengthening the competitive advantages of the European automotive industry which will be able to propose these technologies in emerging countries even more affected by air quality problems. This activity would complement effectively the work foreseen under proposed "European Green Vehicle Initiative" which will strongly focus on CO<sub>2</sub> emissions reductions.

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Eligibility criteria: Subject to the outcome of the on-going study "Development and design of inducement prize competitions in key areas under Horizon 2020" undertaken by the Commission, which includes an item on the Transport Challenge.

Award criteria: Subject to the outcome of the on-going study "Development and design of inducement prize competitions in key areas under Horizon 2020" undertaken by the Commission, which includes an item on the Transport Challenge.

Type of action: Prize

Date of publication of the contest: 2014-2015

Date of opening of the contest: 2014-2015

Deadline to submit applications: 2015

Indicative budget: EUR 5.00 million from the 2015 budget

## BUDGET: SMART, GREEN AND INTEGRATED TRANSPORT

<b>Calls</b>	<b>2014<sup>43</sup> Budget EUR million<sup>44</sup></b>	<b>2015<sup>45</sup> Budget EUR million</b>
Call H2020-MG-2014/2015 Mobility for growth	374.50 <i>of which 158.00 from 06.030301 and 216.50 from 08.020304</i>	184.00
Call H2020-GV-2014/2015 Green vehicles	129.00 <i>from 08.020304</i>	30.00
Call H2020-IT-2014/2015 Small business and fast track innovation for transport	35.87 <i>of which 10.76 from 06.030301 and 25.11 from 08.020304</i>	38.96
<b>Contribution</b> from this societal challenge to call ‘H2020-SCC-2014/2015’ (under Part 10 of the work programme)	18.50 <i>from 06.030301</i>	21.50
<b>Contribution</b> from this societal challenge to call ‘H2020-BG-2014/2015’ (under Part 9 of the work programme)	15.00 <i>from 08.020304</i>	4.00

<b>Other Actions</b>	<b>2014<sup>46</sup> Budget EUR million<sup>47</sup></b>	<b>2015<sup>48</sup> Budget EUR million</b>

<sup>43</sup> Subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget for 2014 by the budgetary authority or if the budget is not adopted as provided for in the system of provisional twelfths.

<sup>44</sup> The budget figures given in this table are rounded to two decimal places.

<sup>45</sup> The budget amounts are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2015.

<sup>46</sup> Subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget for 2014 by the budgetary authority or if the budget is not adopted as provided for in the system of provisional twelfths.

<sup>47</sup> The budget figures given in this table are rounded to two decimal places.

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Experts (expert evaluators, experts groups, monitors)	3.30 <i>of which 1.31 from 06.030301 and 1.99 from 08.020305</i>	3.80
Public procurement – Support actions for developing a public European environmental modelling suite for aviation	2.00 <i>of which 2.00 from 06.030301</i>	
Public procurement – Europe wide open source transport models, data and scenarios		5.00

<b>Horizontal activities (08.020403)</b>	<b>2014<sup>49</sup> Budget EUR million<sup>50</sup></b>	<b>2015<sup>51</sup> Budget EUR million</b>
Dissemination activities (see Part 17 of the work programme)	0.62 <i>of which 0.19 from 06.030301 and 0.43 from 08.020304</i>	0.62
Corporate communication (see Part 17 of the work programme)	0.33 <i>of which 0.10 from 06.030301 and 0.23 from 08.020304</i>	–

<b>Estimated total budget</b>	579.12	287.88
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<sup>48</sup> The budget amounts are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2015.

<sup>49</sup> Subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget for 2014 by the budgetary authority or if the budget is not adopted as provided for in the system of provisional twelfths.

<sup>50</sup> The budget figures given in this table are rounded to two decimal places.

<sup>51</sup> The budget amounts are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2015.