Programme

Infravation
An Infrastructure Innovation Programme

10:00 **Welcome and Introduction**
(Peter Wilbers, RWS)
A National Funding Provider's View on the Infravation Initiative
(Marina Martínez-Garciá, CDTI)
EC Views on the Issue of Road Infrastructure Innovation
(William Bird, EC, DG RTD/H2)

10:50 **Thematic Scope of the Infravation 2014 Call**
(Johan Jonsson, Trafikverket, Scoping Team)

11:20 **Proposal Preparation and Submission**
(Miriam Stephan and David Doerr, TÜV Rheinland, Infravation Call Secretariat)

12:30 – 13:30 **Lunch break**

13:30 **Brokerage Session**
- In cooperation with ETNA Plus (European Transport Network Alliance)
- Moderator David Doerr, TÜV Rheinland
- Instructions and details after lunch

16:30 **End of meeting**

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ERA-NET Plus Infravation

Thematic Scope

Infravation Brokerage Event

Brussels, March 20th 2014

Johan Jonsson
TRAFIKVERKET

General

ERA-NET Plus on

'Advanced systems, materials and techniques for next generation infrastructure'. (Road infrastructure: pavements, bridges, tunnels)

through

cost-effective advanced systems, materials and techniques in road infrastructure construction and maintenance, including repair, retrofitting and revamping

using

materials technology, methods and processes, and supporting systems, such as monitoring, communication and energy.

Expected impacts

Resource efficiency

- Better quality, improved recycling reduce the requirement of scarce resources (*e.g.* energy and raw materials).
- Improved virtual engineering for design, construction and maintenance will allow for a less conservative approach.
- Modularisation and standardisation of *e.g.* structural elements enhance production as well as end-of-life handling.

Accessibility

- Less intrusion through novel techniques for construction, inspection and maintenance allow for more effective transport flow during works.
- Predictive performance and deterioration modelling allows for 'right level of action at right time'.

Expected impacts (cont'd)

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Cost efficiency

- Total cost of ownership as an independent design driver.

Safety

- Reduced deterioration of infrastructure reduce the need for *e.g.* barriers during works.
- Automated and autonomous processes for hazardous actions.

´near market-ready research´

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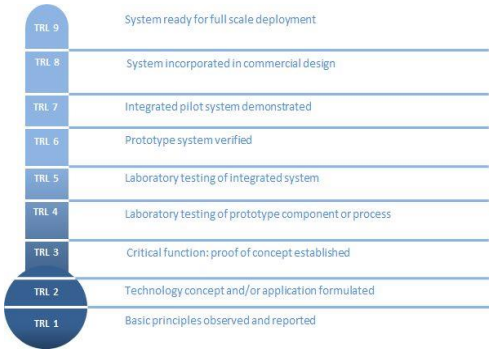
The NASA technology readiness levels:

- New knowledge and technologies (TRL 2 to TRL 3-4).
- Developing the next generation technologies (TRL 3-4 to TRL 4-5).
- Demonstration of technologies (TRL 5-6 to TRL 6-7).
- First-of-a-kind, commercial-scale industrial demonstration (TRL 8).
- Market uptake.



TRL and Demonstration

Technology Readiness Levels and Demonstration

- The Infravation transnational call encourages ´near market-ready research´, between TRL 5-7
- Promising technologies/services at a lower level are appreciated as well, provided they include a convincing approach to reach at least level 6 within the project duration of 30 months.
- Proposals shall clarify that the demonstration (TRL 7) of its technology readiness level will be achieved within the time frame of an Infravation project.
- Proposals should demonstrate the applicability of specific technologies and services techniques at existing road infrastructure.

Seven challenges for Infravation

A. Advanced predictive infrastructure performance processes.
B. Enhanced durability and life-time extension.
C. Rapid and non-destructive methods for routine quality and performance checks of materials and construction.
D. Keeping freight routes open through zero-intrusive maintenance.
E. Ensuring performance under all weather conditions.
F. Resource and energy efficiency in road construction and maintenance (Eco-design).
G. Virgin material reduction by substitution or recycling.

Challenge A

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Advanced predictive infrastructure performance processes

To accommodate the performance of current and novel materials and/or design and construction techniques, as well as different conditions (such as different climatic and/or traffic conditions), a better prediction of how infrastructure assets will perform is needed. This requires the development and integration of performance and deterioration models into asset management systems. The role of advanced accelerated testing techniques to complement such models should be considered.

Research Questions

A.1 Next generation predictive models for infrastructure performance and deterioration, including updating leaps in current models.

Challenge B

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Enhanced durability and life-time extension

Extending the life-time of infrastructure contributes to reducing both resource use and congestion. Materials and techniques that provide the cost-effective upgrading and rehabilitation of infrastructures will be developed. This could include maintenance equipment, coating and/or strengthening materials as well as the systems for retrofitting components.

Research Questions

B.1 Surface repair methods.

B.2 Strengthening for increased bearing capacity.

B.3 Extending the capacity of road infrastructure by geometric modification.

B.4 Novel materials for increased durability and lifespan of new road infrastructures.

B.5 Rapid, non-intrusive construction and maintenance systems and techniques.

Challenge C

Rapid and non-destructive methods for routine quality and performance checks of materials and construction.

Traditionally, on-site controls of materials, mixes, compaction and other pavement and structure characteristics have been based on single-point, partly or fully destructive measurements. Innovative methods that result in a step-change will be developed that replace these tests. This could include self-monitoring materials and equipment (e.g. robotics), non-intrusive observation techniques or other methods of ensuring quality and performance control more safely, quickly and/or to a higher degree of accuracy and precision. The demonstration of the benefits in comparison to existing standards and specifications is needed.

Research Questions

C.1 Performance indicators &systematic design for quality in the production phase.

C.2 Next generation testing and monitoring in the exploitation stage.

Challenge D

Keeping freight routes open through zero-intrusive maintenance

Projects will focus on novel products/techniques with the specific objective of ensuring reliable corridors for heavy freight, also during infrastructure maintenance. This will provide systems and techniques that better cope with increased heavy-vehicle volumes. It could provide ways of overcoming current limitations on infrastructure usage, coping with bottlenecks and, where necessary, include links with other modes. Specific attention may be given to the challenges of infrastructure maintenance in heavily freight-used sections where alternative routes are not practical. Robotic techniques, prefabrication and the use of adaptive/temporary structures can be considered.

Research Questions

D.1 Rapid repair, maintenance, retrofitting and revamping.

Challenge E

Ensuring infrastructure performance under all weather conditions

Novel materials and techniques will be developed and demonstrated that allow roads to provide full service under wide-ranging weather conditions. These might include materials that are highly resistant to cold weather (e.g. freeze-thaw), survive extended flooding and other extreme events.

Techniques and processes that reduce the adverse impacts of snow, icing, flooding, wind or heateffects can also be considered.

Research Questions

E.1 Next generation of weather-resistant materials for road infrastructure.

E.2 Weather resilience in design, construction and repair.

E.3 Real time observation of critical weather events.

Challenge F

Resource and energy efficiency in road construction and maintenance (Eco-design)

Techniques and systems may be developed that allow considerably lower environmental impact during the construction and maintenance of infrastructure. This will focus on processes that do not compromise the required performance and affordability, whilst reducing resource use, energy consumption, water pollution, etc.

Research Questions

F.1 Eco-balanced design.

F.2 Energy neutral operations.

Challenge G

Virgin material reduction by substitution or recycling

The development of innovative approaches to utilising advanced materials and techniques in products/services will result in a reduction in the usage of virgin materials and/or the maximization of the recycling of waste and end-of-life materials. This could include the application of material processing techniques or additives which require the use of substantially less existing materials or which enable the use of substitute materials currently deemed as inadequate by enhancing their quality and performance characteristics.

Research Questions

G.1 Advanced techniques and procedures for reuse, recycling and substitution.

G.2 Labelling for re-use and re-cycling.

Questions?