

ORIENTATION PAPER
PROPOSED PRIORITIES AND TOPICS FOR WORK PROGRAMME 2012
Working document – not legally binding

COOPERATION

THEME 7

TRANSPORT (INCLUDING AERONAUTICS)

(European Commission C(2011)XXXX)

**WARNING: This is a working document, which can change up to its adoption.
Applicants must refer only to the final published document.**

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7. TRANSPORT (INCLUDING AERONAUTICS)

Objective

Based on technological and operational advances and on the European transport policy, develop integrated, safer, “greener” and “smarter” pan-European transport systems for the benefit of all citizens and society and climate policy, respecting the environment and natural resources; and securing and further developing the competitiveness attained by the European industries in the global market.

The Innovation Union initiative underlines that research and innovation are key drivers of competitiveness, jobs, sustainable growth and social progress. The work programme 2012 has been designed to support the implementation of the Innovation Union Initiative and in particular to bring together research and innovation to address major challenges. The work programme can contribute to the innovation objective in two ways, and constitutes a significant change to the approach in earlier work programmes:

1. By supporting more topics aimed at generating knowledge to deliver new and more innovative products, processes and services. This will include pilot, demonstration and validation activities. The focus on innovation will be reflected in the description of the objectives and scope of the specific topics, as well as in the expected impact statements. The innovation dimension of the proposals will be evaluated under the evaluation criterion 'Impact'.
2. By identifying and addressing exploitation issues, like capabilities for innovation and dissemination, and by enhancing the use of the generated knowledge (protection of intellectual property rights like patenting, preparing standards, etc).

Information on the Risk-Sharing Finance Facility (RSFF), an innovative financial instrument under FP7, is available on line¹. The Commission will respond to further needs of potential beneficiaries for information on the RSFF (by, e.g., awareness-raising activities in conjunction with the European Investment Bank, participation to thematic events).

I.0. CONTEXT

I.0.1. Policy context: Europe 2020 and Innovation Union

European transport research and innovation have a role to maintain and increase the efficiency of the different transport modes as well as their interaction and to foster progress. Technological progress, the organisation of transport and understanding the supply and demand factors are key elements in European transport research and innovation. The European transport system serves key roles in the transportation of people and goods in a local, regional, national, European and international context. At the same time, it is essential to Europe's prosperity and closely linked to economic growth and quality of life. The grand challenge for Transport is to make growth and sustainability compatible, by decoupling

¹ <http://www.eib.org/products/loans/special/rsff/?lang=en> and http://ec.europa.eu/invest-in-research/funding/funding02_en.htm

environmental impacts from economic growth, while assuring the competitiveness and innovative character of the European transport industry. Economic crisis, increasing scarcity of non-renewable energy sources, aging, migration and internal mobility, urbanisation, and globalisation of the economy are among the other challenges to be faced by Transport research.

In the *Political guidelines of President Barroso* for the next Commission², it is stated that “the next Commission needs to maintain the momentum towards a low emission economy, and in particular towards decarbonising our electricity supply and the transport sector – all transport, including maritime transport and aviation, as well as the development of clean and electric cars. Decarbonising electricity supply and transport will also bring additional benefits in terms of security of energy supply”.

The Commission Communication *‘Europe 2020 – A strategy for smart, sustainable and inclusive growth’*³ emphasises that essential elements of the transport policy are better integration of transport networks, promoting clean technologies, and upgrading infrastructure. Two of the flagship initiatives of this strategy, *‘Innovation Union’*⁴ and *‘Resource efficient Europe’* are of particular relevance to Transport research. The concept of the Innovation Union recognises the need of strengthening the innovation chain today by launching a new approach, the European Innovation Partnerships, which will pool efforts and expertise in research and innovation to focus on results, outcomes and impacts, and rapid modernisation in key transport-related areas such as cities and mobility. Further, a New White Paper on Transport has been adopted by the Commission on 28 March 2011⁵, which lays down a long-term strategy that would allow the transport sector to meet its goals with a 2050 horizon.

Research priorities outlined in this annual work programme are based on the above policy framework as well as on the overall objectives and research activities defined in the Specific Programme ‘Cooperation’ of the Seventh Framework Programme. Other European Union policies are also of relevance for Transport research. Following the adoption by the Commission of the *‘European Economic Recovery Plan’* on 26 November 2008⁶, a *‘European Green Cars Initiative (EGCI)’* has been launched involving research on a broad range of technologies and smart energy infrastructures essential to achieve a breakthrough in the use of renewable and non-polluting energy sources, safety and traffic fluidity. The initiative is funded by the European Union, the European Investment Bank (EIB), industry and Member States. It is worth to mention as well the Sustainable Development Strategy, the Marine and Maritime Research Strategy, the European Road Safety Action Programme 2011-2010, the European Agenda for Freight Logistics, the establishment of the European Maritime Transport Area without barriers, the EU Maritime Transport Strategy 2018, the ITS Directive and its Action Plan, the Action Plan on Urban Mobility, and a European strategy on clean and energy efficient vehicles.

² Political guidelines for the next Commission, José Manuel Barroso, 3 September 2009.

³ COM(2010) 2020 final

⁴ COM(2010) 546 final

⁵ COM(2011) 144 final

⁶ COM (2008) 800

Over recent years, the transport industry has changed under the impact of the internal market and of globalisation. Transport is a high-technology industry, making research and innovation crucial to its further development and conducive to European competitiveness, environmental and social agendas. The European Technology Platforms set up in the Transport sectors (ACARE for aeronautics and air transport, ERRAC for rail transport, ERTRAC for road transport, and WATERBORNE for waterborne transport) have elaborated long-term visions and strategic research agendas which constitute useful inputs that complement those from the Transport Advisory Group and the EGCI Advisory Group to the approach and activities of the Transport theme and the needs of policy makers and expectations of society.

I.0.2. Approach for 2012

A new approach has been adopted for Work Programme 2012 (WP 2012), reflecting the new political context and the priority given to the Innovation Union. This new approach is based on focusing on major socio-economic challenges and responding to societal concerns. The work programme is structured accordingly to these challenges and addresses the innovation cycle in its integrity, while respecting the rules of competition (see below in section I.0.3 the innovation dimension of the activities).

The Transport theme takes a holistic ‘transport system’ approach in addressing the challenges and the innovation dimension, by considering the interactions of vehicles or vessels, networks or infrastructures and the use of transport services. Such an approach will necessitate the integration and demonstration of new concepts, knowledge and technologies, and the support to bringing them to the market within a socio-economic and policy context. Given the different structure and focus of the sectors, the theme is divided into three sub-themes (accordingly with the Specific Programme) and horizontal activities:

- 7.1. AERONAUTICS and AIR TRANSPORT (AAT)
- 7.2. SUSTAINABLE SURFACE TRANSPORT (SST) including the ‘European Green Cars Initiative’
- 7.3. HORIZONTAL ACTIVITIES for the implementation of the TRANSPORT PROGRAMME (TPT)
- 7.4. GALILEO

For the period 2012-13, a multi-annual strategy is proposed focusing on the above new approach. Work Programmes 2012-13 will be the last ones of FP7 and a smooth transition towards the future EU research and innovation funding should also be ensured, in particular via Work Programme 2013.

Based on the policy context, to achieve critical mass, leverage effect and EU added-value, the **strategic research and innovation priorities for WP 2012** will focus on three major socio-economic challenges:

- 1. Eco-innovation** – The decarbonisation of the transport system⁷ and an efficient use of natural resources⁸, i.e. eco-innovation in all transport modes and the further development of clean vehicles and vessels.
- 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 capacity⁹, with the aim of offering safe and seamless transport and mobility to all European citizens, as transport is also crucial for social inclusion.
- 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.

A thorough approach has been taken in order to identify the most promising technology areas and innovation prospects to attain the three major challenges mentioned above. It takes into account the consultations with other Commission services, the Transport Advisory Group, MS/AS and stakeholders (including the Transport Technology Platforms of the four transport modes; and the EGCI Advisory Group), which ensure the added-value at EU level, ERA dimension and complementarity with national programmes and synergies of the activities and topics proposed. The results of previous calls (2007 to 2011) have also been considered when making the present proposal. The synergies between the sub-themes and their contribution to responding to the societal challenges of the Transport system will be exploited, as appropriate.

A common structure of Challenges / Activities / Areas / Topics has been adopted for the sub-themes. The specificities of each sub-theme are provided in detail in the 'Context' sections of the sub-themes (sections I.1 and I.2).

Calls for WP 2012

The 2012 work programme has the following calls:

- FP7-AERONAUTICS and AIR TRANSPORT (AAT)-2012-RTD-1
- FP7-AERONAUTICS and AIR TRANSPORT (AAT)-2012-RTD-L0
- FP7-AERONAUTICS and AIR TRANSPORT (AAT)-2012-RTD-JAPAN
- FP7-SUSTAINABLE SURFACE TRANSPORT (SST)-2012-RTD-1 (including the 'European Green Cars Initiative')
- FP7-2012- MATERIALS FOR GREEN CARS
- FP7-TRANSPORT (TPT)-2012-RTD-1

⁷ Transport is the only sector in which CO₂ emissions keep growing.

⁸ The increasing scarcity of fossil fuels makes the transport sector with 97% oil dependency particularly vulnerable.

⁹ Due to the growing demand for mobility, infrastructures are congested in many cities and in some crucial nodes like ports and airports.

- FP7-TRANSPORT-2012-MOVE-1

In addition to the ERA structuring effects of the activities and topics proposed following the consultations indicated above, the theme continues supporting ERA-NET¹⁰ activities that develop transnational coordination. ERA-NET 'Transport III') is part of a joint call (FP7-ERANET-2012-RTD) that will be launched separately.

For budgetary reasons, there will be no calls for *Galileo* in Transport Work Programme 2012 (see section 7.4).

I.0.3. Innovation dimension of the activities

Aeronautics and Air Transport

Innovation in AAT is promoted by a coherent set of R&I actions at various levels of technology readiness going from future technologies (Level 0 – a new element in FP7-AAT) via upstream research (Level 1) to technology integration, demonstration and validation (Level 2) and final demonstrators in the appropriate operational environment (Level 3: 'Clean Sky' and SESAR). From research and technology development to market, all relevant actors should be present in project partnerships. The key industrial participants are expected to bring innovative products and services to the market, particularly in downstream research.

A new type of approach to research and innovation on future technologies (Level 0) is proposed to stimulate and incubate new fundamental knowledge and disruptive ideas that have a strong potential for innovation. This approach is expected to take on board new players, in particular research entities and knowledge-intensive small businesses from all over Europe.

To address challenges 1 (eco-innovation) and 3 (competitiveness), research and technology validation (Level 1) focuses mainly on two activities: 'The greening of air transport' and 'Improving cost efficiency'. The other activities, 'Increasing time efficiency', 'Customer satisfaction and safety', 'Protection of aircraft and passengers' (all three related to challenge 2) and 'Pioneering the air transport of the future' are open for a limited number of topics selected from the gap analysis of previous calls and ensuring complementarity with research undertaken in Level 2 and Level 0.

As regard to technology integration and demonstration (Level 2), topics for addressing the three challenges mentioned above are selected, complementing the demonstration work in the Clean Sky's Integrated Technology Demonstrators and SESAR Demonstrators, as well as availability at the time of the call of the underpinning technologies from previous research at lower technology readiness levels.

Sustainable Surface Transport including the 'European Green Cars Initiative'

¹⁰ ERA-NET activities will be subject to a joint call across the Specific programme 'Cooperation' – See Annex 4.

Innovation is promoted by following a similar approach to AAT, i.e. balancing upstream and downstream components of the supply/demand side of innovation and ensuring adequate partnerships. Many topics involve demonstration, standardisation, certification, regulatory and/or other activities to promote innovation (see list below). Of particular importance is the *European Green Cars Initiative*, where most topics have a strong innovation character.

Implementing research through the ‘European Green Cars Initiative’ Private-Public Partnership – The three components of the EGCI are covered in WP 2012: 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, in line with the roadmaps adopted by the Industrial Advisory Group of the PPP. These three components underpin the research and innovation needed to address the three socio-economic challenges (i.e. eco-innovation, safe and seamless mobility, and global competitiveness).

Increasing Railway capacity – Railway research focuses mainly on addressing safe and seamless transport and competitiveness, enhancing attractiveness to users (reliability and convenience) whilst increasing railway capacity. The ERRAC ETP Strategic Research Agenda 2020 includes targets to increase overall rail transport demand by 40% for passengers and 70% for freight compared to 2000. Co-modality is essential for an efficient use of rail freight transport, not to compete with but to complement road transport.

Improving the efficiency of Waterborne transport – Research on waterborne technologies concentrates on all three societal challenges, by opening topics for innovative materials and systems for ships, for safety aspects and for e-guided vessels, in line with the WATERBORNE ETP Strategic Research Agenda, including the facilitation of e-Maritime solutions for the maritime transport sector. WP 2012 also contributes to cross-thematic marine and maritime research (*‘Ocean of Tomorrow’*), as foreseen in the EU Strategy for Marine and Maritime research.

Ensuring sustainable urban mobility – Efficient, affordable and accessible mobility for all (challenge 2) is of key importance to sustainable economic growth (challenge 3) and to the quality of life in urban areas. Research in WP 2012 focuses not only on new technological solutions for vehicles and systems, but aims at promoting interoperability, standards and model solutions to improve accessibility of transport systems and safety.

Improving surface transport through Intelligent Transport Systems – Intelligent Transport Systems (ITS) contribute substantially to a greener, safer and more efficient mobility in all modes of transport (societal challenges 1 and 2), ensuring also smarter transport planning and management systems. ITS research in WP 2012 focuses on road safety and logistics.

A list of topics (AAT, SST, TPT) is presented below summarising those (in grey) involving demonstration, standardisation, certification, regulatory and/or other issues addressed to fostering innovation. In addition, specific recommendations are made in many topics to identify bottlenecks preventing innovation (e.g. define a roadmap for the implementation of results including financing aspects, check coherence with regulations (in particular safety), identify problems related to social acceptance). It has to be emphasised that many of these topics will be implemented by large scale integrating projects involving a large amount of financial resources, and coordination and support actions targeted to innovation-related issues.

List of topics with demonstration, standardisation, certification, regulatory and/or other issues to fostering innovation

SOCIO-ECONOMIC CHALLENGES	TOPICS (*)	Demo	Std./ Cert./ Reg.	Other inno. aspects (**)
Eco-innovation	AAT.2012.1.1-6. Development and testing of advanced sustainable bio-based fuels for air transport (CP)	Yes	Yes	Yes
	SST.2012.1.1-3. Management of energy in railway systems (CP-IP)	Yes		
	GC.SST.2012.1-1. Innovative advanced lightweight materials for the next generation of environmentally-friendly electric vehicles (joint call – CP-IP)	Yes	Yes	Yes
	GC.SST.2012.1-2. Smart infrastructures and innovative services for electric vehicles in the urban grid and road environment (CP-FP)	Yes		Yes
	GC.SST.2012.1-5. Integration and optimisation of range extenders on Electric Vehicles (CP-FP)		Yes	
	GC.SST.2012.1-7. Demonstration of Urban freight Electric Vehicles for clean city logistics (CP-IP)	Yes		Yes
	GC.SST.2012.2-2. Complete vehicle energy management (CP-IP)	Yes	Yes	Yes
	GC.SST.2012.2-3. Demonstration of heavy duty vehicles running with liquefied methane (CP-IP)	Yes	Yes	Yes
Safe and seamless mobility	AAT.2012.3.3-6. Enhancing cooperation with Japan in the field of anti-icing systems (CP-FP)			Yes
	AAT.2012.3.3-7. Innovative approach to helicopter safety (CP-FP or CSA-CA)		Yes	Yes
	AAT.2012.3.4-1. Design systems and tools (CP-FP or CSA-CA)		Yes	
	AAT.2012.3.5-1. Integrated approach to safe flights under icing conditions (CP-IP)		Yes	

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AAT.2012.3.5-2. Integrated approach and demonstration of safe operations under crew peak workload / reduced crew configuration (<i>CP-IP</i>)	Yes	Yes	Yes
SST.2012.2.2-1. Innovative fleet for efficient logistics chain (<i>CP-FP</i>)		Yes	Yes
SST.2012.2.4-2. The role of rail in the European transport system in response to major disruptions to it and improving the performance of urban and regional rail networks in case of incidents (<i>CP-FP</i>)			Yes
SST.2012.2.4-3. Efficient rolling stock and train operations for competitive rail freight services (<i>CP-FP</i>)	Yes	Yes	
SST.2012.2.5-1. Rail system interoperability (regulatory and non-legislative interoperability based on technological innovations) (<i>CP-FP</i>)		Yes	
SST.2012.2.5-2. Europe to Asia: rail research collaboration (<i>CSA-CA</i>)			Yes
SST.2012.3.1-1. Research actions regarding the accessibility of transport (<i>CP-FP</i>)		Yes	Yes
SST.2012.3.1-3. Take-up of transport innovation in urban and regional transport (<i>CSA-SA</i>)			Yes
SST.2012.3.1-4. Automated urban vehicles (<i>CP-IP</i>)	Yes	Yes	Yes
SST.2012.3.2-1. Coordinating innovation for efficient bus systems in the urban environment (<i>CSA-SA</i>)		Yes	Yes
SST.2012.4.1-3. Large-scale naturalistic driving observations for safe and sustainable transport (<i>CP-IP</i>)	Yes		
SST.2012.4.2-1. Priorities for road safety research in Europe (<i>CSA-SA</i>)			Yes
GC.SST.2012.1-4. Modelling and testing for improve safety of alternatively powered vehicles (<i>CP-FP</i>)	Yes	Yes	
GC.SST.2012.3-1. Towards sustainable interconnected logistics: a seamless integration of transport logistics, from sourcing, production and distribution (<i>CP-FP</i>)		Yes	

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	GC.SST.2012.3-2. Improve capturing and sharing of transport data in support of innovative freight transport schemes (<i>CP-FP</i>)	Yes	Yes	Yes
	GC.SST.2012.3-3. Platform for continuous intermodal freight transport strategic research and innovation (<i>CSA-CA</i>)		Yes	Yes
	GC.SST.2012.3-4. Green hubs enabling co-modal network design (<i>CP-FP</i>)		Yes	
Competitiveness through innovation	AAT.2012.4.4-1. Integrated approach and demonstration to lean manufacturing of metal, composite and hybrid aircraft / engine structures (<i>CP-IP</i>)	Yes		Yes
	AAT.2012.4.1-1. Design systems and tools (<i>CP-FP or CSA-CA</i>)		Yes	
	AAT.2012.4.2-6. Maintenance and repair (<i>CP-FP or CSA-CA</i>)		Yes	
	AAT.2012.7-8. Attracting young Europeans to future careers in the field of aeronautics (<i>CSA-SA</i>)			Yes
	AAT.2012.7-25. Assessment of the potential insertion of unmanned aerial system in the air transport system (<i>CSA-SA</i>)		Yes	Yes
	SST.2012.5.2-1. Tools and conditions for attractive, efficient and competitive single wagonload traffic and its interaction with road and intermodal transports (<i>CP-FP</i>)			Yes
	SST.2012.5.2-4. Innovation and standardisation in the field of signalling to accelerate a European Train Control System rollout (<i>CP-IP</i>)	Yes	Yes	
	SST.2012.5.2-6. E-Maritime in support of compliance management (<i>CP-FP</i>)		Yes	
	TPT.2012.1-2. Transport infrastructure impact on international competitiveness of Europe (<i>CSA-SA</i>)			Yes
	TPT.2012.1-3. Prospects for transport evolution: challenges for the competitiveness of the European transport sector in the long term (<i>CSA-SA</i>)			Yes
	TPT.2012.2-1. Strategic high-level transport model (<i>CSA-SA</i>)			Yes

	TPT.2012.2-2. Reduction of the vulnerability of the European Transport System to extreme weather events and natural disasters (CSA-SA)			Yes
	TPT.2012.3-1. Fostering innovation for trans-national cooperation in European transport research and promoting active participation of stakeholders in European research calls and projects (CSA-CA)			Yes
	TPT.2012.3-2. Bringing innovative products and services to the market: analysis of pathways and best conditions for innovation (CSA-SA)			Yes

(*) Funding schemes:

CP: collaborative project

CP-IP: collaborative project (large scale integrating project)

CP-FP: collaborative project (small or medium-scale focused research project)

CSA-CA: coordination and support action aiming at coordinating research activities

CSA-SA: coordination and support action aiming at supporting research activities

(**) Other innovation-related aspects such as demand side and social acceptance, market drivers, assessment of investments, decision-making and risk models, understanding innovation systems (including barriers for innovation), coordination on innovation strategies, dissemination, exploitation, transfer and use of research results, benchmarking, public sector innovation, education, training and coaching.

Socio-economic research and cross-cutting issues for implementing the Transport theme

Policy-driven and socio-economic research actions on cross-modal issues are included in the TPT call. They cross-cut the three Socio-economic Challenges and focus in helping the implementation of Transport and Innovation policies (White Paper and Innovation Union), integration of transport modes and future policy-making (see the list of topics in section III.3).

Other activities of this character but focused on particular transport modes, as well as cross-cutting actions involving S&T research, are included in the AAT and SST calls (see lists of topics of cross-cutting activities in sections III.1.1 and III.2.1).

Joint undertakings: 'Clean Sky', SESAR and FCH

On the basis of Article 187¹¹ of the Treaty on the Functioning of the European Union (TFEU), the 'Clean Sky' Joint Technology Initiative¹², the SESAR Joint Undertaking¹³, and the 'Fuel Cells and Hydrogen' Joint Technology Initiative¹⁴ will all be relevant to and will impact on transport innovation. These activities aim at final demonstration in appropriate operational

¹¹ Ex Article 171 TEC.

¹² Council Regulation (EC) No 71/2007 of 20 December 2007 setting up the Clean Sky Joint Undertaking (OJ L 30 of 4.2.2008) as amended by Commission Decision 2009/520/EC (OJ L 175 of 4.7.2009).

¹³ Council Regulation 219/2007 of 27 February 2007 as amended by Council Regulation 1361/2008 of 16.12.2008.

¹⁴ Council Regulation (EC) No 521/2008 of 30 May 2008 setting up the Fuel Cells and Hydrogen Joint Undertaking (OJ L 153 of 12.6.2008).

environments. They will be implemented by separate mechanisms and the details of topics will not be elaborated in this work programme.

SME relevant research

A strategy planned for the whole period of FP7 (including support actions) has permitted the Transport theme to attain and even go beyond the 15% objective (22% in participation and 18 % in funding). Specific actions targeted to support these objectives were included in the 2007, 2008, 2010 and 2011 calls. The aim of this strategy is to encourage participation of SMEs throughout the Transport work programmes with the objective of enhancing their role in the supply chain. Actions are aimed at providing ad hoc support and training for partners and coordinators who want to set-up proposals, as well as access to relevant information. Emphasis has also been placed on facilitating the start-up and emergence of new high-tech SMEs. A better understanding of barriers and drivers in the Transport research area and specific support to the involvement of weaker players including SMEs is being pursued.

In line with the above-mentioned strategy, in WP 2012 a major support action is included with specific attention to SMEs:

TPT.2012.3-2. Bringing innovative products and services to the market: analysis of pathways and best conditions for innovation

In addition to that, the participation of SMEs is important and explicitly recommended in the following topics:

AAT.2012.1.1-4. Systems and equipment
AAT.2012.4.1-1. Design systems and tools
SST.2012.5.2-1. Tools and conditions for attractive, efficient and competitive single wagonload traffic and its interaction with road and intermodal transports
SST.2012.5.2-2. Next generation tools for optimised infrastructure asset management
SST.2012.5.2-3. Innovative structural and outfitting materials for ships including inland ships
SST.2012.5.2-4. Innovation and standardisation in the field of signalling to accelerate a European Train Control System rollout
SST.2012.5.2-5. E-guided vessels: the 'autonomous' ship
SST.2012.5.2-6. E-Maritime in support of compliance management
GC.SST.2012.1-1. Innovative advanced lightweight materials for the next generation of environmentally-friendly electric vehicles
GC.SST.2012.1-4. Modelling and testing for improved safety of alternatively-powered vehicles

Dissemination and exploitation actions

Building a European transport system that serves the citizen and society by means of safe, secure, greener, quality transport options for the demands of life in the 21st century requires significant RTD investment. In addition to the innovation approach presented above, the

creation of partnerships is of paramount importance to ensuring the dissemination and exploitation of results of this investment. From research and technology development to market, all actors should be present in the project partnerships accordingly with their role, particularly in downstream research. Further, a major support action is included in WP 2012 to help bringing innovative products and services to the market (TPT.2012.3-2).

Risk Sharing Finance Facility

In addition to direct financial support to participants in RTD actions, the European Union is improving their access to private sector finance by contributing financially to the 'Risk-Sharing Finance Facility' (RSFF) established by the European Investment Bank (EIB) (See Annex 4). Further to the RSFF scheme, the EIB has other instruments including the 'European Clean Transport Facility', to provide cost-based loans to the transport sector (producers and suppliers) to finance innovation, with particular attention to the 'European Green Cars Initiative', where technologies improving safety and the environmental performance of vehicles and systems are targeted.

Overall expected impact

Many impacts on innovation in all transport modes (air, road, rail and waterborne) are expected as a consequence of implementing WP 2012. They are detailed in areas or topics. Overall they can be summarised as follows:

- Reduction of greenhouse gases (GHG) emissions (particularly CO₂) and pollutants, by focusing on developing electric vehicles and infrastructures and by using alternative fuels.
- Increased safety in transport, by e.g. innovative approaches for aircraft under extreme conditions.
- Easy mobility of passenger and goods, by technical innovation and regulation to improve interoperability and co-modality.
- Higher competitiveness of the European transport industry, by fostering innovation on manufacturing, systems, tools and management, and by helping to bring innovative products and services to the market.

Among other funding schemes, large scale projects integrating demonstration, standardisation and certification will help promoting innovation in these issues (see table above).

I.0.4. International cooperation

International cooperation activities will be encouraged in the Transport theme based on the following lines of activities:

- Market attraction (for example global trade development and connecting networks and services at continental and intercontinental level).
- Opportunities to access and acquire science and technology that is complementary to current European knowledge and of mutual benefit.
- Where Europe responds to global needs (for example climate change), contributes to international standards and global systems (for example applied logistics and satellite

navigation infrastructure) or addresses third countries' regional issues on the basis of mutual interest and benefit.

All activities are open to researchers and research institutions from third countries¹⁵. In some areas of mutual interest, enhanced participation of certain third countries is emphasised where relevant expertise, opportunities and common challenges are identified.

This approach has resulted in successful specific cooperation actions with Canada, China, Latin America, India, Japan, Russia, South Africa, Ukraine and United States in the period 2007-2011. Of particular relevance have been the coordinated calls with China and Russia in 2010. Based on this experience, a coordinated call with Japan is included in WP 2012. Also cooperation with specific regions or countries is encouraged as indicated in the following list.

List of areas and topics for specific cooperation actions

Topics	Targeted country/region
Area 7.1.3.3. Aircraft safety	ICPC and/or other third countries
Area 7.1.3.4. Operational safety	ICPC and/or other third countries
AAT.2012.1.1-1. Flight physics	Latin America
AAT.2012.1.3-2. Airports	Latin America
AAT.2012.2.2-3. Enhancing strategic international cooperation with Japan in the field of aeronautical communications	Japan
AAT.2012.3.3-6. Enhancing cooperation with Japan in the field of anti-icing systems	Japan
AAT.2012.3.5-1. Integrated approach to safe flights under icing conditions	ICPC and/or other third countries (e.g. North America)
AAT.2012.4.1-6. Enhancing strategic international cooperation with Japan in the field engine component cooling	Japan
AAT.2012.4.1-7. Enhancing strategic international cooperation with Japan in the field of engine ceramic bearings	Japan
AAT.2012.6.1-5. Enhancing strategic international cooperation with Japan in the field of high speed aircraft	Japan
SST.2012.2.5-2. Europe to Asia: Rail research collaboration	Europe-Asia route countries, including those with a joint border to EU Eastern border as well as Russia and China
SST.2012.3.1-3. Take-up of transport innovation in urban and	Accession countries and

¹⁵ Both International Co-operation Partner Countries (ICPC) and non-ICPC countries can participate. Organisations from EU Member States, from Associated States to FP7 and from ICPC can be funded in all cases, while from other countries only if indispensable (Cf. FP7 Rules for Participation). The list of eligible ICPC countries is provided in Annex 1.

regional transport	neighbourhood countries
SST.2012.3.2-1. Coordinating innovation for efficient bus systems in the urban environment	Accession countries, neighbourhood countries and ICPC
SST.2012.4.1-2. Safety of ships in Arctic conditions	Arctic States, including Canada, USA and Russia
TPT.2012.2-2. Reduction of the vulnerability of the European Transport System to extreme weather events and natural disasters	ICPC and/or other third countries (e.g. USA, Japan)

I.0.5. Cross-thematic approaches

Biofuels for aviation. A topic on the development and testing of advanced sustainable bio-based fuels for air transport will be jointly implemented by Transport and Energy themes (see section I.1.4). Projects are expected to show their capacity to respond to the need of the aviation sector, in particular the European engine manufacturers, fuels producers and international regulatory bodies, to use alternative fuels in an economically, socially, and environmentally sustainable manner.

Innovative materials for road vehicles. A call will be jointly implemented by NMP, Transport and Environment themes, which focuses on the development of new lightweight materials and respective technologies for vehicle applications. Cost, energy efficiency and environmental benefits are expected.

The Ocean of Tomorrow. Following the two previous “The Ocean of Tomorrow” cross-thematic calls in the framework of the “European strategy for marine and maritime research”¹⁶, several topics will be launched to support the implementation of the Marine Strategy Framework Directive (2008/56/C). Cooperation will involve KBBE, Energy, Environment and Transport themes¹⁷.

I.0.6. Societal aspects

Where relevant, account should be taken of possible socio-economic impacts of research, including its intended and unintended consequences and the inherent risks and opportunities. A sound understanding of this issue should be demonstrated both at the level of research design and research management. In this context, where appropriate, the projects should ensure engagement of relevant stakeholders (e.g., user groups, civil society organisations, policy-makers) as well as cultivate a multi-disciplinary approach (including, where relevant researchers from social sciences and humanities) and contribute to raising awareness, education and training. Projects raising ethical or security concerns are also encouraged to pay attention to wider public outreach.

¹⁶ COM(2008) 534 final

¹⁷ 'Food, Agriculture and Fisheries, and Biotechnology' (KBBE), 'Energy', 'Environment (including climate change)' and 'Transport (including aeronautics)'

The pursuit of scientific knowledge and its technical application towards society requires the talent, perspectives and insight that can only be assured by increasing diversity in the research workforce. Therefore, all projects are encouraged to have a balanced participation of women and men in their research activities and to raise awareness on combating gender prejudices and stereotypes. When human beings are involved as users, gender differences may exist. These will be addressed as an integral part of the research to ensure the highest level of scientific quality. In addition, specific actions to promote gender equality in research can be financed as part of the proposal, as specified in Appendix 7 of the Negotiation Guidance Notes¹⁸.

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¹⁸ ftp://ftp.cordis.europa.eu/pub/fp7/docs/negotiation_en.pdf

7.1. AERONAUTICS AND AIR TRANSPORT

I.1. CONTEXT

This introduction is complementary to the general one (section I.0). The strategy for 2012 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.

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. Research regarding door-to-door aspects of the travel can also be included provided it focuses exclusively on aspects relevant to air transport and excludes ground vehicles (dealt with in the TPT part of the Work Programme). Demonstration, validation, standardisation and certification activities where relevant are also part of WP 2012.

The three **Socio-economic Challenges** indicated in section I.0.2 are addressed by six **Activities**, which are in agreement with the Specific Programme and the Strategic Research Agenda of ACARE¹⁹:

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

The Activities are further divided in **areas** where proposers can find the **topics** calling for **proposals**. 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.*

Following WP2011 where a large part of the funds was dedicated to L2 topics, in WP2012 a large part of the funds will be dedicated to L1 topics (section III.1.1, CP-FP). 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 Japan (sections III.1.3).

¹⁹ ACARE: Advisory Council for Aeronautics Research in Europe (www.acare4europe.org).

Level 2 comprises the research and technology development activities up to higher 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 30 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 2012.*

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* and *supporting programme implementation* are addressed by means of coordination and support actions. The requested EU contribution for these support actions *shall not exceed EUR 600 000*, which constitutes an additional eligibility criterion (see section III.1.1).

The eligibility criteria (including funding limits) are detailed in the call fiches (section III.1).

The information provided under the heading “Implementation and management” of the topic descriptions (section II.1) will be assessed under criterion “Implementation” in the evaluation of proposals.

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 will be 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 *Area 7.1.6.3: 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 Japan

Following workshops held between European and Japanese stakeholders in the field of Aeronautics and Air Transport, a coordinated call with Japan is included in WP 2012 with an indicative EU budget of EUR 4 million and EUR 4 million from Japan (see section III.1.3). The European partners will be funded by the European Union. The Japanese partners will be funded by the Ministry of Economy, Trade and Industry (METI). The requested EU contribution *shall not exceed EUR 1.4 million per project*, which is an additional eligibility criterion. In order to ensure a balance between EU and Japanese participants, *at least two independent legal entities established in Japan are requested*, which is another additional eligibility criterion.

I.1.4. Biofuels for aviation

In the future, biofuels are expected to play an increasing role in aviation to reduce the CO₂ emissions alongside the continuous development of more efficient aircraft technologies and to provide a sustainable alternative non fossil energy source for this mode of transport. However, considering the specific stringent characteristics that are required for aviation fuels, research to support their development needs to be intensified. It was therefore decided to launch jointly with the Energy theme a topic on the development and testing of advanced sustainable bio-based fuels for air transport. The topic description is included in both Energy (theme 5) and Transport (theme 7) work programmes, with reference number ENERGY.2012.3.2.2 and AAT.2012.1.1-6, respectively. The topic is part of the FP7-ENERGY-2012-1 call, where further details are given.

I.1.5. '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.1.6. 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 2012. 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 60 million will have to be transferred to the SJU for the year 2012.

II.1. CONTENT OF CALLS FOR 2012

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.²⁰

Area 7.1.1.1. Green aircraft

²⁰ 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.

The aim is to ensure more environmentally friendly air transport focussing on the greening and energy optimisation of aircraft operations, without compromising safety. Research work will address a wide range of innovative solutions and technologies for the aircraft, its systems and components for optimum use of energy and reduction of pollution (noise and emissions).

Expected impact: Proposals should demonstrate making significant contributions to achieving one or several of the following objectives for technology readiness by 2020 taking 2001 as the baseline:

- To reduce fuel consumption and hence CO₂ emissions by 50% per passenger-kilometre.
- To reduce NO_x emissions by 80% in landing and take-off according to ICAO standards and down to 5 g/kg of fuel burnt in cruise.
- To reduce unburned hydrocarbons and CO emissions by 50% according to ICAO standards.
- To reduce external noise by 10 EPNdB per operation of fixed-wing aircraft. For rotorcraft the objective is to reduce noise foot-print area by 50% and external noise by 10 EPNdB.

AAT.2012.1.1-1. Flight physics

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced or novel aircraft configuration concepts, including improved airframe/engine integration, that 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 and external noise 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. Following recommendations of the CoopAIR-LA support action, international cooperation with Latin America is encouraged.

AAT.2012.1.1-2. Aerostructures

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

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.

AAT.2012.1.1-3. Propulsion

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

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; new knowledge, analysis, design tools and control techniques for advanced low NO_x 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; concepts and technologies to reduce power-plant (turbofan, propeller, propfan, rotorcraft rotor) noise by active and/or passive methods.

Note: Research that is in the scope of the Fuel Cells and Hydrogen Joint Technology Initiative is excluded from the 2012 calls.

AAT.2012.1.1-4. Systems and equipment

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Content and scope: 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; advanced flight control systems technologies supporting optimised flight procedures for environmentally friendly operation (noise and emissions), including take-off and climbing, cruise and approach, descent and landing (work should ensure adequate complementarity/synergy with SESAR); new concepts for aircraft anti-icing and de-icing.

Implementation and management: The involvement of SMEs is strongly encouraged.

AAT.2012.1.1-5. Avionics

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced concepts and technologies for increased modularity and integration of avionics components and systems.

AAT.2012.1.1-6. Development and testing of advanced sustainable bio-based fuels for air transport

CP - Call: FP7-ENERGY-2012-1²¹

Content and scope: The topic will support the development and testing of biofuels for use in air transport. The project is expected to demonstrate the production of biofuels suitable for aviation at large enough scale and through long enough production runs in order to allow testing them in typical short to medium distances in Europe. The project should target the best possible sustainable feedstock and second generation conversion processes and building where relevant on existing plants. It should also make use of existing infrastructures for transportation, logistics, fuelling and testing. Flight testing shall be carried out and relevant datasets shall be collected for the final assessment.

The project should also investigate the complete engine fuel system with a special attention to the relationship between fuel composition range, combustion and air pollutant emissions. The potential variation of fuel blend properties resulting from the conversion process or from the mixing should be studied. Health and safety aspects of the fuel handling should be addressed, as well as logistic issues, such as transport and storage.

²¹ This call is in Work Programme 2012 'Cooperation', Theme 5 Energy.

The project must meet relevant aviation fuel quality standards (ASTM specification). An environmental, economic and social sustainability assessment of the fuel cycle should be done. The biofuels should meet the 60% greenhouse gas emission saving requirement of the Renewable Energy Directive²². The project should also address barriers to innovation and include a study of the economic, social and regulatory implications of the large-scale biofuels utilisation in aviation. Proposals will have to include a clear plan for exploitation of the scientific and technical results.

Funding scheme: Collaborative project.

Implementation and management: In order to maximise industrial relevance and impact of the research effort, the active participation of all relevant industrial actors from the production of the fuel to its testing is essential. This will be considered during the evaluation under the 'Implementation' criterion.

Expected impact: This project is expected to demonstrate the readiness of the technology to produce aviation biofuels in an economically, socially, and environmentally sustainable manner. The results should also serve the development of future scientifically sound regulatory framework. Recommendations to solve potential barriers to large-scale commercialisation should be drawn.

Additional information: Up to one project may be funded.

This action supports the implementation of the European Bioenergy Industrial Initiative of the SET-Plan. The work should complement the results of the SWAFEA study²³.

Area 7.1.1.2. Ecological production and maintenance

The aim is to ensure environmentally friendly air transport activities focussing on the cleanliness of the industrial processes involved in the manufacturing and maintenance of aeronautical products. Research work will address innovative processes able to reduce toxic emissions as well as improving re-usability and disposal. Where appropriate the modification of maintenance rules should be considered.

Expected impact: Proposals should demonstrate making contributions to achieving the following objective: To substantially reduce the environmental impact of the manufacturing, maintenance and disposal of aircraft and related products.

AAT.2012.1.2-1. Production

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced concepts and techniques for the elimination of toxic chemicals and materials and reduction of waste in manufacturing processes; techniques and concepts for increased

²² Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources

²³ SWAFEA is a study for the European Commission's Directorate General for Transport and Energy to investigate the feasibility and the impact of the use of alternative fuels in aviation: <http://www.swafea.eu/>

utilisation of environmentally sustainable materials in aeronautical products in a safety neutral approach.

AAT.2012.1.2-2. Maintenance and disposal

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced concepts and techniques for the 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.

Area 7.1.1.3. Green air transport operations

The aim is to ensure environmentally friendly air transport focussing on the greening of its operations including energy-optimised aircraft operations. Research work will address a wide range of innovative solutions and technologies which will contribute to optimum air traffic management and airport operations for greater fuel efficiency and energy optimised operations in aircraft movements and hence reduced pollution (including noise), as well as to provide tools for improved understanding of the environmental role of aviation and support to European policy-making.

Expected impact: The same objectives as for Area 7.1.1.1 'Green aircraft' apply here.

AAT.2012.1.3-1. Flight and Air Traffic Management

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Investigation of 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.2012.1.3-2. Airports

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

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.); innovative technologies, systems and procedure for a holistic approach to green aircraft taxiing integrating energy and environmental processes of the airport stakeholders; 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. Following recommendations of the CoopAIR-LA support action, international cooperation with Latin America is encouraged.

Level 2

AAT.2012.1.4-2. Demonstration of breakthrough sub-systems enabling high overall pressure ratio engines

Level 2 - CP-IP - Call: FP7-AAT-2012-RTD-1

Content and scope: Building on the results of previous projects such as for example VITAL, NEWAC and DREAM, the work should aim at maturing the missing enabling technologies integrated at sub-system level. In particular, the high level of pressure and temperature require the use of new types of lightweight heat resistant materials for which the affordability and accuracy of the manufacturing process must be assessed. The harsh conditions also call for an integrated health monitoring capable of providing early detection, identification, and prognosis and proposing the relevant maintenance actions. The project should also investigate innovative solutions to control flow angles in the main path (e.g. with increased use of variable guide vanes or active aerodynamic control) in order to achieve fuels reduction beyond those obtained from the high OPR. Finally, efficient sealing systems for the main gas path, the secondary air system and the oil system should be developed that can operate efficiently under high levels of temperature. The effectiveness of the investigated technologies will be demonstrated at least at sub-system level and under the relevant conditions. The benefits in terms of CO₂ will be assessed at engine levels through an appropriate technology evaluator.

Expected impact: The proposal should aim at providing European aero-engine industry with mature technologies at sub-system level enabling engine operation at high Overall Pressure Ratio (OPR) and thus providing reduction of CO₂ emissions.

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 initiative²⁴.

Area 7.1.2.1. Aircraft systems and equipment for improved aircraft throughput

No topic is open in 2012; research in this field is carried out in the frame of the SESAR Joint Undertaking.

Area 7.1.2.2. Time efficient air transport operations

The aim is to ensure reduced waste of time in air transport operations focussing on the improved time-efficiency of basic operational infrastructures, namely the airport and air traffic management. Research work will address a wide range of innovative concepts and methodologies which will result in optimised passenger-related and flight-related airport activities.

Expected impact: Proposals should demonstrate making contributions to achieving one or several of the following objectives for technology readiness by 2020:

- To enable the air transport system to accommodate three times more air movements.
- To enable 99% of flights to arrive and depart within 15 minutes of their scheduled departure time, in all weather conditions.
- To reduce the time spent by passengers in airports for purely transportation related procedures to under 15 minutes for short-haul flights and to under 30 minutes for long-haul.

AAT.2012.2.2-2. Airports

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

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

²⁴ 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.

techniques in support of integrated decision making allowing time optimised passenger choices..

AAT.2012.2.2-3. Enhancing cooperation with Japan in the field of aeronautical communications

CP-FP - Call: FP7-AAT-2012-RTD-JAPAN

The aim is to promote an effective cooperation in the field of advanced concepts and technologies to integrate aircraft radio system through an efficient mobile communication infrastructure in the future ATM concept. The project will participate to the international initiatives for the development of mobile data link sub-networks in support of cockpit services for Air Traffic Management Services (communications with ANSPs, with other aircraft and with airports) and airline operational communication (including aircraft monitoring, geo-localisation, etc). The project will contribute to the development, the standardisation (relying on existing industrial standards) and the validation of the new mobile sub networks based on AeroMACS/WIMAX (providing high communication capacity at airport), LDACS (providing high quality of service in continental airspaces), and the future Satcom services (providing services in oceanic region and complementing LDACS). The activities should consist of the development of prototypes aiming at verifying all or parts of the functions of one or several considered technologies and their integration in a larger validation platform. The project will ensure a close coordination with the EU-funded SANDRA project and with 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 levels²⁵.

Area 7.1.3.1. Passenger friendly cabin

The aim is to ensure improved passenger service orientation in aircraft cabin designs. Research work will address a wide range of innovative solutions and technologies, including the exploitation of information and communication technologies, which will contribute to an enhanced flight environment and health conditions in the cabin.

²⁵ 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: Proposals should demonstrate making contributions to achieving the following objective: To increase passenger choice with regard to on-board services and comfort.

AAT.2012.3.1-2. Noise and vibration

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced modelling tools, concepts and technologies (active and passive) to reduce overall cabin noise as well as noise at passenger level; advanced techniques to reduce vibration and overall effects of noise and vibration on passengers (harshness) as well as other unwanted dynamics effects of flight (ride comfort).

AAT.2012.3.1-3. Systems and equipment

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

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 catering systems; advanced concepts and technologies for enhanced cabin environment and passenger comfort with regard to temperature, lighting, pressure, humidity, ventilation and health; 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.

Area 7.1.3.2. Passenger friendly air transport operations

No topic is open in 2012.

Area 7.1.3.3. Aircraft safety

The aim is to ensure that aviation safety remains at current high standards or even improves regardless of air transport growth, through the increased enhancement of the safety of the aircraft itself and its systems. Research work will address a wide range of innovative solutions and technologies for active and passive safety measures related to essential features of aircraft designs and human factors.

International Cooperation is encouraged on topics related to safety in particular where standardisation issues are considered.

Expected impact: Proposals should demonstrate making contributions to achieving one or several of the following objectives for technology readiness by 2020:

- To reduce accident rate by 80%
- To achieve a substantial improvement in the elimination of and recovery from human error
- To mitigate the consequences of survivable accidents.

AAT.2012.3.3-1. Aerostructures

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced modelling tools, design techniques and structural concepts including its experimental validation for improved protection against crash, impacts and blast loads, including passive and active 'smart' aerostructures; advanced methods and techniques to ensure safety of aging airframe and engine structures.

AAT.2012.3.3-2. Systems and equipment

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced technologies, modelling and design tools for aircraft protection against hazards such as wind shear, wake vortex, clear air turbulence, icing electro-magnetic interference and natural hazards; advanced technologies and concepts for prevention of controlled flight into terrain; advanced systems and technologies to enable full automatic approach and landing in all weather taking into account concepts developed in SESAR; advanced systems and techniques for in-flight and on-ground collision avoidance; advanced techniques and technologies to enable aircraft self separation assurance taking into account concepts developed in SESAR; advanced concepts for fault tolerant systems; design techniques and concepts for improved fire, heat and smoke protection including novel aircraft evacuation procedures.

AAT.2012.3.3-4. Human factors

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

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, ground control (when ATM related aspects are addressed, close coordination with SESAR must be ensured).

AAT.2012.3.3-5. Propulsion: tolerance to particle ingestion

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced testing and modelling to enhance the knowledge on the tolerance of aircraft engines to particle ingestion, in particular volcanic ashes. The different risks resulting from particle ingestion by the engine will be analyzed such as clogging (including of the cooling systems), abrasion, or flameout. The project is expected to come-up with recommendations on acceptable ingestion thresholds, in particular for volcanic ashes (concentration of particles, exposed flight time and maintenance strategy).

AAT.2012.3.3-6. Enhancing cooperation with Japan in the field of anti-icing system

CP-FP - Call: FP7-AAT-2012-RTD-JAPAN

The aim is to promote an effective cooperation in the field of development of anti-icing system to prevent the formation of icing build up at the leading edge of the wing and improve air safety and efficiency of ground de-icing. The project should identify the best robust sensor technology that is capable of detecting ice formation, identifying ice type, measuring thickness and roughness as a function of time and having a potential of being distributed in

several points. The sensors will be tested under representative conditions. The project should also identify new technologies for a multi zone based anti-icing system such as, for example, electro-thermal device, electro-mechanical, anti-ice paint, etc., that can also be applied on composite materials wings. An effective control system will be developed and the capacity to measure in several points should be demonstrated. Finally, the innovation phase will be prepared i.e. obstacles for the exploitation of the project results will be investigated. This is, for example, the integration of the sensors in a real aircraft wing, the insertion of the monitoring system in an icing control system and its reaction when the de-icing system is activated.

AAT.2012.3.3-7. Innovative approach to helicopter safety

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

The project will investigate technologies and procedures to enhance rotorcraft safety by implementing de-icing for CS27 category and /or power reserve capacity to be utilised in case of engine failure for both CS27 and CS29 categories. The technical feasibility of the proposed solutions will be tested and demonstrated. The impact on weight, power and costs will be assessed. The effectiveness and robustness of the proposed safety procedures and safe operations under normal flight will be proven. The work will be carried out in close relationship with existing EASA safety regulations, should lead to recommendations for amended certification requirements and identify obstacles to implementation.

Area 7.1.3.4. Operational safety

The aim is to ensure that aviation safety remains at current high standards or even improves regardless of air transport growth, through increased enhancement of safety in air transport operations. Research work will address a wide range of concepts, innovative solutions and technologies which will result in safer operation of basic infrastructures of the system, such as airports and air traffic management as well as in improved integrated safety solutions.

International Cooperation is encouraged on topics related to safety in particular where standardisation issues are considered.

Expected impact: Proposals should demonstrate making contributions to achieving one or several of the following objectives for technology readiness by 2020:

- To reduce accident rate by 80%
- To achieve a substantial improvement in the elimination of and recovery from human error

AAT.2012.3.4-1. Design systems and tools

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

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 (when ATM related aspects are addressed, close coordination with SESAR must be ensured).

AAT.2012.3.4-2. Maintenance

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

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; advanced concepts and technologies to enable 'smart' maintenance, including self-inspection and self-repair capabilities.

AAT.2012.3.4-4. Airports

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced techniques for all weather ground based high precision landing and take-off systems taking into account concepts under development in SESAR. Advanced techniques for the control and surveillance of mobile vehicles and equipments operating in the manoeuvring area.

AAT.2012.3.4-5. Human factors

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

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.

Level 2

AAT.2012.3.5-1. Integrated approach to safe flights under icing conditions

Level 2 - CP-IP - Call: FP7-AAT-2012-RTD-1

Content and scope: Research will target the development of measurement techniques and instrumentation for research purposes and for use on-board of commercial aircraft (detection and crew alert). Measurements of the physical characteristics of glaciated and mixed phase icing conditions will be performed in high altitude clouds. This knowledge will be used to improve the representativeness of ground testing (wind tunnels) and modelling capacities. Selected icing tunnels should be modified to reproduce more faithfully conditions encountered in high altitude cloud and the computer based modelling will be refined to better include actual physical phenomena. An integrated cross-validation will be performed between in flight measurements, wind-tunnel measurements and model predictions. Results will be analysed in the light of the current regulatory framework and should lead to new recommendations.

Expected impact: The work should aim at providing aircraft manufacturers with enhanced understanding, measurement and modelling capacities of near icing or icing conditions at high altitude. The objective is to reduce the risk of incidents when an aircraft is flying in such weather conditions.

Implementation and management: Cooperation with international working groups on this topic is encouraged as well as cooperation with North America.

AAT.2012.3.5-2. Integrated approach and demonstration of safe operations under crew peak workload / reduced crew configuration

Level 2 - CP-IP - Call: FP7-AAT-2012-RTD-1

Content and scope: The project should investigate an integrated set of cockpit technologies capable of alleviating the crew workload including for example enhanced vision and awareness sensors, advanced single reconfigurable large displays, voice, tactile, gesture based control, pilot incapacitation detection, etc. The development of these enablers should build upon results obtained in former/ ongoing national and European research projects (e.g. ALICIA, ODICIS, etc.). On this technological basis, the project should develop a conceptual architecture that includes also innovative health monitoring, prognostic, communication and decision making strategies allowing an increased level of automation. The benefits of key technology elements for enhanced crew-efficient (up to single pilot) cockpit concept should be evaluated using ground simulations. Finally, the project should analyse the innovation phase i.e. assess potential human factors problems, propose an implementation roadmap including safety and regulatory considerations and analyse the remaining path for a potential single pilot operation.

Expected impact: The work should aim at providing European aeronautical industry with integrated concepts and technologies enhancing safety when the crew faces peak workload or incapacitation.

ACTIVITY 7.1.5. PROTECTION OF AIRCRAFT AND PASSENGERS

Preventing hostile action of any kind to incur injury, loss, damage or disruption to travellers or citizens due to the effects of aircraft misuse. Research will focus on the relevant elements of the air transport system including security measures in cabin and cockpit designs, automatic control and landing in the case of unauthorised use of aircraft, protection against external attacks, as well as security aspects of airspace management and airport operations²⁶.

Area 7.1.5.1. Aircraft security

The aim is to ensure enhanced security in air transport focussing on the improvement of security features in the aircraft. Research work will address the application of a wide range of concepts, innovative solutions and technologies relevant to its main systems to reduce the possibility of an aircraft to suffer from an action of any kind which could compromise its security and improve survivability if the action takes place.

²⁶ 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: Proposals should demonstrate making contributions to achieving the following objectives for technology readiness by 2020:

- To eliminate hazards of hostile on-board or external actions against aircraft.

AAT.2012.5.1-1. Aerostructures

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced concepts and technologies for developing blast-resistant cabin structures and bomb-proof cargo containers. It should build upon former/ongoing national and European research projects such as FP6 VULCAN, FP7 FLY-BAG, etc.

Area 7.1.5.2. Operational security

No topic is open in 2012. Additional topics relevant to security may be found in the Security Work Programme.

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 operations²⁷.

Area 7.1.4.1. Aircraft development cost

The aim is to ensure cost efficiency in air transport focussing on the reduction of aircraft acquisition costs. Research work will address a wide range of concepts, innovative solutions and technologies which will result in lower lead time and costs of the aircraft and its systems from design to production, including certification, with a more competitive supply chain.

²⁷ 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: Proposals should demonstrate making contributions to achieving one or several of the following objectives for technology readiness by 2020:

- To reduce aircraft development costs by 50%.
- To create a competitive supply chain able to halve time to market.
- To reduce travel charges.

AAT.2012.4.1-1. Design systems and tools

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Content and scope: 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, 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.

Implementation and management: Involvement of SMEs is strongly encouraged.

AAT.2012.4.1-2. Aerostructures

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Development of highly integrated structures with optimum combination of advanced metallic and composite materials eliminating or minimising the number of join/assembly elements.

AAT.2012.4.1-3. Systems and equipment

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

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 data networks and information management systems, including wireless on-board communications, advanced on-board processing and middleware.

AAT.2012.4.1-4. Avionics

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

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.

AAT.2012.4.1-5. Production

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

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.

AAT.2012.4.1-6. Enhancing cooperation with Japan in the field of surface heat exchanger for aero-engines

CP-FP - Call: FP7-AAT-2012-RTD-JAPAN

The aim is to promote an effective cooperation in the field of advanced surface heat exchangers as part of the engine heat management system. The project should develop advanced surface heat exchanger to be inserted in the acoustic liner of the core fairing where the air of the by-pass flow is used to cool the engine oil. An innovative design will be developed involving closely the engine manufacturer and the heat exchanger supplier. The effectiveness of the concept will be verified through a combination of computations and testing. The potential gains offered will be quantified and take into account the weight of the solutions and its capacity to be inserted in the acoustic liner.

AAT.2012.4.1-7. Enhancing cooperation with Japan in the field of engine ceramic bearings

CP-FP - Call: FP7-AAT-2012-RTD-JAPAN

The aim is to promote an effective cooperation in the field of development of ceramic bearings. The project will identify the best ceramic materials that can fulfil the requirements of current metallic aeroengine bearings. This will result from a careful comparison of the advantages and drawbacks of ceramic versus current state of the art bearings (e.g. friction coefficient, resistance to wear, production process). The mechanical properties of the selected ceramics will be tested under appropriate and representative conditions. Sample bearings should be manufactured and tested leading to a quantitative comparison of performance under operational conditions. Finally, costs aspects and safety requirements will be addressed.

Area 7.1.4.2. Aircraft operational cost

The aim is to ensure cost efficiency in air transport focussing on the reduction of aircraft - direct operating costs. Research work will address a wide range of concepts, innovative solutions and technologies which will increase energy efficiency and reduce weight, fuel consumption, maintenance, and crew operational costs as main contributors.

Expected impact: Proposals should demonstrate making contributions to achieving one or several of the following objectives for technology readiness by 2020:

- To reduce aircraft operating costs by 50% through reduction in fuel consumption, maintenance and other direct operating costs.
- To reduce travel charges.

AAT.2012.4.2-1. Flight physics

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced or novel aircraft configuration concepts that could deliver improved aerodynamic efficiency compared to traditional configurations in subsonic, transonic or supersonic flight; advanced concepts and technologies for flow control, airframe aerodynamics design and drag reduction (active or passive); advanced concepts and technologies for improved airframe/engine integration aiming at reduced drag; development of wing morphing technologies; concepts and technologies to reduce drag in subsonic or supersonic flight.

AAT.2012.4.2-2. Aerostructures

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced concepts and technologies for increased and optimised use of advanced light-weight metallic, composite materials and metal laminates in primary structures; advanced concepts for increased integration of additional functions (sensing, actuating, electromagnetic, electrical conductivity, etc.) in structural components for wider applications at low cost and weight.

AAT.2012.4.2-4. Systems

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced concepts and technologies to enable the all-electric aircraft, reducing engine bleed and systems weight, including power generation, distribution and management; advanced concepts and technologies for higher integration of on-board mechanical, hydraulic, electrical and pneumatic systems and increased application of light-weight materials in its components, such as landing gears; advanced concepts and technologies for increased independence of the aircraft from the infrastructure at apron area.

AAT.2012.4.2-6. Maintenance and repair

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

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.

Area 7.1.4.3. Air Transport system operational cost

The aim is to ensure cost efficiency in air transport focussing on the reduction of the operational costs relevant to the system. Research work will address a wide range of

innovative concepts and technologies which will increase cost efficiency in basic operational infrastructures such as airports and air traffic management, including also the human element.

Expected impact: Proposals should demonstrate making contributions to achieving one or several of the following objectives for technology readiness by 2020:

- To reduce operating costs by 20%,
- To reduce travel charges.

AAT.2012.4.3-1. Design systems and tools

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Innovative modelling tools and techniques in support of collaborative decision making for improved flexibility and optimum use of aircraft (fleet management), airport and air traffic management in the air transport system in terms of low cost operation; tools and procedures in support of an efficient system approach to aircraft operations encompassing the management of information and requirements related to the flight, air traffic and ground components (coordination with SESAR must be ensured when air traffic management aspects are addressed).

AAT.2012.4.3-4. Human factors

Level 1 - CP-FP or CSA-CA - Call: FP7-AAT-2012-RTD-1

Advanced concepts and techniques, including training, to support the acquisition and retention of skills and knowledge of personnel in the whole air transport system (design, production, maintenance and airport operation).

Level 2

AAT.2012.4.4-1. Integrated approach and demonstration to lean manufacturing of metal, composite and hybrid aircraft / engine structures

Level 2 - CP-IP - Call: FP7-AAT-2012-RTD-1

Content and scope: The project should propose innovative approaches to geometrical management and compensation. Phases to be automated or kept manual should be analysed in view of cost efficiency and combined in an optimum way. Innovative approaches to curing, bonding, fastening and hole making will be investigated. This will include the use of digital manufacturing and visualisation. Suitable measurement systems, in particular non destructive inspection and testing will be developed.

The proposal should show that all these elements have been combined in an integrated approach and propose demonstrations of combinations of technologies. The overall performance of the processes will be assessed in the light of their compliance with safety requirements, the benefit they bring in terms of leaning (less material and energy wasted) as well as cost efficiency. The exploitation plan will highlight eventual bottlenecks that could prevent the use of research results so as to be innovation ready.

Expected impact: The work should aim at ensuring European leadership in metal, composite and hybrid airframe structures manufacturing by investigating lean, robust and right first time

manufacturing technologies that optimise the combined manual and automated operations and can cope with geometrical variations.

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 modes²⁸.

Area 7.1.6.1. Breakthrough and emerging technologies

Only through technology breakthroughs will air transport be able to respond to society's demands in the second half of this century. Research work will need to adopt a less evolutionary approach and take the risk of exploring more radical departures from conventional thinking which will be able to introduce revolutionary concepts in fundamental disciplines of aircraft design.

Expected impact: Proposals should contribute to setting the foundations of a technology base that have the potential to cause a step change in air transport in the long term.

AAT.2012.6.1-5. Enhancing cooperation with Japan in the field of high speed aircraft

CP-FP - Call: FP7-AAT-2012-RTD-JAPAN

The aim is to promote an effective cooperation in the field of conceptual design of a high speed aircraft with low emissions. The project will perform a market analysis and determine the boundary conditions to impose in order to obtain a viable ticket price. An iterative multidisciplinary preliminary design of the aircraft will be undertaken. The type of fuel should be selected in the light of its environmental performance but also the production and distribution possibilities. A careful optimisation of on-board energy management relying on innovative energy sources will be performed. Lightweight materials capable of resisting high levels of stress and temperature will be identified and their tolerance to fatigue and damage assessed. Sonic boom and noise reduction technologies will be proposed and investigated. The proposed technologies should be assessed in terms of reliability and safety. The project should be closely coordinated with the EU-funded projects LAPCAT and ATTLAS and other projects in the field that are relevant to the cooperation between Japan and Europe.

Area 7.1.6.2. Step changes in air transport operation

²⁸ 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.

In addition to technology breakthroughs in fundamental disciplines of aircraft design, new concepts of the air transport system itself will be needed in the long term. Research work will also need to depart from conventional thinking in order to be able to introduce revolutionary concepts in the operation of the air transport of the future.

Expected impact: Proposals should demonstrate making contributions to setting the foundations of new paradigms that have the power to cause a step change in air transport in the long term.

AAT.2012.6.2-4. Building agility and resilience of the ATM system beyond SESAR

Level 1 - CP-FP - Call: FP7-AAT-2012-RTD-1

Investigation for a safe, agile and resilient by design concept for the air traffic management system beyond SESAR; the research work will analyse the ability of the current system to recover and adapt from disruptions that have been experienced; the response of other type of systems (non ATM related) will also be investigated; on this basis, proposals should develop an innovative concept, prove its capacity to operate efficiently under optimum conditions and, when exposed to disruptions prove its ability to react to the crisis, to adapt and to evolve. The research work will combine the appropriate scientific disciplines (e.g. mathematics, psychology, etc.).

Area 7.1.6.3. Promising pioneering breakthrough technologies and concepts for Aeronautics and air transport

While the two previous Areas focus on technologies and concepts that have acquired a certain maturity from previous research and are implemented through Level 1 projects, the Topics in this Area are calling for new fundamental knowledge, emerging technologies and radical new concepts with a strong innovation potential in order to achieve a first maturation and/or proof of concept. These should be implemented with L0 type of projects, i.e. limited size of the partnership, a shorter duration and lower budget compared to current practice in Level 1 (see call fiche III.1.2 for more details).

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.2012.6.3-1. Breakthrough and emerging technologies

Level 0 - CP-FP - Call: FP7-AAT-2012-RTD-L0

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.

AAT.2012.6.3-2. Radical new concepts for air transport

Level 0 - CP-FP - Call: FP7-AAT-2012-RTD-L0

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 with today's transport system.

CROSS-CUTTING ACTIVITIES FOR IMPLEMENTATION OF THE SUB-THEME PROGRAMME

AAT.2012.7-1. European Air Transport System scenario elaboration and trend assessment capability

CSA-SA - Call: FP7-AAT-2012-RTD-1

Content and scope: The study will develop a methodology to elaborate scenarios for the European Air Transport System with a holistic approach, i.e. encompassing aspects such as competitiveness, intermodality, security, environmental impact, energy, regulations, policy and societal acceptance. The modelling approach will include analysis tools to evaluate the impacts and consequences of a scenario. A limited number of scenarios will be developed and analysed in the view of providing and recommendations guidance to policy makers for the most promising concepts. The study will take into account the findings of EU-funded projects such as CONSAVE 2050 and MONITOR.

Expected impact: Development of a European Air Transport System scenario assessment capability; identification of the most promising long-term concepts.

AAT.2012.7-8. Attracting young Europeans to future careers in the field of aeronautics

CSA-SA - Call: FP7-AAT-2012-RTD-1

Content and scope: Today, young people want to learn science through real life applications. However; teachers have not always the knowledge, training and experience to put theoretical lessons into practice and in the context of the latest research developments. Proposals should contain actions to enhance the interactions between the aeronautics research community and the teaching community (primary and secondary schools). Actions could be built at regional, national or European level and include among others studies, events, teaching material, competitions, awards, organisation of activities.

Expected impact: Studies show the likelihood of a shortage of scientists and engineers in aeronautics research and industry in the near future. Proposals should contribute to raising the interest of young Europeans for engineering activities in the field of aeronautics with the aim of attracting them at a later stage to scientific and technical careers in the aeronautical sector.

AAT.2012.7-9. Supporting organisation of conferences and events of special relevance to Aeronautics and Air Transport research

CSA-SA - Call: FP7-AAT-2012-RTD-1

Content and scope: Activities will include in particular the organisation of conferences or other type of events at European level. The events should address broad scientific/technical subjects important to the sector with a significant European or world-wide dimension. Integrating policy and socio-economic issues will be an added value, as well as the dissemination of relevant European funded research.

Expected impact: Proposals should demonstrate contributing to raise the profile of European aeronautics and air transport research as a whole.

AAT.2012.7-25. Assessment of the potential insertion of unmanned aerial system in the air transport system

CSA-SA - Call: FP7-AAT-2012-RTD-1

Content and scope: The study should establish the minimum requirements in terms of standards equipments and regulations to allow the safe insertion of UAS in the civil airspace. It should also anticipate the steps required for the certification and the validation of the insertion. In the light of this, the path to exploitation will be investigated: market trends, adaptation of infrastructures and investments, obstacles to social acceptance. The consortium should gather a representative group of stakeholders including among others manufacturers, regulators, air navigation service providers, and customers.

Expected impact: Proposals should demonstrate contributing to analyse and assess the innovation steps needed to allow the insertion of Unmanned Aerial Systems (UAS) for civil application in the air transport system.

AAT.2012.7-26. Efficient airports for Europe

CSA-SA - Call: FP7-AAT-2012-RTD-1

Content and scope: The proposal should demonstrate contributing to develop a framework where the relevant stakeholders can analyse the different approaches, identify best practices and areas where coordination at European level would bring an added value in the view of:

- Improving crisis management, modal shift and resilience when facing extreme events such as, for example volcanic ash cloud or heavy winter conditions.
- Reducing the minimum time needed for passengers between entering the airport and taking-off (the proposal will build on the results on the EU-funded ASSET project).

The work should analyse difficulties and best practices as well as existing innovative concepts (e.g. stemming from ongoing research projects) with a view to possible replication and

promotion, and identify needs for research, development and innovation. Bottlenecks that prevent innovation in this field should be identified and recommendations made where measures at European level are needed.

Expected impact: Developing an approach / framework at European level to improve efficiency of European airports in the field of crisis management and time efficiency for passengers.

Implementation and management: The consortium should gather a range of representative airports as well as stakeholders involved in airports operations and develop and validate the work with a wider forum of airports and related industrial and service stakeholders.

AAT.2012.7-27. Airport centred co-modality and intermodality

CSA-SA - Call: FP7-AAT-2012-RTD-1

Content and scope: Proposals should demonstrate contributing to develop a framework where the relevant stakeholders draft a state of the art, analyse and propose solutions to improve the efficiency of co-modality links for passengers in European airports and provide recommendation for the proper conception of intermodal links. A mapping of the situation of airports in EU27 will be made, analysing the current state of connectivity of European airports with other transport modes, with specific emphasis on the air-rail connection. The situation will also be analysed from a passenger perspective. Research, development and innovation needs will be identified to better interconnect information exchange systems, to allow single reservation systems and single ticket for multiple modes and to organise the transfer of luggage between modes. A methodology should also be developed for the specific case of long distance high speed train connections (bottlenecks, business case, etc.). The project will take into account the findings of EU-Funded projects such as INTERCONNECT, HERMES and CLOSER.

Expected impact: Developing an approach / framework at European level to improve the performance of co-modality links in European airports.

AAT.2012.7-28. Facilitating access to aircraft for disabled people

CSA-SA - Call: FP7-AAT-2012-RTD-1

Content and scope: In the current configuration of aircrafts, travelling by air is the most inconvenient mode of transport for disabled people, particularly for passengers in wheelchairs. Proposals should gather relevant stakeholders (such as non-profit organisations, airlines, aircraft manufacturers, airports) in view of setting up a platform of communication that would identify the research needs and technical solutions necessary for improving accessibility of airports and aircraft for disabled people. Bottlenecks, costs, technical obstacles should be clearly analysed and corresponding solutions proposed.

Expected impact: Proposals should contribute to initiating change in aircraft cabins as well as throughout the chain of activities and services leading to the aircraft to allow easier and more comfortable access to aircraft by disabled people.

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 2012 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.

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 2012 work programme is divided into two major action lines:

1) The three Socio-economic Challenges indicated in section I.0.2 are addressed by six **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
6. Cross-cutting actions for implementing the sub-theme.

2) Actions supported under the 'European Green Cars Initiative' (EGCI), which are 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 are further divided in **areas** where proposers can find the **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 eligibility criteria (including funding limits) are detailed in the call fiches (section III.2).

The information provided under the heading “Implementation and management” of the topic descriptions (section II.2) will be assessed under criterion “Implementation” in the evaluation of proposals.

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: Activities and research areas of cross-cutting character. They include: ensuring sustainable urban mobility, improving surface transport through ITS, safety and security.

Topics belonging to groups 1, 2 and 4 are described under the six activities of the work programme. 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 2012

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 accident²⁹.

Area 7.2.1.1. The greening of products and operations

The objective is to ensure environmentally friendly surface transport activities through the greening of transport products and operations. Research will concentrate on vehicles, vessels, infrastructures and their interactions with special emphasis on system optimisation. Activities will explore a wide range of possible innovative solutions and technologies for pollution reduction (greenhouse gases, local emissions, noise and vibration, and wash), maximisation of energy conversion and rationalisation of energy use.

Research and innovation goals:

- Contribution to CO₂ reduction emissions from surface transport operations aligned with new policy targets as set out in the Climate and Renewable Energy Package of 2009³⁰. In the short to medium term (before 2020) reducing greenhouse gas emissions by 10% compared to 1990 levels. Beyond 2050, reducing greenhouse gas emissions **through domestic and complementary international efforts** by 25 to 40% by 2020 and by 80 to 95% by 2050³¹ compared to 1990 levels.

²⁹ 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.

³⁰ <http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2009:140:SOM:EN:HTML>

³¹ To this end, and in accordance with the findings by the IPCC, developed countries as a group should reduce their GHG emissions below 1990 levels through domestic and complementary international efforts by 25 to

- For road transport research will aim by 2020 at a 50% CO₂ reduction for new passenger cars and light-duty vehicles and 30% for new heavy-duty vehicles (both based on 2003 figures)³².
- Reduction of exhaust and local emissions to reach near-zero-emission levels in view of the compliance with future legislation at European and international levels and to allow national and local authorities meet their air quality engagements.
- Increased share of renewable energy (bio-fuels, renewable electricity) as an alternative to hydrocarbon fuels in transport applications; for renewable energy the aim will be to arrive at a 10% share in transport by 2020³³.
- Introduction of hydrogen and fuel cell technology in surface transport applications by 2020 as an economic, safe and reliable alternative to conventional engines³⁴.
- Reduction of external and interior noise and vibration. For road and rail transport the target will be a 10 dB to a 20dB³⁵ reduction compared to present noise levels particularly in urban environments.
- Proposals must ensure at least a neutral impact on climate change.

The Ocean of Tomorrow

1. Following the two previous 'The Ocean of Tomorrow' cross-thematic calls, several topics will be launched to support the implementation of the Marine Strategy Framework Directive - MSFD (2008/56/EC). Cooperation will involve Theme 2 Food, Agriculture, Fisheries and Biotechnology, Theme 5 Energy, Theme 6 Environment, (including climate change), and Theme 7 Transport (including Aeronautics). 'The Ocean of Tomorrow' related topics are implemented in the framework of the 'European strategy for marine and maritime research'³⁶. The focus will be on research gaps about the definition and monitoring of the 'Good Environment Status' (GES) of EU waters, to be achieved by 2020. Special attention should also be given to the investigation of mitigation measures and SME participation whenever relevant. Synergies and/or complementarities among projects selected for funding will be encouraged within the same theme or across themes. For information on 'The Ocean of Tomorrow' related topics in other themes, see the corresponding work programme chapters³⁷.
2. As foreseen in the 'EU strategy for marine and maritime research' and in line with the conclusions of the competitiveness of 12 October 2010 asking the Commission to propose "complementary measures to support the Joint Programming initiatives", a Coordination and Support Action is foreseen to sustain the capacity-building process for a JPI on healthy and productive seas and oceans.

40% by 2020 and by 80 to 95% by 2050 while developing countries as a group should achieve a substantial deviation below the currently predicted emissions growth rate, in the order of 15-30% by 2020". *Letter by the Presidency and the Commission to the UNFCCC Executive Secretary, 28 Jan 2010.*

³² ERTRAC Research Framework of April 2006.

³³ Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources.

³⁴ ERTRAC SRA.

³⁵ ERTRAC and ERRAC SRAs.

³⁶ COM(2008) 534 final

³⁷ 'Food, Agriculture and Fisheries, and Biotechnology' (KBBE), 'Energy', 'Environment (including climate change)' and 'Transport (including aeronautics)'

SST.2012.1.1-1. Assessment and mitigation of noise impacts of the maritime transport on the marine environment (coordinated topic within the framework of the 'Ocean of Tomorrow')

Level 2 - CP-FP - Call: FP7-SST-2012-RTD-1

Content and scope: Research will focus on an accurate description of cavitation noise and on mitigation measures to reduce noise with the constraint to maintain the fuel efficiency of ships at its highest level. Research should also provide accurate modelling tools to assess the noise footprint of ships having regard to available datasets at national and EU level (e.g., EMSA and CFCA). Research will take into account the relevant noise characteristics for the protection of the marine environment. Activities will include:

- Development of radiated sound prediction tools, for the estimate of propeller noise (including the effects of propeller-wake and propeller-hull interactions), with particular emphasis on the accurate description of cavitation noise.
- Development of cost-effective measurement tools/techniques for selective detection of cavitation effects on noise signature.
- Development of tools for the prediction of the "noise footprint" of commercial ships (including cruise ships), linking underwater noise characteristics to AIS data (Automatic Identification System) and for the determination of noise spatial distribution linked to shipping. Proposed approaches for noise spatial distribution should be designed for regular assessments by Member States under article 8 of the MSFD. Where appropriate noise spatial distributions should be linked to the European atlas of the seas developed by DG MARE.
- Development of mitigation measures to reduce the noise footprint of ships without reducing the fuel efficiency of the ships.
- Development of design guidelines and tools for the development phase of the ship in order to reduce the noise footprint of new ships.

Expected impact: The work will aim at supporting the requirements of Directive 2008/56/EC (Marine Strategy Framework Directive) and related Commission Decision on criteria for Good Environmental Status, in particular with regard to Descriptor 11, i.e. assessment, monitoring and mapping of underwater noise linked to maritime transport. Innovative exploitable technologies and processes will be proposed as mitigation measures and take into account the relevant noise characteristics for the marine environment, having regard to the need for measures under article 13 of the MSFD.

SST.2012.1.1-2. Support to the development of joint programming in marine and maritime research to address cross-cutting sea-related challenges (Support Action within the framework of the 'Ocean of Tomorrow')

Level 2 - CSA-SA - Call: FP7-SST-2012-RTD-1

Following the Communication 'Towards Joint Programming in Research: working together to tackle common challenges more effectively'³⁸, a first pilot Joint Programming Initiative was launched in 2009 followed by three others previously identified by the High Level Group for

³⁸ COM(2008)468 final

Joint Programming (GPC)³⁹ in 2010. In its Communication on ‘An EU strategy for marine and maritime research’⁴⁰, the Commission indicated “Where this is justified and supported by the Member States concerned, the Commission will consider, for marine research... joint programming, in line with the principles and mechanisms laid down in the related Commission Communication”. In its conclusions of 26 May 2010, the Competitiveness Council welcomed the identification and substantiation of further six “second wave” themes for JPIs, including one in the area of healthy and productive seas and oceans. The JPI that would address this area would seek to support the sustainable development of the maritime economy with cross-cutting research related to marine resources and maritime activities (including transport), as well as the environmental status of the seas and climate change impact. In its conclusions of 12 October 2010, the Competitiveness Council invited the Commission to offer support in the implementation of these initiatives JPIs by “Act(ing) as a facilitator by suggesting complementary measures to support the Joint Programming initiatives.”⁴¹.

Content and scope: In order to fulfil its role of providing the necessary level of support, the Commission foresees to sustain the overall coordination and capacity-building process for the JPI that would address healthy and productive seas and oceans⁴² by means of dedicated actions, which would aim initially at facilitating and shortening the time required to reach the implementation phase. Activities will cover in particular:

- The adoption of effective and efficient methods of collaboration, such as those proposed in the context of the 2010 version of the European-level voluntary guidelines on Framework Conditions, as adopted by the GPC on 11 November 2010⁴³.
- The facilitation of the establishment of the management structure and procedures.
- The development of the Strategic Research Agenda based on a mapping and analysis of the state of the art in this field (including important existing initiatives such as BONUS SEASERA, MARIFISH, MARTEC and other marine related ERANETs), as well as possible preliminary implementation actions.

They should be developed with a view to ensure impact of the JPI on marine and maritime activities (including transport).

Expected impact:

- Establishment of effective governing structures for a JPI on healthy and productive seas and oceans.
- Development of a coherent strategic research and innovation agenda for a JPI on healthy and productive seas and oceans, taking into account EU 2020 objectives.

³⁹ Established by the 2891st Competitiveness Council Meeting Conclusions concerning Joint Programming of Research in Europe in response to the major societal challenges. Brussels, 2 December 2008

⁴⁰ COM(2008) 534 final

⁴¹ Council Conclusions on Joint Programming of 12.10.2010

⁴² This action would be able to support any envisaged Commission Recommendation on the Joint Programming Initiative that would address the ‘healthy and productive seas and oceans’.

⁴³ Annex to "Joint Programming in research 2008-2010 and beyond, Biennial Report of the High Level Group on Joint Programming to the Council", @ <http://ec.europa.eu/research/era/docs/en/joint-programming-in-research-2008-2010-and-beyond--report-of-the-high-level-group-on-joint-programming-to-the-council.pdf#view=fit&pagemode=none>

- Better governance of EU marine and maritime research in support of the European maritime economy and related policies (in particular the EU maritime policy and its environmental pillar, the Marine Strategy Framework Directive).

SST.2012.1.1-3. Management of energy in railway systems

Level 2 - CP-IP - Call: FP7-SST-2012-RTD-1

Content and scope: Intelligent management of energy generation and distribution will become a vital topic for the railway sector in this decade and beyond. To achieve a more sustainable and smarter management of energy in the railway system considering both passenger and mixed freight passenger networks, the research activities will:

- Develop simulation models to optimise the design and functioning of networks. Integrated (overlay-) networks have to be considered.
- Study of the possible increase in use of energy recovery.
- Develop optimisation tools for specific scenarios of railway operations where the intelligent management of energy is most promising and feasible. The optimisation will consider storage, buffering of energy in the infrastructure versus energy storage on board of the rolling stock, optimum operational speeds, including for freight. The economic and contractual price of energy will be important parameters to be considered.
- Pave the way for systematisation of the design of the network and electrical systems (including all relevant parts of the railway system) in order to obtain the best possible result in energy terms with the available resources.
- Implement as far as necessary real railway operations scenarios in order to demonstrate benefits of such improved management, including the consequence within mixed passenger and faster freight services.
- Develop and implement technological solutions to further reduce the specific energy consumption in the railway system and demonstrate the potential of rail to contribute to an overall reduction of energy consumption and Greenhouse Gas Emissions in the transport system as a whole.

Expected impact:

- Optimised supply of traction energy with regard to supply reliability and capacity. Better use of available energy resources, supporting the further improvement of rail's environmental performance.
- Recommendations for the design of distribution networks and electrical systems. Promotion of the development and implementation of energy storage solutions in the rail sector and support decisions on system-choices in this field.
- Better understanding of train operation patterns on micro level (train) and macro level (networks) and their impact on energy demand.
- Support of the fulfilment of the requirements in Directive 2009/72/EC regarding third party access to transmission and distribution systems in railways.

Area 7.2.1.2. Environment-friendly and efficient industrial processes

No topic is open in 2012.

Area 7.2.1.3. Socio-economic issues

No topic is open in 2012.

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 projects⁴⁴.

Area 7.2.2.1. Logistics and intermodal transport

No topic is open in 2012.

Area 7.2.2.2. Maritime and inland waterways transport

The objective is to promote the attractiveness of waterborne transport. Activities will cover competitive solutions for short sea shipping, inland waterways and deployment of the Motorways of the Sea, including recourse to the use of modern information/location technologies. Maritime safety will be addressed through information and telematic

⁴⁴ 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.

technologies, optimised man-machine interactions, improved conditions for transport of hazardous goods and maintenance of double-hull vessels.

Research and innovation goals:

- Increased modal shift for short sea shipping to reach a modal share of 40%.
- Increased involvement of private sector.
- Proposals must ensure at least a neutral impact on climate change.

SST.2012.2.2-1. Innovative fleet for efficient logistics chain

Level 1 - CP-FP - Call: FP7-SST-2012-RTD-1

Research will focus on new eco-friendly ship concepts, including tug-barge systems, allowing for efficient cargo handling and on infrastructure. Activities will include:

- The development and validation of novel ship types, including tug-barge systems, with low fuel consumption, low emissions and inland waterways penetration capability for secondary waterways, enhanced sea-river ship solutions, new transshipment and stowage technologies, durable and easy-to maintain hull structures, excellent manoeuvring capabilities also in shallow and low level waters.
- Development of novel cargo ship and/or ferry concepts based on modularisation and standardisation of components for the cost-effective design of ship variants. Development of optimisation tools for ship cargo variants to address different geographic areas (e.g. Rhine, Danube, etc.).
- Development of new integrated, safe and reliable energy systems for propulsion and auxiliary services. Innovative integral energy management concepts and alternative energy sources and fuels will be considered to obtain low fuel usage and low emissions.
- Investigation of the possibilities for modernisation of waterways with respect to the hydrodynamics of the shipping while preserving the natural environment and landscape, and to the existing infrastructure, including the exploitation of intelligent transport services.
- Development of new river ports infrastructure concepts adapted to novel ship types and multimodal activities, in particular for the Danube region.

Implementation and management: Business plans and/or finance plans for bringing new vessel types to the market or upgrading or building infrastructure should be an integral part of the proposal. Participation of SMEs will be considered as an asset, as well as the articulation of the project to existing initiatives supported by structural funds in the Danube region or other initiatives foreseen by the EU Strategy for the Danube region or in other regions.

Expected impact: The work will constitute a step change in technology compared with existing solutions and support the full integration of waterborne transport into the EU transport and logistics chain.

SST.2012.2.2-2. Towards an implementation of the NAIADES Action Areas

CSA-CA - Call: FP7-TRANSPORT-2012-MOVE-1

Content and scope: A coordination action will be established, consolidating the Inland Waterways Transport (IWT) network and partnership as established with the support of the FP7 project PLATINA and to ensure a solid knowledge basis for the implementation of the

NAIADES programme. The coordination action will build on the results of PLATINA and will reflect the multi-disciplinary requirements and complexity of the subject. The coordination action will be organised around the five NAIADES action areas, but will also take into account the results of the NAIADES progress report and other related activities. The coordination action will, in close cooperation with the European Commission, set up a roadmap for the implementation of actions not yet started or to be finalised and ensure the support to permanent-type of actions. It will identify the appropriate measures and define the necessary means and tools.

Implementation and management: The coordination action will ensure an active participation of key industrial stakeholders, Member States administrations, industry associations and river commissions.

Expected impact: The coordination action will take the lead in coordinating and supporting activities relevant to the promotion and development of the inland waterway sector. It will help to increase awareness regarding the possibilities the sector offers. It will identify best practices and serve as an exchange, discussion and promotion platform. It will further strengthen the coordination between national, EU and industrial research, assist in assessing research and related implementation activities and assist in technology assessment, forecast and transfer.

Area 7.2.2.3. Enhancement of the knowledge base of the rail sector

No topic is open in 2012.

Area 7.2.2.4. Quality of rail services

The objective is to search for step-changes in the quality of service and in the efficiency of railway operations through the demonstration of innovative railway system concepts of generic applicability addressing two key business railway functions: 1) Customer Service including notably the interface with the customer – passenger and freight - across the whole transportation chain; and 2) Railway Operations comprising key operational areas with the potential to provide significant returns in terms of responsiveness and efficiency of operations or in a better usage of existing high-value assets.

SST.2012.2.4-1. Planning rail towards 2050

Level 1 - CP-FP - Call: FP7-SST-2012-RTD-1

Content and scope: This research action will consider a vision of a society where transport needs are overwhelmingly served by electrified rail. A relatively small study is envisaged that may consider the following aspects:

- What would be the implications for a 2050 society focussed around rail traffic, in inter modality with road and other transport modes?
- What are the consequences for urban and regional planning (housing, retail, industrial, social cohesion)?
- How would such a system be developed from existing infrastructure (migration strategies)? How would existing infrastructure cope or require to be upgraded? What would be the costs and how would it be financed?

- What would be the consequences for industrial processes, business and retail; e.g. just in time versus stock management, local production / product licence, freight village vs. industrial web?
- City planning for such a society, e.g. vertical versus horizontal housing.
- How would stations and transport hubs for passenger as well as freight traffic be optimised? Which industrial and logistical localisation patterns would arise – or need to be developed?
- Identify how such a society could evolve, quantify the steps, technology needs and implications, financial and societal at each stage. Which planning authorities and other authorities would need to become involved?
- How can transport corridor concepts, especially in the field of rail, contribute to achieve the vision (e.g. the Rail Freight Corridors), and how could these concepts be further developed?

Implementation and management: Active participation of key stakeholders such as industrial partners, research and academy organisations and relevant authorities is encouraged.

Expected impact:

- Provide a vision and key long term factors that will enable rail systems to be more attractive and better serve the user.
- Enable the shaping of planning policies and a more rail transport friendly society to increase the attractiveness and take-up of rail as a low carbon transport mode.
- Develop decision-making tools for local, regional, national and European authorities on how to shape other policies than transport such as industrial, spatial planning, urban planning, housing, development/cohesion, etc. so that transport is integral to the solution and not a latterly applied variable.
- Provide a vision and road map concerning the integration of the transportation system and urban/industrial planning in a holistic concept for sustainable urban/industrial development respecting the landscape, environment and society and critically review infrastructure funding tools, also at European level, to support such a vision.

SST.2012.2.4-2. The role of rail in the European transport system in response to major disruptions

Level 2 - CP-FP - Call: FP7-SST-2012-RTD-1

Content and scope: Recent events such as the volcanic ash cloud, icing of trains passing through Eurotunnel, earthquakes and extreme snow falls have highlighted the vulnerability of European Transport systems. In general these events have highlighted the relative robustness of rail travel. Other events, both natural and man made, may also cause large scale disruption to European Transport. These events could for example include volatile changes in economic conditions such as a rapid increase of oil prices forcing markets to move towards non-oil based transport, or an industrial action blocking key hubs or transport modes. This research is expected to:

- Identify risks and propose innovative operational solutions for rail to better deal with failures of other transport modes within the European transport system. Solutions should

also cut across networks and borders, considering information exchange and cooperation to better adapt to the new scenarios.

- Analyse the availability, capacity and safety of railways in extreme situations. Quantify the vulnerability of the railway network. The intent is to keep such events under control and minimise disruption to European Transport network.
- Analyse the strategic importance of rail, in terms of economy and society, to provide a European transport system that is less vulnerable to the impacts of extreme events, including economic events such as volatile and massive rises in oil prices. How will the competitiveness and functioning of countries/regions/cities be influenced by the existence - or absence - of an efficient rail system?
- Identify the infrastructure, technological, financial and operational implications for Europe of ensuring a sufficiently robust rail transport system that is adaptable towards these events.
- Quantify across Europe the most common categories of rail operations incidents affecting the customer due to service disruption. Identify the disruptions that impact most on customer satisfaction.
- Assess and benchmark the current public transport system management solutions used in case of rail service disruption across Europe and within some systems external to Europe.
- Apply a strategy to maximise the dissemination and take-up of the projects results.

Activities could liaise as appropriate with project(s) funded under TPT.2012.2-2.

Expected impact:

- Ensure a robust European rail network that can better adapt to changes in the European transport system.
- Reduce delays and improve service for rail passengers following extreme events while maintaining safety.
- Support for decision makers concerning the definition and quantification of rail service and infrastructure capacity and quality necessary to ensure a robust European Transport system.

SST.2012.2.4-3. Efficient rolling stock and train operations for competitive rail freight services

Level 1 - CP-FP - Call: FP7-SST-2012-RTD-1

Freight wagons constitute an important cost factor in the rail freight business. The possibilities to improve freight wagon design will be analyzed and demonstrated, taking into account possible improvements of relevant infrastructure parameters – at least in selected corridors – such as axle-loads and loading gauges. The benefits of increasing train-lengths will be demonstrated and possible barriers for the operation of long trains analysed and suggestions be made to overcome these barriers.

The project will:

- Develop and demonstrate possibilities to increase the load capacity of freight wagons.
- Identify measures to improve loading and unloading procedures of freight wagons.

- Assess and demonstrate ways to increase rolling stock utilisation (number of load-trips) by improving wagon design and developing new wagon concepts (e.g. flexible wagons with detachable superstructures).
- Assess the potential of light weighting of freight wagons to increase the rail freight capacity.
- Demonstrate benefits of operating long trains. Special focus should be given to train-operations in the Rail Freight Corridors.
- Identify technical, operational or regulative barriers for operation of long trains and make concrete proposals how to overcome these.

Expected impact:

- Adoption of new wagon designs and concepts.
- Improved economies of scale in rail freight through higher load capacity of wagons and better rolling stock utilisation.
- Pave the ways for introduction of increased train-lengths in selected corridors and remove remaining barriers for operation of long trains.

Area 7.2.2.5. Interoperability and safety

The objective of the research will be the establishment of a longer-term interoperability and safety perspective which may emerge from the step-wise integration of the EU-rail-networks and their potential extension to neighbouring regions (e.g. Russia, Balkans, Turkey). The research will aim at providing interoperability and safety requirements that evolve from new business, operational and technical needs (e.g. issues such as supply-chain networks, third party logistics, real-time management of customer information across a supply chain, the emergence of new technologies, the availability of Galileo services for safety applications) as well as the evolution of current requirements that might be commanded by the evolving context of integration, notably those specific impositions under the legal regimes of the COTIF (Convention Concerning International Carriage by Rail) and OSJD (Organisation for Cooperation of Railways). The work will rely on a whole-life-cycle outlook of interoperability and safety regulations from conception through to deployment, including the monitoring and the feedback-assessment of their application.

Research and innovation goals:

- All proposals submitted to every topic would have to ensure at least a neutral impact on climate change.
- Enhance interoperability on existing infrastructure and develop new interoperable rail equipment.
- Reduce migration time for the implementation of new interoperable solutions.
- Develop and implement Technical Specifications for Interoperability (TSI).
- Create the conditions for the operational and technical integration of the different national railway systems in the European Union and accession countries.
- Contribute in capturing twice the freight and passenger market share and three times the market volume in rail transport by 2020 compared to 2000 levels⁴⁵.

⁴⁵ ERRAC SRA.

SST.2012.2.5-1. Rail system interoperability (regulatory and non-legislative interoperability based on technological innovations)

Level 1 - CP-FP - Call: FP7-SST-2012-RTD-1

Content and scope: Technologies and innovative train concepts will be developed for both passengers and freight transport characterised by interoperability and cross-operation between different rail networks. Research results will contribute to standardisation at two main levels: 1) In the regulated domain, related to Technical Specifications for Interoperability (TSI) and the need for further standardised specifications that may appear with the TSI geographical scope extension; and 2) in the non regulated domain, innovative solutions for interoperability and standardised interfacing between mostly proprietary solutions.

Proposals will cover (but not necessarily be limited to) one or more of the following subjects:

- Preventive axle bearing condition monitoring:
 - Identify indicators (acoustic, vibration etc.) for early stage development of axle bearing defects.
 - Development of prototypes of diagnostic systems for preventive axle bearing and track condition monitoring, both on-board and track side, focussing on high speed traffic.
 - Analyse the economic optimum distribution from a railway system point of view, including both on-board and track side solutions, considering the relation between monitoring intervals and measurement precision.
 - Demonstrate technical feasibility of the technical solutions.
- Braking system independent of adhesion conditions: Eddy current brake
 - Improve understanding of the interaction of the eddy current brake with track and trackside signalling equipment.
 - Identify critical thermal, mechanical and electromagnetic parameters and their related vehicle and trackside compatibility limits.
 - Develop design, engineering and operational guidelines for new eddy current brakes and new trackside signalling equipment.
- Common data protocols for end applications or end devices (considering also in the context of the Technical Specifications for Interoperability for Telematic Applications for Freight – TAF-TSI – if applicable).
 - Review existing application profiles, operational requirements and use cases and analyze their potential for migration towards harmonised functional interface specifications (FIS) for true interoperability of end devices to avoid obsolescence problems.
 - Develop FIS for end applications like brake control, door control or propulsion control etc.
 - Validate FIS in a simulation environment (laboratory tests).
 - Disseminate the FIS for further processing in industry specifications.

Expected impact:

- Optimised maintenance of rail infrastructure and rolling stock. Improved safety in railway operations.
- Clarification of the prospects for implementation of improved braking systems, especially for high-speed traffic, on a wider scale.
- Support of the implementation of TAF-TSI.

SST.2012.2.5-2. Europe to Asia: rail research collaboration

Level 2 - CSA-CA - Call: FP7-SST-2012-RTD-1

Content and scope: Europe's largest trading partners are located in Asia. Currently trade is overwhelmingly moved by sea, involving long transport time and big detours. However, infrastructure development and increased stability now makes it possible to create a rail land bridge between Europe and Asia. Rail research collaboration between Europe and Asia can support a common understanding of technical issues related to interoperability and consequently support the move towards more common standards. The coordination action will support cooperation between rail research centres along Asian-European corridors (including EU neighbouring countries, Russia and China). The project will:

- Use international workshops and engage stakeholders in order to identify key interoperability issues for efficient rail transport between Europe and Asia.
- Identify the technology issues concerned and any knowledge gaps.
- Make recommendations concerning collaborative research necessary to bridge these gaps.
- Provide a comprehensive and publicly available survey of rail research centres in the region, the related competences and contact arrangements.
- Provide and promote a web site that provides key information that is available in a number of languages, including English, Russian and Chinese to facilitate long term links and rail research cooperation with Europe.

Expected impact:

- Creation of research networks along the Trans-Eurasian land bridge in the field of rail research.
- Systematic understanding of market demands.
- Identification and definition of relevant research areas and topics to support the development of efficient rail transport along the Europe-Asia axis.

Area 7.2.2.6. Traffic and information management

No topic is open in 2012.

Area 7.2.2.7. Policy support

No topic is open in 2012.

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 transport⁴⁶ 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 employment⁴⁷.

Area 7.2.3.1. New transport and mobility concepts

The objective is to develop a more efficient, effective and inclusive urban transport system, bringing together all elements of a clean, energy-efficient, safe and intelligent transport. Research will cover, among other things, the market take-up of the 'next generation vehicle', and new transport modes and concepts, and the efficient handling of urban freight, deliveries and services, including the development of the related systems and technologies.

Research and innovation goals:

- Increased acceptance and take-up of new urban transport solutions and technologies.
- More inclusive urban transport system with better access for all.
- Reduction of CO₂, pollutant emissions and noise at least in compliance with EU legislation.
- Increased energy efficiency by at least 20% in urban transport and improved transport safety.
- Proposals must ensure at least a neutral impact on climate change.

SST.2012.3.1-1. Research actions regarding the accessibility of transport systems

Level 2 - CP-FP - Call: FP7-SST-2012-RTD-1

Content and scope: Research will aim at integrated approaches covering the planning, implementation, monitoring and evaluation of measures supporting accessibility of transport systems for all citizens, particularly vulnerable groups, such as older people, children and the disabled. It should include both policy oriented and technical or technological solutions. Links with land use planning and with societal challenges such as the ageing society should be established. Suggestions for improved minimum requirements and standards should be included. A comprehensive concept of accessibility should be considered, including physical barriers as well as sensory, cognitive and psychological constraints.

⁴⁶ Building upon the experiences of the CIVITAS initiative.

⁴⁷ 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.

A link to previous and on-going research activities (e.g. MEDiate, ACCESS TO ALL, AENEAS, ASK-IT and CIVITAS) should be established.

The following research actions should be covered:

- Validation and take-up of innovative practices to improve quality of mobility solutions taking into account the user's need for accessible seamless travel, e.g. total quality management in public transport, walkability and cycling audits.
- Developing an analysis, monitoring and reporting mechanism, including quality indicators, for the accessibility of the transport system and for services from the end user's point of view, e.g. to measure the impact of traveller information systems, to assess the accessibility of vehicles and infrastructure.
- Examining innovative solutions to address accessibility issues arising from urban design and infrastructure, and land use plans in need of adaptation due to demographic change.
- Developing advanced methodologies for cost-benefit analysis from a system perspective, in view of establishing cost-effective solutions to ensure mobility for a heterogeneous but growing group of travellers.

Expected impact:

- Wide-scale testing and take-up of integrated approaches to accessible transport planning and operations.
- Contributing to a more accessible transport system and reducing the dependency on special services and vehicles, thus contributing to more attractive and seamless door-to-door mobility services bringing more transport efficiency in view of traffic fluidity, cost reduction and reduced carbon footprint.
- More opportunities for disabled and elderly people to access jobs, healthcare, education and training, as well as leisure facilities, in line with the European Disability Strategy 2010-2020 'A Renewed Commitment to a Barrier-Free Europe' launched in 2010.

SST.2012.3.1-2. Innovative design and operation of new or upgraded efficient urban transport interchanges

Level 2 - CP-FP - Call: FP7-SST-2012-RTD-1

Content and scope: Research on passenger infrastructures will cover approaches to help cities plan a fully integrated and environmentally-friendly multimodal transport system, making more efficient use of their infrastructure and public transport networks, providing greater accessibility for citizens, and helping to promote greater levels of walking and bicycle use. This includes the development of performance criteria for public authorities to monitor the achievement of energy and environmental objectives.

The following research actions should be covered:

- Innovative approaches relating to the design of new or upgraded efficient transport interchanges.
- Guidelines for the provision of information to travellers at interchanges, including ICT tools.
- Strategies for integrating land use planning with urban passenger infrastructure planning.
- Management and business models for the operation of all services – including non-transport related – of new and existing interchanges.

Implementation and management: The involvement of local or regional authorities, transport operators and end-user organisations is an asset. A link to previous and on-going research activities (e.g. CIVITAS, IEE and IST) should be established.

Expected impact:

Actions will encourage a better complementarity and coordination between the different modes of transport and their operators, and create people-focused seamless and energy efficient journeys on the transport network in the urban region catchment area. They will enhance intermodality and lead to improved public transport and overall a more energy-efficient urban network performance. Actions will also increase the economic viability and cost-efficiency of interchanges, creating a business case that stimulates the local economy.

SST.2012.3.1-3. Take-up of transport innovation in urban and regional transport
Level 2 - CSA-CA - Call: FP7-SST-2012-RTD-1

Content and scope: Technological and organisational innovation is a key factor to address today's challenges in urban and regional transport. While innovation is an integral part of European and national transport research, so far only few projects have addressed the concrete transfer and up-take of promising new solutions for urban transport and mobility.

The support action will address this by refining existing methodologies for the transfer and up-take of results from research and innovative practices. It will build on the results of previous projects that have dealt with these issues (e.g. NICHES and NICHES+, CIVITAS, CURACAO, PRESTO, CVIS and IN-TIME).

The action will support European cities and regions to team-up on urban transport innovation. It will provide an innovative range of methods and tools for training and guidance targeted at cities and regions interested in implementing innovative transport and mobility concepts. Outcomes will include concrete implementation plans to enhance take-up in selected cities and regions. Active dissemination and synergies with existing projects and websites are encouraged.

The action will address the key challenges for the future of urban and regional mobility in Europe (e.g. energy efficiency and decarbonisation of transport, impact of demographic change on urban and regional mobility, while adjusting to new economic and financial conditions, etc.). The following research actions will be covered:

- New financing models or pricing measures to increase the cost-efficiency of urban transport.
- Strategies to increase the opportunities for non-motorised transport in the urban context to reduce short car trips, taking into account safety considerations and addressing society's demographic changes, e.g. the ageing society.
- Integration of advanced network and traffic management to support advanced traveller information systems for the end user including personal, intermodal and integrated information.
- Advanced vehicles.
- Measures to improve public transport organisation.

Implementation and management: Cooperation of EU Member States and Associated States with accession countries and neighbouring countries is encouraged.

This topic is complementary to the Topic Energy.2012.8.8.1: Strategic sustainable planning and screening of city plans (FP7-ENERGY-SMARTCITIES-2012), which supports the implementation of the Smart Cities and Communities Initiative⁴⁸ of the SET-Plan. In this context, the European Commission may ask the projects, during the negotiation, to establish strong links, where appropriate, with the projects funded under the topic Energy.2012.8.8.1 as well as with other relevant R&D projects at EU, national or regional level.

Expected impact:

- More favourable climate for cities and regions to integrate innovations into their urban mobility policies and increased acceptance and take-up of new urban transport solutions and technologies.
- Actions will help cities and regions to address common challenges in a collaborative and integrated way - supporting the framework of Sustainable Urban Mobility Plans (SUMP) - and to shorten the implementation path to the deployment of innovation.
- More cost-efficient mobility policies in economically challenging times, increased use of non-motorised transport while improving road safety, more inclusive urban transport systems with access for all, optimised performance of the urban mobility network, increased energy efficiency and reduced CO₂ pollutant emissions and noise.

SST.2012.3.1-4. Automated urban vehicles

Level 2 - CP-IP - Call: FP7-SST-2012-RTD-1

Content and scope: The aim is to develop a real scale test and validation platform showing that automated urban transport systems have the potential to become a self-sustaining service which can really attract car users and be an efficient passenger transport solution which is complementary to conventional public transport. A link to previous and on-going research activities (e.g. CITYMOBIL, CIVITAS, CYBERCARS II, EDICT, HAVE-IT and INTERACTIVE) should be established⁴⁹. The proposals should also consider the European ITS communication architecture⁵⁰. The following research actions will be covered:

- Implement a large-scale pilot platform for technical and socio-economic test and validation in an urban environment.
- Perform research activities using the pilot demonstration test bed; research into technical, financial/funding, and cultural aspects, ex-post evaluation, behavioural research (accessibility, pricing elasticity, preferences), effects on land use, effects on policy and how new systems could fit into existing infrastructures, the development of a common evaluation methodology, and ideally, investigation into how different system options could fit in different environments, e.g. Ground Rapid Transit (GRT) and Personal Rapid Transit (PRT) in new towns, historic, large and small cities, etc.

⁴⁸ <http://setis.ec.europa.eu/about-setis/technology-roadmap/european-initiative-on-smart-cities>

⁴⁹ See also study on Definition of necessary vehicle and infrastructure systems for automated driving (http://ec.europa.eu/information_society/activities/esafety/studies/ongoing/index_en.htm)

⁵⁰ <http://www.etsi.org/WebSite/Technologies/CooperativeITS.aspx>

- Carry out awareness campaigns. Awareness campaigns are seen as an integral component of the research to develop automated and space-efficient transport systems in order to promote the sustainability benefits of such schemes.

Expected impact:

- Demonstrate financial and economic feasibility of automated urban transport.
- Demonstrate a reduced car-use and projected reduction of car-ownership rate in the long term.
- Demonstrate a rail-standard safety level for road transport.
- Development of a proposal for a European directive regulating the circulation of automated vehicles on roads.
- Clarification of the legal and institutional procedures and approvals needed for planning, operations and safety certification of automated and space-efficient transport schemes.
- Standardisation of vehicle and infrastructure technology for automated transport systems to make them interoperable.

Area 7.2.3.2. High quality public transport

The objective is to increase the quality and provide the adequate level of public passenger transport while ensuring access for all and high levels of intermodal integration, including traveller information and ticketing. Activities will include the design and operation of interfaces, seamless door-to-door solutions, tourist traffic, and public transport in suburban areas. In addition, the research will address the management of public transport operations, financing and market assessment.

Research and innovation goals:

- Increased modal share of public transport and reduced car use in urban and peri-urban areas.
- More attractive and inclusive urban transport system with better access for all.
- Improved overall performance of public transport operations and reduced operational costs and environmental impacts per passenger kilometre.
- Better integration between public transport operators, and between public transport and other modes, to promote co-modality.
- Proposals must ensure at least a neutral impact on climate change.

SST.2012.3.2-1. Coordinating innovation for efficient bus systems in the urban environment

Level 2 - CSA-CA - Call: FP7-SST-2012-RTD-1

Content and scope: The aim is to support the exploitation of the results of previous and ongoing research and innovations to increase the performance and efficiency of bus systems as well as make them more attractive for customers. By considering the system approach on the optimisation of interaction of bus-vehicles, bus-infrastructure and bus-operations, the following key innovative elements will be included:

- Energy strategies including energy efficiency and management.
- Accessibility and safety.
- Measures to optimise accessibility and operation during special events.

- Modularity, internal and external, to be adapted to the operational scenario.
- IT standardised platform for bus systems (in line with the ITS Action Plan and in particular with the IT in-vehicle open platform architecture).
- Intermodality with other public transport (PT) and complementary transport modes.
- Level of service, including commercial velocity and innovative strategies for step changes in the areas of transit signal priority (TSP), dedicated bus lanes, automated vehicle location (AVL).

With the aim of reinforcing the position of EU bus industries outside Europe, the activity should provide both exchange of experiences between innovative urban bus systems already existing or under development worldwide, and the transfer of innovative concepts and solutions to developing countries. Finally, the activity should contribute to prepare the framework for future EU research on innovative urban bus systems.

Implementation and management: The activity should involve key PT actors through dedicated fora and an exploitation platform, and should be supported by dedicated case studies and dissemination events in Europe, accession countries, neighbourhood countries and ICPC. A link to previous and on-going research activities (e.g. EBSF, TRANSAFRICA, CIVITAS and CVIS) should be established, as well as consideration of standards on ITS communication⁵¹.

Expected impact:

- Stimulate PT stakeholders to integrate innovation solutions in their bus systems and enlarge the acceptance of EBSF solutions and technologies.
- Support bus industry (manufacturers and suppliers), bus operators and authorities in achieving objectives, such as: reduction of the production costs, better effectiveness of investments and operation costs, more attractiveness of bus systems for passengers, environmental performances and smart use of energy alternatives, accessibility for all typologies of passengers with their specific needs.
- Strengthen the competitiveness of EU bus industries also outside Europe.

Area 7.2.3.3. Demand management

No topic is open in 2012.

Area 7.2.3.4. Innovative strategies for clean urban transport

No topic is open in 2012.

Area 7.2.3.5. Policy support

No topic is open in 2012.

⁵¹ <http://www.etsi.org/WebSite/Technologies/CooperativeITS.aspx>

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 system⁵².

Area 7.2.4.1. Integrated safety and security for surface transport systems

The objective is to develop new technologies and innovative solutions for the improvement of safety and security in transport operations and the protection of vulnerable users. Activities will address the entire range of approaches and technologies to ensure safer operations based on design for safety, advanced protection systems, intelligent vehicles, vessels and infrastructures (including their interactions) and related socio-economic aspects. Research will also address aspects inherent to the transport system which can lead to the achievement of an adequate level of intrinsic security of the transport system and its operations.

Research and innovation goals:

- All proposals submitted to every topic would have to ensure at least a neutral impact on climate change.
- Increase the level of safety and security of both the whole transport system and its components, thus contributing to the overall scope of reducing the number of fatalities and the severity of injuries caused by transport accidents.
- Enhance the positive interactions between pilots-drivers/infrastructure/vehicles-vessels in order to decrease the level of human error and increase the safety performance of the infrastructure.
- Maintenance/increase of the level of safety and security of the transport system, whilst applying innovative technologies contributing to the mitigation of the greenhouse effect and reduction of CO₂ emissions.
- 10% reduction in maintenance of transport infrastructures for all surface transport modes.

SST.2012.4.1-1. Human element factors in shipping safety

Level 1 - CP-FP - Call: FP7-SST-2012-RTD-1

The crucial influence of the human element on safety, security and environmental protection has been recognised by the International Maritime Organisation (IMO), including its "Vision, principles and goals" for the human element, as set out in resolution A.947(23) [IMO, 2004].

⁵² 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.

The combined and integrated effects of human error and intervention have shown to be a major consideration in the estimation of the probability of structural failure. Activities will include:

- Multi-disciplinary, human centred design optimisation, including:
 - Framework for integrating human factors in ship design projects
 - Tools and methodologies for integrating human factors in ship design projects and optimisation
- Goal setting approaches for future application of complex human-centred systems, including:
 - Development of error-free Human-Machine-Interfaces, e.g. in the context of the development of e-navigation or e-maintenance/e-diagnostics.
 - Development of principles for ensuring system resilience through people.
- Significance of management options and organisational factors
 - preventing fatigue onboard
 - roadmap for integrating training and crewing into prevention of human errors
 - exploring development of safety culture and capabilities of human beings in the processes
- Novel concepts for integrating human performance and physical capabilities with advanced technical means in risk-based inspection approaches.
- Operation, maintenance and intelligent evacuation concepts, including:
 - Research on the complexity of team operations in extreme environments (harsh weather conditions, heavy traffic in close areas, parallel or remotely controlled operations).
 - Research on productive leadership in vessel operations.
 - Novel concepts for integrating human performance and physical capabilities in risk-based inspection approaches.
 - Tools based on behavioural sciences for evacuation optimisation.
 - Managing the interfaces between land coordination and vessel operations.
 - Research on optimum risk and safety management in extreme environments.

Implementation and management: The consortium will take appropriate measures to ensure that methodologies and technologies developed in other transport or industrial sectors are taken into account. Cooperation with other sectors should be envisaged. Pre-normative activities should be included in the proposals.

Expected impact: Improvement of safety of the maritime transport through new systems and concepts.

SST.2012.4.1-2. Safety of ships in Arctic conditions

Level 2 - CSA-CA - Call: FP7-SST-2012-RTD-1

Content and scope: As underlined by the Arctic Council in its 2009 Assessment Report on Arctic Marine Shipping, harsh conditions and lack of infrastructure in large parts of the Arctic create a higher vulnerability to emergencies than in more temperate climates. Consequently, prevention, preparedness and response must be adapted to Arctic conditions. The IMO Guidelines for ships operating in Arctic ice covered waters is currently under revision and are expected to be adopted at the end of 2012. The research should facilitate the implementation of the mandatory code. Activities will include:

- An identification of gaps regarding safety measures (construction, equipment, operation).
- Comparative analysis of the various ice-strengthening class capabilities and strengths, in view of standards coordination.
- Development of best practices for rescue operations in the remote and cold Arctic regions, in particular for cruise ships.
- Development of long-distance fleet management for reliable, safe and sustainable navigation through Arctic waters.
- Development of uniform training standards for ice navigation, in view of the development of training standards.
- Analysis of the salvage capacities and future needs.
- Analysis of preparedness and response capacities to avoid accidents and oil spills;
- Analysis of communication infrastructures in the Arctic and weather, sea-ice and wave forecast and information to sailors, including the use of Galileo and/or other innovative search and rescue service.

Implementation and management: Consortia are encouraged to include participants from the Arctic States concerned, including Canada, USA and Russia, as well as Classification Societies.

Expected impact: The action will contribute to the implementation and assessment of the Polar Code and of Arctic navigation and to the development of international best practices.

SST.2012.4.1-3. Large scale naturalistic driving observations for safe and sustainable transport

Level 2 - CP-IP - Call: FP7-SST-2012-RTD-1

Content and scope: In order to succeed in reducing the number of fatalities and injuries on European roads it is of great importance to understand and adjust human behaviour with respect to modal choices (e.g. driving, walking, cycling), risk taking (e.g. drink-driving, mobile phones, distraction, speeding), eco-driving (e.g. driving style, route choice), adapting to new technologies (e.g. in-vehicle and cooperative safety systems). The aim of the research is to address the role of driver performance and behaviour in traffic safety, traffic management and sustainable road transport. This includes developing an understanding of how the driver interacts with, and adapts to, the vehicle, traffic environment, roadway characteristics, traffic control devices and the environment.

Large-scale naturalistic driving observations will be developed collecting data from several parts of Europe to take into account physical, climatic and cultural differences in road user behaviour. The key new feature of naturalistic driving observations is the ability to record video and data logs of accidents as they occur naturally, and to subsequently provide a validated understanding of accident causation and pre-crash behaviour. Experiences from ongoing research on naturalistic driving in the US, Japan and in Europe and relevant EU projects⁵³ have to be considered. Research on a large European scale will focus on:

⁵³ such as PROLOGUE, Fot-Net, HumanIST, EuroFOT, TeleFOT, DriveC2X, eCoMOVE, eCodriver, DaCoTA, 2BeSafe and INTERACTION.

- Road user behaviour in normal conditions, near miss accidents and crashes in order to provide quantified risk factors and to identify potential risk countermeasures.
- Driver/vulnerable user interactions in traffic taking into account the mutual attention to and understanding of each other's intentions and constraints.
- Road user behaviour related to emission levels (eco-driving), in order to identify relevant and effective communication, training, and vehicle design measures steering towards sustainable attitudes.
- Road user behaviour related to road design and road network characteristics, in order to identify the essential elements needed to evoke desirable behaviour (e.g. self-explaining road design).
- In-depth analysis of the effects of fatigue and drowsiness on driving; identification of impairment symptoms to be kept under control.
- Setting safety and environmental performance indicators for monitoring developments over time.

Expected impact:

- Better understanding of all factors that are likely to contribute to unsafe and inefficient behaviour of drivers and other road users (e.g. driver's interaction with, and adaptation to, the vehicles, information and communication devices (mobile phones, navigation), in-vehicle information systems, road characteristics, traffic and weather conditions, traffic control devices, etc.).
- Naturalistic Driving data that support the identification and development of new and more efficient safety and sustainability measures related to vehicles, road design, education, regulation enforcement, etc.
- Support the development of tools such as driver models and traffic simulations by providing validation data and a basis for calibration.

SST.2012.4.1-4. Impacts of Intelligent Transport Systems on vulnerable road users

CP - Call: FP7-TRANSPORT-2012-MOVE-1

Content and scope: Several EU and national projects have been working on the prevention of accidents with vulnerable road users through new or improved intelligent transport systems (ITS). Advanced vehicle safety systems, infrastructure based ITS and cooperative systems based on communication from vehicle-to- X⁵⁴ or infrastructure-to-vehicle/user can however have both positive and negative impacts on the safety/well-being and quality of mobility for vulnerable road users. This project should contribute to assessing the safety and comfort related impacts of selected ITS applications and to paving the way for the promotion and enhanced deployment of services with positive impact and a pan-European coordinated mitigation of negative effects. It should also take into account relevant results achieved by the European Standardisation Organisations. Vulnerable Road Users (VRU) are to be considered as all “non-motorised road users, such as pedestrians and cyclists as well as motorcyclists and persons with disabilities or reduced mobility and orientation”. This comprises a series of heterogeneous sub-groups with specific characteristics, abilities, behaviours and requirements, which should all be taken in consideration. The work should include:

⁵⁴ vehicle, infrastructure or user

- Qualitative and quantitative assessment of the impact of selected ITS Services and applications on the safety and comfort of (sub-groups of) VRU; assessment and recommendations on the potential clustering of measures.
- Identification of the needed technological improvement in order to reduce or neutralise any negative effect and underpinning of recommended actions at European level to foster accelerated deployment of ITS services and applications with clear positive impact.
- Specific attention to the development and operational use of Human-Machine-Interface (HMI) responding to the needs of an ageing population.

Expected impact:

- Qualitative and quantitative underpinning of recommendations for action at European level.
- Full integration of all road users in co-operative systems, taking in due account the simplicity of use of the technologies to be developed and deployed for every mobility mode considered.
- Development (including pilot deployment and testing) of innovative on-board or infrastructure based ITS and/or cooperative systems aimed at easing the mobility of specific groups of VRU, such as the disabled, the elderly and children.

Area 7.2.4.2. Policy support

The continuing objective of further reducing the number of fatalities on the EU roads should be properly supported by research activities addressing in-depth road accidents data collection and analysis in the framework of the European Road Safety Observatory, multidisciplinary analysis of the impact of societal trends on road safety (i.e. ageing population) and technology-based solutions to improve infrastructure related road safety. Research activities will include demonstration, validation and implementation of recognised best practices.

Research and innovation goals:

- Contribution to the best possible level of road safety, beyond the common objective proposed by the Commission in 2001, following targets already set by some Member States ("sustainable safety" and the ultimate "vision zero").
- Development of capacities to explore potential road safety improvements that will not have been exploited by the ongoing actions within the 3rd European road safety action programme (2001-2010) and within the 5th and 6th Framework Programmes.
- Development of new mechanisms for exploiting existing data sources in standardised ways to facilitate analyses and comparison with other traffic crash related databases (already existing or under development).
- Definition of a strategic framework for the selection of pan-European priorities for in-depth data collection.
- Proposals must ensure at least a neutral impact on climate change.

SST.2012.4.2-1. Priorities for road safety research in Europe

Level 2 - CSA-SA - Call: FP7-SST-2012-RTD-1

Content and scope: A support action should identify the directions which future European road safety research should follow in order to bring about maximum safety benefits against a

backdrop of limited funding resources. A long-term perspective should be considered, and the guiding principle should be the notion that human life and physical integrity is the paramount concern. Effective mechanisms should be established to make sure that the prioritisation of research topics will be based on broad consultations of relevant stakeholders, open debates and, wherever possible, on scientific evidence. The overall objective is to develop, and later on continuously update, a focussed, well-founded and long-term safety research roadmap and to derive periodically concrete suggestions for a limited number of research topics. Clear references to the EU Road Safety Policy Orientations 2011-2020 and to the White Paper on Competitive and Sustainable Transport are requested.

The following elements should be covered:

- Creating a systematic overview of current road safety research activities both at European and national levels.
- Identifying white spots and promising continuations of current research activities.
- Priority setting in co-operation with all relevant stakeholders taking into account their existing safety research agendas.
- Road mapping, by putting the prioritised research topics in a logical sequence, considering the required inputs and outputs of individual activities.
- Dissemination of research results and success stories to the key stakeholders, to the media and to the general public, including the provision of a forum for feedback and discussion.
- Initiation of a network of all relevant stakeholders to continue the activities beyond the duration of the support action.
- Organisation of thoroughly prepared workshops and seminars, panel discussions, interviews with stakeholder representatives and online surveys among experts.

Expected impact:

- Development of a long-term road safety research roadmap in Europe which will help to maximise the efficiency of public research funding and the return on investment in road safety research, both in terms of reduced human suffering and in terms of reduced economic loss from road accidents.
- Creation of a pan-European network which will cover road safety research as a whole and bring all relevant stakeholders (including road user groups, industry, research institutions, regional and local authorities, insurance companies, schools, etc.) together.
- Implementation of mechanisms for a long-term continuation of the networking activities beyond the duration of the project

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 developed⁵⁵.

Area 7.2.5.1. Competitive industrial processes

No topic is open in 2012.

Area 7.2.5.2. Competitive surface transport products and services

The objective is to develop innovative products and systems concepts (for vehicles, vessels and infrastructures) meeting end-users' expectations and ensuring high quality services, enabling Europe to strengthen its global position or to regain competitiveness. Particular attention will be given to the role of SMEs in the innovation process and the supply of components, systems and equipments within the transport sector. Therefore, the involvement of SMEs in project partnerships is important.

Research and innovation goals:

- Maintain European share of ultra-large cruise ship world production.
- Develop new generations of transport products that are highly competitive, emit less CO₂ and other pollutants and are tailored to customer's expectations.
- Create new niche markets for high technology added value products⁵⁶ and services and take full advantage of eco-innovations.
- Improve the quality and competitiveness of surface transport services considering features such as price attractiveness, environmental friendliness, punctuality, frequency, real time information or leisure and work during travel time⁵⁷.
- Drastically reduce maintenance and inspection costs⁵⁸.
- Sustain economic development in Europe, create job opportunities and technology skills, with special focus on green technologies.
- Promote the start-up and emergence of new high-tech SMEs, particularly in the advanced transport technologies and 'services-related' activities specific to Transport.
- Proposals must ensure at least a neutral impact on climate change.

⁵⁵ 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.

⁵⁶ Waterborne^{TP} SRA.

⁵⁷ ERRAC SRA.

⁵⁸ ERRAC SRA and ECTP SRA.

SST.2012.5.2-1. Tools and conditions for attractive, efficient and competitive single wagonload traffic and its interaction with road and intermodal transports
Level 1 - CP-FP - Call: FP7-SST-2012-RTD-1

Content and scope: Single wagonload (SWL) traffic represents a large share of the current rail freight market, (up to approximately 50%). Competition from road transport is severe, partly due to the dominance of road transport infrastructure compared to rail for door to door services. Single wagonload traffic is characterised by complex cost structures and sometimes unclear cost responsibilities. The following aspects will be addressed:

- Which key technologies are needed to make SWL more efficient and competitive? This should include:
 - Examination, development and demonstration of traction concepts (e.g. dual-power locomotives)
 - Train Formation methods (automatic couplers, brake test etc)
 - Loading/unloading technologies for goods (not transported in intermodal units)
 - Design of capillary (local industrial freight terminus) infrastructure and how investment maintenance and operation costs can be reduced.
- How can single wagonload traffic, combined traffic and trainload traffic together best address market demands? What are the strengths and weaknesses of each one? How do industrial density and localisation patterns affect this choice?
- Analysis of costs, cost structures and cost responsibilities within different production systems (single wagonload, combined traffic, trainload, road transport), with special focus on the "last mile" and train formation processes; even external costs and possibilities for cost reductions (infrastructure costs, operational costs and administrative costs).
- Means to protect and develop capillary infrastructure (industrial spurs; freight terminals) necessary for single wagonload traffic. The legal framework in railway as well as planning law should be covered, as well as instruments to promote the development of capillary infrastructure. How can the acceptance of wagons in urban areas be improved?
- How to utilise the high loading efficiency of wagon load traffic; by optimal routing, feeder services, etc.
- Development and demonstration of relevant information tools to support punctuality, reliability, flexibility and customer information in single wagonload traffic, also in combination with other freight services.

Expected impact:

- Increased efficiency and competitiveness of single wagonload traffic.
- Emergence of new business models and production methods for single wagonload traffic, also aiming at reducing the vulnerability of single wagonload traffic in relation to small changes in transport demand.
- Realistic solutions for problematic single wagonload issues such as the "last mile", addressing costs and cost responsibilities, planning procedures and administrative burdens.
- Improve quality and reliability of single wagonload services, also in order to attract new customers and market segments and improve stakeholder satisfaction.
- Define new key technologies to improve single wagonload traffic (traction concepts, train formation techniques, loading/unloading techniques, and technical design of capillary infrastructure).

SST.2012.5.2-2. Next generation tools for optimised infrastructure asset management

Level 1 - CP-FP - Call: FP7-SST-2012-RTD-1

Content and scope: Railway infrastructure is subjected to more variables than most utility companies, and risk, cost, availability and performance are important parameters under different vehicle, traffic density, environmental conditions and across different systems (e.g. Rail Freight Corridors). This diversity of operating conditions requires the most advanced tools to create the necessary integrity for high resolution models to support maintenance decisions locally and across trans-European networks with a value of billions of EUR per annum. The next generation tools will be developed by investigating:

- Transferability of maintenance tools developed for infrastructures in other industry sectors (e.g. electricity and water).
- Application of fuzzy analysis techniques.
- Linkage to tools modelling vehicle dynamic behaviour, traffic density, track quality, track stiffness and past maintenance history.
- Application towards trans-European freight corridor network infrastructure management, observing the requirements in the Regulation concerning a European rail network for competitive freight (Regulation EU Nr 913/2010).
- Case studies for selected sites, including one or more European Rail Freight Corridors.

Implementation and management: The preservation and future development of the tools and data developed in this project will be achieved through the formation of an asset management club managed by the project participants. All categories of railway assets are expected to be included, together with assets in the context of trans-European corridors, applying the highest practical resolution to optimise solutions through linked models.

Expected impact:

- Improved maintenance routines for rail infrastructure and higher availability or infrastructure availability.
- Better cross-border coordination of infrastructure maintenance decisions in order to reduce traffic disruptions, with special focus on Rail Freight Corridors.

SST.2012.5.2-3. Innovative structural and outfitting materials for ships including inland ships

Level 1 - CP-FP - Call: FP7-SST-2012-RTD-1

Content and scope: New materials, in particular lightweight materials, e.g. alloys and composites, etc. can provide suitable solutions to reduce ship environmental footprint, including the manufacturing, maintenance and dismantling phases. In addition, new innovative steel materials for the maritime industries and new coating materials could also greatly improve properties for corrosion resistance, friction, weldability and dimensional accuracy during construction. Research will focus either on the entire structure or substructure of the ship or on parts of the structure. All vessel types, including inland vessels and small crafts, can be considered:

- Development of new cost-effective lightweight materials, including the assessment of safety performance.
- Development of new steel material.

- Development of new coating materials, including nanotechnology for marine applications, to reduce costs in new building, maintenance and repair.
- Development of combination techniques for dissimilar materials in ship structures or super-structures, taking into account recycling and disposal.
- Development of innovative processes that maximise material capabilities while minimising costs.
- Assessment of the long-term degradation of new materials and joints under various loading conditions.

Implementation and management: Inclusion of SMEs and at least one Classification Society is considered vital and will be assessed under the 'Implementation' criterion. A business plan in view of market take-up will be provided. Research must build on, and go beyond, the large body of research and development already undertaken in this area.

Expected impact: Research will contribute to the competitiveness of the shipbuilding industries, in particular of SMEs. New materials will contribute to a significant reduction of operation costs and life-cycle-costs.

SST.2012.5.2-4. Innovation and standardisation in the field of signalling to accelerate a European Train Control System rollout

Level 1 - CP-IP - Call: FP7-SST-2012-RTD-1

Content and scope: The aim of the research will be to facilitate the introduction of European Train Control System (ETCS). Using existing results, it will lead to standardisation processes involving national and European standardisation bodies as well as national safety authorities. Activities will include:

- Development of tools and methodologies to improve ETCS lab testing and increase automation of tests, in particular as regards automatic interpretation of test results, automatic data input and automatic running of test sequences.
- Implementation of standard interfaces in a real demonstration project to validate the specification: focus will be on the establishment of an interface between interlocking and ETCS. The project should lead to the definition of a standard interface (FFFIS format) to be used for new interlocking so as to ensure that RBC (Radio Block Centre) can be easily "plugged" to the interlocking.
- Demonstration of the possibility to use satellite based positioning, as necessary in conjunction with other techniques, to reach the appropriate safety and accuracy requirements for ETCS on-board equipment. Technical implementation should be such that it should not have any impact on the Technical Specification for Interoperability related to Control Command and Signalling.

The research may include any other activities that might help accelerating the roll out of ERTMS (European Rail Traffic Management System), in particular in the field of lab testing, validation and STM (Specific Transmission Module) demonstration.

Expected impact:

- Faster roll-out of ERTMS and reduction of cost for the certification and authorisation to put equipment into service.

- Improved possibilities to make use of lab-testing in connection with the validation of ETCS
- Definition of standard interfaces between the RBC and new interlocking.
- Clarification about the possibilities and ways to use satellite-based positioning in the context of ETCS, if necessary in connection with other techniques.

SST.2012.5.2-5. E-guided vessels: the 'autonomous' ship

Level 2 - CP-FP - Call: FP7-SST-2012-RTD-1

Content and scope: The objective of the research is to increase the adaptability, availability and autonomy of the waterborne transportation through enhanced autonomy for ship systems and ships, i.e. the capability to solve problems with limited human interface. Recent developments in information and communication technologies (ICT) make safe wireless transfer of large amounts of data from ship to shore possible. This capability could be used to develop a whole new range of innovative and life cycle-oriented concepts that will increase the adaptability, availability and 'autonomy' of waterborne transportation allowing a fresh approach to the improvement of ship operations and waterborne transport quality. Activities will include:

- Development of e-maritime applications for autonomous operations, including integration with improved safe wireless ship-shore communication links.
- The evaluation of the feasibility and reliability of combined use of shore/satellite communication in view of autonomous operations.
- The development of concepts, methods and means for autonomous optimisation of the ship's performance and operations (e.g. in respect to energy consumption, environmental issues, near land and port operation and manoeuvring).
- The design of new ship functions systems for increased autonomy, in particular regarding those system and functions necessary for monitoring, data collection, data transfer and onboard system maintenance and updating. Safety and legal issues will be considered.
- The development and validation of cost-effective concepts for predictive maintenance approaches.
- The development and validation of concepts and systems for autonomous vessels in navigation channels aimed for short-sea-shipping
- The assessment of the proposed products and services, in legal (liability), safety and economic terms.

Implementation and management: Proposals should include a convincing implementation plan. Pre-normative research should be included. New solutions to increase ship autonomy should consider the legal implementation of such solutions, in particular the liability aspects.

Expected impact: The development of new solutions will improve the competitiveness of operations. Project results are expected also to contribute to energy saving and reduction of emissions.

SST.2012.5.2-6. E-Maritime in support of compliance management

CP-FP - Call: FP7-TRANSPORT-2012-MOVE-1

Content and scope: The maritime sector is heavily regulated. The interaction between the national, European and international institutions is a complex subject area. This situation

creates inefficiencies in regulation enforcement. On the other hand differing interpretations of regulations creates difficulties for shipping companies to manage compliance at each port of call. The EU e-Maritime initiative is aimed at making maritime transport safer, more secure, more environmentally friendly and more competitive by improving knowledge, facilitating networking and dealing with externalities. A key priority for e-Maritime is supporting authorities and shipping operators to collaborate electronically in regulatory information, management and to address the challenges outlined above. Activities will include:

- Establishment of a cooperation model between regulation setting and enforcement authorities, both for port state control and IMO regulations, for modelling and interpreting regulations, ensuring harmonisation across national and organisational boundaries.
- Demonstration of automated compliance management by:
 - Modelling and delivery of regulations in electronic format.
 - Harmonised e-Services for more effective and coordinated enforcement controls and inspections.
 - E-services in support of the class requirements, particularly on surveys and for ship risk management in upgraded e-Maritime applications.
- Evaluation of the practical implementation of the above in representative networks and the provision of recommendations for e-Maritime policies

Implementation and management: Proposals should build on the results of the FP6 project FLAGSHIP and existing e-services provided by the International Association of Classification Societies (IACS).

Expected results:

- Evaluated governance solutions for harmonised and common interpretation of maritime regulation that can be carried out and processed electronically for operations in Europe.
- Validated tools for designing and implementing regulations in a rational manner, easily integrated into operational information systems.
- Extensive dissemination and an industry engagement programme to create lasting solutions based on organisational and technological innovation.

CROSS-CUTTING ACTIVITIES FOR IMPLEMENTING THE SUB-THEME PROGRAMME

Cross-cutting activities in the Sustainable Surface Transport Work Programme 2012 support the achievement of an integrated surface transport system across activities, common to all surface transport modes, to help meet the three socio-economic Challenges.

SST.2012.6-1. ERA-NET 'Transport III'

Call: FP7-ERANET-2012-RTD (see Annex 4)

Content and scope: The aim of this initiative will be to continue to strengthen the foundation of the European Research Area for surface transport through coordination and cooperation of national and regional research programmes. Activities will include: exchange of information and knowledge, implementation of joint activities and trans-national research. The partnership

will be composed of representatives from national and regional authorities responsible for the programming of transport research and implementing research on transport. Care should be taken to ensure synergies with the activities carried out in ERA-NET 'Transport' and ERA-NET 'Transport II'.

ERA-NET 'Transport III' will aim at:

- Broadening the geographical scope by the inclusion of new members from national and regional programmes whose transport research potential needs to be developed.
- Supporting cooperation of national/regional transport research programmes.
- Testing and exploitation of further large-scale cooperation such as ERA-Net Plus or further innovative means that are feasible for public research programmes.
- Fostering a more intensive cooperation of national/regional programmes and the EU's Framework Programme.
- Structuring of public funding through an increased complementary effect and concentration of efforts towards common aims, this effort will be supported by the creation of a knowledge based system on national and regional transport research programmes.
- Supporting the ERA for Transport by enhancing the visibility of nationally/regionally financed research in the frame of suitable European conferences, ideally in the context of a multimodal European transport conference.

Expected impact: It is expected that further coordination efforts in the area of sustainable surface transport will consolidate the initiated process of identifying major research needs, extending the partnership, making better use of scarce resources and avoiding double funding, reducing fragmentation of research efforts at national and regional level. Ultimately, the cooperation shall lead to a self-sustainable and long-lasting network of funders in the surface transport area.

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 modality.

Area 7.2.7.1. Development of electric vehicles for road transport

To have a real impact on the green economy, research in this field should no longer focus on electric vehicle technologies seen in isolation from the rest of the transport system: a massive introduction of the technology requires the availability of smart electricity grids and intelligent vehicle charging systems tailored to customers' needs. Lightweight materials for vehicle applications (joint call) and socio-economic research are also among the issues included in this area.

GC.SST.2012.1-1. Innovative advanced lightweight materials for the next generation of environmentally-friendly electric vehicles

CP-IP - Call: FP7-2012-GC-MATERIALS

Content and scope: Research proposals should focus on the development of advanced materials for cars and light-duty commercial vehicles, contributing to an accelerated market introduction of new energy-efficient electric vehicles, while ensuring sustainability and viability by rapidly achieving the appropriate economies of scale. The research proposals should address also several of the following issues or all of them:

- Reducing the structural weight, e.g. by deploying light alloys, thermoplastics, fibre-reinforced polymers, composites, honeycombs, foams, advanced steels and tailored, multifunctional materials into the body parts, chassis and heavier interior systems, and including e.g. optimisation of structural layouts, multi-functional design, numerical simulation, testing, prototyping and/or manufacturing processes. Standardisation issues should be considered.
- Exploiting new materials characteristics in association with the innovative structural layouts made possible by new electric vehicles, in order to improve safety by enhanced energy absorbing capability. For instance, this could allow to better deal with asymmetric crash conditions (opponent of higher size and weight) in the case of very light vehicles. Fire resistance of the proposed advanced materials should be taken into account, where appropriate.
- Addressing related production process challenges, in particular developing suitable forming and joining technologies, to guarantee reliability, robustness and safety (e.g. guaranteeing that crash performance as tested does not degrade over time), reducing the cost of assembly while permitting a wide range of vehicle variants.
- Assessing the performance of the behaviour of the advanced materials and the respective components and systems under typical operational and extreme loading conditions (e.g. with respect to durability and safety) and external environment (e.g. for corrosion resistance), including the potential for accelerated lifetime testing while ensuring reliability.
- Carrying out of an appropriate life-cycle analysis of the advanced materials and the respective components and systems, including appropriate dismantling and recycling technologies; for brand new materials, a recycling method should be outlined with appropriate lab-scale experimental part.
- Carrying out an economic analysis, including material resources availability and cost that demonstrate the real advantages of the new materials over conventional ones. Trade-offs between the extra cost of lightweight design and possible gains from lower lifetime costs for energy consumption and emission of vehicles should also be assessed.

While the focus of the proposal should be on electric cars, the potential for synergies with other types of environmentally-friendly vehicles or the cabs of heavy-duty vehicles can also be taken into account.

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

Proposals may 1) include research results validation and the physical demonstration of the performance achieved with the innovative advanced material(s), e.g. even via a complete body in white or vehicle demonstrator, or 2) consist of a focussed research limiting validation of the innovative advanced material(s) at substructure level.

Specific Features: The proposed projects should not duplicate similar FP6 or FP7 projects, e.g. projects funded under the FP7 European Green Car Initiative. Coordination or ex-ante clustering with projects in topic GC.SST.2012.1-4 can be foreseen.

Additional Eligibility Criterion: The EU contribution per project must be at least EUR 4 000 000 and must not exceed EUR 10 000 000.

Expected impact:

- i. Considerable weight reduction: a 30% body in white weight reduction was already demonstrated in recent EU projects on conventional vehicles; a further 20% reduction (taking into account the higher acceptable cost) is to be demonstrated, with the relevant safety, energy efficiency and environmental benefits; and/or
- ii. Overall reduction in time-to-market and development costs while increasing product flexibility; and
- iii. Economic viability and technological feasibility of the advanced materials and the related processes with reference to real applications of industrial relevance; and/or
- iv. Options for the use of globally available, recyclable or recycled, and carbon-neutral materials; and/or
- v. Extended lifetime of durable components of a vehicle and lower life-cycle costs.

GC.SST.2012.1-2. Smart infrastructures and innovative services for electric vehicles in the urban grid and road environment

Level 1 - CP-FP - Call: FP7-SST-2012-RTD-1

Contents and scope: With the advent of new electrified vehicles (EV) for application in the urban environment, a significant need exists to drastically improve the convenience and sustainability of car-based mobility. In particular, research should focus on the development of smart infrastructures, and innovative solutions which will permit full EV integration in the urban road systems while facilitating evolution in customer acceptance.

Within this context, activities will focus on:

- Investigation into alternative, innovative solutions for recharging stationary EV minimising risks deriving from vandalism (e.g. inductive charging).
- Study of on-route charging technologies which would increase the vehicle range while reducing the size of on-board energy storage systems.
- Development of innovative location based Demand Management systems by means of intelligent systems integrated in both EV and charging stations that can communicate and manage adaptively the charging process autonomously, if necessary, or taking into account the priorities of the user-grid.
- Development of data security standards and crypto measures to ensure privacy protection.
- Intelligent coordinated systems (micro-grids) that balance the simultaneous demand of a given geographically location (multiple, slow and fast charging EV combined with other electric consumers) with policies that prioritise emergencies, security of the net, minimal autonomy for all the elements, etc., and that can also coordinate with neighbouring micro-grids and upper level electric grid control.

Projects may address these issues by technology development and demonstration from a technological perspective while focusing on business case analyses and impact studies demonstrating the feasibility and viability of the proposed solutions across a wide-range of operational situations.

The work should take into account projects running under the TEN-T programme, on going research projects (e.g. ELVIRE, SmartV2G and PowerUP) and those resulting from the call 'GC-ICT-2011.6.8 ICT for fully electric vehicles dealing with vehicle to grid issues' and 'ICT- PSP-2011.1.3. Smart Connected Electro-Mobility'. It should also take into account the standards being developed by the European standardisation organisations (CEN-CENELEC and ETSI TC ITS) in this area.

This topic is complementary to the Topic Energy.2012.8.8.1: Strategic sustainable planning and screening of city plans (FP7-ENERGY-SMARTCITIES-2012), which supports the implementation of the Smart Cities and Communities Initiative⁵⁹ of the SET-Plan. In this context, the European Commission may ask the projects, during the negotiation, to establish strong links, where appropriate, with the projects funded under the topic Energy.2012.8.8.1 as well as with other relevant R&D projects at EU, national or regional level.

Expected impact: The proposed solutions should demonstrate the enhanced attractiveness of electric mobility, both in terms of convenience and reduced total cost of ownership, while showing how they ensure a correct relationship with the electric supply network and its requirements, as well as the economics of the needed investments.

GC.SST.2012.1-3. European strategy for rare materials and their possible substitution

Level 2 - CSA-SA - Call: FP7-SST-2012-RTD-1

Possible limitations of lithium for advanced energy storage systems have recently been discussed at length, and will be subject to research on battery cells. Mass production of electric vehicles however will also strengthen the demand for some other essential materials that are not abundant, or of limited supply, for European companies, primarily for electric and electronic components. Examples include rare earths, such as neodymium, and noble or other scarce metals. Essential for motors, neodymium-iron-boron alloys are the strongest permanent magnets available on earth. The reserves of neodymium are about 8 million tonnes. However, the world production is about 7 000 tonnes per year, 97% of which being concentrated in China. Also the demand for more common metals with appropriate conductive and electrolytic capabilities will increase: cobalt and nickel are used as electrode materials in storage cells, or gold, silver, palladium for any kind of electronic circuits, indium used in transparent electrodes of liquid crystal displays and touch screens, etc.

Content and scope: The development of new technologies for the electric vehicle needs to be complemented by developing a European strategy for rare materials and their possible substitution.

⁵⁹ <http://setis.ec.europa.eu/about-setis/technology-roadmap/european-initiative-on-smart-cities>

The Support Action will focus on the following:

- Prediction of the long term needs of the European electric vehicle industry for strategic materials.
- Access to alternative supply.
- Alternative materials and technologies for electric traction and energy storage.
- Options to replace rare earth materials by new electro magnetic systems (motors, driver electronics, sensors, etc.).
- Recycling and reuse options.
- Economic, social and environmental risks of shortages.
- Political situation and development of solutions at a global scale.
- Assessment of the total landed cost associated with the use of new materials.
- Options for ensuring sufficient resilience for a given level of efficiency of the supply chain of new materials.

The above aspects should be covered only to the extent necessary in relation to existing EU level initiatives in order to ensure complementarity and to minimise duplication. During negotiations, complementarity with work performed in response to topic ‘NMP.2012.4.1-4. Substitution of critical raw materials: networking, specifying R&D needs and priorities’ will be ensured.

Expected impact: A small and well focussed project within the European Green Cars Initiative that includes input from all relevant stakeholders, which will deliver a materials roadmap and recommendations for strategic plans to solve the specific long-term materials issues for the Electric Vehicles sector.

GC.SST.2012.1-4. Modelling and testing for improved safety of alternatively-powered vehicles

Level 2 - CP-FP - Call: FP7-SST-2012-RTD-1

Contents and scope: Modelling tools and testing procedures have a fundamental role to play to ensure that future Electric Vehicles not only respect current and future safety requirements, but balance this with performance and reliability on one hand, and light-weight, production feasibility and cost on the other. Activities will focus on the development and experimental validation of numerical simulation and physical testing methodologies, and on the application of such tools in order to:

- Investigate solutions for improving the crashworthiness and performance of future generation alternatively-powered vehicles and their constituent components and sub-systems which may be critical from a safety and reliability perspective (e.g. batteries and high-pressure storage tanks). In particular, to improve pedestrian protection and vehicle-to-vehicle compatibility in case of crash with larger and heavier opponents and keep into account slightly different angles of impact to validate performance beyond current EURO-NCAP tests.
- Develop evaluation criteria with regard to injury prevention of occupants of electrical and light-weight vehicles.
- Analyse the weight saving potentials of new safety oriented structural designs.
- Verify technological feasibility and economic viability of the solutions proposed.

Implementation and management: To achieve practical demonstration and validation, coordination or ex-ante clustering with projects in topic GC.SST.2012.1-1 (Innovative advanced lightweight materials for the next generation of environmentally-friendly electric vehicles) would be preferred.

Expected impact: Projects should demonstrate that the advanced modelling and testing tools can be used to ensure improved performance in terms of combined injury prevention, safety in asymmetric crashes (in terms of height and weight) and low environmental impact of next generation alternatively-powered vehicles at an acceptable cost, while fostering the constitution of interdisciplinary consortia (academia, research and testing centres, supply industry, vehicle manufacturers, SMEs, etc.).

GC.SST.2012.1-5. Integration and optimisation of range extenders on Electric Vehicles

Level 2 - CP-FP - Call: FP7-SST-2012-RTD-1

Although Electric Vehicles are able to cover almost 80% of average travel needs, the residual need of many vehicle users for occasional longer distance travel means that range-extended electrified vehicles provide an important path towards increasing the market penetration and customer acceptance of electrified vehicles, by relieving the so-called “range anxiety”.

Contents and scope: The focus of the research will be on developing and optimising the concept of the fully-integrated, range-extended, electrified light duty vehicle which will offer both significantly reduced impact on the environment and long range capability. The aim is to optimise the integration and control of the electrified vehicles equipped with a range-extender while ensuring that the range in pure-electric mode, typically charged using the grid, is sufficient to cover average daily mileage.

The activities should address the following issues:

- Optimisation of the ICE used as the range extender and of its after treatment system.
- Impact on optimal battery capacity.
- Advanced control strategies.
- Modularisation.
- Performance, safety, recyclability and cost.
- Characterisation, standardisation and synergies with other applications.

The activities should not focus on the development of the range-extender engine itself, nor of electric machines, which were already addressed in previous calls.

Expected impact: With respect to the 2020 Emission Regulation targets for urban cars and low cost Near Zero Emission Vehicle, the expected impact has to be motivated in terms of:

- Overall performance, particularly in terms of the expected CO₂ emissions reduction of the range-extended EV.
- Safety, recyclability and life-cycle sustainability.
- Helping European automotive industry to maintain world-class status.

GC.SST.2012.1-6. Advanced energy simulation and testing for Fully Electric Vehicles (FEV)

Level 2 - CP-FP - Call: FP7-SST-2012-RTD-1

Contents and scope: Advanced modelling tools and testing procedures (from one-dimension to three dimensional approaches) have a fundamental role to play in optimising during the earliest project phases both the energy dimensioning of FEV and their “energy management strategies”. They reduce project development lead-time and are used to build-up requirements for subsystems and their related control units. Research will focus on the development and validation of numerical simulation, virtual prototyping and physical testing and on the application and standardisation of such tools in order to:

- Investigate solutions for improving the efficiency and performance of future generation EV and their constituent components and sub-systems that may be critical from the energy efficiency point of view. The development of these systems is however excluded.
- Assess the effect of different subsystems solutions, in terms of energy efficiency and related increase of autonomy, on different specific real life driving cycles, which will take into account traffic constraints, road slope evolution, etc.
- Verify the technological feasibility and economic viability of the advanced solutions proposed.

Implementation and management: Projects should have interdisciplinary consortia (academia, research and testing centres, supply industry, vehicle manufacturers, SMEs, etc.), and work should be complementary to projects funded under previous calls of the EGCI, national or ERANET+ schemes.

Expected impact:

- Projects should demonstrate that the advanced modelling and testing tools can be used to ensure improved energy efficiency and performances of the next generation EV and HEV by taking into account all the real constraints, at an acceptable and assessed cost.
- Reduction of testing time for life cycle testing up to 50% using new test methodologies.
- New test methods for identification of second life applications together with battery qualification and testing for these applications.
- Real world testing of batteries on the test bench instead of field testing: combination of mechanical, thermal and electrical load.
- Reduced development time and improvement loops for battery systems by combined testing and simulation methods.
- Increased reliability and durability as well as reduced validation time.

GC.SST.2012.1-7. Demonstration of Urban freight Electric Vehicles for clean city logistics

CP - Call: FP7-TRANSPORT-2012-MOVE-1

Content and scope: The objective of the project is to demonstrate logistic solutions with electric vehicle applications to optimise urban logistics efficiency to improve transport flow management and reduce environmental impact in urban areas. Fleets are expected to include autonomous road vehicles with differing drive-train technologies, provided that electricity for the electric drive can be taken from the grid. The project time-frame should consider the latest technological developments in EU-funded or national and regional programmes. Fuel cell

electric vehicles are not included here, as they are covered by the Fuel Cells and Hydrogen JTI. The project will address the following issues:

- Assessment of the state of the art of city freight movements and development of new governance models, based on real and close co-operation between public bodies, retailers and distributors. These can be used in order to deploy sustainable policies able to assure environmental improvements with economical sustainability.
- Demonstration of urban and logistics solutions with electric vehicle fleets with the aim to validate the feasibility of logistics solutions on the basis of electric vehicle applications.
- Demonstration of required ICT for final users and fleet managers.
- Assessment of public acceptance of demonstrated new delivery systems.
- Assessment of the impact on urban transport and delivery market such as size of deliveries, frequencies and vehicle types.
- Assessment of the impact on energy, environment, overall efficiency and cost.

Implementation and management: A typical consortium will include cities, logistics fleet operators, vehicles and equipment manufacturers, utilities, research centres and universities. 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. This demonstration project should take into account the first results of projects under topic GC.SST.2011.7-5 (Urban – interurban shipments).

Expected impact:

- Optimisation of urban logistics efficiency to improve transport flow management and reduce environmental impacts (noise, CO₂ emissions and pollutants) as well as typical congestion in urban areas.
- Contribute to the clarification of the safety, economic and technical viability of electrical vehicles for clean city logistics applications.
- Input for further deployment of clean logistics systems technologies through the European Investment Bank instruments.

Area 7.2.7.2. Research for heavy duty vehicles for medium and long distance road transport

Research will primarily concentrate on increasing the efficiency of vehicles by energy management, aerodynamics and low rolling resistance, as well as on eco-driving and innovative truck designs. A demonstration action on heavy duty vehicles running with liquefied methane is also included.

GC.SST.2012.2-1. Extreme low rolling resistance tyres

Level 1 - CP-FP - Call: FP7-SST-2012-RTD-1

Contents and scope: The objective of research is to develop an innovative tyre concept that will reduce the rolling resistance without compromising performance, safety and cost (e.g. wet/low temperature performance, mileage, reliability, noise) for both steering and trailer tyres. Load capacity should be maintained or improved. Interaction with the road surface should be considered and appropriate parameters for maximum effectiveness (rolling resistance, braking and road holding, abrasion of tyre and surface, etc.) and robustness of the

designed tyre for good performance on the widest possible variety of EU pavements should be defined in cooperation with infrastructure stakeholders.

The activities will address the following aspects:

- Design of new tread pattern for reduced rolling resistance.
- Modification of chemical composition of the tyres. Show the potential of nano-technologies.
- Smart solutions for tyre pressure, temperature and condition monitoring/adaptation systems.

Implementation and management: Strong interdisciplinary consortia should ensure cooperation involving both tyre and road experts to define the above mentioned optimal design parameters for both tyre and road surface.

Expected impact: The project should demonstrate the maximum potential for low rolling resistance tyres.

GC.SST.2012.2-2. Complete vehicle energy management

Level 2 - CP-IP - Call: FP7-SST-2012-RTD-1

Content and scope: The overall aim for the research is to develop and assess technologies for efficient vehicle energy management. Auxiliaries today consume about 6-7 KW for a typical long-distance application. Different driver types have significant (10-15%) influence on energy consumption. New drive line technologies such as stop and go, mild hybrid and full hybridisation, combined with energy scavenging concepts, will make energy available from several different sources. This will give rise to complex inter-relationships between the different auxiliaries and their use within the different truck applications, but they also provide possibilities to balance the power demand.

All subsystems and configurations should be considered, both energy consumers and producers/converters. Driver demand should be interpreted and influenced through a driver coaching system, taking into account the current mission and available pre-view information like e-horizon, V2V and V2I information (development of these applications is however excluded). Energy losses (electrical, friction and aerodynamics) at subsystem level should be reduced or harvested. This should be achieved without compromising overall performance or safety. Research will address the following aspects:

- Optimised power management and distribution including energy balancing with respect to efficient electrical power generation, conversion, distribution and buffering to different systems.
- Optimised control of electrified auxiliaries and synergies for cooling performance including the optimisation of all configurable vehicle parameters with respect to transport mission and pre-view information, so that real-time power balancing can be achieved.
- Advanced vehicle aerodynamics through the application of best practice and standardised methodologies for aerodynamic simulation and analysis to optimise the aerodynamics of the whole vehicle combination without compromising the operational efficiency of cargo handling. The potential for improvements through platooning or convoying (vehicle-to-vehicle control and communication) while assessing issues related to safety, dedicated new infrastructure requirements and costs, taking into account results of previous projects.

- Reduced friction between moving parts in all vehicle sub-systems, including the application of new roller bearing concepts, novel lubricants and development of simulation techniques for further reduction of energy losses;
- Energy recovering/scavenging/harvesting and optimisation of external energy supply , e.g. quick energy charging stations;
- Driver Support (eco-driving/driver-coaching): Integrate the results from ongoing research activities (e.g. eCoMove and FREILOT) so the driver is taken into account in the vehicle energy optimisation strategy.
- Creating an energy efficient work environment for the driver including the design of the cab, its interior systems and materials. Aspects such as weight reduction, insulation materials, reflective coatings for glass, new thermally reflective paint technologies and other intelligent materials, should be considered.

Implementation and management: Complementarity with work already underway on the mentioned topics at national or EU level should be demonstrated.

Expected impact: The project should demonstrate the potential for improved energy efficiency and the economic viability of advanced complete vehicle energy management concepts.

GC.SST.2012.2-3. Demonstration of heavy duty vehicles running with liquefied methane

CP - Call: FP7-TRANSPORT-2012-MOVE-1

Content and scope: The overall objective is to perform a large-scale demonstration in order to facilitate a broad market development for heavy duty trucks running with liquefied methane. The specific objectives for the project should be:

- To optimise the complete powertrain and storage system of LNG heavy duty vehicles with respect to energy efficiency and pollutant emission, by fully utilising the technical potential of liquefied methane in an optimised fuel-engine system. The project should take into account the work of complementing projects such as GREEN, INGAS and any other developing similar technologies and should address all the key components of LNG powertrain including:
 - High performance heavy duty natural gas engine including injection systems, aiming at efficiency close to that of current diesel engines.
 - Low temperature after-treatment systems for heavy duty natural gas engines, to abate in particular NO_x and unburned methane emissions, to comply with post-Euro VI requirements.
 - Liquefied natural gas tank systems including boil-off treatment or high volumetric efficiency solid state compressed natural gas storage systems.
- To analyse data from current pre-commercial demonstrations, and to perform additional demonstrations in different environments, in order to facilitate a market development for heavy duty vehicles running medium and long distances with LNG.
- To carry out benchmarking and assessment of the different vehicles technologies, where needed by coordinating with existing projects at EU and national level, including full safety assessment.

- To evaluate energy efficiency, costs, performance, environmental benefits and durability of heavy duty vehicles running on LNG under different climatic, geographic and traffic conditions.
- To provide recommendations for the development of relevant standards, in particular for the homologation of LNG heavy duty vehicles and refuelling stations.
- To demonstrate a LNG distribution system by road tankers as a means of distribution of LNG to refuelling stations available in different parts of Europe.
- To provide recommendations for cost-efficient and safe distribution network and refuelling stations for liquefied methane.

Implementation and management: The project should involve cooperation between heavy duty vehicle manufacturers, fuel suppliers, fuel distributors and fleet operators, including trucks and buses. The heavy duty vehicles demonstration should be carried out in at least three Member States, and should be complementary to existing demonstrations running at national level. The project should include a first definition of European LNG Blue Corridors, with strategic LNG refuelling points which would help to guarantee LNG availability for road transport in a simple and cost effective way. The demonstration part of the project should help to improve the knowledge and general awareness of LNG as alternative fuel for medium and long distance road transport. The project should also serve to remove the existing barriers for heavy duty vehicles running on LNG.

Expected impact:

- Oil substitution through the use of alternative fuels, namely liquefied methane (LNG).
- Reduction of GHG emission from transport using liquefied methane as fuel in heavy duty vehicles.
- Market development for heavy duty vehicles running with liquefied methane.
- Increase of energy efficiency of heavy duty natural gas engines to the level of the current diesel heavy duty vehicle engines.
- Achievement of EUROVI standard for LNG heavy duty vehicles.

Area 7.2.7.3. Logistics and co-modality

Logistics and co-modality combined with intelligent transport system technologies are essential to optimise the overall system efficiency and sustainability, avoiding, for example, that empty trucks circulate on highways due to sub-optimal logistics. In this respect, smooth and co-operative interactions between the different transport modes will be essential. In order to enhance coordination and create synergies, research proposals addressing this area should be aware of research activities resulting from ‘Objective ICT-2011.6.6 Low carbon multi-modal mobility and freight transport’ of ‘Theme 3 ICT – Information and Communication Technologies’.

GC.SST.2012.3-1. Towards sustainable interconnected logistics - development of standardised and modular solutions for freight transport vehicles, loading units and transshipment equipment

Level 1 - CP-FP - Call: FP7-SST-2012-RTD-1

Content and scope: Efficient load units are absolutely key in improving transport of goods, their storage and handling across the consumer driven supply chain process. Manufacturers, retailers and transporters can benefit from committing themselves to a set of driving principles and must address the physical component of seamless interconnected logistics, focusing on the development of standardised and modular solutions for freight transport vehicles, load units storage, handling and transshipment equipment. Research will specify, demonstrate and recommend a standardised set of load unit sizes and functionalities along with the associated information and protocols to route them through the logistics networks across the EU and the world. It will impact fields such as logistics networks, transportation, material handling, supply chain, production, sourcing and distribution strategies. Solutions should follow the “well-to-wheel” approach looking at all elements of the logistics chain, i.e. the transport, storage, warehousing from the early stages of the production process till the last transport and distribution activity. Research will evaluate the impact of a new standardised iso-modular units approach for logistics down to the last km on the revenues and business models for the various stakeholders. It is possible and encouraged to build relationships with research programmes from other continents to help build the international framework required to promote a worldwide solution.

Expected impact:

- A multiscale standard set of logistic units will lead to breakthrough asset utilisation with a dramatic decrease in cost and carbon footprint of supply chains (by a factor 4 or 5).
- Facilitate the integration of today’s independent supply chains, overcoming current physical barriers to collaboration.
- Enable a completely new interconnected logistics organisation to be achieved. This new organisation, similar to the Internet, with its standardised and shared resources, will itself be an enabler for improving services, increasing productivity, reducing the environment footprint of logistics by better use of transport means and encouraging a shift to cleaner ones, improving quality of life in urban areas, as well as the quality of logistics jobs, and providing a stimulant for breakthroughs in logistics innovation.

GC.SST.2012.3-2. Improve capturing and sharing of transport data in support of innovative freight transport schemes

Level 2 - CP-FP - Call: FP7-SST-2012-RTD-1

Contents and scope: Better information on freight flows and the performance of freight transport systems is needed in order to improve the performance of the European transport system and to support business and policy decisions. The focus of research is on generating and sharing information among shippers, transporters and logistic service providers and other stakeholders which allow them to make more rational decisions on the use of vehicles. This can improve the load factor of vehicles and hence reduce the number of freight movements.

Research will consider:

- The development and demonstration of an innovative data gathering methodology.
- Opportunities for improvements in interfacing between data collection and company transport IT systems.
- Cross-fertilisation of best practice in freight data collection between countries.
- Correction of current statistical anomalies and filling in data gaps.

Implementation and management: Results of previous EU projects, such as WORLDNET, FREILOT, EURIDICE and TRANSTOOLS will have to be taken into account.

Expected impact:

- Authorities and companies will have access to more accurate and timely information, allowing the demonstration of the feasibility of new policies and business strategies, with the aim to increase a more efficient use of the transport infrastructure and transport means.
- Better knowledge about the seamless freight transport system to help benchmark market size, structure and trends.
- Adoption of statistical surveying systems and new data acquisition methodologies and estimation techniques at European level covering urban, regional, national and international freight transport.
- Development and testing of simulation tools for implementing new and efficient transport schemes.

GC.SST.2012.3-3. Platform for continuous intermodal freight transport strategic research and innovation

Level 2 - CSA-CA - Call: FP7-SST-2012-RTD-1

Content and scope: The objective of this coordination action is to stimulate discussion and consensus-building amongst main public stakeholders, market players and researchers in the intermodal and freight logistics domain to turn knowledge and research into investment in innovation. The coordination action will address the following:

- Raising the profile and understanding of new intermodal and freight logistics technologies and business processes.
- Identifying policies, regulatory measures, financial mechanisms and socio-economic aspects that are required in support of their market penetration.
- Encouraging greater involvement in and acceptance of innovations in the public as well as private sector.

Implementation and management: Related initiatives in the area, such as the Intelligent Cargo Forum and Logistics4Life will have to be taken into account.

Expected impact:

- Assessment and consensus building amongst, and between, industry and authorities on intermodal logistics market developments.
- Identification of standardisation, harmonisation and innovation requirements.
- Accelerated exploitation of research results and innovations in the domain of intermodal and freight logistics.

GC.SST.2012.3-4. Green hubs enabling co-modal network design

Level 2 - CP-FP - Call: FP7-SST-2012-RTD-1

Content and scope: An efficient and seamless European transport system depends on efficient hubs or nodes that enable multimodal interconnections. The focus of the research will be on co-modal network design and supply chain visibility. Activities will address the conditions and drivers for integrated terminal networks and quality standards, taking into

account the potential of innovative control and coordination mechanisms for co-modal transport. In particular, research will address the following:

- The integration of terminal networks within the supply chain, across borders of Member States and with continental transport networks, removing administrative bottlenecks for the enhancement of co-modal transport links.
- The conditions and requirements for inland terminals to participate in seaport hinterland terminal networks.
- Definition of critical Key Performance Indicators (KPI) for integrated terminal networks and their supply chains.
- Definition of innovative value added services at intermodal terminals within or across various intermodal terminals, facilitating cooperation amongst terminal service providers and between terminal services providers and their clients, increasing overall supply chain visibility.
- An analysis of the most effective forms of governance of the network from the EU or regional policy perspective as well as that of business venture.
- An agreed methodology to assess the economic and environmental impact on a wider European network scale of individual nodes.

Expected impact: Improved interconnectivity and interoperability in co-modal networks will lead to:

- Increased productivity of the European industry, including transport operations, terminals and logistics services.
- Reduced congestion, as freight assignment will be more flexible depending on the situation at hand in the different modal networks.
- Enhanced environmental performance of integrated network.
- Quality standards and increased performance of the freight system towards the end consumer, making supply chains more responsive, customisable and robust.

7.3. HORIZONTAL ACTIVITIES FOR THE IMPLEMENTATION OF THE TRANSPORT PROGRAMME

I.3. CONTEXT

The Transport (including Aeronautics) theme aims to support a number of topics that exploit the synergies between air transport and the surface transport modes and that can make a contribution to strategic research and innovation priorities for 2012-13, which, as explained in the introduction to this work programme (section I.0.2), will focus around the following socio-economic challenges: 1) eco-innovation through decarbonisation and efficient use of natural resources; 2) safe and seamless mobility; and 3) competitiveness through innovation.

This section of 'Theme 7 Transport (including Aeronautics)' is not formally structured in activities and areas according to the Specific Programme⁶⁰. Nonetheless, for the sake of clarity, the topics proposed for the 2012 call of the transport horizontal activities (FP7-TPT-2012-RTD-1) are presented accordingly with the major strategic objectives of these horizontal activities. Three domains have been established:

1. Socio-economic research and technology foresight.
2. Integration of transport modes and cross-cutting research.
3. Strengthening the European Research Area, encouraging participation, and fostering innovation.

Potential proposers' attention is drawn on the need in this call to address cross-modal concerns that are common, or of interest, to more than one transport mode.

In addition to the topics included in these domains of this TPT call, other topics on socio-economic research and cross-cutting issues have been included in the AAT and SST chapters of this 2012 Transport Work Programme, which can be found in the table of contents of this Work Programme.

II.3. CONTENT OF CALL FOR 2012

II.3.1. Socio-economic research and technology foresight

TPT.2012.1-1. Forum to help implement the future orientation of the overall transport system as defined by the White Paper⁶¹

CSA-SA - Call: FP7-TRANSPORT-2012-MOVE-1

⁶⁰ Council Decision 2006/971/EC of 19 December 2006 concerning the Specific Programme "Cooperation" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013) (OJ L 400, 30.12.2006, p.86).

⁶¹ COM(2011) 144 final - Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system

Content and scope: Transport is a series of systems comprising many actors covering areas such as research, technology, planning and scheduling, operations, energy, infrastructure, authorities at local, national and EU level, etc. Reaching the ambitious objectives of the transport sector as defined in the White Paper on Transport will demand a change of the direction of the overall transport system. This will require all involved actors moving jointly towards the same goals. The Commission therefore proposes to set up a forum to foster discussions and joint actions between actors. This action will:

- Identify relevant actors to be involved in the Forum.
- Select at least 3 relevant topics in line with goals of the White Paper. Notably goals 1, 3, 4 and 8 of the White Paper require concerted action of stakeholders and the activation of different policy measures⁶².
- Organise meetings and working groups with actors on identified topics to discuss and propose joint recommendations and potential roadmaps for their implementation.

The Forum and its working groups should give special attention to the research and innovation activities, in addition to any coordination and support measures needed, to meet the goals of the White Paper. Of particular relevance is the target for the transport sector to reduce GHG emissions by 60% below 1990 levels by 2050.

Implementation and management: Activities funded under this topic would liaise and co-ordinate as appropriate with on-going related activities (e.g. Technology Platforms, 'European Green Cars Initiative' and 'eSafety Forum') and should help implement the 'Strategic Transport Technology Plan'.

Expected outputs and impact:

- A forum for actors representing the whole transport system and relevant stakeholders to discuss how to achieve relevant goals defined in the White Paper.
- Recommendations and roadmaps based on inputs from stakeholders on joint actions required to meet these goals.
- A detailed strategic outlook into the future European transport system envisaged by the White Paper, influencing the development of concrete policy proposals.

TPT.2012.1-2. Transport infrastructure impact on international competitiveness of Europe

CSA-SA - Call: FP7-TPT-2012-RTD-1

Content and scope: This action will analyse qualitatively and quantitatively the relationships between transport infrastructure, competitiveness and economic growth. The links between infrastructure investments and the impacts on economic growth have been the subject of e.g. new economic geography, but they have not been understood in depth in relation to the assessments of different investments. When such impacts are not included in assessments, there is a tendency to underestimate the value of the investment. There is thus a need to better understand the relationships, and to quantify the impacts on competitiveness and economic growth as well as to be able to include them into the assessment methodologies.

⁶² Page 9 of the White Paper.

Implementation and management: Activities funded under this topic should be aware of the current transport policy developments (e.g. 2011 Transport White Paper, ‘Strategic Transport Technology Plan’) and other related policy initiatives that may affect this analysis.

Expected impact: This action will provide a better understanding of the relationships between transport infrastructure, competitiveness and economic growth. It will help policy-making, particularly for the comparison of policy interventions to promote the competitiveness of Europe.

TPT.2012.1-3. Prospects for transport evolution: challenges for the competitiveness of the European transport sector in the long term

CSA-SA - Call: FP7-TPT-2012-RTD-1

Content and scope: The time scale for research and innovation cycle in the transport sector, as well as the time in service of aircraft, trains, vessels and infrastructure is measured in decades. A long term forward-looking activity has to be developed aiming at exploring and trying to anticipate key drivers of change and the related socio-economic aspects, which will affect the competitiveness of the European transport sector. This support action should focus on the following issues:

- Assessing the present situation of European transport research per mode regarding e.g. the impact of European transport-related policies on the global competitiveness of the European transport industry.
- Evaluating the impact of upcoming innovations on the global competitiveness of European industrial sectors.
- Analysing the demand and market drivers for new products and services related to the transport sector taking into account possible constraints (energy, raw materials and environment).
- Developing identified scenarios at successive time horizons for 2030 and beyond, while taking into consideration different societal trends and challenges.

Implementation and management: Activities funded under this topic would liaise and co-ordinate as appropriate with pertinent activities of Transport-related national/European Technology Platforms and other relevant activities.

Expected impact: This support action will provide a better understanding of the global position of the European transport industry and the definition of strategic options for European transport research policy, in a context where efficient technologies and operational measures are needed to help reduce drastically, or even eliminate, greenhouse gas emissions and other environmental impacts, as well as confronting serious constraints coming from the scarcity of raw materials and energy, and meeting societal challenges such as ageing, land use or urban mobility.

II.3.2. Integration of transport modes and cross-cutting research

TPT.2012.2-1. Strategic high-level transport model

CSA-SA - Call: FP7-TRANSPORT-2012-MOVE-1

Content and scope: The Commission has put an important emphasis on the development of transport models in previous Framework Programmes. The latest transport model developed for the Commission was TRANSTOOLS, which is a detailed European network model, currently being updated as version 3. Besides analysis at a very detailed level using TRANSTOOLS and TREMOVE, the Commission wishes to develop a high-level strategic transport model to scan transport policy options.

This action should provide an IPR-free tool comprising passenger and freight transport for EU27 as well as all relevant components of transport modelling for the assessment of economic, social and environmental impacts of broad transport policy options. Relevant input parameters and output indicators will be defined. Key is to determine a comprehensive set of output indicators based on the Impact Assessment guidelines of the Commission and based on which policy options can be assessed.

The tool will contain equations and elasticity developed in previous or ongoing research projects. The goal is to group and combine all known and relevant relations between policy and the transport system to develop a comprehensive and reliable strategic modelling tool. The tool will be broadly consistent with TRANSTOOLS and TREMOVE and enable comparison with the reference scenarios of these models. Moreover the tool will be validated by means of statistics and case studies. The tool will be user friendly and accessible for non-experts, possibly built on Excel.

Expected impact: This action will provide better basis for decision making for overall transport policy decisions. It will allow for quick scan of policy options for pre-impact assessment use. Retained policy options would subsequently be subject to more in-depth analysis using more detailed models. The action would use the new tool in collecting all necessary data and relevant parameters, and develop criteria to enable comparisons.

TPT.2012.2-2. Reduction of the vulnerability of the European Transport System to extreme weather events and natural disasters

CSA-SA - Call: FP7-TPT-2012-RTD-1

Content and scope: Our society and economy depend on the availability of efficient transport systems. The recent events and impacts of the volcanic eruption in Iceland and winter heavy snowfalls show that our air transport system and decision models are not sufficiently robust to cope with such unforeseen events. Additionally, our surface-based transport systems are unable to provide adequate alternatives or cannot supply the required capacity within a short reaction time. The reliability and resilience of the European transport system need to improve so that it can react quickly to such emergency situations.

Crisis handling models and decision support tools have proven to be very strict and understanding of the interactions insufficient (e.g. between aircraft and volcanic ash). The induced risk is resulting in loss of recovery time and unnecessary delaying the restart of the transport system. The legislative framework - European and national - are being interpreted in various contradictory ways, leading to considerable passenger discomfort resulting from major delays. The impact on society and the economy of these failings has been unprecedented and enormous.

In order to be better prepared for the possibility of such major disruptions in the future (whose frequency seems to increase due to climate change), a study should analyse and rank the research topics and policy options which might help to reduce the vulnerability of the transport systems in both short and longer term. The study should identify issues and possible solutions in the following areas to improve future readiness of the transport systems:

- The organisational and decision making structure.
- The technical options and possibilities to reduce the impact.
- The procedural and operational options to mitigate the risk.
- Information flow, ICT support (e.g. monitoring by satellites) and passenger services.
- Decision and risk models.
- Transfer and exchange between transport modes (cross-modality).
- Speed of reaction of different transport modes.
- Legislative structure.

Implementation and management: Work packages should be prepared and implemented taking into account the previous work carried out on this subject (e.g. EWENT, WEATHER). Activities could liaise as appropriate with project(s) funded under SST.2012.2.4-2. International cooperation is particularly encouraged in this activity either with international cooperation partner countries and/or other third countries (e.g. USA, Japan).

Expected impact: As a result the study will identify the major options needed to reduce vulnerability to natural disasters and present roadmaps towards increased robustness of existing systems. It will also indicate new mechanisms by which transport systems could better interact, or provide alternatives for major passenger flows and rapid diversions of these. The study will list the available options that can be implemented within short timeframes, as well as those topics that require a more in depth and longer term study. It will also help support policymaking for efficient planning, construction and maintenance of transport infrastructure at local, regional and European level.

II.3.3. Strengthening the European Research Area, encouraging participation, and fostering innovation

TPT.2012.3-1. Fostering innovation for trans-national cooperation in European transport research and promoting active participation of stakeholders in European research calls and projects

CSA-CA - Call: FP7-TPT-2012-RTD-1

Content and scope: This action will explore possible innovative routes for improving trans-national cooperation in transport research at the operational level (including National Contact Points - NCPs). It will facilitate the operational coherence of research activities in Europe taking into account actions and calls at the level of EU Research and Innovation programmes, ERA-NET, ERA-NET Plus, possible Joint Programming Initiatives, etc. One of the main objectives of this coordination action is to raise awareness and give support to national/regional research stakeholders in order to identify and cross-link partners from other MS/AS with a view to build trans-national consortia for the participation in the above mentioned actions and research calls. One area where all these elements come together is the leverage effect of EU funds. Given the limits of EU funding, the role as a 'seed' for public

and private investment to develop innovative technologies and services becomes more important. The action should also help overcome barriers to further integration of transport research and innovation in Europe and suggest further actions that could be supported by the Commission. This action should also help develop a set of harmonised high quality operating tools to promote partnering, transfer of good practices at operational level, brokerage events, benchmarking, training, coaching and other possible measures to enhance the potential and participation of new innovative actors and regions. Looking at experiences from the EU and industrialised countries could help understand innovation systems and to maximise the leverage effect.

Implementation and management: This action is expected to include and enable the active participation of National Contact Points and/or other representatives or organisations which have been officially appointed by the relevant national Ministries or authorities in the EU and associated countries. It could make use of the data and information provided by the Transport Research Knowledge Centre and shall build upon other relevant previous and on-going activities (e.g. ETNA, DETRA, MARKET-UP).

Expected impact: This action will strengthen the European Research Area in the Transport sector by helping to use the available resources and instruments efficiently and by suggesting new approaches/networking initiatives at operational level for further cooperation and integration. It will unleash the potential of new actors and regions and support their active participation in European research calls and projects.

TPT.2012.3-2. Bringing innovative products and services to the market: analysis of pathways and best conditions for innovation

CSA-SA - Call: FP7-TPT-2012-RTD-1

Content and scope: This action should focus on innovation mechanisms for the transport sector i.e. how to bring more efficiently and quicker innovative products and services to the market. The action will target the innovation process in 1) EU-funded Framework Programme research projects, 2) SMEs and 3) establish a selected number of ‘Innovation Networks’ involving, in particular, regions of Europe where links between actors of the innovation chain are weak.

1) The project should analyse how, and to what extent, research and development projects have led to innovative products and services and compare results and approaches based on sound field work, including, but not limited to, research projects funded by the EU Framework Programmes. Specific actions (e.g. workshops) should be carried out to help project partners to exploit results and bring innovative products and services to the market. The action should also identify a selection of EU funded research projects with high innovation potential and assist them in developing a sound plan for the use and dissemination of results. In particular, support will be provided to identify potential obstacles along the innovation line, including aspects that are not related to research and technology such as, for example, certification, standards, regulations and financing.

2) Studies show that only a small percentage of SMEs (~1%) currently acquire novel technologies through their own research or contract research. The action should analyse how SMEs in general acquire new technologies and identify the bottlenecks along the innovation

pathway. The role of regional, national and European initiatives in this field will be studied. Recommendations to make the research and innovation area more attractive to SMEs will be made, taking into account the socio-economic context. Close coordination with ongoing actions supporting the participation of SMEs in the Framework Programme in the 'Transport' theme will be ensured.

3) A selected number of cases will be identified where the untapped potential of new solutions, new technologies and new combinations of technologies could be exploited to create new business opportunities. 'Innovation Networks' should be established gathering key actors of the innovation chain (e.g. universities, research centres, industry, specialists of IPR, regulation and standardisation bodies, funding agencies) to create a streamlined, integrated and dynamic environment for entrepreneurship and innovation. The networks will involve preferentially regions of Europe where links between actors of the innovation chain are weak.

The partners of this action will have a demonstrated experience in the field of innovation.

Proposals can address one, two or all three targets (bullet points) mentioned above.

Expected impact: This support action will 1) enhance the capacity of EU-funded Framework Programme projects in the field of transport to be at the source of innovation and help them to transform research results into products and services; 2) identify difficulties faced by SMEs, propose specific solutions and recommendations to improve their innovation capacity; and 3) set-up innovation networks involving, in particular, regions of Europe where links between actors of the innovation chain are weak.

7.4. GALILEO

I.4. CONTEXT

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 Regulation⁶³, the financial envelope foreseen to implement 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.

⁶³ Council Regulation (EC) 683/2008 of 9 July 2008 (OJ L 196 24.07.2008).

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 2012 Work Programme.**

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