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Call Topics for International Cooperation in Horizon 2020

EU and South Korea

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Content

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Industrial Leadership

Horizon 2020 Pillar: Industrial Leadership

Programme: Leadership in enabling and industrial technologies (LEIT)

Call Title: Foundations for Tommorrow's Industry

Call Identifier: h2020-nmbp-to-ind-2018-2020

Topic Title: Safe by design, from science to regulation: multi-component nanomaterials (RIA)

Topic Identifier: NMBP-16-2020

Type of Action: RIA Research and Innovation action

Deadline(s): 12.12.2019, 14.05.2020 (two-stage)

Participant Portal Weblink:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/nmbp-16-2020

Specific Challenges: Complex multi-component, hybrid, functional nanomaterials and High Aspect Ratio Nanoparticles (NMs&HARNs), present both innovation potential and challenges in terms of assessing the risk in different environments. Concerns for these multi-component nanomaterials result from differing rates of degradation and toxicities of the separate and interacting components and their different interactions with biological and environmental systems. Previous projects on Safe by Design have developed risk assessment tools and strategies, however they were only implemented within the context of an example case study. The implementation of these tools and approach at scale is still remains to be achieved. The challenge is to develop and implement Safe by Design concepts for products incorporating such nanomaterials and to understand their impact on manufacturing processes, on product performance, and on the environment and on health.

Scope: The proposals should:

- Coordinate with the projects from NMBP-15-2019, and focus on filling the gaps in the current understanding of exposure and hazard characteristics of NMs&HARNs especially those arising from their unique properties, as well as assessing the extent of and rates by which variations of environment modify the nanoparticle properties and agglomeration rates;
- Use multiscale modelling approaches to identify how different patterns of release may influence physiological responses and how elements of multi-component nanomaterials interact with each other, with other NMs, and other chemicals leading ultimately to mixture toxicity;

Develop knowledge and tools for Safe by Design approaches that support the development of multi-component nano-enabled products with reduced persistence, exposure and hazard. This should be coupled with developing multi-scale modelling approaches to evaluate the effectiveness of the proposed safe-by-design strategies

Relevant indicators and metrics, with baseline values, must be clearly stated in the proposal and should be in line with previous efforts on Safe by Design. For this topic a parallel call scheme is envisaged with the USA-NNI. Resulting projects should establish close cooperation mechanisms. Therefore, proposals should foresee a dedicated work package for cooperation and earmark appropriate resources.

Activities should start at TRL 4 and achieve TRL 6 at the end of the project.

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

Expected Impact:

- Implementation of validated safe-by-design strategies including enabling their uptake and utilization by SMEs;
- Recommendations on adaptation and improvement of current guidelines for exposure and hazard assessment of multi-component NMs as necessary;
- A categorisation scheme to cluster sector-specific multi-component nanomaterials by assessing nano-specific properties in real-life environments;
- Integration of specific characteristics of multi-component NMs, including the potential for mixture effects, in risk assessment and safe-by-design strategies.

Call information:

GOVERNANCE, SCIENCE-BASED RISK ASSESSMENT AND REGULATORY ASPECTS

Managing the risks of every emerging technology is of key importance for its societal acceptance and consequent possible success. The overall challenge is to establish a suitable form of nanotechnology risk governance and to ensure that beyond the state of the art technologies are accepted by stakeholders (civil society, industry, regulators).

This requires working on three different layers:

(i) a scientific research layer for sound foundations,

(ii) a regulatory research layer to validate and translate the scientific findings into appropriate regulatory frameworks and implementation, and

(iii) a market layer dealing with the daily management of risks and safety.

These three distinct layers should be integrated through actions for risk governance, risk assessment and safe by design. Notably nano-informatics approaches offer good chances for innovation. These will include the challenge of ensuring consistency in all EU Member States in terms of risk management.

The present convergence of several sciences and the rapid evolution of novel technologies in the healthcare sector create a need for fast advance in regulatory science in that sector. Development and adoption of reference methods and of technical standards should be based on solid scientific foundation, hence the need for additional activities within regulatory science for medical technology products.

In terms of resources, the regulatory layer should be jointly supported by Horizon 2020, Member States governments and industry whereas at market level, Horizon 2020 should support only the networking and coordination. Proposals in all layers can foresee modalities for integrating additional public or private funding or foresee specific calls for proposals funded by these additional sources. Costs for the organisation of the calls and coordination of the work can be foreseen in proposals' budgets. Such calls can also be used to foster international cooperation in nanosafety.

Proposals in this area should apply the Open Access and the Open Data Access policies and strongly support the activities of EU regulatory bodies and agencies, and of international organisations like ISO, CEN and OECD. To maximise overall synergy and joint impact, projects should take account of the strategy and roadmaps in place, respect and complement the established ontology and the data logging format (ISA-TAB-NANO[1]), contribute to the objectives of relevant platforms (such as the EU NanoSafety Cluster[2] or The Nanomedicine Translation Hub) and foresee the necessary resources to this effect.

Nanosafety issues are global and, therefore, international collaboration is strongly encouraged. In particular, all projects in this area are expected to collaborate with similar projects under the established scheme of Communities of Research with the USA NNI programme[3] and/or to include direct participation of relevant USA entities. In addition, participation from countries actively involved in the work of OECD -WPMN, the NanoSafety Cluster and the NANoREG[4] project (e.g. **South Korea**, Brazil, Canada, Australia, China, Japan, South Africa) is strongly encouraged.

Proposals should consider risk-assessment procedures for both men and women, where relevant, and enable a reduction of animal testing in the regulatory compliance.

Cross-cutting Priorities: Open Science, Open Innovation, International cooperation

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[1] http://enanomapper.net

[2] http://www.nanosafetycluster.eu

[3] http://www.us-eu.org

[4] http://www.nanoreg.eu

Horizon 2020 Pillar:	Industrial Leadership
Programme:	Leadership in enabling and industrial technologies (LEIT)
Call Title:	Competitive, low carbon and circular industries
Call Identifier:	h2020-low-carbon-circular-industries-2020
Topic Title:	ERA-NET on materials, supporting the circular economy and Sustainable Development Goals
Topic Identifier:	CE-NMBP-41-2020
Type of Action:	ERA-NET-Cofund ERA-NET Cofund
Deadline(s):	05.02.2020 (single-stage)

Participant Portal Weblink:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/ce-nmbp-41-2020

Specific Challenges: Maintaining Europe's position in research related to materials science and engineering requires concentrated action on common European research priorities in view of implementing joint initiatives.

The M-ERA.NET 2 network has successfully targeted the Low Carbon Energy Technologies addressed by the SET Plan. Now the scope should on one hand guarantee some continuation, and on the other hand become more ambitious and underline the commitment of the EU regarding the circular economy and Sustainable Development Goals.

The European Commission has adopted an ambitious new Circular Economy Package to help European businesses and consumers to make the transition to a stronger and more circular economy. Moreover, in 2016, the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development came into force. They aim to end poverty, protect the planet, ensure prosperity and tackle climate change. The EU is fully committed to be a frontrunner in implementing the 2030 Agenda and SDGs. Finally, the Commission launched the Battery Alliance initiative in 2017.

Materials research is a relevant field for addressing these overall challenges and for making substantial contributions to achieving the specific objectives.

Global challenges call for co-operation on a global scale to build capacity in science, technology and innovation (STI) at both national and international levels. A strategic and industrially relevant approach is needed that cover the entire research and innovation chain by pooling national research and innovation capacities, thereby mobilising European infrastructure networks as well as promoting education and training in materials research and innovation.

Scope: The proposed ERA-NET aims at coordinating the research efforts of the participating Member States, Associated States and Regions in the field of materials, continuing the activities started by M-ERA.NET, for materials research and innovation, especially targeting the circular economy and Sustainable Development Goals (such as Goal 7 – "Affordable and clean energy", by enabling electromobility through sustainable energy storage technology or Goal 9 "Industrial innovation and infrastructure", by enhancing scientific research and upgrading the technological capabilities of industrial sectors). Proposals should pool the necessary financial resources from participating national or regional research programmes by implementing a joint transnational call for proposals (resulting mainly in grants to third parties) with EU co-funding to fund multinational innovative research initiatives in this domain, including support to the large scale research initiative on future battery technologies launched under the H2020-LC-BAT-2019-2020 Call[1].

Proposers are also requested to implement other joint activities and, additional joint calls without EU co-funding. The proposal should demonstrate that these additional joint calls exclude any overlaps with related on-going actions co-funded by the EU under NMBP.

Proposals should demonstrate the expected impact on national and transnational programmes as well as the leverage effect on European research and competitiveness, and should plan the development of key indicators for supporting this.

Participation of legal entities from **third countries**, and/or regions including those not automatically eligible for funding in accordance with General Annex A is encouraged in the joint call as well as in other joint activities including additional joint calls without EU co-funding. Participants from countries not listed in General Annex A are eligible for EU funding under this topic and may request a Union contribution (on the basis of the ERA-NET unit cost) only for the coordination costs of additional activities.

The Commission considers that proposals requesting a contribution from the EU of EUR 15 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. EUR 5 million of the requested contribution from the EU should be used as support to transnational projects, co-funded by the Commission, on future battery technologies, fostering synergy between European, national and regional initiatives and promoting broader partnerships between the European stakeholders in future battery technologies.

Expected Impact:

- synergies with international, national and regional programmes that support research and innovation;
- synergies but no overlap with the topics of Horizon 2020 and with related European Partnership initiatives and be open to adapt to future coming initiatives of Horizon Europe;
- leverage of national, regional and European funding;
- contribution to meeting Global Challenges through Better Governance: International Co-operation in Science, Technology and Innovation;

- relevant contribution to the SDGs, including sustainable battery based energy storage technology;
- relevant contribution towards a circular economy.

Cross-cutting Priorities: ERA-NET

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[1] http://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-cc-activities_en.pdf

Societal Challenges

Horizon 2020 Pillar: Societal Challenges

Programme: Health, demographic change and wellbeing

Call Title: Better Health and care, economic growth and sustainable health systems

Call Identifier: h2020-sc1-bhc-2018-2020

Topic Title: Innovative actions for improving urban health and wellbeing - addressing environment, climate and socioeconomic factors

Topic Identifier: SC1-BHC-29-2020

Type of Action: RIA Research and Innovation action

Deadline(s): 24.09.2019, 07.04.2020 (two-stage)

Participant Portal Weblink:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/sc1-bhc-29-2020

Specific Challenges: The natural and built[1] environment as well as the social fabric are critical determinants of health and well-being. Three quarters of the European population now live in cities and urbanisation continues at high speed, driven by economic growth and employment opportunities. The related environmental changes e.g. pollution of air and water, transportation problems, reduced social cohesion and stress affect physical as well as mental health. Although health has improved in the EU over the last decades, large differences in health still exist between and within all countries in the EU. These differences are caused by many factors such as living conditions, health-related behaviour, education, occupation and income, health care. Some of these inequalities are widening[2]. As European cities are growing, they are increasingly taking action and introducing policies to become more sustainable and liveable, adapting to climate change, investing in a range of smart and innovative solutions such as clean and sustainable transport, higher energy efficiency and stronger social cohesion. Similar initiatives are underway e.g. in Canada, USA as well as in **Asia** and Africa which could provide valuable knowledge.

At EU level, the Urban Agenda for the EU[3] focuses on improving the life of their citizens for example through the development of digital solutions, reducing urban poverty and better integration of migrants and refugees. The headline targets in the EU2020 strategy aim to turn the EU into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion[4].

Improving urban health and reducing health disparities can be achieved by changes in individual behaviour as well as policies such as urban design and sustainable transport, (re)creating green and blue space or improved housing standards. There is a need to address public policies across sectors to achieve health benefits, systematically taking into account the health implications of decisions, to seek synergies, and avoid harmful health impacts (health in all policies[5]).

Scope: European research should engage to build the evidence base of effective policies, developing and testing new initiatives to improve urban health and environment in Europe. Given the variety of national experiences across European countries and regions, there is an important potential to learn from each other's practices and develop innovative actions for urban health.

Proposals should develop and test effective actions and/or policies for improved urban health and wellbeing in Europe. Where applicable, health inequalities and environmental aspects should be addressed. These actions or policies should also be assessed for cost-effectiveness as well as barriers and facilitators to implementation. Proposals should address improved physical or mental health, or both, while considering the relevant socio-economic and/or environmental determinants of health. They could address any sector (with priority on other sectors than health care) or policy area relevant to achieve a lasting health improvement. Proposals should include analysis of vulnerable groups and gender aspects and address any such inequities in the design of interventions. Research teams should bring in all appropriate scientific disciplines to design and test interventions. This includes social scientists not least for their role on behavioural aspects

In order to link research to practical needs and user demands, teams should include other relevant parties in urban health, building partnership with stakeholders such as policy makers, users, business, and local communities. Proposals should address the need for more systematic data collection on urban health across the EU, to allow better analysis and conclusions. This may include the linking up with relevant population based cohorts.

As urban health is of concern in many regions of the world, proposals should foresee the possibility to link up internationally with other relevant urban health initiatives. Proposals should include in their budgets funds for participation in at least one international meeting gathering urban health initiatives relevant to the research.

The Commission considers that a proposal requesting an EU contribution between EUR 4 and 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- More robust evidence for policy making on improved urban health in the EU
- Improved population health, physical and/or mental, in urban areas of the EU
- Reduced health inequalities in urban areas

Cross-cutting Priorities: Gender, Open Innovation, Socio-economic science and humanities

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[1] Man-made structures, features, and facilities viewed collectively as an environment in which people live and work (https://en.oxforddictionaries.com/definition/built_environment)

[2] http://www.health-inequalities.eu/about-hi/health-inequalities-in-the-eu

[3] https://ec.europa.eu/futurium/en/urban-agenda

[4] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF

[5] http://www.who.int/healthpromotion/conferences/8gchp/statement_2013/en

Horizon 2020 Pillar: Societal Challenges

Programme: Food security, sustainable agriculture and forestry, marine and maritime and inland water research

Call Title: Sustainable Food Security

Call Identifier: h2020-sfs-2018-2020

Topic Title: Healthy terrestrial livestock microbial ecosystems for sustainable production

Topic Identifier: SFS-02-2020

Type of Action: RIA Research and Innovation action

Deadline(s): 22.01.2020, 08.09.2020 (two-stage)

Participant Portal Weblink:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/sfs-02-2020

Specific Challenges: Research is increasingly paying attention to the importance of interactions between the animal host and microbiota and their effects on the production efficiency, and the health and welfare of animals. These interactions are highly dynamic and influenced not only by genetics, but also by external factors such as environment, nutrition/feeding and management. Recent developments in omics science and technologies have opened new avenues for understanding not only the biology and genetics of animals, but also the ecosystems in which they function and those which they harbour, i.e. microbiomes. This is particularly relevant for micro-organisms that are currently non-culturable. Research on the interplay between the animals and their microbial ecosystems is needed to contribute to the improvement of sustainable livestock production.

Scope: Activities shall address relevant microbial ecosystems of terrestrial livestock, and their effects on the production, health and welfare of animals. They should look in a balanced way at the characterisation of microbial ecosystems (including microbial communities and microbe-derived metabolites), assessing variability within and between breeds in relation to variability of production systems and diet; at microbial behaviour (e.g. interactions between microbiota, evolution with age of animals, transmission); at microbial functions and interactions with host, environment and management practices, including feeding where relevant; and at possible ways in which those ecosystems can be managed, including socio-economic aspects, in order to reduce environmental impact, improve production and its quality, and/or health in particular during challenging periods

such as early life, weaning or after disturbances. Activities will include the incorporation of data on microbial ecosystems in the models used to analyse phenotypic variability and to perform genetic evaluations. The activities shall address either ruminants, or monogastrics. Gut microbiome of pigs or poultry can be addressed only in so far as the activities are complementary to those in related projects selected under LC-SFS-03-2018. Proposals may cover one or more species and one or more microbial ecosystem.

Research on anti-microbial resistance can be included as long as it is not the main objective of the project (see topic SFS-12-2018/2019). Research on single animal pathogens is not the focus of the topic. The projects are encouraged to interact as appropriate with relevant collaborative projects in Europe as appropriate and with international initiatives such as the rumen microbial genomics network of the **Global Research Alliance on Agricultural Greenhouse Gases**[1].

The Commission considers that proposals requesting a contribution from the EU of up to EUR 10 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Funding will allow support for at least one project relating to ruminants and one to monogastrics.

Expected Impact: Funded activities will contribute to deciphering the characteristics and functions of the livestock microbial ecosystems and understand the ways in which they influence production, health and/or welfare of animals. They will provide standardised methodologies for further application in livestock production to the greatest extent possible, including socio-economic aspects.

In the short- to medium term, the application of the knowledge and solutions developed will, as appropriate:

- enable inclusion of data on microbial ecosystems in the models used to analyse phenotypic variability and to perform genetic evaluations;
- improve resource use and environmental impact of terrestrial livestock production;
- improve robustness and health of terrestrial livestock, in relation to productive functions;
- reinforce collaborations with initiatives in related domains to promote coherence and applicability of research on microbial ecosystems.

In the longer term, the funded activities will contribute to more resilient production systems.

Delegation Exception Footnote: This topic is part of a microbiome cluster. For complementary activities see also SC2 topics SFS-01-2018/19/20, SFS-03-2018 and BG-06-2018 on Marine Microbiomes as SC1 topic SC1-BHC-03-2018

Cross-cutting Priorities: International cooperation

[1] https://globalresearchalliance.org/research/livestock/networks/rumen-microbial-genomics-network

Horizon 2020 Pillar: Societal Challenges

Programme: Secure, clean and efficient energy

Call Title: Competitive, low carbon and circular industries

Call Identifier: h2020-low-carbon-circular-industries-2020

Topic Title: Low carbon industrial production using CCUS

Topic Identifier: LC-SC3-NZE-5-2020

Type of Action: IA Innovation action

Deadline(s): 01.09.2020 (single-stage)

Participant Portal Weblink:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/lc-sc3-nze-5-2020

Specific Challenges: CCUS in industrial applications faces significant challenges due to its high cost and the fierce international competition in the sectors concerned. However, these sectors currently account for 20% of global CO2 emissions, and in the 2 degree scenario, should represent half of the stored CO2 by 2050. Relevant sectors with high CO2 emissions are for example steel, iron and cement making, oil refining, gas processing, hydrogen production, biofuel production and waste incineration plants.

Scope: Projects will focus on integrating CO2 capture in industrial installations, whilst addressing the full CCUS chain. Projects will elaborate a detailed plan on how to use the results, i.e. the subsequent transport, utilisation and/or underground storage of the captured CO2. Important aspects to address are of technical (e.g. the optimised integration of capture plant with industrial processes; scalability; CO2 purity), safety (e.g. during transportation and storage), financial (e.g. cost of capture; cost of integration) and strategic nature (e.g. business models; operation and logistics of industrial clusters and networks).

Projects are expected to bring technologies to TRL 6-7 (please see part G of the General Annexes). Technology development has to be balanced by an assessment of the societal readiness towards the proposed innovations. Relevant end users and societal stakeholders will be identified in the proposal, and their concerns and needs will be analysed during the project using appropriate techniques and methods from the social sciences and humanities, in order to create awareness, gain feedback on societal impact and advancing society's readiness for the proposed solutions. Projects should also explore the socio-economic and political barriers to acceptance and awareness with a view to regulatory or policy initiatives.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged, in particular with relevant **Mission Innovation**[1] countries such as China[2].

Proposals submitted under this topic should include a business case and exploitation strategy, as outlined in the Introduction of this part of the Work Programme.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 15 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: Successful, safe and economic demonstration of integrated-chain CCUS from relevant industrial sources such as mentioned in the specific challenge will accelerate the learning, drive down the cost and thus help break the link between economic growth and the demand for industrial output on one hand, and increasing CO2 emissions on the other hand. The impact of projects under this call will to a large extent be determined by the extent to which the results will be exploited, i.e. the plan on how the captured CO2 will be actually utilised and/or stored, either in the project or planned as a future phase. This will be evaluated based on the maturity and quality of the proposed post-capture solutions. Projects under this call that are carried out in areas where there is both a high concentration of CO2 emitting industries and a nearby capacity for geological storage are considered prime sites for hub and cluster developments, and will generate the highest impact on full-scale deployment in the medium to longer term.

Cross-cutting Priorities: Socio-economic science and humanities

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[1] http://mission-innovation.net/our-work/innovation-challenges

[2] A Co-funding mechanism is in place in China; see https://ec.europa.eu/programmes/horizon2020/en/news/eu-china-research-and-innovation-co-funding-mechanism-first-call-launched-china

Horizon 2020 Pillar: Societal Challenges

Programme: Smart, green and integrated transport

Call Title: 2018-2020 Digitising and Transforming European Industry and Services: Automated Road Transport

Call Identifier: h2020-dt-art-2018-2019-2020

Topic Title: Efficient and safe connected and automated heavy-duty vehicles in real logistics operations

Topic Identifier: DT-ART-05-2020

Type of Action: IA Innovation action

Deadline(s): 21.04.2020 (single-stage)

Participant Portal Weblink:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/dt-art-05-2020

Specific Challenges: Connected and automated driving systems for heavy commercial vehicles have great potential to bring a disruptive change to the trucking industry, fleet operators and the whole logistics sector. They can improve safety and efficiency of freight transport and make vehicle operations more comfortable. Fuel efficiency gains can be achieved through automated truck operations, such as platooning. Various automated trucks and truck platooning concepts are being tested in several countries. Positive impacts can be expected when highly automated systems will be used in logistics operations going from hub to hub including both operations in mixed traffic and in confined areas.

There are a number of specific challenges that need to be addressed before connected, cooperative and automated driving technologies for heavy commercial vehicles can be widely deployed: vehicle technologies, driver/user interaction/collaboration, vehicle-to-vehicle and vehicle-to-infrastructure communication, operational challenges in confined areas (ports, logistics terminals, consolidation centres, truck parkings, etc.) and in mixed traffic on public roads.

Scope: The focus of this topic is to develop, test and demonstrate connected and automated systems for heavy commercial vehicles in real logistics operations.

Proposed actions should include all the following aspects:

- Identify logistics operational needs and analyse new, emerging business and operating models and related technologies for efficient, high capacity and safe

connected and automated heavy commercial vehicles (preferably low-emission vehicles) and optimised links with other parts in the logistics chain.

- Develop, design, test and validate enhanced connected and automated vehicle technologies for heavy commercial vehicles for improved perception and localisation, vehicle control, connectivity (vehicle-to-vehicle, vehicle-to-cloud and vehicle-infrastructure), system resilience and dependability, functional safety, cyber security, interoperability and system cost optimization, reduced emissions and fuel consumption at fleet level.
- Test and demonstrate innovative, efficient and safe connected and automated heavy commercial vehicles for real logistics operations on hub-to-hub corridors, on open roads in mixed traffic or in confined areas addressing mixed traffic capabilities to prepare for operation in real road conditions.
- Enhanced interaction between connected and automated heavy commercial vehicles and their users and other (vulnerable) road users. Innovative services for automated freight logistics of individual transport units.

A cost-benefit analysis will demonstrate the added value and economic viability of automated systems in real logistics operations for users and stakeholders.

The active involvement of shippers, freight forwarders and truck manufacturers is strongly encouraged. The cooperation with organisations linked to actions of the TEN-T network is encouraged.

In line with the Union's strategy for international cooperation in research and innovation, international cooperation is encouraged. In particular, proposals should foresee cooperation with projects or partners from the US, Japan, **South Korea**, Singapore and/or Australia. Proposals should foresee twinning with entities participating in projects funded by US DOT to exchange knowledge and experience and exploit synergies. Twinning with Japan is also encouraged.

The Commission considers that proposals requesting a contribution from the EU between EUR 15 and 20 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: Actions are expected to contribute to the accelerated deployment of innovative connected and automated freight transport solutions in Europe. Actions will show that they will help to increase the overall safety and efficiency of freight operations of individual trucks or fleets (emissions/freight ratio, fuel consumption, road occupancy, vehicle utilization, capacity of transport network) in confined areas and in mixed traffic (hub to hub) through innovative connected and automated driving systems. Actions will show the uptake of new business models and seek to reach a total cost reduction of operations and logistics and supply chain leading to improved competitiveness of the European transport and logistics industry.

Cross-cutting Priorities: International cooperation

Horizon 2020 Pillar: Societal Challenges

Programme: Smart, green and integrated transport

Call Title: 2018-2020 Digitising and Transforming European Industry and Services: Automated Road Transport

Call Identifier: h2020-dt-art-2018-2019-2020

Topic Title: Large-scale, cross-border demonstration of connected and highly automated driving functions for passenger cars

Topic Identifier: DT-ART-06-2020

Type of Action: IA Innovation action

Deadline(s): 21.04.2020 (single-stage)

Participant Portal Weblink:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/dt-art-06-2020

Specific Challenges: Significant progress has been made in developing technologies for connected and automated driving in Europe and many large-scale demonstration projects are already ongoing. Automated driving functions for passenger cars at SAE Level 3[1], such as Traffic Jam Chauffeur or Highway Chauffeur, are expected to be introduced into the market from 2020 onwards.

However, several challenges remain, in particular for highly automated vehicles, before we will see them on the roads. Highly automated vehicles must achieve very high levels of availability and effectiveness of the vehicle functions and their performance has to be better compared to the performance of human drivers. Based on ongoing demonstration pilots, new large scale, cross-border corridor projects for highly automated driving systems are needed to ensure that no new risks are introduced and to study user and customer expectations and acceptance, market potentials and risks.

Scope: The proposed actions should include all the following aspects:

- Demonstrate the robustness and reliability (functional safety) and user acceptance of connected and highly automated driving technologies and systems for passenger cars (SAE level 4[2]) for different use cases in particularly challenging and complex environments that are expected to be introduced into the market after 2020.
- Test innovative connectivity technologies for connected and automated driving since communication and cooperation of automated vehicles with other vehicles, infrastructure and other road users has the potential to increase the safety, comfort, productivity and the enabling of innovative

business models of automated vehicles and to improve the efficiency of the overall transport system.

- The use of the European Global Navigation Satellite Systems (Galileo and EGNOS) should be encouraged to achieve the full potential of advanced satellite positioning for automated driving functions.
- Optimised use of digital technologies such as the Internet of Things, Artificial Intelligence and Big Data for automation should be considered.
- Conduct cross-border demonstrations to ensure that new services and systems are compatible and interoperable at European level, to optimise the use of digital technologies for automation between countries, to coordinate investments towards reliable communication coverage and to exploit the full potential of hybrid communications between short-range and long-range technologies and technologies within the 5.9 GHz spectrum band.
- Develop and test solutions for smooth communication and interaction between automated vehicles and their users and other (vulnerable) road users, taking into account gender differences, when relevant.
- Holistic concept for cybersecurity to protect automated driving systems (and its connectivity points) to avoid any (conscious) manipulations of the information enabling automated driving functions and to assure confidentiality, availability and integrity of data. This concept should also include the protection of the information collected by the automated vehicles and the external data transferred to the vehicles. Provide support to the development of testing and validation procedures of connected and automated driving functions, including their performance related to cyber-security.
- Evaluate effects of connected, cooperative and highly automated driving systems on transport system efficiency, safety, security, environment as well as on user behaviour and user acceptance, taking into account gender differences and other intersectionalities, when relevant.

Lessons learned (data, knowledge and experiences from the project, including disengagements and edge cases) should be provided. Consortia should commit to make the data collected during the pilots available through common data sharing frameworks in order to foster further research.

In line with the Union's strategy for international cooperation in research and innovation, international cooperation is encouraged. In particular, proposals should foresee cooperation with projects or partners from the US, Japan, **South Korea**, Singapore, and/or Australia. Proposals should foresee twinning with entities participating in projects funded by US DOT to exchange knowledge and experience and exploit synergies. Twinning with Japan is also encouraged.

The Commission considers that proposals requesting a contribution from the EU between EUR 15 and 30 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: Actions are expected to demonstrate at large-scale the technological readiness, reliability and safety of the connected and highly automated driving functions for different use cases in particularly challenging

and complex environments. They will show that highly automated driving systems for passenger vehicles can increase road safety and transport efficiency, reduce energy use, pollutant emissions and traffic congestions, and therefore support climate action and sustainable development objectives. Better protection of connected and automated vehicles against any type of cyber threats to guarantee safe operations. Actions will seek to improve user acceptance of innovative connected and highly automated driving systems and the uptake of new business models. They will contribute to a better understanding of viable business and operating models that could lead to private and/or public private investments in communication infrastructure.

Cross-cutting Priorities: International cooperation

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[1] Definition of SAE Level 3 – Conditional Automation – "the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task, with the expectation that the human driver will respond appropriately to a request to intervene", according to the SAE International's standard J3016.

[1][2] Definition of SAE Level 4 – High Automation: "the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task, even if a human driver does not respond appropriately to a request to intervene", according to the SAE International's standard J3016.

Horizon 2020 Pillar: Societal Challenges

Programme: Smart, green and integrated transport

Call Title: Building a low-carbon, climate resilient future: Green Vehicles

Call Identifier: h2020-lc-gv-2018-2019-2020

Topic Title: Setting up a common European research and innovation strategy for the future of road transport

Topic Identifier: LC-GV-09-2020

Type of Action: CSA Coordination and support action

Deadline(s): 21.04.2020 (single-stage)

Participant Portal Weblink:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/lc-gv-09-2020

Specific Challenges: The objective of this topic is to define R&D roadmaps for a sustainable and efficient road transport system in Europe. It calls for a Coordination and Support Action to support ERTRAC (the European Technology Platform for Road Transport), future Partnerships relevant to road transport in Horizon Europe and the European Commission in defining the research needs for their upcoming research and innovation programmes, and by then helping to achieve the targets set at EU and global level (EU Transport White Paper, COP21 for decarbonisation, etc.).

International cooperation with developing and emerging economies should also be developed in order to increase efficient mobility for all, reduce local (air and noise) and CO2 emissions, and tackle health and safety issues, and increase attractiveness and competitiveness in particular in urban areas.

Scope: Proposals should take a comprehensive approach ranging from components up to system integration, and include enabling technologies where relevant. Both passenger mobility and freight transport should be addressed and covering urban mobility as well as inter-urban and long-distance transport. They should address all the following aspects:

- Updating of research agendas and roadmaps developed by the European Technology Platform ERTRAC (European Road Transport Research Advisory Council) and supporting the definition of research priorities of future Horizon Europe Partnerships relevant to road transport, covering all transport research fields.
- Facilitating cooperation between cities in Europe, **Asia**, Latin America and Africa. Actively support policy and knowledge exchange and establish a peer-

to-peer exchange and capacity building programme that takes advantage of the results of a large number of relevant cities. Cooperation between EU and international projects on urban mobility. Develop implementation concepts for sustainable mobility including shared private vehicles (e.g. light-duty vehicles and 2-, and 3-wheelers), logistics (e.g. e-Trucks, cargo bikes), public transport systems (e.g. Bus Rapid Transit Systems, buses, soft modes) and new mobility services.

- Liaise with international financing institutions to foster the take-up and implementation of the concepts developed, support the European Commission in international discussions and specialised sectorial Fora related to Mobility for All, Climate Change and the New Urban Agenda. Track global progress on urban electric mobility and support UN activities, such as the Urban Electric Mobility Initiative (UEMI).

The implementation requires close collaboration with the leading European stakeholders in transport research, including vehicles manufacturers, supply industry, and research and engineering organisations, as well as strong links with other relevant European initiatives and associations. In line with the strategy for EU international cooperation in research and innovation, international cooperation is encouraged with key emerging countries, in particular with **Asia**, Latin America and Africa.

The Commission considers that proposals requesting a contribution from the EU of between EUR 0.8 to 1 million each would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: This action will bring together the leading European stakeholders in road transport research to develop roadmaps and support international cooperation. It will contribute to a further harmonisation of research and innovation, and therefore contribute to the European Research Area, in particular also in the view of innovation, as well as to the European strategies for a future transport system.

Proposals are expected to contribute to:

- The objective of the European Union for climate action and sustainable development.
- The objectives set by the Paris Agreement (COP21) and the New Urban Agenda.
- The fulfilment of post 2020 emission targets in road transport (at least 30% by 2030 compared to 2021)
- The EU's long-term goal of moving close to zero fatalities and serious injuries by 2050 ("Vision Zero")
- UN's Sustainable Development Goals 11 "Sustainable cities and communities" (with particular attention to 11.2) and 13 "Climate Action"
- Strengthening the collaboration of the European Union with **Asia**, Latin America and Africa.

Horizon 2020 Pillar: Societal Challenges

Programme: Climate action, environment, resource efficiency and raw materials

Call Title: Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement

Call Identifier: h2020-lc-cla-2018-2019-2020

Topic Title: Polar climate: understanding the polar processes in a global context in the Arctic and Antarctic Regions

Topic Identifier: LC-CLA-17-2020

Type of Action: RIA Research and Innovation action

Deadline(s): 13.02.2020, 03.09.2020 (two-stage)

Participant Portal Weblink:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/lc-cla-17-2020

Specific Challenges: Many of the natural physical processes occurring in the polar atmosphere and oceans are potentially of profound significance in controlling conditions across the globe and affecting lives and livelihoods across the world, in the Polar, sub-Polar, temperate, and tropical regions. Understanding the interacting nature and feedback of polar processes and addressing their consequences in a global context will benefit the people, policy and businesses well beyond the Polar Regions.

Scope: Proposals should aim at developing innovative approaches, building on existing data resources and infrastructures, the latest observational products (including in-situ observations), and state-of-the-art climate models, to assess the key physical and chemical processes in the ocean and atmosphere and the key ocean-atmosphere-ice interactions. Proposals should cooperate with relevant projects funded by the ESA Earth Observation Programme. In addition, they are encouraged to join the EU Arctic Cluster in order to build synergies and maximise the complementarity of the different actions in the Cluster. Proposals should build upon previous actions funded under Horizon 2020 and avoid duplication or overlap.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged, in particular with countries – beyond the EU Member States and countries associated to Horizon 2020 – that took part in the Arctic Science Ministerial meetings of 28 September 2016 and 25-26 October 2018[1].

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 7-8 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

The project results are expected to contribute to:

- improved understanding of how the changing polar climate systems affect and are affected by lower latitudes through ocean and atmospheric circulation;
- improved understanding of the key ocean-atmosphere-ice interactions;
- improved understanding of the fully coupled physical climate system (atmosphere-ocean-ice) on diverse space and time scales;
- improved understanding of the key physical and chemical processes in the ocean and in the atmosphere;
- improved projections of future polar and global climate, including feedbacks and impacts
- improved capability to respond to the impact of climatic change on the environment and human activities in the Polar Regions (with a focus on the Arctic), both in the short and longer term;
- the IPCC scientific assessments, the consolidation phase of the Year Of Polar Prediction (YOPP) and to the Copernicus Climate Change (C3S) services.
- supporting the assessment of regional climate impacts.

Cross-cutting Priorities: International cooperation, Blue Growth

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[1] i.e. the United States of America, Canada, the People's Republic of China, Japan, the Russian Federation, **South Korea**, New Zealand, India, Singapore, and Greenland; see https://www.arcticscienceministerial.org/en

Horizon 2020 Pillar: Societal Challenges

Programme: Climate action, environment, resource efficiency and raw materials

Call Title: Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement

Call Identifier: h2020-lc-cla-2018-2019-2020

Topic Title: Supporting the implementation of GEOSS in the Arctic in collaboration with Copernicus

Topic Identifier: LC-CLA-20-2020

Type of Action: RIA Research and Innovation action

Deadline(s): 13.02.2020, 03.09.2020 (two-stage)

Participant Portal Weblink:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/lc-cla-20-2020

Specific Challenges: In order to gain more insight in the fast rate of climate, ecological and environmental change taking place in the Arctic and to facilitate well-informed decisions, there is a need to develop coordinated Earth observations and information services specifically targeting this region, also building on the essential contribution of indigenous knowledge and community-based monitoring systems. These observations and services need to be delivered in order to support a sustainable development in the Arctic, particularly for responding to the needs of the people who live there. Observations and services are also necessary to improve the monitoring and predicting capabilities on changes that may affect other parts of the planet, and in particular the Northern hemisphere. The challenge and suitable actions to alleviate adverse consequences were identified in the 2nd Arctic Science Ministerial Joint Statement of Ministers.[1]

Scope: The action should aim at:

(i) advancing the operationalisation of an integrated pan-Arctic Observing System in preparation for a possible future ArcticGEOSS initiative;

(ii) improving and extending the terrestrial, marine and cryospheric in-situ measurements and the community-based monitoring systems necessary for the monitoring of the Arctic;

(iii) setting up pilot services and implementing the coordinated network of those services necessary for the adaptation to climate change in the region;

(iv) contributing to the interoperability of Arctic Data systems; and

(v) to make a positive contribution to national, regional and international decision-making processes and science strategies.

The action should help to build an Arctic “window”[2] of Copernicus by bringing together all Arctic relevant observations deriving from different Copernicus services and promoting access to relevant Copernicus datasets.

The action should coordinate with projects stemming from the NSFs Arctic portfolio, such as the "Navigating the New Arctic" programme, and other actions of the Transatlantic Ocean Research Alliance, by establishing joint operational activities, in order to support the mission and objectives of the international initiative on Arctic observations brought forward by the Sustaining Arctic Observing Networks (SAON).

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged, in particular with the countries and Indigenous Peoples organisations participating in the 2nd Arctic Science Ministerial[3].

The action should build on the outcomes of previous EU-funded projects in the framework of GEO and Copernicus, create synergies and avoiding un-necessary duplications also by joining the EU Arctic Research Cluster. Likewise, the action should cooperate with relevant projects funded by the ESA Earth Observation Programme. To this end, proposals should foresee a dedicated work package and /or task and earmark the appropriate resources accordingly.

The pilot services should fall into the scope of EuroGEOSS and follow the direction of the EuroGEOSS initiative. Data and services produced through the projects should be registered in the GEOSS Common Infrastructure (GCI).

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 15 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

The project results are expected to contribute to:

- the implementations the GEO-Cold Region Initiative with a specific emphasis on the Arctic, and the initiating of an ArcticGEOSS initiative;
- sound and effective decision-making by policy makers in the Arctic regions through the use of reliable and science-based Earth observation and information;
- supporting of the 2030 Agenda for Sustainable Development, the Paris Agreement and Sendai Framework for Disaster Risk Reduction 2015-2030;
- strengthening Earth observation capacity focused on the European region;
- delivering EuroGEOSS services for the Arctic;
- improved handling, archiving and interoperability of environmental data in polar regions;
- a coherent data management, through the use of GEOSS Data Management Principles and best practices (aligning with INSPIRE).

Cross-cutting Priorities: Blue Growth, International cooperation

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[1] Joint Statement of Ministers, 2nd Arctic Science Ministerial, Berlin 2018, https://www.arcticscienceministerial.org/files/ASM2_Joint_Statement.pdf

[2] https://www.copernicus.eu/en/copernicus-services-information-and-sentinel-products-arctic-region

[3] i.e. the United States of America, Canada, the People's Republic of China, Japan, the Russian Federation, **South Korea**, New Zealand, India, Singapore, and Greenland; see https://www.arcticscienceministerial.org/en

Horizon 2020 Pillar: Societal Challenges

Programme: Secure societies - Protecting freedom and security of Europe and its citizens

Call Title: Security

Call Identifier: h2020-su-sec-2018-2019-2020

Topic Title: Technologies for first responders

Topic Identifier: SU-DRS02-2018-2019-2020

Type of Action: RIA Research and Innovation action

Deadline(s): 27.08.2020 (single-stage)

Participant Portal Weblink:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/su-drs02-2018-2019-2020

Specific Challenges: Resilience is critical to allow authorities to take proper measures in response to severe disasters, both natural (including climate-related extreme events) and man-made. Innovation for disaster-resilient societies may draw from novel technologies, provided that they are affordable, accepted by the citizens, and customized and implemented for the (cross-sectoral) needs of first responders.

Scope: Proposals are invited to propose novel solutions improving the protection of first responders against multiple and unexpected dangers, or enhancing their capacities by addressing related research and innovation issues, in particular:

- Sub-topic 3: [2020] Methods and guidelines for pre-hospital life support and triage

  Development of innovative tools, methodologies and European pre-hospital guidelines for first responders of medical services, fire services and police and hospital trauma teams in order to ensure faster and more effective evaluation and control of numerous seriously injured casualties in disaster and/or emergency situations. This should take account of lessons learned from military mass-casualty techniques such as damage-control surgery. The aim is to ensure more effective pre-hospital triage of victims with appropriate digital traceability of actions and data transfer from the event to the hospital(s), including across administrative and political boundaries.

  If appropriate, proposals should demonstrate how they will build on relevant previous and on-going FP7 and/or H2020 projects.

- Sub-topic: [2018-2019-2020] Open

  Other technologies for use by first responders may be subject of proposals provided that they involve a large number of first responders' organisations (see eligibility and admissibility conditions.) For instance, but not exclusively: communicating and smart wearables for first responders and K9 units including light-weight energy sources; situational awareness and risk mitigation systems for first responders using UAV and robots, connected and swarms of drones; systems based on the Internet of Things; solutions based on augmented or virtual reality; systems communication solutions between first responders and victims; risk anticipation and early warning technologies; mitigation, physical response or counteracting technologies; etc.

  Any novel technology or methodology under this topic should be tested and validated, not just in laboratories but also in training installations and through in-situ experimental deployment. They therefore need to be quick to deploy, bases on resilient and robust communication infrastructure. First responders, including through interdisciplinary teams (e.g. involving medical emergency services, public health authorities, law enforcement team, civil protection professionals, etc.) need to be involved in these activities. Proposals should address the participation of first responders in a systematic manner, and propose new methods on how to involve them and to organise their interaction with researchers when developing, testing, and validating technologies and methods.

  Solutions are to be developed in compliance with European societal values, fundamental rights and applicable legislation, including in the area of privacy, personal data protection and free movement of persons. Societal aspects (e.g. perception of security, possible effects of technological solutions on societal resilience, gender diversity) have to be taken into account in a comprehensive and thorough manner.

In line with the objectives of the Union's strategy for international cooperation in research and innovation (COM(2012)497), international cooperation according to the current rules of participation is encouraged (but not mandatory), in particular with Japanese or **Korean** research centres. Co-funding opportunities from the Japan Science and Technology Agency exist for Japanese partners.[1] Co-funding opportunities from the **Korean** MSIP/NRF exist for **Korean** partners.[2]

The centre of gravity for technology development with actions funded under sub-topics 1,2 and open is expected to be up to TRL 4 to 6, whereas under sub-topic 3 it is expected to be up to TRL 6 to 7 – see General Annex G of the Horizon 2020 Work Programme.

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

Expected Impact: As a result of this action, first responders should benefit from:

- Novel tools, technologies, guidelines and methods aimed at facilitating their operations
- New knowledge about field-validation of different tools, technologies and approaches involving first responders in (real-life) scenarios

Cross-cutting Priorities: International cooperation, Socio-economic science and humanities, Gender

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[1] For more information on Japan, please consult http://www.jst.go.jp/sicp/announce_eujoint_04_GeneralInfo.html.

[2] For more information on **Korea**, please consult http://www.nrf.re.kr/eng/main and http://www.nrf.re.kr/biz/info/notice/view?nts_no=82388&biz_no=116&search_type=ALL&search_keyword=EU&page.