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PREPARATION PROCEDURES**

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WORK PROGRAMME 2013

COOPERATION

THEME 7

TRANSPORT (INCLUDING AERONAUTICS)

(European Commission C(2012)XXXX)

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7.1. AERONAUTICS AND AIR TRANSPORT

I.1. CONTEXT

This introduction is complementary to the general one (section I.0). The strategy for 2013 is summarised there, including the new innovation dimension of the activities, SME relevant research, international cooperation, and cross-thematic approaches and societal aspects. Only the specificities of the sub-theme are presented here.

The information provided in this introduction as well as in the content of calls for 2013 shall not be considered as eligibility criteria (unless it is explicitly indicated) but shall be taken into account during the evaluation for the respective evaluation criteria. For eligibility criteria and additional information, e.g. funding schemes, budget limits, etc., please refer to section III.

I.1.1. Specific approach for Aeronautics and Air Transport

The scope of research and innovation includes the technologies, services and operations of all the components of the air transport system (i.e. aircraft, airport and air traffic management) from airport kerbside to airport kerbside. Demonstration, validation, standardisation and certification activities where relevant are also part of WP 2013.

The three **Socio-economic Challenges** indicated in section I.0.2 are addressed by six **Activities**, where proposers can find the **topics** calling for **proposals**. The Activities are in agreement with the Specific Programme and the Strategic Research Agenda of ACARE¹:

1. The greening of air transport
2. Increasing time efficiency
3. Ensuring customer satisfaction and safety
4. Improving cost efficiency
5. Protection of aircraft and passengers
6. Pioneering the air transport of the future

In order to reflect the level of readiness of the developed technologies with respect to the final application that is commonly used in aeronautics, three Levels are applicable.

Level 1 comprises the research and technology development activities that span from basic research to the validation of concepts at component or sub-system level in the appropriate environment through analytical and/or experimental means. *Topics for Level 1 can be addressed in the proposals with a high degree of flexibility, selecting only part of a topic and/or combining several topics.*

For most of the L1 topics, the requested EU contribution *shall not exceed EUR 5 million per topic* which threshold constitutes an additional eligibility criterion. Specific limits apply for the coordinated call with Russia (sections III.1.3).

Level 2 comprises the research and technology development activities up to higher

¹ ACARE: Advisory Council for Aeronautics Research in Europe (www.acare4europe.org).

technology-readiness, centred on the multidisciplinary integration and validation of technologies and operations at a system level in the appropriate environment (large scale flight and/or ground test beds and/or simulators). *Proposals can address only one of the proposed topics and should address it in its entirety.*

Topics for Level 2 are limited in number (see section III.1.1, CP-IP). The requested EU contribution *shall exceed EUR 5 million and it is expected not to exceed EUR 35 million*. The minimum threshold (EUR 5 million) constitutes an additional eligibility criterion.

Level 3 comprises the research and technology development activities up to the highest precompetitive technology readiness, focusing on the combination of systems and the final demonstration in the appropriate operational environment of the comprised technologies in fully integrated system of systems. These activities will be undertaken in large scale public-private partnerships especially established for this purpose in specific areas: the ‘Clean Sky’ Joint Technology Initiative relevant mainly to the Work Programme Activity ‘The greening of air transport’ and SESAR, Single European Sky Air Traffic Management Research. Clean Sky and SESAR will also cover research activities of lower technology readiness levels (i.e. Level 1 and Level 2), where appropriate. Both Clean Sky and SESAR Joint Undertakings are briefly described in a subsequent section. *No Level 3 topic is included in this Work Programme for 2013.*

Standardisation and certification are part of the content and scope of topics at any level where appropriate (see section I.0.3).

Cross-cutting activities. In addition to the above six activities, cross-cutting issues for *structuring European aeronautics research, supporting programme implementation and international cooperation* are addressed by means of collaborative projects (small or medium-scale focused research projects), and coordination and support actions. The requested EU contribution for *coordination actions shall not exceed EUR 1 200 000*, and for *support actions shall not exceed EUR 600 000*, which constitutes an additional eligibility criterion (see section III.1.1).

I.1.2. Introducing Level 0 (open call)

Level 0 is located upstream of Level 1 in the technology readiness levels. It comprises the research and development of breakthrough highly innovative technologies and concepts that need a first maturation before they can be developed at larger scale, within larger consortia and larger financial resources (for example in Level 1). In order to provide more agility and flexibility to the process, this is being implemented by means of a specific *open call*. The call fiche specifies recommendations for a limited size of the partnership, a shorter duration and lower budget compared to current practice in Level 1.

The call covers exclusively promising pioneering ideas in air transport, i.e. technologies and concepts that have the potential to bring step changes to European aeronautics and air transport *in the second half of this century and beyond*.

Information on the eligibility criteria and evaluation procedure are detailed in the corresponding call fiche (section III.1.2) and in the Guide for Applicants.

I.1.3. Coordinated call with Russia

Following workshops held between European and Russian stakeholders in the field of Aeronautics and Air Transport, a coordinated call with Russia is included in WP 2013 with an indicative EU budget of EUR 5 million and a matching amount from Russia (see section III.1.3). The European partners will be funded by the European Union. The Russian partners will be funded by the Department of Aviation Industry (Ministry for Industry and Trade of the Russian Federation) and other authorities concerned. The requested EU contribution *shall not exceed EUR 1.3 million per project*, which is an additional eligibility criterion. In order to ensure a balance between EU and Russian participants, *at least two independent legal entities established in Russia are requested*, which is another additional eligibility criterion.

I.1.4. 'Clean Sky' Joint Technology Initiative

The 'Clean Sky' (CS) Joint Technology Initiative is a unique public private partnership aiming at developing environmentally friendly technologies impacting all flying segments of commercial aviation, thus contributing to the ACARE targets for reduction of emissions and noise in Air Transport in Europe and increasing the competitiveness of the European aeronautical industry.

To implement CS, the European Union, represented by the Commission, and the major aeronautical stakeholders in Europe have set up a Joint Undertaking (CS JU) as a legal entity for a period up to 2017. The Council Regulation setting up the CS JU was adopted in December 2007. Since autumn 2009, the Joint Undertaking is autonomous from the Commission.

The objectives of the CS JU are to be achieved through the support of research activities that pool resources from the public and private sectors, and that are carried out by the main aeronautical stakeholders (CS private members) directly and by partners selected following open and competitive calls for proposals. The total budget of CS amounts to up to EUR 1.6 billion.

Clean Sky is organised in six Integrated Technology Demonstrators, corresponding to technological research areas, each led by two founding members:

Smart Fixed Wing Aircraft (SFWA) led by Airbus and Saab
Green Regional Aircraft (GRA) led by Alenia Aeronautica and EADS Casa
Green Rotorcraft (GRC) led by Agusta-Westland and Eurocopter
Sustainable and Green Engines (SAGE) led by Rolls-Royce and Safran
Systems for Green Operations (SGO) led by Thales Avionics and Liebherr Aerospace
Eco-design (ED) led by Dassault Aviation and Fraunhofer Gesellschaft

A Technology Evaluator (TE) led by Thales Avionics and DLR has the purpose of assessing the environmental performance of the technologies developed in CS.

At least 25% of the EU funding to the CS JU is allocated to partners selected via calls for proposals. They serve the dual purpose of widening the participation to Clean Sky to further organisations, especially SMEs, and to identify R&D performers called in to participate to the mainstream activities of Clean Sky.

The activities related to Clean Sky are implemented by separate mechanisms and the details

of topics will not be elaborated in this work programme, as Clean Sky is autonomous in the execution of its budget. Call for proposals are published on www.cleansky.eu as well as on CORDIS.

I.1.5. SESAR – Single European Sky Air Traffic Management (ATM) Research

The SESAR (Single European Sky ATM Research) Programme has been launched as an integrated part, the “technological pillar”, of the Single European Sky initiative (SES). It aims at developing a modernised and high-performance air traffic management infrastructure which will enable the safe, cost-efficient and environmentally friendly development of air transport in support of the Single Sky 2020 objectives.

The ongoing SESAR Development phase (2008-2016) is managed by the SESAR Joint Undertaking (SJU), established by a Council Regulation, under Article 187 of the TFEU. This includes the targeted and coordinated research, development and validation activities of the SESAR programme, and SJU is responsible for the execution and maintenance of the European ATM Master Plan. In order to rationalise and organise ATM research so that it leads to actual operational and industrial implementation, all relevant Air Traffic Management (ATM) research in the Seventh Framework Programme will be undertaken and implemented by the SJU. It will also be coordinated with other aeronautical research activities in order to maintain a consistent system wide approach for the entire air transport system and in order to avoid possible duplications between different programmes.

The SESAR development phase programme is composed of over 300 research projects and transversal activities, plus other supporting activities defined in the multi-annual and annual work programme and in the General Agreement with the Commission. As the SJU is subject to its own separate mechanisms, the details will not be developed in this Work Programme for 2013. The detailed description of the work programme can be obtained via the SJU webpage under the following link: <http://www.sesarju.eu>.

The European Union will provide a maximum total contribution of EUR 700 million to the SJU for the development phase of the programme over the period 2007-2013. This amount will be provided in equal parts from the Seventh Framework Programme for research and technological development and from the Trans-European Network programme. The contribution of EUR 350 million from FP7 shall be transferred to the SJU by the Commission through annual contributions over the entire programme in accordance with a General Agreement concluded between them. This contribution shall be used to finance the costs of the activities in the relevant areas indicated in the work programme, including programme management, and the running costs of the SJU. For this purpose, an amount of EUR # million will have to be transferred to the SJU for the year 2013.

II.1. CONTENT OF CALLS FOR 2013

CHALLENGE 1. ECO-INNOVATION

The decarbonisation of the transport system and an efficient use of natural resources, i.e. eco-innovation in all transport modes and the continuation of the development of clean vehicles and vessels.

Activity 7.1.1. The greening of air transport

Developing technologies to reduce the environmental impact of aviation with the aim to halve the emitted carbon dioxide (CO₂), cut specific emissions of nitrogen oxides (NO_x) by 80% and halve the perceived noise. Research will focus on furthering green engine technologies including alternative fuels technology as well as improved vehicle efficiency of fixed-wing and rotary wing aircraft (including helicopters and tiltrotors), new intelligent low-weight structures, and improved aerodynamics. Issues such as improved aircraft operations at the airport (airside and landside) and air traffic management, manufacturing, maintenance and recycling processes will be included.²

Expected impact: [# to be completed]

AAT.2013.1-1. Flight physics

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

Content and scope: Research and innovation on flight physics will focus on the greening of air transport while taking into account the cost efficiency related aspects. Proposals could address one or several of the following subjects:

- Advanced or novel aircraft configuration concepts, including improved airframe/engine integration, which could deliver improved aerodynamic efficiency and reduced external noise compared to traditional configurations for subsonic, transonic or supersonic flight.
- Advanced concepts and technologies for flow control, airframe aerodynamics design, drag reduction (active or passive).
- Advanced designs for high lift over drag ratios; innovative high lift devices to enable steeper take-off and landing flight profiles.
- Development of adaptive wing and wing morphing technologies.

AAT.2013.1-2. Aerostructures

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

Content and scope: Research and innovation on aerostructures will focus on the greening of air transport while taking into account the cost efficiency, safety and security related aspects. Proposals could address one or several of the following subjects:

- Advanced concepts and technologies for increased and optimised use of light-weight metallic, composite materials, including metal laminates, in primary structures; advanced concepts and techniques for application of 'smart' materials, multi-functional materials, micro and nano-technologies; aero-elasticity, 'smart' structures and morphing airframes with a potential to reducing green house gas emissions.
- Development of highly integrated structures with optimum combination of advanced metallic and composite materials eliminating or minimising the number of join/assembly elements.

² The above text is a reproduction of the text included in the Council Decision on the Specific Programme Cooperation regarding this activity. The topics in each call for proposals do not necessarily have to cover all the issues mentioned in this text.

- Advanced concepts for increased integration of additional functions (sensing, actuating, electromagnetic, electrical conductivity, etc.) in structural components for wider ‘greener’ applications at low cost and weight.
- Advanced concepts and technologies including experimental validation for improved protection against crash, impacts and blast loads, including passive and active ‘green’ and ‘smart’ aerostructures; advanced methods and techniques to ensure safety of aging airframe and engine structures.
- Advanced concepts and technologies for developing blast-resistant cabin structures.

AAT.2013.1-3. Propulsion

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

Content and scope: Research and innovation on propulsion will focus on the greening of air transport while taking into account the cost efficiency related aspects. Proposals could address one or several of the following subjects:

- New knowledge, analysis, design tools and control techniques for advanced low NOx combustor and injector systems, including when using alternative fuels.
- Tools and techniques for modelling and measuring engine exhaust gaseous emissions.
- Research on emissions variability, performance changes resulting from deterioration and effects of engine aging on emissions.
- Advanced concepts and technologies for improving engine thermal efficiency and/or propulsive efficiency; design tools and techniques for increased application of advanced light-weight high-temperature materials.
- Advanced light-weight engine architectures and components; technologies for optimal use of ‘intelligent’ and fully digital engine control systems.

Note: Research that is in the scope of the Fuel Cells and Hydrogen Joint Technology Initiative is excluded from the 2013 calls.

AAT.2013.1-4. Flight and Air Traffic Management

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

Content and scope: Research and innovation will focus on the effects and potential of adopting flight profiles and altitudes other than the conventional ones as a means to reduce aviation emissions and improve their environmental impact. The research in this topic will need to be coordinated with relevant activities in the Clean Sky JTI and the SESAR JU.

AAT.2013.1-5. Noise and vibration

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

Content and scope: Research and innovation will focus on reducing noise in the environment while taking also into account customer satisfaction. Proposals could address one or several of the following subjects:

- Advanced concepts, technologies and innovative geometries to reduce aircraft and power-plant (turbofan, propeller, propfan, rotorcraft rotor) noise by active and/or passive methods.
- Advanced concepts, technologies allowing low noise aircraft operations (in coordination with SESAR) for reduced noise disturbances in airports and neighbouring areas.
- Investigation on the way human beings perceive noise and are affected by noise disturbances.

- Advanced modelling tools, concepts and technologies (active and passive) to reduce overall cabin noise as well as noise at passenger level.
- Concepts and technologies to reduce structural vibrations induced noise (and associated increase of passenger comfort).

AAT.2013.1-6. High overall pressure ratio engine modules validation of low pressure system

Level 2 - CP-IP - Call: FP7-AAT-2013-RTD-1

Content and scope: Further reduction of fuel consumption require to increase further the overall pressure ratio (OPR) of engines up to 70 (currently ~50). While LEMCOTEC looks into the core engine capable of achieving such high OPR, this project would look in the low pressure parts, also targeting very high by-pass ratios [# to be expanded].

AAT.2013.1-7. Demonstration (incl. flight testing) of second generation active wing technologies

Level 2 - CP-IP - Call: FP7-AAT-2013-RTD-1

Content and scope: While the Clean Sky SFWA ITD will perform large global demonstration for a particular geometry with selected mature technologies, this project wants to test a number of next generation active technologies that would be tested locally only but in flight in order to increase their level of maturity. The goal is to reduce the drag, i.e. the fuel consumption of the aircraft [# to be expanded].

CHALLENGE 2. SAFE AND SEAMLESS MOBILITY

The optimisation of the global efficiency and safety of the transport system (by application of Intelligent Transport Systems and logistics), making efficient use of infrastructure and network capacity, with the aim of offering safe and seamless transport and mobility to all European citizens, as transport is also crucial for social inclusion.

Activity 7.1.2. Increasing time efficiency

Realising a step-change in aviation in order to accommodate the projected growth of three times more aircraft movements by improving punctuality in all weather conditions and reducing significantly the time spent in travel-related procedures at airports while maintaining safety. Research will develop and implement an innovative Air Traffic Management (ATM) system within the context of the SESAR initiative, by integrating air, ground and space components, together with traffic flow management and more aircraft autonomy. Design aspects of aircraft to improve handling of passengers and cargo, novel solutions for efficient airport use and connecting air transport to the overall transport system will also be addressed. The most efficient coordination of the development of ATM systems in Europe will be ensured through the SESAR initiative³.

Expected impact: [# to be completed]

³ The above text is a reproduction of the text included in the Council Decision on the Specific Programme Cooperation regarding this activity. The topics and areas open in each call for proposals do not necessarily have to cover all the issues mentioned in this text.

AAT.2013.2-1. Airports

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

Content and scope: Research and innovation on airports will focus on increasing time efficiency while taking into account the environmental related aspects. Proposals could address one or several of the following subjects:

- Advanced concepts and techniques for time efficient passenger and luggage flow in the terminal area and for passenger boarding patterns, including multi-door embarking and disembarking.
- Advanced concepts and techniques for time efficient freight operations, including comprehensive planning of airport operations.
- Advanced fleet management concepts and techniques for fast turnaround at the apron area.
- Innovative modelling tools and techniques in support of strategic decision making for improved flexibility and optimum use of airports in the context of the full air transport system.
- Innovative modelling tools and techniques in support of integrated decision making allowing time optimised passenger choices.
- Concepts and technologies for reducing greenhouse gas, pollutant and noise emissions for apron operations (e.g. boarding of passengers, support to aircraft at the gate, services provided by ground vehicle etc.).
- New environmentally friendly concepts for aircraft de-icing.
- Techniques for real time detection, monitoring and modelling of local air quality and aircraft noise around airports; investigations for improved understanding of the effects of aircraft noise in the airport surrounding community.

Note: Proposals should focus on landside operations. Proposal involving airside operations must demonstrate that they complement but not duplicate activities foreseen in SESAR.

Activity 7.1.3. Ensuring customer satisfaction and safety

Introducing a quantum leap in passenger choice and schedule flexibility, whilst achieving a five-fold reduction in accident rate. New technologies will enable a wider choice of aircraft/engine configurations ranging from wide body to smaller size vehicles including rotorcraft, increased levels of automation in all the elements of the system. Focus will also be on improvements for passengers comfort, well being and new services, cabin logistics systems and active and passive safety measures with special emphasis on the human element. Research will include the adaptation of airport and air traffic operations to different types of vehicles and 24-hour utilisation at acceptable community noise levels⁴.

Expected impact: [# to be completed]

AAT.2013.3-1. Human factors

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

⁴ The above text is a reproduction of the text included in the Council Decision on the Specific Programme Cooperation regarding this activity. The topics and areas open in each call for proposals do not necessarily have to cover all the issues mentioned in this text.

Content and scope: Research and innovation will focus on customer safety (vehicle and operations) while taking into account the cost efficiency related aspects. Proposals could address one or several of the following subjects:

- Advanced concepts to enable improved human centred design of cockpit displays, training of crews and flight control systems.
- Methods and techniques for improved understanding of the human factor (e.g. state of mind, response to the stress) in support of human-machine interaction, crew performance in the cockpit and crew behaviour when managing information from different ends such as cockpit, ATM and ground control.
- Advanced concepts and techniques in support of increased consideration of human behaviour in the conceptual design of the air transport system, in particular with regard to the mission of the crew and maintenance personnel, with special consideration of abnormal situations and crisis management.
- Advanced concepts and techniques, including training, to support the acquisition and retention of skills and knowledge of personnel in the air transport system.

If ATM related aspects are addressed, close coordination with SESAR should be ensured and complementarity demonstrated.

International cooperation is encouraged.

AAT.2013.3-2. Large scale demonstration of a future electronics platform encompassing avionics, cabin and open world communications

level 2 - CP-IP - Call: FP7-AAT-2013-RTD-1

Content and scope: While SCARLETT looks into distributed modular electronics for avionics applications only, the ambition of this project is to extend this approach to cabin and open world applications and to perform the demonstration [# to be expanded].

CHALLENGE 3. COMPETITIVENESS THROUGH INNOVATION

The strengthening of the competitiveness of European transport industry through innovation, as competition from developed and emerging economies is intensifying in a global economy.

Activity 7.1.4. Improving cost efficiency

Fostering a competitive supply chain able to halve the time-to-market, and reduce product development and operational costs, resulting in more affordable transport for the citizen. Research will focus on improvements to the whole business process, from conceptual design to product development, manufacturing and in-service operations, including the integration of the supply chain. It will include improved simulation capabilities and automation, technologies and methods for the realisation of innovative and zero-maintenance, including repair and overhaul, aircraft, as well as lean aircraft, airport and air traffic management operations⁵.

⁵ The above text is a reproduction of the text included in the Council Decision on the Specific Programme Cooperation regarding this activity. The topics and areas open in each call for proposals do not necessarily have to cover all the issues mentioned in this text.

Expected impact: [# to be completed]

AAT.2013.4-1. Systems and equipment

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

Content and scope: Research and innovation on systems and equipment will focus on improving cost efficiency while taking into account the environmental, customer satisfaction and safety related aspects. Proposals could address one or several of the following subjects:

- Advanced concepts and techniques for higher systems integrations and for simulation of installation environments to enable rapid customisation and industrialisation with low manufacturing and maintenance costs.
- Advanced concepts and technologies to enable the all-electric aircraft, reducing engine bleed and systems weight, including power generation, distribution and management, primary flight control.
- Advanced concepts to reduce weight of mechanical, pneumatic and hydraulic systems.
- New concepts for aircraft anti-icing and de-icing.
- Advanced high bandwidth technologies and systems architectures to enable home-like and office-like cabin environments with regard to passenger preferences, including on-board communication, entertainment and information services.
- Advanced concepts and technologies for enhanced cabin environment and passenger comfort with regard to temperature, lighting, pressure, humidity, ventilation and health.
- Advanced catering systems.

The involvement of SMEs is strongly encouraged.

AAT.2013.4-2. Avionics

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

Content and scope: Research and innovation on avionics will focus on improving cost efficiency while taking into account the environmental related aspects. Proposals could address one or several of the following subjects:

- Advanced concepts and techniques to include new technologies and low cost components in avionics equipment to reduce both development and recurring costs.
- Advanced concepts and techniques to develop affordable, scalable, fault tolerant and reconfigurable modular avionics architectures; data networks, packaging and information management systems, including wireless on-board communications, advanced on-board processing and middleware.
- Advanced technologies for high performance air/ground data links and communication including automated on-board flight information systems taking into account concepts developed in SESAR.
- Advanced concepts and technologies for increased modularity and integration of avionics components and systems.

AAT.2013.4-3. Design systems and tools

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

Content and scope: Research and innovation on design systems and tools will focus on improving cost efficiency of vehicles and operations while taking into account the safety related aspects. Proposals could address one or several of the following subjects:

- Advanced modelling and simulation tools to include ‘virtual reality’ in support of design and ‘virtual prototyping’; development of advanced cost-effective highly accurate computational tools, including multidisciplinary optimisation, and experimental testing methods in the fields of structural analysis, fluid dynamics, aeroelasticity, flutter and dynamic loads, flight dynamics, aerothermodynamics and icing thermodynamics.
- Knowledge-based design tools and methods to include integrated life-cycle (design, manufacturing, maintenance, re-use or disposal) product definition; concepts and methodologies for efficient multi-site product development in support of the extended enterprise.
- Methods and tools to support reconfigurable customisation of aircraft cabin architectures and interior designs; methods and tools enabling the modular aircraft concept; on-ground and in-flight tests; advanced concepts and procedures in support of novel approaches to certification of aeronautical products and operations.
- Innovative modelling tools and techniques in support of collaborative decision making for improved flexibility and optimum use of aircraft (fleet management).
- Advanced concepts and techniques for the development of safety metrics to identify, assess and manage the risks in systems and procedures taking into account reliability, maintainability and availability; development of anticipation, diagnostic and prognostic systems to handle faults, incidents and accidents; advanced concepts and procedures in support of novel approaches to certification of aeronautical products and operations; tools and procedures supporting a system approach to safety encompassing flight, air traffic and ground components and the evaluation of the system performance.

If ATM related aspects are addressed, close coordination with SESAR must be ensured and complementarity demonstrated. The involvement of SMEs is strongly encouraged.

AAT.2013.4-4. Production

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

Content and scope: Research and innovation on production processes and technologies will focus on improving cost efficiency while taking into account the environmental related aspects. Proposals could address one or several of the following subjects:

- Development of advanced ‘intelligent’ knowledge-based manufacturing and assembly processes and technologies with increased degree of automation.
- Advanced manufacturing methods to reduce both recurring and non-recurring costs across the whole production cycle from single component manufacturing process to final assembly including techniques to repair and re-use key components and for reduction of waste and consumables.
- Development of techniques for increased flexible tooling.
- Advanced in-process inspection and quality control, including knowledge-based diagnosis and prognosis and damage tolerance.
- Tools and procedure to manage production workload and timing.
- Advanced concepts and techniques for the cost-efficient elimination of toxic chemicals and materials and reduction of waste in manufacturing processes.
- Techniques and concepts for cost-efficient utilisation of environmentally sustainable materials in aeronautical products in a safety neutral approach.

AAT.2013.4-5. Maintenance, repair and disposal

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

Content and scope: Research and innovation on processes and technologies for maintenance, repair and disposal will focus on improving cost efficiency while taking into account the environmental and safety related aspects. Proposals could address one or several of the following subjects:

- Advanced concepts and techniques for continuous inspection of structures and systems allowing on-time maintenance and eliminating unscheduled maintenance; advanced concepts and technologies for ‘smart’ maintenance systems, including self-inspection and self-repair capabilities up to ‘maintenance-free’ aircraft.
- Advanced concepts and techniques for cost-efficient repair and overhaul operations applicable at the gate or at the workshop including time and cost-efficient logistic processes for the supply of parts; the relevant certification strategies should be developed in parallel with the research work.
- Advanced concepts and techniques for the cost-efficient elimination of toxic chemicals and materials and reduction of waste in maintenance operations; advanced maintenance and repair techniques for increased re-use of components; concepts and techniques for increasing the life-time of aeronautical products and for full recyclability at life-end in a safety neutral approach.
- Advanced concepts and techniques for continuous health and usage monitoring (e.g. non destructive testing, signal processing techniques) and for avoidance/mitigation of structural corrosion.

AAT.2013.4-6. Integrated airline maintenance and operation enhancement technologies

Level 2 - CP-IP - Call: FP7-AAT-2013-RTD-1

Content and scope: The goal is to increase the availability of aircraft, reduce the maintenance cost and avoid unscheduled maintenance. The project should select and or developed the needed technologies and integrate them in functional information management architecture and demonstrate the concept [# to be expanded].

Expected impact: [# to be completed]

AAT.2013.4-7. Thermal overall integrated conception of aircraft

Level 2 - CP-IP - Call: FP7-AAT-2013-RTD-1

Content and scope: The trend to an increased use of electronics in a composite fuselage environment poses new challenges for the thermal design of the aircraft. The project should develop a Behavioural Digital Aircraft with a multidisciplinary simulation capacity and the possibility to perform optimisation on the thermal aspects [# to be expanded].

AAT.2013.4-8. Seamless aeronautical networking through integration of data links, radios and antennas extended beyond ATM

Level 2 - CP-IP - Call: FP7-AAT-2013-RTD-1

Content and scope: Following the SANDRA project working on communications links for ATM, the project should extend the integration to other services such as for example navigation, surveillance, aircraft-aircraft links [# to be expanded].

Activity 7.1.5. Protection of aircraft and passengers

No topic is open in 2013. Some security aspects are included in topic AAT.2013.1-2 – Aerostructures.

Activity 7.1.6. Pioneering the air transport of the future

Exploring more radical, environmentally efficient, accessible and innovative technologies that might facilitate the step change required for air transport in the second half of this century and beyond. Research will address aspects such as new propulsion and lifting concepts, new ideas for the interior space of airborne vehicles including design, new airport concepts, new methods of aircraft guidance and control, alternative methods of air transport system operation and their integration with other transport modes⁶.

Expected impact: Proposals should investigate breakthrough technologies and concepts that have the capacity to cause a step change in aeronautics and air transport in the second half of this century.

AAT.2013.6-1. Breakthrough and emerging technologies for vehicles

Level 0 - CP-FP - Call: FP7-AAT-2013-RTD-L0

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

Content and scope: Investigation of emerging technologies or technologies from other sectors which have the potential to bring radical new approaches to the vehicles, the propulsion technology, the energy needed for the flight, the tools to provide guidance and control to the vehicles, the ground infrastructures for passengers and freights and the impact of the air transport on the environment. The research work will make the best use leading-edge facilities and/or simulation tools. At the end of the project, the progress against the technology readiness scale will be evaluated, the potential of the technologies to be developed at further technology readiness level will be assessed and barriers that could prevent such development identified.

Note: Level 1 proposals addressing this topic will have to demonstrate previous technology maturation.

AAT.2013.6-2. Radical new concepts for air transport

Level 0 - CP-FP - Call: FP7-AAT-2013-RTD-L0

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-1

Content and scope: Investigation of radical new concepts for the air transport system. The research work will propose and assess new approaches to systems for the air transport such as new approaches to the control and guidance of vehicles, the way passengers or freight access the vehicle, the way air transport is connected with other modes and the way travel information is handled. The functioning of the concept should be technically proven. The performance will be assessed preferably quantitatively against the relevant criteria such as for example economic viability, time efficiency, safety, environmental friendliness, energy sustainability, etc. Qualitative assessment will be done for non quantifiable criteria such as for example potential to cope with evolutions of current regulations, passenger friendliness, social acceptance etc. The investigation will also address the evolution from / compatibility

⁶ The above text is a reproduction of the text included in the Council Decision on the Specific Programme Cooperation regarding this activity. The topics and areas open in each call for proposals do not necessarily have to cover all the issues mentioned in this text.

with today's transport system.

Note: Level 1 proposals addressing this topic will have to demonstrate previous technology maturation.

AAT.2013.6-3. International cooperation on civil high speed air transport research

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-#

Content and scope: [# to be completed]

CROSS-CUTTING ACTIVITIES FOR IMPLEMENTING THE SUB-THEME PROGRAMME

Cross-cutting activities in the Aeronautics and Air Transport Work Programme 2013 support the achievement of actions which help meeting the three socio-economic Challenges.

AAT.2013.7-1. Coordinating research and innovation in the field of Aeronautics and Air Transport

CSA-CA - Call: FP7-AAT-2013-RTD-1

Content and scope: The action will provide on an annual basis a review of the state of the state of the art of research and innovation (capacity, main performers), identify of gaps in the research landscape, bottlenecks to innovation (regulation financing) and formulate strategic recommendations to address these. On the basis of ongoing and completed projects, the action will also assess the impact of the EU-funded projects and their contribution to progress towards ACARE or other relevant goals. The action will develop a web-site that centralises information and links to the relevant project in a comprehensive way, consider the relevance of setting-up a central database for projects. Dissemination of the findings will be organised through workshops. The action will also favour joint dissemination events for projects dealing with similar fields and will examine and promote conferences. The partnership should include stakeholders that are actively engaged in research in the domain of the coordination action and represent industry, academia and research centres. The action will ensure close coordination with similar initiatives of this type in the same domain or in connected domains. [# to mention explicitly SMEs?]

A proposal should address no more than one of the following domains:

- 1) Environmental related research and innovation [# content to be decided depending on Call 5 results] (CO₂, NO_x, noise, recyclability, air transport system modelling (incl. technology evaluation), typically gathering project results from topics such as Flight Physics, Aerostructures, Propulsion, Noise, and some ATM and Airports)
- 2) Cost Efficiency (Design Systems and Tools, Production, and Avionics)
- 3) Time Efficiency (Airports, ATM, aircraft separation, etc.)
- 4) Safety research (Coordination of Safety research, support to Safety Management System for Europe, and ATM)
- 5) Biofuels for Aviation.

Expected impact: [# to be completed]

AAT.2013.7-2. Coordinated call with Russia

Level 1 - CP-FP - Call: FP7-AAT-2013-RTD-RUSSIA

Content and scope: Proposals should include a balanced consortium of EU-RU participants and target one of the domains of common interest identified below:

- 1) New Generation hybrid (composite – metal) structures.
- 2) Advanced flow control systems applied on wings, ailerons, high lift devices to reduce drag and enhance safety during manoeuvres.
- 3) Architecture of control system for more electrical aircraft.
- 4) Computer aided design of avionics system based on modular elements.
- 5) Aerodynamic design of a ducted contra-fan (incl. acoustic treatment and integration with the airframe).
- 6) Control of unsteady flows in compressors for enhanced stability.

Expected impact: [# to be completed]

AAT.2013.7-3. Communication of EU funded RTD project results to targeted audience

CSA-SA - Call: FP7-AAT-2013-RTD-1

Content and scope: The goals are to communicate to the general public the results and benefits of the RTD projects under a form that is adapted for this type of audience and publicise aviation careers; also primary, secondary school and engineering school would be specifically targeted with local actions. The action would ultimately target the creation of an EU-wide network of dissemination.

Expected impact: [# to be completed]

AAT.2013.7-4. Creating East–West links and common knowledge at industrial level

CSA-SA - Call: FP7-AAT-2013-RTD-1

Content and scope: The goal is to put in direct contact potential coordinators and potential partners established in regions that lack of mutual knowledge. The project would first establish a mapping of regional capacities and identify the regions which would benefit from better connections, in particular between Eastern and Western Europe. Workshops, plant and factory tours could be organised locally, centred on defined technology areas of common interest. The consortium should be composed of regional associations, with a suitable balance in the partnership. [#SME friendly topic?]

Expected impact: [# to be completed]

AAT.2013.7-5. Conference: support for the organisation of Aerodays

CSA-SA - Call: FP7-AAT-2013-RTD-1

Content and scope: [# to be completed]

Expected impact: [# to be completed]

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7.2. SUSTAINABLE SURFACE TRANSPORT (INCLUDING THE ‘EUROPEAN GREEN CARS INITIATIVE’)

I.2. CONTEXT

This introduction is complementary to the general one (section I.0). The strategy for 2013 is summarised there, including the new innovation dimension of the activities, SME relevant research, international cooperation, cross-thematic approaches and societal aspects. Only the specificities of the sub-theme are presented here.

The information provided in this introduction as well as in the content of calls for 2013 shall not be considered as eligibility criteria (unless it is explicitly indicated) but shall be taken into account during the evaluation for the respective evaluation criteria. For eligibility criteria and additional information, e.g. funding schemes, budget limits, etc., please refer to section III.

I.2.1. Specific approach for Sustainable Surface Transport

The scope of the research covers the entire Surface Transport System and embraces all its elements: products (vehicles, vessels and infrastructures), services, operations and users integrating organisational, legal and policy frameworks. The 2013 work programme is divided into two major action lines:

- 1) The three **Socio-economic Challenges** indicated in section I.0.2 are addressed by five **Activities**, which are in line with those of the Specific Programme:
 1. The greening of surface transport
 2. Encouraging modal shift and decongesting transport corridors (co-modality)
 3. Ensuring sustainable urban mobility
 4. Improving safety and security
 5. Strengthening competitiveness

In addition to the above activities, issues cross-cutting the three Socio-economic Challenges, e.g. for structuring European surface transport research and supporting programme implementation are also addressed in this work programme.

- 2) **Actions supported under the ‘European Green Cars Initiative’ (EGCI) and the ‘Ocean of Tomorrow’**, which are also cross-cutting the three Socio-economic Challenges.

The Sustainable Surface Transport (SST) work programme covers a comprehensive and co-related spectrum of the innovation cycle, from basic and applied research to large scale and multi-disciplinary technology and socio-economic integration, validation and demonstration, including standardisation and certification where appropriate. Coordination and support actions contribute also to the structuring of European Surface Transport research and support for programme implementation.

The activities/actions are further divided in **topics** calling for **proposals**. Topics are classified

in two levels of categories according to the degree of specification of the topic descriptions: **Level 1** (generic) and **Level 2** (specific). There is no direct relation between budget allocation and either topic levels or the funding schemes. Funding schemes for each topic and eligibility criteria (including funding limits) are indicated in the call fiches (section III.2).

Topics in Level 1 are technology driven and enable technology synergies and transfer between transport modes. Proposals may be approached with some degree of flexibility, by addressing only part of topic content or only one surface transport mode. Research and development activities within Level 1 will contribute to the technological foundation of the sub-theme. Topics in Level 2, being specific, refer to well identified industrial, policy and socio-economic matters. They are mission driven, explicit in their formulation. They may for example give indications concerning the type of activity, the research approach, characteristics of the partnership and expected outcomes. Proposals addressing a Level 2 topic will cover it entirely.

Standardisation and certification are part of the content and scope of topics at any level where appropriate (see section I.0.3).

The indicative budget allocated to the main call (section III.2) has been distributed into four groups of topics:

- Group of topics N° 1: Increasing railway capacity
- Group of topics N° 2: Ensuring safe, green and competitive waterborne transport
- Group of topics N° 3: Implementing research for the ‘European Green Car Initiative’
- Group of topics N° 4: Ensuring sustainable urban mobility, improving surface transport through ITS, safety and security, and infrastructures.

Topics belonging to groups 1, 2 and 4 are described under the five activities of the work programme or under the cross-cutting chapter. Topics belonging to group 3 are described in a separate sub-division under the heading ‘European Green Cars Initiative’.

I.2.2. The ‘European Green Cars Initiative’

The ‘European Green Cars Initiative’ belongs to the ‘**European Economic Recovery Plan**’, an initiative to coordinate efforts and implement joint actions to contain the scale of the economic downturn and to stimulate demand and confidence. Within the Recovery Plan, the ‘**European Green Cars Initiative**’ is a series of measures boosting research and innovation aiming at facilitating the deployment of a new generation of passenger cars, trucks and buses that will safeguard our environment and lives and ensure jobs, economic activity and competitive advantage to car industries in the global market. A series of different measures are proposed: support to research and innovation through FP7 funding schemes, specific EIB loans to car and other transport industries and their suppliers, in particular for innovative clean road transport, and a series of legislative measures to promote the greening of road transport (circulation and registration taxes, scrapping of old cars, procurement rules, CARS21 initiative).

II.2. CONTENT OF CALLS FOR 2013

CHALLENGE 1. ECO-INNOVATION

The decarbonisation of the transport system and an efficient use of natural resources, i.e. eco-innovation in all transport modes and the continuation of the development of clean vehicles and vessels.

This challenge will be addressed by Activity 7.2.1 as well as by Areas 7.2.7.1 (Development of electric vehicles for road transport) and 7.2.7.2 (Research for heavy duty vehicles for medium and long distance road transport) of the European Green Cars Initiative.

Activity 7. 2. 1. The greening of surface transport

Developing technologies and knowledge for reduced pollution (air including greenhouse gases, water and soil) and environmental impact on such areas as climate change, health, biodiversity and noise. Research will improve the cleanliness and energy-efficiency of power trains (e.g. hybrid solutions) and promote the use of alternative fuels, including hydrogen and fuel cells as mid and long-term options, taking into account cost efficiency and energy efficiency considerations. Activities will cover infrastructure, vehicles, vessels and component technologies, including overall system optimisation. Research in developments specific to transport will include manufacturing, construction, operations, maintenance, diagnostics, repair, inspection, dismantling, disposal, recycling, end of life strategies and interventions at sea in case of accident⁷.

SST.2013.1-1. Track optimisation and monitoring for further noise reduction (in relation to Technical Specification for Interoperability and Environmental Noise Directive)

Level 2 - CP-FP - Call: FP7-SST-2013-RTD-1

Content and scope: Infrastructure noise emissions are not subject to specific European railway regulations through the noise Technical Specifications for Interoperability – TSI, which only concerns rolling stock. But it is fully understood that the noise level to which populations along the railway lines are submitted is largely generated and/or amplified by the infrastructure and this total noise emission is subject to limitation coming from national environmental regulations, harmonised under other European legislative instruments. Even if noise-reduced solutions for tracks and infrastructure are partly available from the design solutions, new solutions addressing the whole life of the infrastructure and its component have to be developed. To reduce all along its life the noise emitted by the infrastructure means acting on the track emissions parameters identified in the Noise Technical Specification for Interoperability (TSI): Acoustic roughness and Track Decay Rate (TDR) or dynamic response of the track and maintain them to an acceptable level.

The research activities should include:

- Better understanding of the track contribution in the total pass-by noise of the train.
- Harmonisation of monitoring of track roughness and average characteristic wheel roughness.
- Monitoring track dynamic properties with respect to noise emission.

⁷ The above text is a reproduction of the text included in the Council Decision on the Specific Programme Cooperation regarding this activity. The topics and areas open in each call for proposals do not necessarily have to cover all the issues mentioned in this text.

- Optimisation of track vibration and noise radiation in relation either by combining of already prototype solutions developed separately or by radical design (including slab track).
- Influence of track characteristics on aerodynamic noise sources.
- Influence of ground geometry and characteristics close to the track on noise propagation at low frequency.
- Development of solutions (design, maintenance policy) for a better control of track noise.

Expected impact:

- Developing the concepts and tools for economic maintenance of track.
- Developing and standardising operational monitoring systems for track (roughness and track decay rates) along with the associated operational measures for an affordable maintenance policy, with the aim to achieve a track optimisation and monitoring for further noise reduction.
- Contribution to the expected revision of TSI – noise.

SST.2013.1-2. Towards the zero CO₂-emission ship

Level 2 - CP-IP - Call: FP7-SST-2013-RTD-1

Content and scope: Research will focus on the optimisation of the energy chain of a ship, including the integration of renewable energy systems, on energy recovery systems from the main and auxiliary engines taking into account the latest research developments. Solutions shall be implemented on ships with optimised propulsion chains.

Activities will include:

- The optimal integration of renewable energy systems for energy production and use for auxiliary equipment and the accommodation area of complex ships.
- The development of optimised solutions for a wider use of alternative fuels for the main engines and respective deployment options.
- The development of innovative technologies for energy recovery and energy integration and respective deployment options, including storage, i.e.
 - techniques to minimise energy losses and to recover energy, in particular in the low temperature range; and
 - advanced technology for optimal storage of energy, including decentralised arrangements.
- The development of concepts for an optimal integration of the energy chain of complex ships including a holistic energy management.
- The development of novel after-treatment technologies for CO₂ reductions, taking into account energy optimisation.
- Building physical mock-ups on critical parts of the energy chain, which shall be used for measurement and verification under realistic conditions, as well as demonstration.
- Modelling of the energy chain onboard ships. The holistic model of the energy chain shall be validated using data obtained from measurement under realistic conditions.
- Modelling of fully optimised complex ships in various operation conditions taking into account all appropriate measures for CO₂ reduction, i.e. use of alternative energy sources, energy integration measures, optimised propulsion chain including hull/propeller interaction, new after-treatment technologies and routing.
- The development of reliable methods and tools for the assessment of CO₂ emission over the entire life time of a ship, including cost-effectiveness assessment.

- Assessment of the potential for market uptake and business potential of the different technologies developed and expected market barriers or bottlenecks. Development of a concept for raising the awareness of industry and public administrations regarding the potential of these new technologies for the reduction of CO₂ emissions.

Research and demonstration activities shall take into account the latest technology development in the field, in particular in fields that have previously benefited of EU support. Participation of SMEs active in equipment design, production and/or installation will be considered an asset. Proposals will clearly indicate the baseline in terms of CO₂ emissions and the progress expected as a result of research.

Expected impact: This research is expected to reduce energy consumption and thus CO₂ emissions by at least 20% compared to state-of-the art vessel technology through an optimal integration of leading edge technologies for emission reduction and energy efficiency without compromising ship safety or security. This will contribute to the roadmap to a single European Transport Area, which sets an ambitious target to reduce the EU CO₂ emissions for maritime transport by 40% (if feasible 50%) by 2050 compared to 2005 levels.

SST.2013.1-2. ERA-NET Plus ‘Advanced materials and techniques for green and reliable infrastructure’

Call: FP7-ERANET-2013-RTD (see Annex 4)

Content and scope: The main aim of this ERA-NET Plus is to launch a joint transnational call for proposals for research, development and innovation in the field of advanced materials and techniques for green and reliable road infrastructure. The joint call will focus on construction techniques using advanced materials, including those from other industries or from using conventional materials in an innovative way. Actions under this joint call will include the development of sophisticated modelling techniques or the testing and monitoring of novel techniques with regard to its impacts on reliability, safety and environment.

Cooperation with the USA in the respective areas should be sought. Care should be taken to ensure complementarities with the activities carried out in the ERA-NET ROAD.

The thematic focus of this joint transnational call should be proportionate with the funds available in order to ensure a reasonable rate of success in the call. Details on the topics covered by the call will be decided by the participants in due time but shall be selected upon consultation with the concerned Commission services.

Additional information: The deadline included in the call FP7-ERANET-2013-RTD applies for this topic. More information about the ERA-NET Plus actions (including eligibility criteria) can be found in Annex 4 of the work programme.

Expected impact:

- Improving coordination and reduce overlap in research and innovation in the field of green materials and technologies for reliable road infrastructure.
- Achieving critical mass and ensure better use of limited resources in fields of mutual interest. A significant participation of Member States and Associated States is expected.
- Sharing good practices in implementing research programmes.
- Promoting transnational collaboration and generating new knowledge and innovation

- Mobilising SMEs in transnational projects to enhance innovation.

CHALLENGE 2. SAFE AND SEAMLESS MOBILITY

The optimisation of the global efficiency and safety of the transport system (by application of Intelligent Transport Systems and logistics), making efficient use of infrastructure and network capacity, with the aim of offering safe and seamless transport and mobility to all European citizens, as transport is also crucial for social inclusion.

This challenge will be addressed by Activities 7.2.2, 7.2.3 and 7.2.4, as well as by Area 7.2.7.3 (Logistics and Co-modality) of the European Green Cars Initiative.

Activity 7.2.2. Encouraging modal shift and decongesting transport corridors

Developing and demonstrating seamless door-to-door transport for people and goods as well as technologies and systems to ensure effective intermodality, including in the context of rail and waterborne transport competitiveness. This includes activities addressing the interoperability and operational optimisation of local, regional, national and European transport networks, systems and services and their intermodal integration in an integrated approach. The activities will aim at European-wide strategies, optimised use of infrastructure including terminals and specialised networks, improved transport, traffic and information management, enhanced freight logistics, passenger intermodality and modal shift strategies to encourage energy efficient means of transport. Intelligent systems, new vehicle/vessel concepts and technologies including loading and unloading operations as well as user interfaces will be developed. Knowledge for policy making will include infrastructure pricing and charging, assessments of European Union transport policy measures and trans-European networks policy and projects⁸.

SST.2013.2-1. Next generation of train control systems in the domain of urban and main line European railway systems

Level 2 - CP-IP - Call: FP7-SST-2013-RTD-1

Content and scope: The research focuses on the next generations of train control systems for the two domains of urban and main line European railway systems. The goal of the project is to deliver specifications describing the new features of these next generations, leading to common technical architecture and associated standard interfaces within each of the two domains.

The research activities should include:

- Introduction of new technologies in the ERTMS (European Rail Traffic Management System) standard architecture to fit further requirements from railways undertakings.
- Investigation of next generation of ERTMS common technical specifications and their associated standard interfaces.
- Further development of CBTC (Communication Based Train Control) based control

⁸ The above text is a reproduction of the text included in the Council Decision on the Specific Programme Cooperation regarding this activity. The topics and areas open in each call for proposals do not necessarily have to cover all the issues mentioned in this text.

systems including both onboard and wayside equipment and associated standard interfaces.

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- Investigation of various possible higher industrial synergies between the control systems of the two domains, in terms of specifications for on-board and wayside equipment, certification processes, as well as facilitation of trans-border operations between the main line and sub-urban systems.

Expected impact:

- Delivery of Functional Requirement Specifications (FRS), Systems Requirements Specification (SRS) and Functional Interface Specification (FIS) for the next generation of ERTMS.
- Development of a common technical architecture and its associated standard interfaces for urban train control systems including delivery of related FRS, SRS and FIS specifications.
- Development of assessment methods and installation procedures for next generation of ERTMS and CBTC.
- Harmonisation of main line / urban rail train control systems development.
- Increase of capacity for regional lines, freight lines and high-density lines and for urban rail systems.

***SST.2013.2-2. New concepts for railway infrastructure and operation:
adaptable, automated, resilient and high-capacity***

Level 1 - CP-IP - Call: FP7-SST-2013-RTD-1

Content and scope: The research will define an affordable railway infrastructure and operations concept that is resilient to extreme weather, is designed for automated maintenance and operations and is adaptable to different route characteristics and future innovation. It should equally investigate techniques to increase the throughput of freight transport, either by the creation of longer trains or by an increase of freight speed.

The research activities could include:

- Infrastructure for medium/long distance mixed traffic – designs for low maintenance, low carbon, rapid construction including prefabricated track with provision for integrated power systems and communications
- Very high speed track - for speeds over 350km/h, requirements for structures design criteria related to dynamic analysis: bridge-vehicle interaction, damping considerations and the effect of track irregularities. Compatibility with high-speed freight should be investigated.
- Switches and Crossings for the railway of the future - the development and demonstration of alternative designs for switches and crossings phasing out all currently known failure modes and incorporating optimised sensor technologies.
- Development of innovative and cost effective technologies for collecting real-time data on the train operation (current train position, the current delay, reason of delays, details on operational problems and the estimated time of arrival at relevant operation points) as well as technical data (train weight, wagon list etc).
- Development of innovative operational measures and technologies reducing the time and operational cost related to the transshipment between rail and other modes
- Development of joint requirements and testing for incident management plans.
- Longer trains and/or high-speed freight, addressing automated coupling, improved braking technology and planning aspects allowing the interleaving of slower freight trains with regular and high-speed passenger traffic.

Expected impact:

- Contribution to the development of future specifications for technologies and systems.
- Development of guidance documents setting out the above and identifying the technologies and systems that should be developed to ensure their delivery.
- Practical demonstration that step change in railway infrastructure and operations may be achieved within the constraints of the need to maintain railway services. Case studies for selected sites, including one or more European Rail Freight Corridors are desirable.

Activity 7.2.3. Ensuring sustainable urban mobility

Focusing on the mobility of people and goods by research on the 'next generation vehicle' and its market take-up, bringing together all elements of a clean, energy efficient, safe and intelligent road transport system. Research on new transport and mobility concepts, innovative organisational and mobility management schemes and high quality public transport will aim at ensuring access for all and high levels of intermodal integration. Innovative strategies for clean urban transport⁹ will be developed and tested. Particular attention will be paid to non-polluting modes of transport, demand management, rationalisation of private transport, and information and communication strategies, services and infrastructures. Tools and models supporting policy development and implementation will cover transport and land use planning including the relationship with growth and employment¹⁰.

SST.2013.3-1. Managing integrated multimodal urban transport network

Level 2 - CP-IP - Call: FP7-SST-2013-RTD-1

Content and scope: Research will aim at developing, demonstrating and validating strategies and tools (technological and methodological), which contribute to integrated multimodal network management for cities and their hinterland. Strategies can address the movements of goods and people on the network. Specific technological, operational and governance aspects have to be taken into account as well as efficient use of existing platforms and solutions already tested and capable to provide some of the key functionalities.

The following subjects should be covered for research, development and demonstration:

- Innovative and cost-effective detection technologies leading to improved real-time data collection on people and vehicle movements, particularly for soft modes and public transport.
- Multimodal modelling and simulation covering road vehicles (including public transport) and soft modes.
- Innovative operational and strategic decision-support systems which can balance safety, environment and efficacy aspects of traffic management and control.
- Integrated traffic control involving coordination among road and transport operators and emergency services.
- Open traffic and communication systems.
- Multimodal cooperative mobility for local authorities (including migration scenarios).
- Open data systems - Approaches, business models and contractual arrangements.
- Generic interface between digital applications relating to future urban infrastructures

⁹ Building upon the experiences of the CIVITAS initiative.

¹⁰ The above text is a reproduction of the text included in the Council Decision on the Specific Programme Cooperation regarding this activity. The topics and areas open in each call for proposals do not necessarily have to cover all the issues mentioned in this text.

and ITS reference architecture inside vehicles.

Each demonstration should involve several modes of transport including public transport. The aim is to have an integrated and complementary approach with several demonstrations of several of the above subjects in different urban areas across Europe.

The proposal should also foresee the development of guidelines for network managers on the research actions listed above. The proposal should gather multi stakeholder partnerships including local authorities (as policy/decision makers, infrastructure managers, traffic operators, and mobility services providers), public transport authorities/operators, information service providers, traffic system suppliers and technology developers. It should establish links with the Digital Agenda, the EC open data strategy and the ITS and Urban Mobility Action Plans (it should be based on and take into account the work and guidelines developed by the Urban ITS Expert Group) and build on past and existing research activities on urban network management (CONDUITS, EBSF, CVIS, SMARTFREIGHT, 2DECIDE). Appropriate links with CIVITAS activities should be established.

Expected impact:

- Contribute to more efficient integrated multimodal network management for cities and their hinterland.
- Upgraded methodologies and tools for traffic planning and operations enabling integrated and multi-modal management.
- Progress towards open systems for traffic solutions enabling a faster market deployment of ITS in urban areas.
- Improved understanding of people and freight movements across the modes, especially public transport and soft modes.
- Integration of public transport and soft modes in traffic planning and operations, including in supporting ITS.
- Support the use of standards to achieve open traffic systems (in particular for data model and data exchange interfaces).

SST.2013.3-2. Implementing innovative and green urban transport solutions in Europe and beyond

Level 1 - CSA-CA - Call: FP7-SST-2013-RTD-1

Content and scope: The active take up and transfer of experience between European cities and cities across the world is expected to accelerate the deployment of sustainable urban transport solutions and to contribute to reach the objectives set up by the European Union in terms of energy efficiency and fight against climate change.

Building on past or on-going EU-funded projects, the aim of the action is twofold:

- 1) To develop and implement the take-up of innovative and green urban transport solutions which are adapted to the specific framework conditions of cities across the world. Beyond a structured take up of innovative solutions, the action will develop recommendations for future cooperation between cities across the world and in particular Latin American Countries and China.
- 2) To share experiences of topic of common interest and propose innovative and green urban transport solutions which are adapted to the specific framework conditions of cities from Mediterranean partner countries. The action will develop recommendations for future research cooperation.

The action should cover several of the following subjects:

- Open network management
- Cleaner vehicles (including electro mobility use)
- Advanced public transport systems, in particular advanced bus systems
- Infrastructure development
- City logistics

This project should take into account the results of previous and on-going EU research activities on international cooperation¹¹ and other projects which have developed results at European level of great interest for international cooperation.¹² Appropriate links with the related bilateral research cooperation frameworks should be established including the Euro Mediterranean cooperation on research and innovation.

Expected impact:

- Foster the deployment of innovative transport solutions across the world to address global challenges through active take up and transfer of experience between European cities and cities across the world.
- Support the structured transfer of innovative transport solutions promoted by the European industry to other regions of the world, thus contributing to the competitiveness of European companies.
- Strengthen the links between local authorities from Europe and other industrialised and emerging countries.

SST.2013.3-3. Capitalising CIVITAS knowledge and experience

CSA-CA - Call: FP7-TRANSPORT-2013-MOVE-1

Content and scope: The aim is to capitalise knowledge gained in previous CIVITAS phases and bridge to Horizon 2020. This action should promote uptake of successful CIVITAS measures and develop capabilities required to meet the goals of the transport White Paper, building on existing support actions - including POINTER, VANGUARD and CATALIST - as well as relevant projects funded under CIVITAS, ELTIS, etc. Actions should include:

1) Development of CIVITAS Thematic Groups: Centred around a core of CIVITAS cities, Thematic Groups comprising a broad range of interested stakeholders shall be established for the eight CIVITAS measure categories and for other relevant areas such as transport planning, citizen engagement, etc. Thematic Groups shall stimulate program-level knowledge transfer, dissemination, and long-term evaluation.

2) Establishment of CIVITAS Advisory Groups: Based upon CIVITAS experiences, Advisory Groups shall support development and implementation of strategic initiatives, anticipating Horizon 2020, and informing EU urban mobility policies in the Action Plan on Urban Mobility and the White Paper "Towards a single European transport area", etc. Advisory Group coverage should include, but not be limited to:

- Sustainable Urban Mobility Plans, urban mobility performance audits and Urban

¹¹ Such as the FP7 projects SIMBA, VIAJEO and STADIUM on ITS, TRANSAFRICA on public transport, and TURBLOG on city logistics.

¹² Such as NICHES and NICHES + on the take up of innovation for a more sustainable urban mobility, EBSF on public transport, and CITYMOVE, CITYLOG and SMARTFREIGHT on urban logistics.

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- Quality public transport and co-modality
- New mobility concepts for personal transport
- Sustainable urban logistics
- Access restrictions
- Safe walking and cycling
- Understanding and promoting behavioural change
- International co-operation
- Other such working groups as may be relevant to White Paper objectives

The coordination action shall provide the secretariat for groups. Each Advisory Group should include public- and private-sector experts, the research community and legal and financial expertise. Activities could include reviews, surveys of CIVITAS Forum cities, elaborating deployment strategies covering the full innovation cycle; identifying RTD&I priorities; assessing technical and non-technical barriers and policy options and delivery mechanisms that could accelerate deployment. Sufficient budget should be foreseen to cover experts' expenses associated with the work of the Advisory Groups and to provide for supporting studies, etc.

3) Professional Placements / Exchanges: Support for short-duration placements and exchanges for transport practitioners should be offered on a competitive basis. Placements may involve “lead” cities from the CIVITAS network, able to offer exchanges and /or host training to “learning” city practitioners.

4) Take-up actions: Building on CATALIST, GUARD and NICHES+, this action shall develop suitable implementing procedures, involving experienced “lead” cities from the CIVITAS network willing to offer support for transferring know-how of successful measures to “learning” cities – based on competitive calls and on analysis of transferability potential. A CIVITAS Activity Fund shall be managed to provide partial financial support to beneficiaries of take-up activities (typically entities from small and medium sized cities not actively participating in CIVITAS). The consortium shall build on the approach followed for the previous CIVITAS Activity Fund. This activity should assimilate the results and establish links with the projects under topic SST.2012.3.1-3 “Take-up of transport innovation in urban and regional transport”.

5) CIVITAS National/regional Networks: Budget shall be set aside to establish complementary or maintain existing national/regional networks to promote awareness, ensure results dissemination and take up following the approach taken in already established CIVINET networks.

The coordination action shall initiate establishment of the groups in association with the Commission – including drafting terms of reference, initiating and managing requests for expressions of interest to participate, convening and managing group meetings, and preparation of group strategy documents. Deliverables will depend on the activity / theme, but shall normally include an international state of the art review, technical reports and a strategic plan (action plan) including recommendations for priority actions and indicative budgets for future actions. This support action is required to establish links with the support actions POINTER, VANGUARD, CATALIST and projects supported under topic SST.2012.3.1-3.

Expected impact:

- Detailed recommendations and strategy for priority actions which support delivery of the White Paper and Action Plan goals for sustainable urban mobility.
- Further dissemination, transfer and replication of successful CIVITAS measures.
- Consolidation and structuring of experience and knowledge developed in CIVITAS with a view to informing policy at EU, national and local levels.
- Exploit linkages with other relevant FP7 activities related to urban mobility.
- Grow CIVITAS national networks and CIVITAS Forum membership.
- Capacity building through short duration professional exchange/placement activities.

Activity 7.2.4. Improving safety and security

Developing technologies and intelligent systems to protect vulnerable persons such as drivers, riders, passengers, crew, and pedestrians. Advanced engineering systems and risk analysis methodologies will be developed for the design and operation of vehicles, vessels and infrastructures. Emphasis will be placed on integrative approaches linking human elements, structural integrity, preventive, passive and active safety including monitoring systems, rescue and crisis management. Safety will be considered as an inherent component of the total transport system embracing infrastructures, freight (goods and containers), transport users and operators, vehicles and vessels and measures at policy and legislative levels, including decision support and validation tools; security will be addressed wherever it is an inherent requirement to the transport system¹³.

SST.2013.4-1. Ships in operation

Level 2 - CP-IP - Call: FP7-SST-2013-RTD-1

Content and scope: The aim of this research is to ensure the safety of ship operations in view of the introduction of new IMO (International Maritime Organisation) standards related to energy efficiency, in particular EEDI (Energy Efficiency Design Index). Starting from the new IMO regulations, particular focus will be given to the development of right methods, tools and procedures to facilitate and support the safe design and operation of a wide range of ships in compromised situations, in severe seaways, in restricted waters and during manoeuvring, accounting also for interaction with other vessels, maritime structures and the environment. Furthermore, focus should also be placed on the necessary safety requirements of other types of vessels, currently not covered by the EEDI, such as tugs and offshore service vessels in anticipation of future energy efficiency requirements for these segments.

Activities will include:

- The development of high fidelity tools and processes for accurate and efficient analysis of safety and performance sensitive hydrodynamic problems in complex and/or extreme sea operational conditions, including intact stability performance (surfing/broaching, rolling, extreme motions) and added resistance.
- Extension and validation of hydrodynamic analysis codes for ships manoeuvring performance in safety-sensitive environment such as confined waterways, including particular aspects of shallow water hydrodynamics and slow speed behaviour as well as the interaction with other vessels and stationary structures in diverse environment and weather conditions.
- Adaptation of multi-objective optimisation and integrated design environments for

¹³ The above text is a reproduction of the text included in the Council Decision on the Specific Programme Cooperation regarding this activity. The topics and areas open in each call for proposals do not necessarily have to cover all the issues mentioned in this text.

holistic operational performance and minimum powering requirement predictions to ensure safe application of the design rules guaranteeing at the same time the right balance between safety, economic efficiency and greenness.

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- The provision of technical input position paper to the Commission, based on the project results to support, when requested, the activities of EU services within the IMO framework.

Research concern all ship types, including non-cargo ships such as tugs and offshore service vessels. Participation of ship owners and operators, classification societies and ports will be considered as an asset.

Expected impact: Results should contribute to enhance the safety of vessels in compromised situations while respecting regulatory environmental constraints. Projects shall contribute to the strengthening of technical knowledge as inputs to negotiations in IMO.

SST.2013.4-2. Inspection capabilities for enhanced ship safety

CP- IP - Call: FP7-TRANSPORT-2013-MOVE-1

Content and scope: The last decade has seen a surge in the shipbuilding markets placing the shipbuilding process and its monitoring by administrations and classification societies under unprecedented strain not only in terms of technology and resources, but also in terms of quality management and risk management. These changes need to be taken into account to improve the EU capabilities to manage ship safety and environmental risks especially (but not only) for long-term prevention. There is a need to critically consider the circumstances and changes which have taken place in the industry in the past decade and develop methodologies to identify vulnerabilities and associated risks for safety and put in place the necessary corrective actions. This should transcend the actors' routine quality and risk management practices and should be integrated as appropriate in their usual activities.

The aim is to provide appropriate support to recognised organisations, port state control authorities, coastal and flag administrations and shipyards by:

- Developing methodologies for improving existing risk management procedures and processes for inspections, incident detection, compliance monitoring, contingency plans and emergency responses which address risk issues arising from changes in shipbuilding and certification practices.
- Addressing the technical capabilities needed to support the implementation of the above mentioned enhanced methodologies.

Through the close cooperation and involvement of the relevant actors, the prospective project should assist the recognised organisations to fulfil their obligations under Regulation (EC) n° 391/2009 to improve the effectiveness of ship inspection and plan approval and to assist the identification and monitoring of high-risk ships.

Active participation of class, ship-owners, shipyards, equipment manufacturers, maritime authorities and researchers (academy) would be a critical success factor. The review of the above mentioned actors' current policies, strategies and the operational responses will be fundamental for this activity. It must lead to the development of a comprehensive preventive policy.

Expected impact: The expected impacts are the enhancement of the above mentioned actors' current policies, strategies and the operational responses and the development of a comprehensive preventive policy, which will be based on:

- 1) Methodologies and tools:

- Enabling recognised organisations to assess and upgrade their risk management processes in a way that any risks generated as a result of the strain suffered by the shipbuilding and certification process as described above will be properly addressed.
 - Identifying and monitoring ships at risk.
 - Defining preventive actions over time, performing risk analysis, evolving risk control options, cost benefit analysis and decision making recommendations.
- 2) Improved technologies in inspection, repair and verification of ship structures, taking into account the results of previous EU-funded research projects.

SST.2013.4-3. Advanced digital human body models and virtual testing

Level 1 - CP-FP - Call: FP7-SST-2013-RTD-1

Content and scope: Advanced vehicle safety systems of the future will have to be able to provide optimum protection to occupants of all sizes, weights and constitutions including children and elderly people with their specific biomechanical characteristics and physical movements in critical pre-crash situations. Further research is needed to help to understand and quantify these characteristics and to develop and implement self-adapting integrated safety systems. For this research the importance of numerical simulations has increased over last a few years. The use of virtual human body models and virtual testing offers many benefits over physical testing, such as cost reduction, robustness checks and optimisation opportunities. Virtual testing also opens the potential to cover a much wider range of traffic scenarios and human diversity (size, age, gender).

Research will cover the following aspects:

- Development of advanced virtual human body models with a clear focus on model robustness and acceptance by the industry, regulatory bodies and consumer organisations. Work should also include validation procedures and tools, standardised range of biofidelic human occupant models and statistical modelling strategies.
- Virtual testing methods with a high bio-fidelity and injury prediction capability which will help to get a better understanding of human-like reactions and injury risks in road accidents. Current findings from ergonomics studies should be taken into account and be integrated into existing Digital Human Models to make them more suitable for virtual design of passive safety systems and for virtual crash tests.
- Methodologies, tools and numeric solutions allowing time and cost effective extension of biomechanical databases with new biomechanical properties of human bodies in respect to age, sex, posture, etc. Methodologies should also be found to create and efficiently maintain a database of general motions of human bodies. A sustainable business model, including licensing of data, should be elaborated.

Cooperation with partners from other parts of the world (e.g. US, Japan) should be considered.

Expected impacts:

- Better understanding of the specific biomechanical characteristics and physical movements of occupants in critical situations and accidents and contribution to the design of innovative vehicle safety systems.
- Developing digital human body models and virtual testing methods for safety assessment with biofidelic kinematics and realistic injury predictions for integrated safety.
- Harmonised human body models, validated in pre-crash and crash situations, as a basis

for a worldwide accepted virtual safety assessment methodology.

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- Recommendations for the implementation of virtual testing in global regulations and consumer testing.

CHALLENGE 3. COMPETITIVENESS THROUGH INNOVATION

The strengthening of the competitiveness of European transport industry through innovation, as competition from developed and emerging economies is intensifying in a global economy.

Activity 7.2.5. Strengthening competitiveness

Improving the competitiveness of transport industries, ensuring sustainable, efficient and affordable transport services and creating new skills and job opportunities by research and developments. Technologies for advanced industrial processes will include design, manufacturing, assembly, construction and maintenance and will aim at decreasing life cycle costs and development lead times. Emphasis will be placed on innovative and improved product and system concepts and improved transport services ensuring higher customer satisfaction. New production organisation including the supply chain management and distribution systems will be developed¹⁴.

SST.2013.5-1. Technical requirements for the certification of new materials for railway rolling stock

Level 2 - CP-FP - Call: FP7-SST-2013-RTD-1

Content and scope: The necessary decrease of the energy consumption, as well as the increase of capacity for high speed and high capacity freight trains, must be supported by lightweight railway rolling stock. Therefore the evolution of the rolling stock requires the implementation of new materials similar to those used in other industries. The first step will be to face the challenge of certification of safety related components that will make use of innovative material in an industry where safety is of primary importance.

The research activities should include:

- Benchmarking the most promising materials (being) developed in other sectors able to be implemented in the railway rolling stock industry.
- Gaining a better understanding of new materials behaviour and consequences of their use given the specific safety standards and conditions of the railway sector. Specific attention should be paid to the impact of ballast, especially by modelling.
- Investigation of the influence of the characteristics of new materials on the maintainability of rolling stock, in order to consider their use in the overall vehicle life cycle.

Expected impact:

- Identification of the requirements for the new materials in terms of reliability, maintainability and safety.
- Development of standards, especially in terms of safety, for railway rolling stock, able to allow and support the development and use of new lightweight materials.

¹⁴ The above text is a reproduction of the text included in the Council Decision on the Specific Programme Cooperation regarding this activity. The topics and areas open in each call for proposals do not necessarily have to cover all the issues mentioned in this text.

- Reduced energy consumption of rolling stock by introduction of new lightweight materials.

SST.2013.5-2. Low cost flexible automation and mechanisation in small to medium shipyards

Level 2 - CP-FP - Call: FP7-SST-2013-RTD-1

Content and scope: The objective of this topic is to strengthen the competitiveness of shipbuilding industries, in particular SMEs, through innovative and cost-effective processes while developing new skills and job opportunities in this sector. Focus shall be put on low cost automation and mechanisation for shipyards processes including design, engineering, basic material processing, assembly and outfitting. All solutions should ensure a minimal environmental impact in shipyards.

Activities will include:

- The identification of technical needs and development of cost model for low cost, flexible automation and mechanisation based on typical production volume throughput of European small-medium size shipyards building, repairing, converting and maintaining ships.
- The identification of automation solutions matching the technical requirements for design, engineering, basic material processing, assembly and outfitting, which have proven reliability within the large shipyards and are relevant for the needs of European small-medium size shipyards, including solutions from outside the shipbuilding industry.
- The development and testing of business models that include cost-effective flexible solutions for shared facilities, equipment and/or human resources.
- Demonstration in small-medium size shipyards of selected automation and mechanisation solutions with subsequent evaluation of the relevance and efficiency of these technologies, including cost-benefit aspects and human skills requirements.
- Establishment of a development scheme for adapting promising automation and mechanisation solutions to European small-medium size shipyards needs with focus on material processing, assembly and outfitting. Education programme shall be implemented for at least one year in the course of the project.
- Development of specific training programmes in the domain of mechanisation and automation specific to the shipbuilding industry.

SMEs active in the shipbuilding sector should have major roles in the consortium and share at least 50% of the requested EU funding. The participation of a major shipyard will be considered as an asset.

Expected impact: Results are expected to raise the competitiveness of small-medium shipyards, reinforce the role of SMEs, and increase the availability of technical skills suitable for the shipbuilding industries.

SST.2013.5-3. Open in-vehicle platform architecture

CP-IP - Call: FP7-TRANSPORT-2013-MOVE-1

Content and scope: Several EU funded projects have addressed in the past the required integration of telematic (ITS) applications onto an open in-vehicle platform (e.g. GST). This integration has also been the subject of a number of industrial initiatives (e.g. AUTOSAR), more specifically from automotive manufacturers. This trend is accelerating especially

among car manufacturers, fuelled by recent evolutions in wireless communication, by the proliferation of nomadic and connected devices, and by the novel 'apps' business models. Ubiquitous connectivity and Internet access in personal transport, and especially in personal cars, is a business opportunity currently taken care by the automotive industry. On the other hand, the use of ITS components or systems is also regulated, or bound to be, for many segments or areas of commercial transport. Examples include existing provisions on the transport of dangerous goods and live animals or the existing and future legislation on the digital tachograph. So far most of these acts and agreements have evolved independently of each other, so there has been little synergy even when needs are the same.

A streamlining and integration of these applications within a coherent, open-system architecture, especially for commercial vehicles, could yield better efficiency and usability, reduced costs and enhanced extensibility, enabling a 'plug and play' integration of future new or upgraded applications such as those in nomadic devices and those utilising GNSS services for advanced positioning and timing. This open system architecture would be embodied in an open in-vehicle platform, guaranteeing interoperability/interconnection with infrastructure systems and facilities. With this modular approach, additional functionalities could be integrated later for in-vehicle safety and safe HMI, personal mobility, logistics support and access to multimodal information and possibly electronic vehicle identification. This is the thrust of action 4.1 of the ITS Action Plan which aims to define definition of an open in-vehicle platform architecture for the provision of ITS services and applications, including standard interfaces. A preliminary study conducted in 2010 has indicated some orientations for such architecture.

Building on the results and achievements of previous research projects, taking into account recent contributions and projects in the area of cooperative systems (e.g. CVIS or the concept of European Wide Service Platform (EWSP) for cooperative system enabled services) and on in line with the most recent regulatory developments (e.g. revision of digital tachograph legislation), the project should define and demonstrate, for commercial vehicles, the required open architecture able to integrate a number of existing applications (digital tachograph, transport of dangerous goods, transport of live animals, etc.).

The work should include:

- Definition of the open in-vehicle architecture, including the required interfaces, and in synergy with standardisation developments.
- Demonstration of its implementation on commercial vehicles.
- Testing and validation of the business and operational integration of ITS applications (regarding efficiency, quality, robustness and acceptance).
- Definition and launch of new standardisation requirements.

In order to maximise industrial relevance and impact of the research effort, the active participation of all relevant industrial actors from the automotive industry (especially for commercial vehicles manufacturers) is essential. This will be considered during the evaluation under the 'Implementation' criterion.

Expected impact:

- Definition (including development, testing and pilot deployment) of a EU- based open in-vehicle architecture for commercial vehicles, based on transport policy based legal requirements.
- Development of an adapted and acceptable business/deployment environment for the

deployment of ITS applications for commercial vehicles.

SST.2013.5-4. Innovative, cost-effective construction and maintenance for safer, greener roads

Level 1 - CP - Call: FP7-SST-2013-RTD-1

Content and scope: Research will focus on the development and demonstration of new design, construction and maintenance processes which will address both the renovation of existing road infrastructure and the construction of new road infrastructure. Inherent to this is the need for common measurement systems to assess road surfaces for new and maintenance work approval. Only an optimised interaction between skid, rolling resistance and noise reduction can lead to a high level of road safety while ensuring the most positive greening effect, through reduction of CO₂ output and noise emissions.

Activities will cover one of the following subjects:

1) Measurement systems: Definition of standards and test methods to measure the impact of road pavement characteristics on safety and fuel consumption. Two key strategic components are:

- The development of guidelines and standards supporting the objectives of European road network development and related EC priorities in terms of safety, noise and energy consumption.
- The provision of harmonised measurement tools to enable consistent assessment of road surfaces and tyres.

The participation of standardisation bodies is to be encouraged.

2) Design, construction and maintenance:

- Tools and techniques of road asset management and renewal, including aspects such as structures, road durability and time stability.
- The development and demonstration of products, services and guidelines for cost-effective construction and maintenance of infrastructure that address one or more of the White Paper issues such as:
 - specially developed freight corridors optimised in terms of energy use and emissions, minimising environmental impacts, improved reliability, limited congestion and low operating and administrative costs; and
 - infrastructure upgrades which are resilient to foreseen negative impact of climate change such as rising sea level and more extreme weather including floods, droughts and more frequent storms.

Expected impact:

- Contribute to the objectives of the strategy for a greener, smarter and more resilient European transport network as set out in the EU Transport White Paper: Roadmap to a Single European Transport Area.
- Products and services that bring about considerable cost-reductions for road authorities and industries and ensuring a wide-European application.
- Guidelines and recommendations for the application and adoption of cost-effective innovation in the road infrastructure sector.
- Standards for the determination of road infrastructure influence on important vehicle performance characteristics (such as safety, fuel consumption and noise).
- Supporting the extension of EU transport and infrastructure policy to our immediate

neighbours, to deliver improved infrastructure connections and closer market integration.

CROSS-CUTTING ACTIVITIES FOR IMPLEMENTING THE SUB-THEME PROGRAMME

Cross-cutting activities in the Sustainable Surface Transport Work Programme 2013 support the achievement of modal or cross-modal actions which help meeting the three socio-economic Challenges.

SST.2013.6-1. Strengthening the research and innovation strategies of the transport industries in Europe

Level 1 - CSA-SA - Call: FP7-SST-2013-RTD-1

Content and scope: The objective of this action is to strengthening the effectiveness of research and innovation capacities of the transport industries in Europe through improved cooperation between stakeholders, including decision-makers, and enhanced definition of strategic research and innovation needs. The action will assist the transport-related European technology platforms (ETP), in particular ERTRAC and Waterborne TP, the European Commission (EC) and Member States and Associated States (MS/AS) in defining research needs for their strategies and programmes in order to realise the objectives of the Europe-2020 strategy and further on the vision of the White Paper 2011 for a competitive and resource-efficient future transport system.

The action should undertake where appropriate the following activities:

- Updating of research agendas and roadmaps. This includes multi-modal research and innovation areas, which will be elaborated in cooperation with other transport modes.
- The establishment of thematic technological groups on the most relevant technologies to ensure innovative advances by pooling together leading European experts in selected fields, in particular those involved in EU and national research projects and programmes.
- Monitoring of transport research projects from relevant programmes (such as FP7, ENT, JU, etc.), and organisation of workshops to foster innovation aspects.
- Defining implementation plans, including innovation roadmaps and business implementation, based on the research agendas and roadmaps and on the monitoring of the existing programmes (starting from FP6); this would be an input for the EC and MS/AS.
- Developing links and coordination strategies between the transport-related ETPs and technology platforms existing at national level in MS/AS, in order to avoid duplication of efforts.
- Increasing visibility of research and innovation activities, and contributing to the dissemination of results, through large conferences, thematic events, show cases, databases, website support, newsletters and other publications. Coordination with other large transport events, such as TRA, and cooperation with the Transport Research Knowledge Centre and relevant ERA-NETs need to be ensured.

Two support actions are expected focusing on road and waterborne transport, respectively. Strong and focused consortia must be made-up of leading European experts for transport technologies from both industry and research providers. The implementation of this action

requires close collaboration with the ETPs dealing with transport research and innovation (particularly with ERTRAC and Waterborne TP), as well as with other related initiatives and entities. Cooperation with EU services will be an essential element in this support action.

For waterborne transport, dedicated resources and a specific work package should aim to cluster ongoing and recently concluded e-Maritime related projects. The purpose is to consolidate and align their developments and support the definition of an EU e-Maritime Framework that will ensure the interoperability of new information systems services for maritime transport and facilitate their take-up in the marketplace.

Note: The project must not subsidise any direct or indirect costs (e.g. secretariat) of the ETP organisations. In kind contributions from additional stakeholders are welcome.

Expected impact: Projects will bring together the leading European stakeholders in transport research to monitor projects, develop roadmaps, and support their implementation. They will contribute to an optimisation of research and innovation strategies, to the improvement of communication, dissemination and use of results as well as to the definition of relevant transport policies.

SST.2013.6-2. Technology transfer in the area of Transport (including AAT)

Level 1 - CP-FP - Call: FP7-SST-2013-RTD-1

Content and scope: Technology transfer is a very efficient way to foster innovation and market uptake. In the transport sector this is particularly relevant since some trends towards the use of the same materials, processes or solutions in different modes and sectors are evident, with a certain time shift due to cost or maturity issues.

The aim of this topic is to develop and implement concepts of technology transfer or cross fertilisation of technical solutions between transport modes or sectors in areas such as: sustainable and light materials and their processing, human factors, lean manufacturing, passenger comfort and safety, energy efficient components, etc.

This topic accepts bottom-up proposals in which a potential user or group of users in any transport sector develops in cooperation with partners in another transport sector/application the use of a technology for their intended application. Special attention should be given to possibilities of technology transfer from aeronautics to other transport modes in the areas of new and intelligent materials, composites, sensor systems, etc.

Proposals shall satisfy important needs for one or more surface transport SMEs.

Expected impact: Increased efficiency of research and innovation efforts by enhancing co-operation and sharing of technology between surface transport modes and aeronautics. In particular, SMEs are expected to benefit from this approach, since most of them have difficulties in developing technologies in-house but are normally very good at applying or adapting existing technologies.

SST.2013.6-3. Towards a competitive and resource efficient port transport system

CP-FP/CSA-CA - Call: FP7-TRANSPORT-2013-MOVE-1

Content and scope: To facilitate ports to efficiently handle the increasing freight volumes;

enable seamless logistics chains; review the restrictions on provisions for port services; enhance the transparency on ports' financing, clarifying the destination of public funding to the different port activities with a view to avoid any distortion of competition; and establish a mutually recognisable framework on the training of port workers in different fields of port activities¹⁵ are at the forefront of the EU transport policy actions¹⁶. Two actions areas are expected to address the aims of the present topic.

There are significant differences in current practice in collecting and interpreting ports data that restrict the ability to monitor the evolution, developments and needs of the EU port system. In addition, the tremendous impacts of innovation¹⁷ dynamics will become critical for the sustainable development of EU ports. This will drive requirements for mastering innovative port operations and generating the necessary human resources, i.e. people with the right skills, training and qualifications to understand, assume and exploit all the advantages provided by the new technologies.

A collaborative project (small or medium-scale focused research project) will develop a ports observatory with a set of indicators measuring EU ports performance, activities and developments. The results of the PPRISM project and other relevant work¹⁸ should be taken into account. Indicators should initially be identified across five different categories: 1) market trends and structure; 2) logistic chain and operational performance; 3) environment; 4) governance; and 5) socio-economic indicators. Starting from a limited set, focussing on the five different categories, forward-thinking should seek at possible extensions and elaborations of the set of indicators. This collaborative action should go beyond the port authorities and develop an approach to obtain data from the whole port community: port authorities, terminal operators, shipping lines calling to the different ports, etc. At the same time, it should ensure that inland ports are also covered by the observatory. The implementation will demonstrate that it satisfies stakeholder confidentiality concerns in the management of data. The indicators will be weighted and aggregated in order to have a comprehensive and meaningful output. A balanced representation of ports and port actors across the EU will be demonstrated and an easy to use interface for the collection of the data implemented.

To meet the second challenge a further action (coordination and support action) should consider the relevant results of EU projects with particular focus on port operations and needed skills and the state of the art in professional training methodologies. Training/human resources issues need to be considered as a component of wider efforts to make EU ports more competitive and resource efficient and the action should ensure the active participation of the key stakeholders and facilitate an effective, broad and open dialogue between the social partners within the port sector for pan-European solutions.

Note: The requested EU contribution for the collaborative project shall not exceed EUR # million and its duration 48 months. The requested EU contribution for the coordination and support action shall not exceed EUR # million and its duration 30 months.

Expected impact:

- A knowledge and management tool for monitoring the efficiency and performance

¹⁵ See the 'Social Agenda for maritime transport' of the 2011 White Paper on Transport policy.

¹⁶ The 2011 White Paper on Transport policy identifies the need for a strong and highly specialised labour force to tackle the expected growth and change of job profiles in ports.

¹⁷ Highly sophisticated port handling equipment technologies and innovations in port processes and logistics.

¹⁸ The ECOPorts initiative, individual reporting by ports, the Germanischer Lloyd 'Container Terminal Quality Indicator Standard', the experiences of the shipping-KPI project and others.

of sea and inland ports. It will allow for a comprehensive view on port activities, developments and performance and, at the same time, allow for individual ports to compare their activities and operations with the EU average and with ports in other important regions like Asia and the Americas and. The results should include appropriate mechanisms to collect, manage and distribute the data on a long term and to show trends over a substantial timeline and a business case to ensure sustainable continuity.

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- A coordination action supporting the implementation of the ILO 'Guidelines for Training of Workers in the Port Sector' and the objective of the 'Social Agenda for maritime transport' for the establishment of a mutually recognisable framework on the training of port workers in different fields of port activities. It should identify anticipated human resource demand profiles, skill and training needs for EU ports in the 2030 horizon. It should facilitate consensus building on the next steps that need to be made in realising the objectives of a sustainable and efficient EU port system.

SST.2013.6-4. Ex-post evaluation of the Transport (including Aeronautics) theme of the FP7 'Cooperation' specific programme

Level 1 - CSA-SA - Call: FP7-SST-2013-RTD-1

Content and scope: The ex-post evaluation of FP7 scheduled for 2015 will need to be based on the ex-post or interim evaluations of the FP thematic areas. These evaluations will need to be available by mid 2014. For this purpose, the Commission intends to avail itself with an external assessment of the implementation, achievements and impact of the FP7 Transport theme [# to be expanded].

Expected impact: [# to be completed]

SST.2013.6-5. Conference: support for the organisation of Transport Research Arena (TRA)

CSA-SA - Call: FP7-SST-2013-RTD-1

Content and scope: [# to be completed]

Expected impact: [# to be completed]

THE 'EUROPEAN GREEN CARS INITIATIVE'

The 'European Green Cars Initiative' includes three major research and development areas within its RTD pillar: 1) development of electric vehicles for road transport; 2) research for heavy duty vehicles for medium and long distance road transport; and 3) logistics and co-modality.

GC.SST.2013-1. Efficient, safe, convenient solutions for grid and road integration of the electric vehicle

Level # - CP-IP - Call: FP7-SST-2013-RTD-1

Contents and scope: Advanced solutions for charging electric vehicles (EV) which are fully integrated in the grid and road infrastructure within urban environments and at the same time account for the state of the art battery technologies may pave another way towards unlimited range of the fully electric vehicle in the future. Driving range and battery lifetime of the full electric vehicle (FEV) can be enhanced, e.g. by frequent recharging through connections to the power grid which are widely deployed and accessible in a barrier-free manner, or by inductive charging. Continuous or quasi continuous charging will also lead to shorter recharge duration, and thus raise usability of the FEV beyond the urban context. High power (fast) charging will also enable range to be increased, although it is essential to account for the faster degradation of the battery. Interoperability is key for effective implementation of any new (continuous/fast/inductive) charging systems, and therefore technologies, communication

protocols, safety standards need to be harmonised.

Research will address the following aspects:

- Investigation into alternative, innovative solutions for recharging EVs (e.g. inductive charging, fast charging) which maximise convenience to the users.
- Study on first steps towards continuous, en-route charging technologies which would increase the vehicle range while reducing the capacity and weight of the on-board energy storage systems.
- Assessment of safety and health impacts of charging solutions.
- Assessment of the economics (capital and operating cost impacts) of charging solutions.
- Requirements of innovative charging solutions at the distribution grid.
- Development of ICT solutions at vehicle making the driver aware of optimized battery use, cell degradation due to fast charging, charge monitoring for new modes as inductive, fast, and bidirectional charging.
- Implementation of energy management strategies taking into account preview information from cooperative systems and e-Horizon.
- Establishment of data security standards and crypto measures.
- Advanced test concepts for FEVs and smart grid charging and communications (including safety, durability, efficiency) shortening time to market.
- Supporting measures enabling the deployment of charging infrastructure and the required harmonisation.

Proposals shall address relevant technology development and demonstration issues from a technical/technological perspective and/or focus on business case analyses and impact studies demonstrating the feasibility and viability of the proposed solutions across a wide-range of operational situations.

Expected impact: The grid connection system of the FEV is turning into a distinguishing factor between vehicle manufacturers, thus a jointly harmonised and standardised solution would be a competitive edge for Europe.

[#The content of this topic will also depend on the results of the current call that includes similar issues. Research activities of this topic might be carried out in a Joint Call].

GC.SST.2013-2. Next generation electric motors

Level 2 - CP - Call: FP7-SST-2013-RTD-1

Contents and scope: The energy efficiency of Electric Vehicles can be improved by next generation of electric motors providing higher efficiency. Improved materials or substitutes could deliver higher and tailored output while reducing weight and volume. The scarcity and the recyclability of such materials should also be addressed considering the mass introduction of next generation electric vehicles.

Research will focus on:

- Weight reduction.
- Power density.
- Electricity consumption optimisation.
- Smart packaging of power electronics including materials for thermal management.
- Manufacturing and dismantling processes.
- Novel or substantially improved materials for permanent magnets of motors of next

generation electrical vehicles, offering quality and robustness, and including analysis of recyclability.

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- Substitution of Rare Earth magnets with alternative magnetic materials or magnet-free concepts.

Expected impact:

- Optimising electric powertrains and increased energy efficiency of electric vehicles.
- Reducing cost towards mass use in next generation electric vehicles.

GC.SST.2013-3. Future light electric vehicles

Level 1 - CP - Call: FP7-SST-2013-RTD-1

Contents and scope: The objective is to close the gap between bikes/mopeds and cars by developing light, affordable, safe, ergonomic and energy efficient electric vehicles meeting customer expectations in all weather conditions.

Research under this topic will address the following aspects:

- Optimised weight through innovative materials and system integration (300 to 600 kg) using technologies covered in previous calls (no specific technology development).
- Safe and integrated chassis and body shell design.
- Measures to reach similar occupant safety level than in normal passenger cars despite worse conditions (low mass and stiff structure will lead to high crash pulses). Topics to investigate are: optimised crash detection mechanisms (sensing, algorithms); optimised/adaptive actuators (restraints and structures); high compatibility design, including assessment of the potential benefits for such light vehicles of standardising the position of structural elements for all vehicles.
- Extremely low energy consumption (40-80 Wh/km in urban driving).
- Long pure electric range (170 km and more in urban driving).
- Compelling acceleration (0 to 100 km/h: 10 sec) in comparison with conventional vehicles
- Purely electrical braking with enhanced recuperation capability with respect to the state of the art and advanced stability systems.
- At least two seats and three wheels.
- Assembly line capable designs.
- Low energy consuming manufacturing processes.
- New business approaches, based on reasonably low budgets and leading to novel supply chains.

Expected impact: [# to be completed]

GC.SST.2013-4. Demonstration of electric buses as urban public transport

CP-IP - Call: FP7-TRANSPORT-2013-MOVE-1

Contents and scope: The White Paper 'Roadmap to a single European transport area' calls for a transition from a car based personal mobility to a public transport based mobility. Public transport plays also an important role in mitigating the negative effects of transport in urban areas such as congestion, green house gas and pollutants emissions. Clean, energy efficient and silent buses will contribute to meet these objectives. A large demonstration project will facilitate the market take up of electric buses in Europe. The fleets of urban buses will include the main several types of electrification technologies dealing or not with different scenarios on interaction with the electricity grid. The proposal time frame should be designed to take on board latest development in EU or national programs and latest available industrial technologies for all vehicle categories considered. Existing local or regional demo projects

and new projects could be coordinated in this demonstration project.

The activities to be carried out should include:

- Demonstration of the use of electricity as energy vector for urban buses in a wide range of real-life operating conditions. The project could demonstrate electric buses from with different types of electrical power train systems covering plug in hybrid to full electric technologies. Fuel cells and trolley buses should be excluded from the proposal. Focus should be on vehicles with interaction with the grids. The demonstration sites should provide various climatic and geographical conditions. Coordination of existing local, regional or national demonstration programs is an asset.
- Assessment of the infrastructure optimisation and bus-to-grid interactions scenarios should be included.
- Development of standards and investigating safety issues and technology validation for performance, durability and costs.
- Assessment of the impact on energy and environment, including a well-to-wheel analysis.
- Communication, dissemination of information and education.

The project should have a predominant demonstration component. The marginal cost associated with the innovation element compared to state-of-the-art vehicles will be considered as eligible cost. A typical consortium could include cities or regional authorities, fleet operators, vehicles and equipment manufacturers, utilities, research centres and universities.

This activity should assimilate the results of previous research projects on buses (in particular EBSF and HCV) and establish links with the projects under topic SST.2012.3.2-1 'Coordinating innovation for efficient bus systems in the urban environment'.

Expected impact: This project should clarify the viability of the different types of electrical buses for immediate market introduction. The expected impact of this project is an acceleration of the market roll-out of electric buses in order to meet EU policy objectives. The project should also help to clarify possible support for further deployment of electric buses in European cities through European Investment Bank instruments.

GC.SST.2013-5. Configurable and adaptable truck

Level # - CP-IP - Call: FP7-SST-2013-RTD-1

Contents and scope: Today trucks are designed and optimised towards a limited variance set of usage and for maximum pay load. In the future there will be an increasing need for optimised load efficiency for each mission of a truck. The objective of research is to develop innovation solutions for the truck and load carrier design to have an integrated approach on configuration and adaptation of the whole vehicle concepts. Both the design phase (e.g. new tractor-trailer architecture) and the operation phase should be considered. A key aspect in the design phase is to have a modular drive line for rightsizing the vehicle combination with respect to the transport assignment while keeping vehicle performance (e.g. stability). In the operation phase, the vehicle combination should be adapted to the actual driving environment (i.e. traffic situation, topology, and payload). The project should also investigate legal constraints and harmonisation issues across the EU, e.g. engine certification, vehicle combination dimensions, etc. and identify possible deployment scenarios.

The following issues should be addressed by research:

- Optimised trucks design for transport mission.
- Configurable truck (tractor & trailer) and load carrier concepts.
- Energy tailored driveline, with a modular approach for rightsizing.
- Total truck – trailer architecture including modular powertrain.
- Distributed driveline including high level of hybridisation.

The project should include the development of a demonstrator of complete vehicle combination and requirements on modular tractor and trailer design.

Expected impact: Viable concepts for better matching and combination of truck and load carrier to different types of transport assignments will lead to an improved load efficiency both from an energy (estimated to 25% less energy/t.km, drag reduction, driveline and transport mission rightsizing,) and infrastructure usage point of view.

GC.SST.2013-6. High efficiency energy conversion for future heavy duty transport

Level 1 - CP-FP - Call: FP7-SST-2013-RTD-1

Contents and scope: The aim of research is to develop innovative complete high efficient energy conversion concepts for heavy duty trucks.

Research may include:

- engine downsizing concepts, e.g. dynamic cylinder deactivation;
- refined combined cycle systems, with e.g. heat, steam or fuel cell systems;
- drive train concepts reducing the transient environment for the engine, e.g. by dynamic energy storage offering optimisation potential of the engine; etc.

These converters must be designed to be operated in combinations with highly efficient integrated after-treatment solutions. A new generation of total driveline control architectures should be developed which utilise the potential of the new energy converter concept in an optimal combination with truck energy usage and energy recovery systems on-board.

Expected impact: Demonstration of new innovative energy conversion concepts which reach a system efficiency well above 50%

GC.SST.2013-7. ERA-NET Plus 'Electromobility and logistics'

Call: FP7-ERANET-2013-RTD (see Annex 4)

Contents and scope: The main aim of this ERA-NET Plus is launch a joint transnational call for proposals for research, development and innovation in the fields of electromobility and logistics. The joint call should focus on an interdisciplinary approach to transport research in the specific fields of electromobility and logistics. Care should be taken to ensure complementarities with the activities carried out in the ERA-NET Plus Electromobility. The thematic focusing of this joint transnational call should be proportionate with the funds available in order to ensure a reasonable rate of success in the call. Details on the topics covered by the call will be decided by the participants in due time but shall be selected upon consultation with the concerned Commission services.

Additional information: The deadline included in the call FP7-ERANET-2013-RTD applies

for this topic. More information about the ERA-NET Plus actions (including eligibility criteria) can be found in Annex 4 of the work programme.

Expected impact:

- Improving coordination, reduce overlap in research and innovation in the field of electromobility and logistics for greener transport systems.
- Achieving critical mass and ensure better use of limited resources in fields of mutual interest. A significant participation of Member States and Associated States is expected.
- Sharing good practices in implementing research programmes.
- Promoting transnational collaboration and generating new knowledge and innovation.
- Mobilising SMEs in the transnational projects to enhance innovation.

GC.SST.2013-8. Technical and operational connectivity in intermodal freight transport

Level 1 - CP-IP - Call: FP7-SST-2013-RTD-1

Contents and scope: Ports, freight terminals and the transport industry are confronted with

- ever increasing volumes to handle (continuous volume growth over the years as well as increased vessel sizes);
- new logistic concepts applied by shippers such as co-modality and synchro-modality, the latter offering companies the ability to time and again select the most appropriate mode of transport for a particular moment and circumstances;
- the need for innovative transshipment technologies allowing cost efficient integration of small and voluminous container flows and the sharing of transport volumes which may e.g. require stop & go operations in addition to point to point shuttle services;
- the fast growing development of e-freight applications and networks for a secure, reliable and efficient platform for digital information exchange for global trade and logistics; and
- the growing development of port - hinterland networks.

The objective of this topic is to increase the individual and co-operative performance quality and throughput of ports and terminals through the development of innovative technologies, infrastructures and e-freight solutions. Research under this topic will address the following aspects:

- Next generation of environmental friendly safe and efficient “Automated Guided Vehicles” for the transport of goods within ports/terminals or beyond fenced spaces, i.e. between ports/terminals, and supportive infrastructure.
- New transshipment technologies, new management and software tools.
- Low-cost innovative connectivity solutions based on existing, freely available components, which may include upload and download facilities, document sharing facilities with access authorisation mechanisms, electronic document readers, a basic data model that is in line with existing international standards, and dashboard functionality. Functional requirements and main components for modular connectivity solutions in international trade shall be addressed.

Expected impact:

- Efficient and safe port and terminal operations.
- Efficient, safe low environment impact use of transport means within and between ports and terminals.
- Contribution to the open up of e-freight developments to a wider community, notably

SMEs and link them up with networks that are being developed predominantly by big companies.

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- Development of easy to use and affordable software solutions and demonstrate connectivity solutions (in particular for SMEs in the transport sector) in different trade lanes, within the European Union, and between European Union and third countries, for different purposes, with special attention for the ease of use, low entry barrier, possibilities for quick connect and disconnect, and possible business models.
- Assessment of the benefit for international trade of a general roll out of this type of connectivity solution.

'THE OCEAN OF TOMORROW' (JOINT CALL)

Aims of the call

The EU Strategy for Marine and Maritime Research supports the EU maritime policy's objective of a thriving maritime economy, making the most of marine resources in an environmentally sustainable manner. It helps deliver the full potential of the maritime economy to the "EU 2020" goal of a smart, inclusive and sustainable growth for Europe.

In this framework, 'the Ocean of Tomorrow' calls for proposals addressing cross-cutting marine and maritime challenges, requiring interdisciplinary marine and maritime research. Generic marine technologies, which can enable a range of marine and maritime activities, are crucial in that respect.

This is the case of marine sensing technologies necessary to monitor a range of parameters in the sea, and of new materials or coatings that can avoid bio-fouling. New marine technologies need also to be developed both in relation to the cost-effective installation, maintenance, operations and decommissioning of large offshore wind farms as well as to transport, logistics and equipment needs.

This call will address these technologies by bringing together, in an integrated way, technology providers and end-users in order to foster innovation in these three key areas to the benefit of a broad range of users.

OCEAN.2013-1. Biosensors for real time monitoring of biohazard and man made chemical contaminants in the marine environment

(Topic not relevant for SST)

OCEAN.2013-2. Innovative sensors for in-situ monitoring of marine environment and related maritime activities

(Topic not relevant for SST)

OCEAN.2013-3. Innovative antifouling materials for maritime applications

Biofouling at the interface with seawater is a major concern for mobile and stationary maritime structures and equipments. In the case of mobile equipment, biofouling negatively affects the hydrodynamics of ships, it increases drag by accumulating on the hulls and reduces the efficiency of propulsors, resulting in higher fuel consumption (increases of

40% fuel consumption have been measured); biofouling can also act as marine pest vector. For stationary structures, such as those linked to aquaculture, biofouling generates a need for regular cleaning and regeneration, which is costly, might disrupt operations and is potentially polluting. With the purpose to avoid toxic biocide used in antifouling coatings, and due to increasing concerns on the use of heavy metals to control biofouling in the marine environment, novel alternative cost-efficient and environmentally friendly approaches are needed. The proposals under this topic should focus on developing new, well beyond the state of the art, antifouling materials and should address in an integrative way, both mobile as well as stationary maritime applications.

On the basis of a thorough analysis of the state of the art, research could draw on the whole range of antifouling materials e.g. foul release approach, biomimetics, marine biotechnology based coatings etc. In the case of marine biotechnology based approaches the issues of supply and the need for the bio-based active antifouling compounds to be produced in bulk, as required for final commercial production should be given due consideration. The proposals should include benchmarking of related existing materials and technologies. In this sense environmental, and economic factors, as well as performance, must be duly considered.

An improvement in the understanding of marine biofouling processes with respect of the developed material should be an integral part of the proposals. For the resolution of the technological bottlenecks impeding the achievement of well performing final materials and products, proposers are welcome to investigate and exploit the potential offered by converging technologies such as e.g. materials science and engineering, maritime technology, nanotechnology and biotechnology.

The proposals should include relevant field testing for all the selected applications. Development, improvement and/or standardisation of relevant protocols should be included. Proof of concept in terms of product and/or process should be delivered within the project, excluding commercially usable prototypes (2006/C323/01), but convincingly proving scalability towards industrial needs. The proposals should follow a life cycle approach for the new materials and their selected applications also taking into account issues of cost efficiency, effective life span, production, handling, maintenance, environmental impact, ecotoxicological profile and end of life. It may include Life Cycle Assessment. The proposals should include assessment of the environmental, health and toxicological effects according to REACH (<http://echa.europa.eu/>), OECD Guidelines for the Testing of Chemicals (<http://www.oecd.org>) and/or relevant international standards.

In order to ensure the industrial relevance and impact of the research efforts, the active participation of industrial partners represents an added value to the activities, and this will be reflected in the evaluation, under the criteria Implementation and Impact.

Funding Scheme: Collaborative Projects

Additional eligibility criteria: The requested European Union contribution shall not exceed EUR # million

Additional information: Up to # projects may be funded.

Expected impact: i) Development of new and better performance functional materials leading to improved environmental impact and decreased need for maintenance of both

mobile and stationary maritime equipment; ii) better understanding of the scope of existing materials and technologies; iii) contribution to achieving EU policies.

OCEAN.2013-4. Innovative transport and deployment systems for the offshore energy sector

In its Communication ‘Offshore Wind Energy: Action needed to deliver on the Energy Policy Objectives for 2020 and beyond’, the Commission indicated that offshore wind can make a significant contribution to all three key objectives of the new Energy Policy: reducing greenhouse gas emissions, ensuring security of supply and improving EU competitiveness. The Communication underlines that the potential exploitable by 2020 is likely to be 30-40 GW, and in the 2030 time horizon it could be up to 150 GW.

In 2007, the Energy Wind Association assessed that achieving 40 GW by 2020 will mean that 7,800 turbines of 5 MW need to be built building over the next 13 years. Those turbines have to be assembled, transported and installed on sites.

The Strategic Agenda of the European Wind Energy Technology Platform (Market Deployment Strategy from 2008 to 2030) identifies transport and logistic issues as key elements for the deployment of offshore wind farms and their maintenance. The Strategic agenda points to research needs both in relation to the cost-effective installation, maintenance, operation and decommissioning of large offshore wind farms as well as to transport, logistics and equipment needs.

In its Communication on Strategic goals and recommendations for the EU's maritime transport policy until 2018, the Commission stresses that maritime transport is key to Europe's energy security and therefore an important instrument of the European energy policy, amongst other offshore servicing vessels are considered as increasingly important for ensuring the security of supply.

Research activities under this topic shall address the following aspects:

- Development of innovative and cost-effective deployment strategies for large-scale turbines, including building and testing onshore.
- Elaboration of optimal logistical processes and on-land transport links for large offshore structures.
- Development of novel vessel types and equipment for installation, maintenance and decommissioning.
- Development of safety procedures for installation, operation and maintenance activities, regarding both offshore wind structures and the vessels.
- Improved operations and maintenance including the enhanced role of condition monitoring and systems with reduced human intervention.
- Development of new business models at European level for large offshore systems based on integrated life-cycle approaches.
- Development of methods and tools to assess the field performance of offshore wind farms servicing vessels and for optimised service activities in terms of lead time and energy usage.

Proposals shall include demonstration activities at reduced scale using testing models and when possible tests at real scale using existing infrastructure and equipment, adapting those to validate models and management tools. Tests shall also address extreme conditions.

Funding Scheme: Collaborative Project

Additional eligibility criteria: The requested European Union contribution shall not exceed EUR # million

Additional information: Up to # project(s) may be funded.

Expected impact: Projects will contribute to the implementation of the roadmap activity of the European Wind Initiative aiming at supporting offshore take-off in the medium-term. Projects are also expected to contribute to the development of new niche markets for the European shipbuilding and shipping industries thereby contributing to competitiveness of the sector and to the creation of new jobs.

7.3. HORIZONTAL ACTIVITIES FOR THE IMPLEMENTATION OF THE TRANSPORT PROGRAMME

No topic is open in 2013 for these activities. However, cross-cutting topics on modal or cross-modal issues addressing all at once the three socio-economic challenges (eco-innovation; safe and seamless mobility; and competitiveness through innovation) have been included in the AAT and SST 'cross-cutting activities' chapters of this 2013 Transport work programme (see table of contents).

7.4. GALILEO

The European Global Navigation Satellite System, encompasses Galileo and EGNOS, and provides a worldwide positioning and timing infrastructure.

In parallel to the development phase, that is demonstrating the technical feasibility and the European capacity of implementing an independent satellite navigation infrastructure, the deployment of the full Galileo satellite constellation and the associated ground segment starts in 2008. The procurement activities include full system validation and are foreseen to lead in 2014 to an operational infrastructure owned by the European Union.

The main objective of the deployment phase is to procure and set up the various elements that constitute the Galileo infrastructure, in particular the completion of the space and ground infrastructures, system support tasks, launch and operation of services, as well as the development of external interfaces for the future service/application systems and test receivers. Beyond manufacturing of equipments, the procurement activities encompass trade-offs and analysis, simulations, testing, demonstration, in-orbit validation, and other activities that increase competencies of European companies in satellite navigation.

According to the European GNSS Regulation¹⁹, the financial envelope foreseen to implement

¹⁹ Council Regulation (EC) 683/2008 of 9 July 2008 (OJ L 196 24.07.2008).

the above activities (EUR 3.4 billion for EGNOS and Galileo) includes the sum of EUR 400 million made available from the Seventh Framework Programme for the period 2007-2013.

A delegation agreement between the European Commission and the European Space Agency has been concluded in the course of 2008, pursuant to Article 54(2) of the EC Financial Regulation, allowing ESA to procure the Galileo deployment in the name and on behalf of the Commission. Therefore, the implementation of the above activities will not be detailed in this Work Programme. Finally, the Commission will procure performance monitoring facilities.

New satellite navigation applications are being developed everyday, covering numerous sectors of the world economy. The expected global market in products and services will likely reach EUR 400 billion in 2020. The activities will give European industries the right opportunities to acquire the knowledge and expertise required in a strong international competing environment. Small and Medium Enterprises are key players for innovation in this sector.

The European infrastructure is being implemented in an incremental way. The overall GNSS performances will gradually improve, allowing the smooth development of receiver technologies and applications. The set of R&D activities will follow the incremental build up of the infrastructure, i.e. EGNOS in 2009, four satellites for in orbit validation in 2011, and an 18 satellites initial operative constellation in 2014. The activities will build on existing infrastructure elements, including ground-based test and verification facilities.

The 'GNSS Evolution programme' of the European Space Agency will maintain the technology at the state-of-the-art level. The activities within European GNSS Supervisory Authority and European Space Agency are coordinated.

The European GNSS, as a global navigation system, has a strong international dimension. All R&D activities will fully take into consideration the cooperation frame established with partner countries in order to promote the use of the European Navigation system worldwide.

The financial envelope foreseen to implement Galileo deployment activities (EUR 3.4 billion for EGNOS and Galileo), does not allow any more call after the call 2011. **As a result there will be no calls for Galileo under the Theme Transport of the 2013 Work Programme.**