OVERVIEW OF SENSKIN PROJECT’S FIRST WORKSHOP p.15

Workshop focuses on Monitoring Systems for Resilient and Sustainable Bridges

AND SKILLFUL PROJECT’S FIRST CONFERENCE TO GAIN KEY INPUT AND DIRECTION p.18

Event sets the scene, and outlines progress made so far

HIGHLIGHTS FROM KEY EVENTS AT BASt INFRASTRUCTURE WEEK

FOX final conference and 2017 Infravation Annual Event held end-October at FEHRL’s German member (p. 6-9)
INNOVATION FOR TRANSPORT INFRASTRUCTURE

Transport infrastructure is the lifeblood of modern society, but often struggles to meet demands and expectations on reliability, availability, maintainability, safety, environment, health and cost. FEHRL’s role is to provide solutions for the challenges now faced and anticipate the challenges to come. Through innovation, the operation of transport infrastructure can address society’s needs.

FEHRL encourages collaborative research into topics such as mobility, transport and infrastructure, energy, environment and resources, safety and security as well as design and production.

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EDITORIAL FROM SECRETARY-GENERAL AND MESSAGE FROM FEHRL PRESIDENT

FIRM magazine now five years old, FEHRL key recent events in 2017 and gearing up for 2018.

DESIGN & PRODUCTION SYSTEMS

FOX project comes to an end with final conference

Annual event and demonstration activities for ERA-NET Plus Infravation programme and innovation projects, respectively

Update on asset management with AM4INFRA and RAGTIME projects

First nine months of SAFE-10-T project

And first two years of AEROBI project

First SENSKIN workshop focuses on Monitoring Systems for Resilient and Sustainable Bridges

MOBILITY, TRANSPORT & INFRASTRUCTURE

First six months of CoEXist project…

…And last half a year of FLOW project

HORIZONTAL & DISSEMINATION

First SKILLFUL conference sets the scene and outlines progress made so far

FEHRL European Scanning Tour focuses on automated driving and electrification
Also in this issue, you can read updates on the H2020 AM4INFRA (p.10-11), RAGTIME (p.12), SAFE-10-T (p.13), AEROBI (p.14), CoExist (p.16) and FLOW (p.17) projects and a comprehensive overview of FEHRL’s 2017 European Scanning Tour held in September 2017, which focused on automated driving and electrification (p.19).

GEARING UP FOR 2018

As our President mentions in her message on the opposite page (p.5), FEHRL has an intense programme of activities planned for 2018 for both its project and non-project related activities. The year started of course with the 2018 Transportation Research Board’s 97th Annual meeting (TRB) in Washington DC, USA, where we participated as usual in the ERA-NET Plus Infravation session with great interest from all. I also introduced our SKILLFUL project to a US audience at the Council of University Transportation Centers - Winter Business Meeting, took part in a CoExist project workshop about twinning with the US and progressed the FEHRL self-funding initiative you can read about on page 5.

As you can read on the back page, FEHRL and selected FEHRL institutes will be present again on the CEDR stand at the Transport Research Arena 2018 (TRA 2018) on 16-19th April 2018 in Vienna, Austria and is also organising the final conference for the H2020 AM4INFRA project as a side event during TRA 2018 on Wednesday 18th April 2018. Many of our projects will also feature on the European Commission stand and in various technical sessions of the conference.

We hope you enjoy your read!

Thierry Goger
FEHRL Secretary General
(thierry.goger@fehrl.org)
Another year has ended and a brand new year begun. It is time for reflection about all the good work carried out and the brave results received. My congratulations to all FEHRL members! It is also time for the start-up of 2018 activities. The FEHRL General Assembly (FGA) agreed on the FEHRL business plan for 2018 at its meeting in Lisbon, Portugal from 28-29th November 2017. This business plan is indeed ambitious on behalf of transport research, as well as FEHRL. I am glad and proud that the FGA confirmed this intensity in the level of FEHRL activities for the coming year!

During the last year, we have been working on a lot of programmes. All of them performed very well. FGA has also been working for a while now on the concept of FEHRL self-funded projects. The Forever Open Road Programme Manager, Martin Lamb, presented the principle behind FEHRL’s new self-funding initiative at the FGA. Following good work by the Research Coordinators (RCs), two project proposals were suggested and approved by the FGA:

- Assessment of big data potential from road vehicles and embedded devices for asset management and operation
- Development of low noise pavements

Anyone who is interested in these topics, as researcher or funder, is kindly asked to get in contact with the FEHRL Secretary-General, Thierry Goger at thierry.goger@fehrl.org.

The ERA-NET Plus Infravation programme has been an important programme for FEHRL these last years. Last year and continuing into this year, results have been presented and demonstrated in Europe and the USA. FGA considers the following as an overview of the significant impact FEHRL has had on the programme:

- Involvement in the Scoping Study
- Setting up of financial scheme with FHWA, hence enabling for the first time a real common pot between Europe and USA
- Monitoring of projects, which includes coordinating the Scientific Panel and developing the Technology Readiness Level (TRL) Assessments (together with FHWA)
- Dissemination of the programme

FGA decided that FEHRL is willing to remain actively involved in the Infravation follow-up initiative and play the same advisory role as in the current Infravation blueprint initiative and, in addition to other tasks to be discussed and agreed within FEHRL and the Infravation Steering Group, of the follow-up initiative. FEHRL is looking forward to receiving an invitation from the funders of the follow-up initiative.

With FEHRL member’s common research competence and allocated knowhow in the transportation field, combined with our network to industry, I see FEHRL as a body of experienced professionals that possess the skills to share competence and enhance performance – when we cooperate.

Marit Brandtsegg
FEHRL President
(marit.brandtsegg@vegvesen.no)
FOX (Forever Open Infrastructure across (X) all transport modes) was a 30-month Coordination and Support Action (CSA) project funded by the European Commission (EC) under the H2020 MG-812-2014 Smarter design, construction and maintenance call that has just finished at the end of October 2017. FOX aimed to identify common research needs and innovative techniques in the areas of construction, maintenance, inspection, and recycling & reuse, and develop a network of engaged experts both during and beyond the lifetime of the project. In the longer term, the ambition is that there will be a vibrant community of stakeholders from a range of transport modes, sharing experiences and technologies, undertaking joint research projects and creating a European transport network that is safer, more secure, with lower carbon emissions and which is focussed on user needs.

FOX had a sister project USE-iT (Users, Safety, security and Energy in Transport Infrastructure), which finished at the end of April 2017 and they effectively operated as one single project with common meetings due to the synergies that exist between the two and the fact that many partners and third parties on one project were also partners or third parties in the other, and that FEHRL was also the leader of both projects. The 24-month USE-iT project’s vision was to better understand the common challenges experienced across transport modes, bring representatives of transport modes together to share experience and skills and develop a set of common research objectives.

The results of FOX were presented at a final conference on the morning of Wednesday 25th October 2017 at FEHRL member BASt near Cologne, Germany for some 40 key transport research stakeholders. Maria Cristina Marolda of the European Commision’s (EC) DG MOVE first introduced the rationale behind FOX and USE-iT, as well as related projects SETRIS (newrail.org/setris), REFINET (www.refinet.eu) and the EC’s Infrastructure Cloud initiative (collaborativeinnovationdays.eu).

Thierry Goger, FEHRL Secretary General, explained the history of FOX and USE-iT and how they both were influenced strongly by FEHRL’s FORx4 initiative, and in turn will influence the development of the FORx4 initiative by the results that have been achieved. He also outlined the common process used for both FOX and USE-iT, which included:

- **An Inventory of the State of the Art and best practices from May – December 2015 presented at the first workshop in January 2016**
- **Description of the best practices/most promising opportunities useful for other transportation modes and identification of common research needs from January - November 2016**
- **Development of roadmaps for future initiatives on cross-modal research from December 2016 – August 2017**
The Work Package (WP) leaders then presented the recommendations from each of these four FOX roadmaps for Construction, Maintenance, Inspection and Recycling & Reuse, as well as the next steps for implementation and exploitation. Veronique Cerezo of IFSTTAR first described the recommendations for Construction. She was followed by Ursula Blume from BASt who outlined the Research Areas for Maintenance. Darko Kokot of ZAG then gave an overview of the Inspection results and challenges. Finally, the fourth area of Recycling & Reuse was described by Jos Wessels of TNO.

Martin Lamb, FOR/FORx4 Programme Manager for FEHRL, closed the event by outlining the achievements of both FOX and USE-iT. These comprise the identification of hundreds of technologies, 42 research challenges for the four above-mentioned FOX areas of Construction, Maintenance, Inspection and Recycling & Reuse and three USE-iT areas of User Information, Safety and Security, and Energy and Carbon. He outlined the development of the large community of almost 840 stakeholders and the active core community and explained how all these achievements are planned to be built upon to create a fully integrated transport infrastructure.

A “Summary report of recommendations” (Deliverable 6.7), which builds on the final USE-iT Deliverable 5.4 with the same name (described in detail in the August 2017 issue of this magazine), has just been approved by the EC. This Deliverable will now be disseminated to public and private transport infrastructure operators, research funders and providers, construction and technology companies amongst others, as a document produced and endorsed by their peers on the challenges and opportunities facing the transport sector.

It is also basis of the FEHRL position paper to the new Framework Programme of the EC (FP9) as it clearly expresses the urgent needs for the adaptation of the transport network to future challenges, considering the innovations that have been and will probably achieved in the near future.

The projects will now work to establish a co-modal transport Working Group, called FORx4 Working Group, which will develop and update the FORx4 programme by the consideration and integration of the output from FOX, USE-iT and REFINET, enhance the work achieved within the three projects and respond to existing research calls, etc. The kick off meeting of this FORx4 Working Group is planned at the Transport Research Arena 2018 (TRA 2018) in Vienna, Austria, from 16-19th April 2018.

The presentations from the FOX final conference and individual Deliverables can be found at www.useitandfoxprojects.eu/library.

This event was one of a series that took place during the whole week, most notably the ERA-NET Plus Infravation Annual Event 2017 on the afternoon of Wednesday 25th October and the Infravation Healroad project demonstration event on the morning of Thursday 26th October (see pages 8-9).

For more information on USE-iT and FOX, go to www.useitandfoxprojects.eu or contact Project Coordinator Thierry Goger at thierry.goger@fehrl.org under “FOR x 4 initiative on transport infrastructure” group.
Some 70 key transport research stakeholders attended the 2017 ERA-NET Plus Infravation Annual Event held during the Infrastructure week on the afternoon of Wednesday 25th October 2017 at FEHRL member BASt near Cologne, Germany. This event, held on the same day as the H2020 FOX project’s final conference (see p.6-7), was opened by Peter Wilbers, Infravation Programme Coordinator and Stefan Strick, BASt President, who both gave their respective introductions. Thomas Harman, Director of the Center for Accelerating Innovation of FHWA, then gave a motivational presentation on how the US has managed to transform transportation by innovation and each of the nine Project Coordinators followed with an update on their project’s progress, including the aim, problem statement, solution, results so far and progress. William Bird, the European Commission’s Scientific Officer for Infravation, then made the entertaining wrap-up and closing remarks before delegates were able to enjoy a joint Infravation and FOX cocktail party.

This event was one of the following series of Infravation events that took place during the whole week:

- **Tuesday 24th October, whole day:** Infravation Scientific Panel and Project Coordinators meeting
- **Thursday 26th October, morning:** Healroad project demonstration event
- **Thursday 26th October, afternoon:** Infravation Steering Group meeting

You can find out more about Infravation at two upcoming key events this year:

1. Infravation will feature in the “Collaborative Innovation” quarter of the CEDR stand (no. D02) at the Transport Research Arena 2018 (TRA2018) in Vienna, Austria on 16-19th April 2018 (see back page)

2. The Infravation Final Event will be held at the Innovation Expo 2018 in Rotterdam, the Netherlands on 4th October 2018. See www.innovatie-estafette.nl/ for more details
DEMONSTRATION EVENTS TAKEN PLACE FOR SIX OF NINE PROJECTS

As already mentioned in the last issue of FIRM, the focus for 2017 and into 2018 for Infravation is most definitely the demonstration activities being held for each of the nine innovation projects, which gear them up for onward implementation. Events for six of the nine projects have now taken place with the following three still to come early this year:

- **27-28th February 2018**: ALTERPAVE demonstration event in Milan, Italy
- **12-13th March 2018**: SHAPE demonstration event in Bologna, Italy
- **March 2018 (date still to be confirmed)**: ECLIPS demonstration events in Delft, Netherlands and Arizona, USA

Following the SEACON project event in Tampa, Florida on 3rd-4th May 2017 and the BioRePavation project at IFSTTAR in Nantes, France on 6th July 2017 (outlined in the August 2017 issue of this magazine), four more projects held their demonstration events in the second half of 2017.

SUREBRIDGE HOLDS TWO DEMONSTRATION WORKSHOPS

On 1st September 2017, the SUREBridge project held a workshop at Chalmers University of Technology in Gothenburg, Sweden, to present the results so far. Participants from relevant stakeholders including representatives from Swedish Transport Administration (TRV), a number of consultant offices and contractors active in the strengthening and repair of structures attended the workshop. The workshop ended with a laboratory visit where the participants could see the large-scale beam specimens tested during August at Chalmers.

This event was followed by a public seminar on 22nd September at the School of Engineering of the University of Pisa, Italy where again some initial results were presented. More information can be found at surebridge.eu.

SEEBRIDGE HOLDS FOUR EVENTS IN UK, ISRAEL, USA AND GERMANY

Four demonstration events have been held in total for the SEEBRIDGE project. Three took place on 18th September 2017 in Tel Aviv, Israel at the Netivei Israel Head Office for more than 40 participants, at the University of Cambridge, UK, for almost 80 participants and the GDOT Bridge Office in Atlanta, USA, for more than 10 participants. The fourth then followed on 25th September in Munich, Germany. More information can be found at seebridge.net.technion.ac.il.

HEALROAD WORKSHOP UNVEILS RESULTS AND DEMONSTRATION

As already mentioned, the HEALROAD workshop took place on 26th October in Germany on the day after the 2017 Infravation Annual Event. The consortium presented the scientific and technical actions developed so far to an audience of around 50 experts.

The laboratory tests focussed on key parameters to improve the self-healing technique already created by the University of Delft. The full-scale demonstrator considered the asphalt production and deployment of the test-section at the new duraBASt facility in Germany. The workshop finished with a visit to the duraBASt demonstration area where participants joined a live demonstration with the devices deployed to prepare the pavement for the self-healing process. More information can be found at healroad.eu.

FASSTBRIDGE DEMONSTRATION EVENT HELD AT DRAGADOS NEAR MADRID SPAIN

Finally, the FASSTBRIDGE demonstration event was held at project partner DRAGADOS near Madrid, Spain on 7-8th November 2017. The meeting started with a welcome and introduction by Dragados, followed by a general introduction by the Project Coordinator Tecnalia. Then each of the technical elements were described:

- Fatigue and design by Altavista
- Adhesive development by Collanti
- Prototype testing by IFSTTAR
- Jarama bridge by DRAGADOS

The day ended with a site visit to the Jarama bridge. More information can be found at fasstbridge.eu.

See www.infravation.net or contact the Call Manager, Richard van der Elburg at richard.vander.elburg@rws.nl for more information..linkedin.twitter
FIRST STAKEHOLDER GROUP MEETING HELD AND SEVERAL EVENTS PLANNED IN 2018

The first AM4INFRA stakeholder group meeting was held on 3-4th October 2017 at the LEF future centre in Utrecht, the Netherlands. In a lively and fruitful discussion, over 30 participants from different countries and multi-modal organisations provided valuable input to draft project documents, as well as the planned Living Labs in which the documents will be demonstrated and verified. The documents constitute a common framework for a European life-cycle based asset management approach for transport infrastructure.

Over the coming months, various additional consultation events will be organised, centred around the Living Labs and the final project event during the 2018 Transport Research Arena (TRA 2018) on Wednesday 18th April (9-12pm) in Hall B (see back page).

AIM OF THE STAKEHOLDER GROUP MEETING

The main aim was to consult external stakeholders on three draft documents supporting the application of the common framework approach:

- An application guideline for Infrastructure Asset Managers on how to use the framework approach in order to optimise decisions across their line of sight from policy indicators to condition and performance of the individual assets
- A repository of case examples for whole life cycle and risk based management for reference
- A data business model explaining how data and data architectures are implemented in order to support optimal and transparent decision-making across the modes and institutions.

In addition, the objectives and scopes of three planned Living Labs were discussed, in which the common framework will be demonstrated and verified against the backdrop of live practice cases on specific (multi-modal) sections of the (road) transport networks.

The stakeholders were welcomed by the Technical Coordinator of the project, Ruud Smit. He introduced the AM4INFRA project and the leaders of the content driving Work Packages (WPs): Gerrald Goselink (RWS; WP1), Ramesh Sinhal (HE; WP2), Elisabetta Marzocchi (ANAS; WP3).

In a series of break-out sessions, the stakeholders were consulted on the concepts and documents from each of the three content WPs. Valuable insights and recommendations were captured on the project scope, alignment with technology development and replicability in the context of asset management maturity.

Furthermore, in relation to the dissemination and replication activities, a large number of recommendations and ideas resulted from the discussion of a beneficial stakeholders’ approach aimed at aligning with the strategic, tactical and operations elements of any agency or entity. Discussion also ensued regarding the legacy of the project, in which the plan is to create a specific Community of Practice (CoP) and post Living Lab activities. In his wrap up, the Technical Coordinator stressed that such a CoP would be open for external registration in spring 2018. During the joint dinner, the stakeholders were encouraged to discuss their observations and findings of the day in a cordial setting.
In the second leg of the meeting, the concept and objective of the three Living Labs were briefly explained. Each of the Living Labs were introduced:

- **A90 Rome** (31st January 2018; applicability of the data and information element of the common framework)
- **E34 Eindhoven** (21st February 2018; applicability of the integrated common framework/line of sight)
- **M4 London** (8-9th March 2018; applicability of the life cycle and risk-based management element of the common framework).

**LIVING LAB A90 ROME**

The first Living Lab will be launched on 31st January 2018 at the headquarters of project member ANAS, Rome, Italy and concentrate on a 70 km stretch of the Rome Ringway A90. Here, major works are planned and implemented, which require intensive interplay with the regional and municipal asset managers. The goal is to verify and improve the application of the data meta model as described in the project document "Business Blueprint an asset management core system". This Living Lab will be held in Italian, but a webinar will be held on Thursday 8th February (10-11.30am) in English for other interested stakeholders.

**LIVING LAB E34 EINDHOVEN**

The second Living Lab will be launched on 21st February 2018 in Antwerp, Belgium and concentrate on the E34 motorway and its interconnections in the area. This road connects the seaports of Antwerp and Zeebrugge to the German Ruhrgebiet, crossing Dutch territory south of the City of Eindhoven, where it intersects with a main route from the seaport of Rotterdam. This Living Lab will be held in Dutch, but a webinar will be held on Thursday 1st March (10-11.30am) in English for interested stakeholders.

As such, this Living Lab will span three countries. The spatial setting is the fast growing ‘brain port’ area in and around the city of Eindhoven. It addresses numerous cross border challenges like variations in quality of motorway pavement, road access, local authorities. Congestion is a key issue. Also, cross-modal opportunities exist between water and road transport and air with Eindhoven airport in the vicinity. The Living Lab aims to verify and improve the application of the framework architecture as described in the project document “Guideline for the use of the framework architecture”, enabling national infrastructure agencies to translate the framework into context specific actionable strategies.

**LIVING LAB M4 LONDON**

The third Living Lab, to be launched on 8-9th March 2018 near London, UK, will concentrate on the M4 (London - Wales) motorway and its connections in the area such as the M25 and London Heathrow airport. The M4 is a key route connecting Wales and the South West of England to London. Future developments on this route will have an effect on local roads, other transport mode operators, the area surrounding the route and London Heathrow Airport. The goal here is to demonstrate how whole life cost, life cycle engineering and risk based approaches can be integrated to deliver benefits and desired outcomes for road users as well as the asset owners. A webinar will also be held on Tuesday 20th March (10-11.30am) for interested stakeholders.

The results will also be made available to stakeholders at the final project conference, which will take place during the Transport Research Arena (TRA 2018) on Wednesday 18th April 2018 (see back page for more details).

For more information, see [www.am4infra.eu](http://www.am4infra.eu) or contact Project Coordinator Jenne van der Velde at [jenne.vander.velde@rws.nl](mailto:jenne.vander.velde@rws.nl)
The H2020 RAGTIME project intends to move from current Assets Integrity Management (AIM) approaches to Advanced Asset Integrity Management (AAIM) of transport infrastructure networks across the whole life-cycle phases. This AAIM concept is based on three main interconnected modules, that will be enabled via an Open Software Platform: where tools and modules will be integrated and interrelated to allow the sharing of information at various levels and for various purposes. The modules are detailed here.

**GOVERNANCE MODULE**

Governance Module focuses on a new procurement process, which entails a new process for infrastructure acquisition through a new Governance risk mitigation approach; the development of a new lean and innovative procurement process; the definition of a standard methodology for commonly evaluating the tenders from different administrations. Governance Module is based on the idea that infrastructure is an asset itself, and should apply asset management techniques including a whole innovative process.

RAGTIME expects to develop a RAGTIME Governance Flow, based on Governance indicators; a new relationship between the stakeholders involved in the public–procurement process and further exploitation and maintenance of the infrastructures while enhancing transparency and social involvement.

**FINANCIAL, ECONOMIC AND RISK MODULE**

This module focuses on a comprehensive and standardised multi-step methodology for implementing risk assessment in transport infrastructure projects which the end user will be able to implement in its company through the guidance of a tool. The proposed risk management approach consists of three steps: mapping, evaluation and strategy. Every step will be represented by a separate tool section. Thus, the risk assessment will be conducted directly from the end-user, who will be guided through the completion of each section by suggestions and examples. In addition, the user will be allowed to customise the tool depending on its previous experience and knowledge of the Risk Management activity, making the tool extremely versatile and capable of satisfying the needs of both a user new to the Risk Management field and an experienced Risk Manager.

More than 50 relevant risks have been identified so far. For every risk, one or more of the causes of the risk have been identified and characterised defining the phase of origin, the affected phase, transport mode, stakeholders involved, and risk evaluation, as well as some possible mitigation strategies. As of today, the map developed has been validated with several stakeholders and project partners, which has provided useful insight to the map structure and contents.

**MANAGEMENT MODULE**

The new strategy defined within RAGTIME for the technical management of transport infrastructures, focused on the road and rail sectors and affecting mainly the phase of operation and maintenance, will be based on the incorporation of the infrastructure monitoring methodology, with the overall objective of being able to contribute with real, reliable and on-time data to the decision process.

In addition to the Open Software Platform, guidelines for the implementation of the RAGTIME AAIM methodology and specific Business models will enable the transfer of exploitable results into implementation at network level and for specific business cases.

**FIRST RAGTIME STAKEHOLDER REFERENCE GROUP MEETING HELD**

The Stakeholder Reference Group (SRG) was organised as a forum for information and opinion exchange, consisting of project partners and external experts. The first SRG meeting was held on 21st November 2017 in Brussels, Belgium where participants provided valuable feedback about the project approach and tools developed.

SRG meetings will be held every six months, with the next one planned on 26th February 2018 in Milan, Italy, at AON premises.

RAGTIME will also feature at the European Commission stand at the 2018 Transport Research Arena (TRA2018) on 16-19th April 2018 (see back page).

▶ For more information, see www.ragtime-asset.eu or contact Project Coordinator Maria Zalbide at maria.zalbide@tecnalia.com.
SAFE-10-T DEVELOPING NOVEL MACHINE LEARNING APPLICATIONS FOR TRANSPORT INFRASTRUCTURE NETWORKS

As first profiled on page 12 of the August 2017 issue of this magazine, the 36-month SAFE-10-T (Safety of Transport Infrastructure on the TEN-T Network) project, funded by the European Commission under call topic H2020 MG-3.4-2016 Transport infrastructure innovation to increase the transport system safety at modal and intermodal level (including nodes and interchanges), aims to enhance the safety of EU transport infrastructure according to the development of an online Decision Support Tool (DST). It is intended that this DST will be used to make strategic investment decisions regarding transport infrastructure.

The DST will incorporate novel machine learning applications for road, rail and inland waterway infrastructure, at both asset and network level. Specifically, the project will consider the safety of bridges, tunnels and earthworks and will look at multi-modal transport movement. The project consortium is currently developing these applications, whereby monitored data will feed into newly developed algorithms that will enable the models to learn and evolve with time. For example, the project is looking at how rainfall data may feed into a model for earthworks along transport networks that learns from past data and which may be used to predict impending slope failure.

SAFE-10-T EVENTS TO WATCH OUT FOR IN 2018

There are a number of exciting upcoming events for SAFE-10-T in 2018. Transport infrastructure owners and operators, in particular, are encouraged to attend the following events as the consortium is keen to ensure that the project outputs, particularly the DST, address the specific needs of stakeholders.

TRANSPORT RESEARCH ARENA (TRA), VIENNA, 16TH – 19TH APRIL 2018

SAFE-10-T will present at the European Commission stand at the 2018 Transport Research Arena (TRA2018) on 16-19th April 2018 (see back page). The project will present on research activities conducted in the first year in the project, including advanced safety models for bridges, tunnels and earthworks.

SAFE-10-T STAKEHOLDER WORKSHOP, CETRA, ZADAR, CROATIA, 17TH – 19TH MAY 2018

SAFE-10-T will host a special session at the 5th International Conference on Road and Rail Infrastructure, which will be held in Zadar in May. Preliminary project results and findings will be presented at the session. In addition, a stakeholder workshop will be held to determine current and future transport demand for road, rail and inland waterways in Europe. Further information will be made available on the SAFE-10-T website www.safe10tproject.eu soon.

For more information see www.safe10tproject.eu or contact Project Coordinator Dr. Paul Doherty at pdoherty@gdgeo.com

PARTNERS

For more information see www.safe10tproject.eu or contact Project Coordinator Dr. Paul Doherty at pdoherty@gdgeo.com
The H2020 project AErial RObotic System for In-Depth Bridge Inspection by Contact (AEROBI) project has just completed its first two years. One of the main objectives of the project is to develop an incrementally optimised aerial robotic system with a multi-joint arm for the in-depth inspection and assessment of reinforced concrete bridges that will include the computer vision system, sensor system and the laser equipment, while it will be integrated with the software to evaluate and structurally assess the mechanical performance and safety of the inspected bridges.

During this period, a first version of the system V1 (Beta) and a preliminary version of the computer vision module were integrated. The V1 (Beta) was tested on an operational bridge in the south of Seville. The tests demonstrated that the system (manually piloted and without the articulated arm) could inspect the bridge (one span in this case) and detect all anomalies/defects.

The computer vision system under development combines traditional image analysis techniques (background extraction type) with deep learning techniques. The first version of the computer vision module tested on an operational bridge, some 150 km south-east of Seville, Spain in December 2016, demonstrated the validity of this choice as the results exceeded the expectations of the end-users. After these first tests/trials, the development of the computer vision module continued.

The new strategies to collect bridge data and the constitution of the databases have been defined. They involve collecting a large set of images with all types of defects. This set is used to train the system (deep learning) on a large panel of different objects and a large spectrum of environmental conditions (light, textures, etc.). The second step is to collect data from the bridge to inspect to calibrate the algorithms.

The ultra-sonic sensor is now available (first prototype). The tests have started on various samples of concrete with cracks and it appears that the results are quite stable (different measures are giving very close results). The tests results are also very close to the manual measures (the percentage of difference is inferior to the percentage of error of the manual methods). The sensor itself is therefore 80% complete. The following work will essentially be to optimise the manufacturing process and integrate it in the robotic arm to warrant its full operationality.

Meanwhile, the second version of the system has been integrated and the articulated arm is operational with the ultra-sonic sensor mounted. This version will be tested in the second part of March 2018 on the same afore-mentioned bridge near Seville that was used for the first version. The operational capabilities will be studied, especially in terms of autonomous navigation and user-friendliness to prepare the final version that will be tested in Greece for the final demonstration. This final demonstration will incorporate the structural assessment module that interprets all the inspection data with all the data from the bridge and its environment. The Greek bridge on the Strymonas river is quite old and has a lot of different defects. It is in a prestigious location, close to the old Macedonian city of Amphipolis and in the middle of the military harbour of Alexander the great. More details to given in the next issue of FIRM!

▶ For more information, contact Project Coordinator Philippe Chrobocinski at philippe.chrobocinski@airbus.com or see www.aerobi.eu

AEROBI ADAPTS AND INTEGRATES RECENT RESEARCH WITH SPECIALISED MULTI-JOINT ARM TO SCAN POTENTIAL CRACKS IN A BRIDGE

PARTNERS

DESIGN & PRODUCTION SYSTEMS
In a lively and fruitful discussion, around 40 participants provided valuable input to the work of the project. The aim of this workshop was to analyse the requirements and methodology of the SENSkin monitoring system. To facilitate and enhance knowledge exchange between practitioners in the field of (SHM), a number of systems already being used and developed within the project context were also presented. A short overview follows:

**SESSION 1: SETTING THE SCENE**

Following a welcome by Adewole Adesiyun from FEHRL, Sergio Escriba, SENSKin Project Officer from the EC/INEA described the expectations for SENSKin and Konstantinos Loupos, Project Manager from ICCS, then gave an overview of the project. The keynote speech by Joan Ramon Casas of the Technical University of Catalonia was entitled “Latest trends in Structural Health Monitoring”.

**SESSION 2: BRIDGE MONITORING SYSTEMS - USERS’ NEEDS AND CHALLENGES**

Moderated by Konstantinos Loupos, this session started with a presentation by Panagiotis Panetsos of Egnatia Motorway, Greece on the bridge structures of Egnatia Motorway. The second presentation, SENSKin Integrated Monitoring System, given by Konstantinos Loupos, described the modules/sub-systems that constitute the monitoring system. Peter Jones’ (TRL UK) presentation, Laboratory Tests on Prototypes, focused on the various laboratory tests conducted on the sensors. The fourth presentation, The Structural Assessment Modules, given by Sanna Corrado of TECNIC SA in Italy, explained the objectives of the structural modulus. The last presentation given by Panagiotis Panetsos explained the work to field evaluate and benchmark the system and integrated package on two actual and in-service bridges - the Bosporus Bridge in Istanbul and the Egnatia G4 Ravine Bridge in Greece.

**SESSION 3: THE SENSKin MONITORING SYSTEM**

The Consortium members described the progress made so far, starting with an overview of the Prototype of Sensing Elements by Dmitry Rychkov of the University of Potsdam, Germany. The second presentation, SENSKin Integrated Monitoring System, given by Konstantinos Loupos, described the modules/sub-systems that constitute the monitoring system. Peter Jones’ (TRL UK) presentation, Laboratory Tests on Prototypes, focused on the various laboratory tests conducted on the sensors. The fourth presentation, The Structural Assessment Modules, given by Sanna Corrado of TECNIC SA in Italy, explained the objectives of the structural modulus.

**SESSION 4: MONITORING SYSTEMS OF CIVIL INFRASTRUCTURE**

Here a number of other monitoring systems were presented. The first, Acoustic Emission for Structural Health Monitoring, was presented by Jon Watson and Nassos Anastasopoulos of Mistras Group Hellas (MGH).

**SESSION 5: PANEL DISCUSSION**

This session wrapped up the whole meeting. All materials can be found at www.senskin.eu/downloads.

**2ND WORKSHOP PLANNED IN ISTANBUL**

The 2nd SENSKin workshop is now planned on 24-25th May 2018 at project partner KGM’s 1st Regional Directorate in Hasdal, Istanbul, Turkey. See www.senskin.eu/events/senskin2ndworkshop for more details.

For more information, contact Project Coordinator Angelos Amditis at a.amditis@iccs.gr or see www.senskin.eu.
CoEXist: ENABLING CITIES TO GET AUTOMATION-READY

CoEXist is an H2020 project (May 2017 - April 2020) which aims at preparing cities for the transition phase during which connected and automated vehicles (CAVs) and conventional vehicles will co-exist on their roads.

Automation-ready transport and infrastructure planning in cities are a key precondition for fulfilling the promises of CAVs to reduce road space demand and improve traffic efficiency and safety. CoEXist will address three key steps in transport and infrastructure development.

(1) Automation-ready transport modelling
Develop a validated extension of existing microscopic (micro) and macroscopic (macro) transport models to include different types of CAVs (passenger cars and light freight vehicles with different automation levels).

(2) Automation-ready road infrastructure
Create a tool to assess the impact of CAVs on safety, traffic efficiency and space demand, and develop design guidance for hybrid infrastructure (for both conventional and CAVs) to mitigate the potential negative impacts.

(3) Automation-ready road authorities
Elaboration of eight use cases in four local authorities (Gothenburg, Helmond, Milton Keynes and Stuttgart), used to evaluate – with the CoEXist tools – the impacts of CAVs on safety, traffic efficiency and road space requirements and making detailed hybrid infrastructure design recommendations.

COEXIST USE CASES

In October 2017, the CoEXist project held an internal workshop to further develop the use cases that are going to be investigated. The modelling and impact assessment tools developed in the project will be used to assess the “Automation-readiness” of the locally-designed use cases. Based on the preliminary results of the workshop, the following use cases will be investigated:

Gothenburg, Sweden
- Mixed use road space (micro)
- Accessibility during long-term construction works (micro and macro)

Helmond, the Netherlands
- Signalised urban traffic junction including pedestrian and cyclists (micro)
- Transition from interurban highway to arterial (micro)

Milton Keynes, United Kingdom
- Waiting and drop-off areas for passengers (micro)
- Loading and unloading areas for freight (micro)

Stuttgart, Germany
- Impacts of CAV on road capacity, travel time and mode choice (macro)
- Impact of driverless car- and ride-sharing services (macro)

“AUTOMATION-READY” STAKEHOLDER WORKSHOPS

To achieve its objective of increasing the capacity of road authorities and other urban mobility stakeholders to get ready for the transition towards the gradual introduction of CAVs on roads, CoEXist is conducting several stakeholder engagement activities. The results of this consultation process will be analysed and published in the “Automation-ready” framework that is being developed in the project.

As part of the consultation process, on 28th September 2017 CoEXist held a transport automation in cities focus group meeting/workshop at the CIVITAS Forum 2017. In addition, on 10th October 2017, the Polis network hosted a joint workshop between three H2020 projects: CoEXist, MAVEN and TransAID, on the implications of vehicle automation on urban roads. Around 20 people attended the CIVITAS Forum workshop and over 50 people participated in the Polis workshop with attendees from local authorities and other urban transport stakeholders.

Many ideas were captured during these workshops. The two main comments taken from the consultation process were related to:

- Identifying measures to keep the growth of CAVs in cities under control; i.e. measures to enable and ensure safe deployment of CAVs;
- Identifying the numerous measures that can be taken as early as now; especially the ones concerning both physical and digital transport infrastructure planning, without compromising the development of the necessary policies required to achieve the sustainable city mobility goals.

The project is coordinated by Rupprechت Consult.

For more information, see www.H2020-CoEXist.eu, follow CoEXist on Twitter @H2020_CoEXist or contact Project Coordinator Syrus Gomari at s.gomari@rupprecht-consult.eu or Bernard Gyergyay at b.gyergyay@rupprecht-consult.eu.
With the new year, the H2020 FLOW project has entered its final chapter. In the coming months, the FLOW and related TRACE (Walking and Cycling Tracking Services) projects have joined forces and are organising a joint final conference on 13-14th March 2018 in Brussels, entitled: “Decongesting Europe: New approaches to freeing our cities”. Both projects have worked with transport data and developed new ways to boost walking and cycling as a way to reduce congestion.

The interactive event will include training sessions, presentations, breakout sessions, a TRACE “tracking tour”, political debates, a world café and award ceremony. Registration will open soon via h2020-flow.eu and h2020-trace.eu.

FLOW E-LEARNING:

Throughout 2017, FLOW ran a three-part series of webinars and e-courses looking at different aspects of congestion, cycling and walking and transport modelling. Precisely they were:

- “Congestion and your city: the FLOW approach”,
- “FLOW and transport modelling: Looking at the tools”, and
- “Putting it all together: The policy context of applying the FLOW tools”

The third and most recent course featured FLOW’s popular Quick Facts (covered in the article on p.19 of the August 2017 issue of this magazine) and lessons learned from the FLOW cities through their experience implementing the FLOW methodology.

Participants included transport planners in local authorities, transport consultants, professionals working in NGOs, and university students and recent graduates. The webinars recorded are available on the FLOW YouTube channel and the course content is publicly available at www.mobility-academy.eu/.

PROFESSIONALS ACROSS EUROPE INTERESTED IN FLOW RESULTS

In the autumn of 2017, FLOW was also presented to cities, planners and consultancies at a number of conferences. The biggest events include the CIVITAS Forum in Torres Vedras, Velo-city in Arnhem-Nijmegen, a CIVINET conference Romania and the 2017 Polis Conference. Velo-city marked the release of FLOW’s new video, which explains how walking and cycling can help reduce congestion. In addition to the session that FLOW hosted at the 2017 Polis Conference, the project’s exhibition stand attracted 10 decision makers to answer the FLOW survey.

FLOW SURVEY

The FLOW project has launched a survey aimed at decision makers in transport policy from the city, regional, national and European levels to answer the question: “How do decisionmakers think about and approach congestion reduction in their cities?”

The goal of this survey is to identify the context, key drivers, barriers and triggers for adopting congestion-reducing solutions. The survey is now being carried out a second time, which allows responses given now to be compared with 2.5 years ago when the FLOW project kicked off. The results of the survey are a starting point in understanding perceptions and influences and providing tools that help to make effective decisions.

To learn all about the survey findings and other results from FLOW and TRACE, join the final conference on 13-14th March 2018 at the Bip (bip.brussels/en) at 2-4 rue Royale, 1000 Brussels.

POLIS is responsible for the dissemination of FLOW and this article was put together by Dagmar Köhler, POLIS Communication and Project Manager.

For more information, see www.h2020-flow.eu or contact Project Coordinator Kristin Tovaas at k.tovaas@rupprecht-consult.eu or Bonnie Fenton at b.fenton@rupprecht-consult.eu.
As already reported, SKILLFUL (Skills and competences development of future transportation professionals at all levels) is a 36-month H2020 project started on 1st October 2016. On 20th October 2017, the project held its first conference at project partner Vias Institute premises in Brussels, Belgium for some 45 participants. The conference outlined the progress made so far in the following four sessions:

SESSION 1: SETTING THE SCENE

Following a short introduction from Thierry Goger, FEHRL Secretary General and SKILLFUL Coordinator, Evangelos Bekiaris of CERTH/HIT, SKILLFUL Technical Coordinator gave a general overview of the project. After that, he gave the floor to George Giannopoulos, President of SKILLFUL’s Advisory Board, who presented the innovation gaps and game changers of the transport sector, as well as the impacts on future transport research. Laurie McGinnis, Director at Center for Transportation Studies/University of Minnesota, followed with relevant US initiatives and Sheldon Qiu, from the Beijing University of Technology, with relevant Chinese initiatives.

SESSION 2: FUTURE TRENDS IN TRANSPORT SYSTEMS AND THEIR JOB IMPACT ASSESSMENT

Matina Loukea (CERTH/HIT) presented the project methodology, focusing on three main steps, namely, (1) the identification of future trends/needs and best practices, (2) the development of training schemes and definition of profiles and competences and (3) the verification and optimisation of training schemes.

After that, Evangelos Bekiaris presented the findings of the first Work Package (WP), including the following issues:
- Identification and prioritisation of future trends and driving forces
- Identification of demographic, behavioural, cultural and socio-economic factors
- Main changes to employability, referring to jobs/positions foreseen to be changed or eliminated, as well as new jobs and positions expected to emerge

A discussion followed on the findings, especially those regarding the jobs to be affected.

SESSION 3: BENCHMARKING AND CRITICAL REVIEW OF TRAINING SCHEMES, CURRICULA AND TOOLS

Aoife Ahern (UCD) opened with a review of the educational and training systems and analysis of training needs and gaps from WP2. After that, Jean-Christophe Meunier (VIAS Institute) reviewed the new training methodologies and schemes and emerging training tools benchmarking, also provided by WP2.

SESSION 4: NEXT STEPS

After lunch, the final session took place, with the following presentations:
- Virginia Infante (IST) presented the training schemes to be developed.
- Jean-Christophe Meunier outlined the definition of profiles and competences of the trainers and trainees of the training schemes to be developed

A discussion followed and Evangelos Bekiaris and Thierry Goger then thanked all participants for their presence and feedback.

2018 PROJECT HIGHLIGHTS

Some of the most important actions to be implemented within SKILLFUL during 2018 are:
- Design and development of appropriate training/education training curricula, courses and modules for key actors in the transport sector to fulfil their emerging and foresighted required competences and skills in the most cost-efficient, modular and coordinated ways
- Individualisation of the developed training programmes and schemes, in such a way that due account can be taken of the competences and qualifications that have been acquired
- Definition the necessary trainer competences, as well as trainee basic profiles for the new training schemes
- Definition and development of new business roles and schemes for facilitating the uptake and wide diffusion, as well as promote sustainability of proposed new training schemes
- Realisation of pilots, in order to assess selected training schemes, developed within SKILLFUL, by experts and users; in order to prove the project concept and methodologies, as well as evaluate its future impacts.

For more information, see www.skillfulproject.eu or contact Project Coordinator Thierry Goger at thierry.goger@fehrl.org
Last September 2017, FEHRL embarked on a Scanning Tour to Europe for the first time with the focus on automated driving and electrification. Being in Europe enabled participants to attend all or only part of the tour, depending on their interests and availability.

The tour started with a visit to the TRL Gateway test site in Greenwich, London with presentations on the Digital Greenwich initiative and by TRL on the work being undertaken on connected and autonomous vehicles in the UK and a demonstration of the TRL test vehicle to operate a shuttle route around the Greenwich peninsula.

The tour moved to Paris with a visit to the VEDECOM test site outside Paris; a public-private research park focussing on autonomous driving, new mobility concepts and electric roads. VEDECOM presented their autonomous vehicle, developed with collaboration from Renault and Peugeot, with the main focus being of the visit being to see their 100-metre inductive test track constructed as part of the FABRIC project. This project aims to demonstrate how active charging can facilitate the introduction of electric vehicles.

Also in Paris, there was a visit to World Road Association at their offices in La Grande Arche with presentations and updates from both organisations, followed by a trip on an autonomous shuttle operating nearby.

The tour moved to Amsterdam to visit the TNO SolaRoad demonstration project, where they are generating solar energy from ruggedized photovoltaic panels. They are now on the third generation of panel and plan to install on a trafficked road in 2018.

Finally, there was a visit to Sandviken in Sweden to visit the E16 eHighway where there is a 2km stretch of highway powering two hybrid lorries on electrical using tram technology. Following a successful proof of concept, discussions are moving on as to how to finance further expansion and determine exactly how much infrastructure is required.

It is clear from the tour that there is a significant amount of excellent research and demonstration underway in Europe with involvement from various FEHRL Institutes (TRL in London, IFSTTAR for VEDECOM, TNO for SolaRoad and VTI for the E16 eHighway). A full report on the tour will shortly be available on the FEHRL website www.fehrl.org.

The new FEHRL website (www.fehrl.org) has now been in operation for several months with a much cleaner and more modern interface allowing for easier navigation. What is more important, however, is the work undertaken to turn the website into a knowledge base for FEHRL members and non-members alike with a searchable database based on people, projects, institutes and facilities. Now that this is up and running, work has started on creating a new and updated Forever Open Road website to replace the one put together in 2012. Again, the work will concentrate on providing an improved look and feel, along with better and more logical organisation of the information and available documents, including links to the sister projects such as R5G, R21C and Ferry Free E39. Development is now underway and the website is planned to be launched in spring 2018 at www.foreveropenroad.eu.
WEDNESDAY 18TH APRIL 2018

AM4INFRA FINAL CONFERENCE AT TRA 2018

The H2020 AM4INFRA project’s final conference will take place as a side event during the TRA 2018 conference in Vienna, Austria on Wednesday 18th April 2018 from 9am -12pm in Hall B, Reed Messe Wien GmbH, Messeplatz 1, P.O.Box 277, A-1021 Vienna, Austria. Registration to the TRA2018 conference (a 1-day or 4-day ticket) is required to participate in this event. See www.traconference.eu/registration for more details.

The AM4INFRA final conference will present the results and outcomes of the three Living Labs to be held in the runup to the final conference (see p.10-11), together with the recommendations for the replication of the common framework across the TEN-T network.

Interested but unable to attend the final conference? You will be able to follow the event live via web streaming and afterwards in a special webinar (and separate webinars are also being arranged for each of the three Living Labs). See more information at www.am4infra.eu.

16-19TH APRIL 2018
COME AND JOIN US AT TRA 2018

FEHRL will again be present at the Transport Research Arena 2018 (TRA 2018) on 16-19th April 2018 in Vienna, Austria and we will present our activities and launch our FOR x 4 programme and its network there. These include:

- FEHRL strategy and projects
- FEHRL Institutes BRRC, IFSTTAR and VTI
- ERA-NET Plus Infravation programme

Save the date and come and meet us there on the CEDR stand (no D02) in the main exhibition area (Hall A), Reed Messe GmbH, Messeplatz 1, P.O.Box 277, A-1021 Vienna, Austria.

Several of our projects (such as RAGTIME, SAFE-10-T and SENSKIN) will also feature on the European Commission stand (no. E02), as well as in the overall conference programme.

Register for TRA 2018 and get more details at www.traconference.eu/registration.

FEHRL MEMBERS