REFINET

REthinking Future Infrastructures NETworks

Newsletter No.2

February 2016

Project coordinator CSTB

Partners

ARUP, ITA Polonia, DRAGADOS, PTEC Plataforma Tecnológica Española de Construcción, FEHRL, tecnalia, UIC

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 653789

INDEX

PRESENTATION

The dissemination and communication activities developed in the REFINET CSA, in relationships with experts and stakeholders of the REFINET network, is coordinated by PTEC and include, between other, the following constituents:

- ✓ Website www.refinet.eu that is periodically updated within the framework of Infrastructure and Mobility committee (ECTP).
- ✓ LinkedIn group for the debate, available at https://www.linkedin.com/groups/8464241
- ✓ Newsletters that are published every 3-4 months.
- ✓ Workshops and conferences as the one in London (March 16th, 2016) and the previous one in Madrid (December 2nd, 2015).

This Newsletter No.2 includes four sections:

- ✓ **REFINET progress** with a summary of the recent work achieved in the project
- ✓ Innovation activities on transport infrastructures within **REFINET community**, with contributions from Dragados and Tecnalia. We are looking forward for future collaborations from experts and partners at REFINET network
- ✓ **Coordination with projects and networks**. Information on REFINET and ECTP at TRA 2016, on REFINET, FOX and USE-it CSAs and on Construction NTPs network is included
- ✓ **News** on R&I in transport infrastructures

Jesús Rodríguez
PTEC
director@plataformaptec.es

REFINET PROGRESS

General vision

After more than 8 months in its operational phase, the REFINET project has now entered a period of intensive collaboration among the various stakeholders interested in the REFINET themes related to future Research and Innovation targeting the European infrastructures at short (2020), medium (2030) and long term (2040). It is deeply acknowledged that further R&I should greatly influence the infrastructures of tomorrow throughout all life cycle stages: programming & design (system definition), manufacturing, construction, renovation & demolition (system realisation), and operation & maintenance (system usage). Especially, REFINET intends to further support advances in infrastructures supporting ITS (Intelligent Transport Services), considering interfaces between the various transport modes (road, rail, waterborne, air…) as well as the multi-modal infrastructure features, and with a focus on the entrepreneurial side of infrastructures that targets the architectural, engineering and contracting eco-system, including socio-economic aspects of the development and the management of infrastructures.

REFINET has already established an exhaustive international network of experts and stakeholders, with today more than 650 stakeholders following or interacting with REFINET, and with the setting-up of a Group of Experts (~30 experts) who will be asked on a regular basis to participate to and assess the outcomes of the project.

Moreover, based on a comprehensive search, selection and analysis of relevant documents from technological platforms, associations, and initiatives, as well as elements and inputs from our Group of Experts, the RMMTI is close to delivery. Eventually, the definition of the taxonomy (classification) for the elaboration or

the REFINET portfolio of Best practices (to identify the current state-of-the-art and short-term research) is ongoing along with a proposal of approach to the technology catalogue collection – all to form the grounding for elaborating a vision and a roadmap for future RTD activities, where it will of paramount importance that all the different stakeholders get key roles in establishing, detailing and validating the vision and roadmap with the REFINET project.

Alain Zarli
REFINET coordinator
CSTB
alain.zarli@cstb.fr

Multi-modal transport infrastructure model

The 2nd of December 2015, a workshop within the REFINET project framework was held at *Instituto de Ciencias de la Construcción Eduardo Torroja* (Madrid), it being organised by TECNALIA, and strongly supported by PTEC. This workshop was included in Task 3.1 "Definition of the REFINET multi-modal transport infrastructure (RMMTI) model", which objective was to define a model and to be a reference for the future evolution of the European multi-modal transport infrastructure, within the Work Package 3 "Defining Vision and SIP".

The definition of this model has been carried out by the REFINET´s partners with the assistance of the members of the REFINET network, who have been invited and involved in the discussion through the mentioned workshop, in order to involve different stakeholders´ perspectives related to transport infrastructure (user, Administration, operator/owners, construction companies, engineering firms and Universities and Research centres).

All contributions gathered in the two workshop sessions, attended by selected European experts, were used, as well as other inputs, for the definition of the REFINET multi-modal transport infrastructure (RMMTI) model. The approach for the model, consisting of three different levels (PERFORMANCE, SYSTEMIC APPROACH and TECHNOLOGICAL GAP) aimed at responding to the identified challenges and at achieving the final objective of WP 3, which is to define the Vision and the Strategic Implementation Plan in order to guide the evolution of European transport infrastructure.

The final document "REFINET multi-modal transport infrastructure (RMMTI) model" has been submitted to the European Commission for review in February.

Maria Zalbide
TECNALIA
maria.zalbide@tecnalia.com

Collection of Best Practices and analysis of available technologies

The objective of T3.2 in REFINET is to analyze different sources of information in order to select best practices in design, construction and maintenance of new and existing transport infrastructure with a view to fit these data into

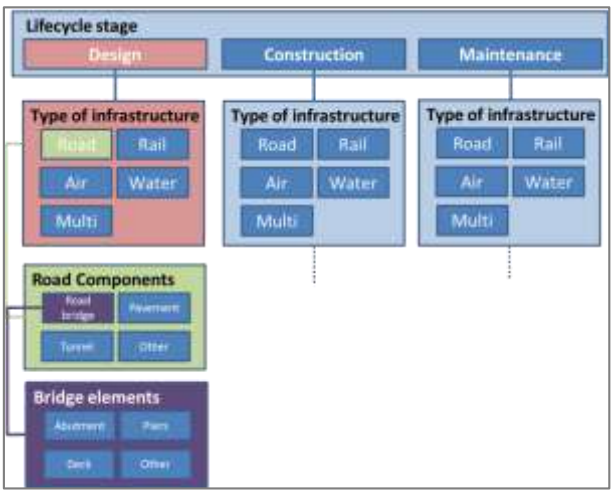
the scheme of the REFINET Multi-Modal Transport Infrastructure model.

For this purpose, the REFINET consortium has decided to take a pragmatic approach in which a search for best current practice is being made, leaving, as set in work plan, to task T3.3 the analysis of available technologies which are not being widely used despite their availability. In summary, T3.2 is collecting "best-on-site" practices available as of today while T3.3 is looking a bit into the future.

Currently, many of the technologies that are needed to enable the implementation of the REFINET multi-modal transport infrastructure (RMMTI) model are already available in the market or will be available in the next years, but awareness of these within the sector is limited and no single source of information exists to showcase technologies applicable across transport modes.

In order to overcome the gap between "common practices" in design, construction and maintenance of transport infrastructures and the "most sustainable practices" that could be deployed, examples of different technologies on the market are currently being collected and categorised by their Technology Readiness Level (TRL).

REFINET taxonomy for the collection of best practices and for the catalogue of technologies for multi-modal transport infrastructure has been given a hierarchical structure and is shown in this table.



In practice, the source organisations for the technologies cover several of the most renowned infrastructure designers, constructors, operators, manufacturers and suppliers globally as well as notable academia and research institutions in the fields of expertise.

The aim is to generate a selection of examples of technologies across the different lifecycle stages, different types of infrastructure (mode) and different types of infrastructure components / elements. These will then be catalogued and disseminated through the REFINET website and the related knowledge networks across Europe.

Next table shows the template for the collection of the REFINET technologies in design, construction and maintenance of transport infrastructure, consistent with the template developed to capture best practice.

Best Practice / Catalogue of Technologies template	
Field	**Description**
Title and Keywords.	Title of the best practice or technology and main keywords
Source of best practice	Organization providing the best practice or technology or other reference to the source (e.g. conference, etc.).
Lifecycle stage	Design, Construction or Maintenance.
Type of infrastructure	Road, Rail, Air, Water, Multi-modal.
Component of infrastructure	Bridge, tunnel, pavement, etc.
Short Description	scenario for application, technology and how is applied, geographical coverage
Success factors	For example, what are the conditions for successful replication.
Constraints	Which are the factors that restrain the application of the best practice (e.g. environmental or weather conditions).
Main impacts	For instance economic or environmental benefits, advantages to users, increased safety, reduction of disturbance, etc.
Maturity and degree of implementation	For example technically feasible, replicable, adaptable.
Key Performance Indicators	Indicators according to the definition of the RMMTI model that help to assess the efficiency of the described practice.
Further information	Links, references and / or contact details for further information.

The first column contains the fields that make up the template and the second column contains the explanation of the different fields that must be completed for every best practice.

As an example of technologies collected so far, the Arup **Future of Highways** and **Future of Railways** reports highlight how pollution, population increase, congestion and changing weather patterns are putting pressure on transport networks. In response, many cities are choosing to get smarter about mobility.

The reports highlight how different technologies – such as e-payments for tolls, buses and trains as well as smart technologies for asset condition and performance monitoring – can benefit passengers and operators alike.

Opportunity to showcase your technology

A large network of experts and stakeholders is being asked to contribute to this effort that is foreseen to continue beyond the scope of the REFINET CSA as transport infrastructure encompasses many different sub-areas for which best practices cannot be documented within the framework of the project.

Relevant technology examples are being compiled from different sources:

- ✓ REFINET partners themselves
- ✓ Infrastructure and Mobility Committee of the ECTP
- ✓ Members of the different networks of organisations represented by the partners
- ✓ Work Group on Infrastructure of ENCORD
- ✓ Other networks such as the Enterprise Europe Network (EEN) and National Technology Platforms (NTPs)
- ✓ Through a review of the main sectorial conferences to detect the most innovative technologies.

The REFINET team are looking for as many examples as possible in order to pick the best examples of technologies to showcase to the European Commission and the wider public.

Miguel Segarra
Dragados
mjsegarra@dragados.com

Ben Kidd
ARUP
Ben.kidd@arup.com

Deploying Strategic Implementation Plan

WP4 aims at securing the deployment of the REFINET Strategic Implementation Plan (SIP) and its vision in Europe across the various stakeholders involved in the transport & infrastructures sectors.

To this end, the following actions will be implemented:

- ✓ Definition of the strategy for the deployment of the SIP (who, what, where, when) and the tactical approach that can ensure to impact at various level (from stakeholders, to users, to policy makers, to public bodies, etc.) [DEFINITION AND ANALYSIS]
- ✓ Identification and clusterization of the technological demand taking into geographic, political, financial, etc. constraints so that to target local, regional and national characteristics and needs [DEMAND FORMULATION]
- ✓ Understanding the different European, national and regional initiatives (from R&I programmes to ESIF, etc.) that could support the deployment of the SIP and mobilization of the required actions (including organization of workshops and public initiatives) to define priorities and to cooperate in future activities [OFFER FORMULATION]

Main exploitable outcome will be to guide stakeholders in the European transport & infrastructures sectors to access to the current

and future available technologies from a triple perspective:

- ✓ What technological solutions are available and what is coming as promising, taking into account what is affordable, sustainable by whom and by when
- ✓ Integration of technological demands through a geo-cluster approach
- ✓ Identification and prioritization of the (funding) mechanisms and R&D programs that can support the technological developments and crossing the 'valley of death' (from research to market)

Clemente Fuggini
D`APPOLONIA
clemente.fuggini@dappolonia.it

REFINET COMMUNITY

Innovations in DRAGADOS on transport infrastructures

DRAGADOS is one of the major global providers of every kind of infrastructure including transport infrastructure. Many of these projects are one-of-a-kind projects that develop into renowned landmarks that become icons of cities and locations worldwide. This is not achieved without a great degree of know-how and constant innovation. Therefore, innovation is embedded in the culture of the company and it becomes natural to confront the novel situations these type of projects poses to designers and builders.

As recent examples of innovative international projects we can cite the following:

- ✓ Cádiz bay bridge in Spain. Second highest clearance in the world above water level.
- ✓ Ulla river viaduct in Spain. This is a world record in span length for this type of bridge.
- ✓ I-595 motorway in Florida (U.S.A.).
- ✓ New Forth Road Bridge Project in Scotland, United Kingdom.
- ✓ M30 motorway tunnels in Madrid. TBM diameter world record at its time.

Miguel Segarra
DRAGADOS
mjsegarra@dragados.com

Innovations in TECNALIA on transport infrastructures

As a member of the REFINET community, Tecnalia is one of the largest RTOs (Research Technological Organizations in Europe).

Within the field of transport infrastructures, Tecnalia has several running research and innovation projects and two examples of which are described as follows:

SISGES: Smart, Green and Integrated System for Infrastructure Management (2013-2016 Spanish Program of Research, Development and Innovation, focused on society challenges).

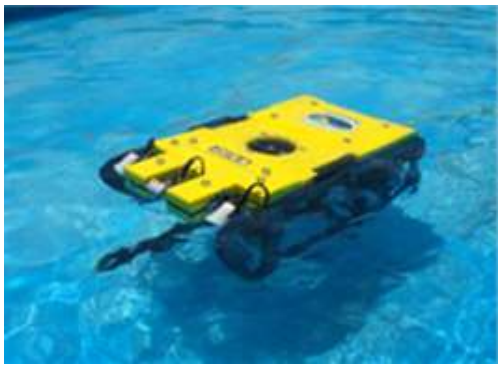
This project aims to develop a comprehensive management system to facilitate rational decisions for the optimization and adequate planning of available resources, in order to maintain and repair existing structures.

The development of a smart and integrated system for infrastructure management will ensure the operating conditions and safety of infrastructures throughout during its lifecycle by using cutting-edge technologies. Tools for preliminary structural diagnosis used in the project include 3D scanning techniques, monitoring drones, BIM integration methodology and the development of applications & standards supported on platforms that enable the storage of high precision information. Structural monitoring is also used to evaluate on-line the infrastructure condition with low maintenance costs. A specific software will be developed, based on technical, socio-economic and environmental criteria, to speed up the decision-making process and optimize the use of resources.

The partners of this project are: FHECOR, COMSA, MAPEI and TECNALIA.

AQUILES (IBEROEKA call, 2016-2017) The main objective of the AQUILES project is the development of criteria, methodologies and tools for monitoring bridge foundation scouring. To achieve this main goal, the AQUILES project aims at several specific objectives, which are described below:

- ✓ Development of a system to determine the potential probability of failure against the undermining of the bridges included in the SIPUMEX system (Mexican system for bridge management) based on the use of a series of data that can be easily accessed (selection of variables and definition of weighting criteria).
- ✓ Developing a methodology for low cost bridge inspection, fast and efficient, allowing the use of non-destructive techniques and other advanced methods to detect processes which undermine its foundations (definition of follow-up and control plan of bridges and development of standard methodology for inspection of scour).
- ✓ Development of improved equipment, specially designed for the detection of scour foundations of bridges, which will allow for more accurate monitoring of its evolution. Such equipment will be based on an ROV type submarine device with a number of developments in relation to commercially available equipment (high stability under high flow rates, greater functionality in low visibility, maneuverability to access tight spaces or greater quality pictures taken).



KAXAN equipment for underwater inspection developed by CIDESI

- ✓ Development of criteria for evaluating the condition of the bridges included in the system SIPUMEX contemplating the state of its foundations with respect to the mining, which will substantially improve the process currently in use for risk assessment of bridges and the prioritization of interventions performed.

The participants of the project are: Sacyr Construcción, S.A.U.; Mexico: Grupo Promotor Aries, S.A. de C.V.; Centro de Ingeniería y Desarrollo Industrial – CIDESI; Fundación Tecnalia Research & Innovation (España); Fundación de la Industria de la Construcción para el Desarrollo Tecnológico y de la Productividad, A.C. – FIC (México); Technological Advisor: Instituto Mexicano del Transporte

Maria Zalbide
TECNALIA
maria.zalbide@tecnalia.com

COORDINATION WITH PROJECTS & NETWORKS

REFINET & ECTP Infrastructure&Mobility and TRA 2016

The REFINET CSA and ECTP are participating in the largest event on transport taking place in Europe, the Transport Research Arena 2016 conference that will be held in Warsaw, Poland between 18 and 21 of April.

REFINET along with the other two CSAs in this area, FOX and USE-IT, submitted a proposal for an invited session that was accepted by the programme and management committees of the TRA. The title of this session is "Increasing the performance of multi-modal transport infrastructure through stakeholder engagement and European-wide shared vision".

At the same time, ECTP and its Infrastructure and Mobility (I&M) Committee have been organizing in collaboration with the European Commission, other transport ETPs (ERRAC, Waterborne, ALICE, …) and other organizations (CEDR, IBDIM, IFFSTAR) the following Strategic Sessions:

- ✓ Session 1: "Adapting the Transport System to Changing Conditions"
- ✓ Session 6: "Green and Resilient Infrastructure"

Finally, DRAGADOS has been invited by CEDR to participate in an invited sessions titled "Moving Forward: The Opportunities and Challenges for Transnational Road Research" and to deliver a presentation on the its participation in the INFRAVATION programme.

Miguel Segarra
DRAGADOS
mjsegarra@dragados.com

REFINET&FOX&USE-it at TRB 2016 conference.

Workshop on Cross-Modal Transport Infrastructure held on 13th January 2016 at the Transportation Research Board (TRB) Annual Meeting in Washington, DC

This workshop, organised by the three Horizon 2020 projects USE-iT (Users, Safety, Security and Energy in Transport Infrastructure), FOX (Forever Open Infrastructure across (x) all Transport Modes) and REFINET (Rethinking Future Infrastructure Networks), provided an overview of these three European initiatives currently underway to pursue the development of a more integrated multi-modal transportation network. USE-iT, FOX and REFINET each address different aspects of this overall effort, with the results from FOX and USE-iT feeding into REFINET.

Representatives briefly introduced the objectives, strategies, and activities of each effort. Following these overview presentations, a more in-depth presentation was provided on the initial results from FOX, highlighting findings on the state of the art and best practices for addressing key challenges in specific modes, along with the identification of initial areas for cross-modal application of those solutions.

A similar in-depth presentation was then provided on USE-iT, highlighting the approach to identifying common challenges and potentially promising research avenues that might have cross-modal application.

Lastly, a detailed presentation on REFINET explored that project's efforts to develop a new framework for multi-modal infrastructure, integrate outcomes from FOX and USE-iT, combine those outcomes with the model to develop a new vision for that infrastructure, and ultimately provide incentives to public and private sectors to invest in the needed R&D.

A brief outline of key framing questions was provided, along with a rough timeline for completing the project, with final deliverables planned for the 2017 TRB Annual Meeting.

Catherine Birkner
FEHRL
Catherine.Birkner@fehrl.org

Review of Cross-Modal Technology Transfer workshop for the USE-iT and FOX projects

FEHRL organized a workshop for the USE-iT and FOX projects on 21st January 2016 in Brussels.

USE-iT and FOX are two Horizon 2020 projects. USE-iT stands for "Users, Safety, security and Energy In Transport Infrastructure" and FOX for "Forever Open infrastructure across (X) all transport modes".

Thierry Goger (FEHRL) explained in his welcome speech that the aim of this workshop was to present preliminary results of the USE-iT and FOX projects of the most appropriate technologies and approaches that have the potential of being applied on a cross-modal basis or on at least two transport modes. Maria Cristina Marolda (Policy Officer of Research and Innovation in EC Directorate General for Mobility and Transport (DG MOVE) explained in her Opening speech that the European Commission had launched, within the Horizon 2020 (H2020) Programme, several initiatives to reflect on the necessary development of cross-modal transport infrastructure. This because the European Commission is now more looking at transport systems as one system. USE-iT, FOX and a third project called "REthinking Future Infrastructure NETworks" (REFINET) have been granted to support this work. Several partners from all transport modes and with various profiles (for example, Research Providers, Industry, Transport Authority) are now actively involved in this attempt.

Bob Collis (TRL UK) explained the structure of the Workshop. The topic areas investigated in the FOX and USE-IT projects had been divided in 6 groups: User information, Safety & Security, Energy & Carbon, Construction & Maintenance, Inspection and Recycling & Reuse. After the plenary session, the participants of the Workshop were also divided into 6 groups and they visited during the workshop the various topics investigated.

When a group visited one of the topics, a detailed description of the technologies collected in the surveys was presented and the barriers and opportunities for cross-modal application were discussed. Also potential research topics that could be of benefit to more than one mode were identified.

Next to these discussions, this workshop also gives a nice overview of the state-of-the-art technologies that are used or can be used in the 4 transport modes: Road, Rail, Runway and Waterway. At the end of the projects, a list of needs/a road map for future research will be created. Several activities such as desk studies, surveys and workshops have been scheduled over the coming two years to collect information and reflect together.

Click here to access the materials from the workshop.

The 2nd workshop will be held on 14th September 2016.

Catherine Birkner
FEHRL
Catherine.Birkner@fehrl.org

Construction NTPs network

At present, there are contacts persons in about 20 countries for the network of National Construction Technology Platforms or similar organizations, coordinated by PTEC.

Collaborations have been requested to the members of this network in order to contribute with best practices on design, construction and maintenance in transport infrastructures within REFINET activities.

Besides, the network will meet in March 8th, 2016, and REFINET will be included in the agenda with the presentation of multimodal transport infrastructure model and the preliminary work on best practices.

Elena Gayo
PTEC
ptec@plataformaptec.es

NEWS

HORIZON 2020 work programme 2017 transport calls – Brokerage event

Within the Framework of the Transport Research Arena (TRA) conference, the Transport NCP network ETNA2020, supported by Enterprise Europe Network, is organizing a networking and brokerage event focusing on the Horizon 2020 Transport Work Programme 2017 call for proposals – Mobility for Growth, Automated Road Transport, and Green Vehicles.

The brokerage event will take place the **21st of April in Warsaw at the TRA premises, from 09h00 to 15h00**.

Within the framework of the brokerage event, participants looking for partners for the Transport Work Programme 2017 published calls will have the opportunity to present their organizations as well as their ideas for project proposals in the form of brief oral presentations, as well as to meet potential partners during bilateral 'one to one' meetings and other networking activities.

NOTA BENE – Registration to attend the TRA is a mandatory pre-requisite for participation in the networking and brokerage event.

More information about the brokerage event – including an on-line registration – can be found at https://www.b2match.eu/h2020transportcall2017

(Source ETNA2020)

Nearly €2 billion requested for H2020 transport research projects

INEA has received 383 project proposals by the 20 and 26 January deadlines for four calls in the fields of Mobility for Growth, Green Vehicles and Automated Road Transport, requesting over €1.9 billion in total EU funding. The total available budget for all four calls is €322 million. Evaluation starts in February.

The Mobility for Growth 2016 call (first of two stages, deadline on 20 January) offers €174 million in total EU contribution for the best

projects providing innovative solutions in all transport areas. In total 11 topics were open for submission.

293 project proposals have been submitted for this call requesting in total €1.4 billion. The highest level of competition is set for the topics 'New ways of supporting development and implementation of neighbourhood-level and urban-district-level transport innovations', 'Breakthrough innovation' and 'Innovative concepts, systems and services towards 'mobility as a service''.

The Mobility for Growth 2016 call (single stage topics, deadline on 26 January) invites project proposals focussing on aviation research, as well as future requirements for skills and jobs across transport modes and systems. €22 million in total EU contribution is earmarked for three topics under this call.

26 project proposals requesting €96 million in total were submitted for the call. The topic addressing aviation safety challenges had the highest interest in this call.

The Automated Road Transport 2016 call (first stage, deadline on 20 January) offers €61 million in total for project proposals on automation pilots for passenger cars, safety and end-user acceptance aspects of road automation, as well as solutions for road infrastructure supporting automation.

45 project proposals requesting €234 million in total were submitted for this call. The topic 'Safety

and end-user acceptance aspects of road automation in the transition period' received the highest number of applications.

Evaluation of all the topics above is expected to start early February 2016. Applicants of the first stage of the two stage calls will receive the evaluation results by the end of April at the latest. The successful applicants will then have at least three months to submit a full proposal for the second stage of the Mobility for Growth and Automated Road Transport two-stage topics.

(Source INEA)

Presentations of non SHIFT2RAIL JU member Info day

Last January 20th took place the SHIFT2RAIL Calls for Proposals to non-JU Member Info Day.

S2R JU's first calls for proposals are for S2R JU members (CFM) and non-JU members (OC), aimed at driving innovation in railways, under Horizon 2020.

Indicative budget: €90 million EU funding

Estimated projects value, including in kind contributions by the members, other than the Union or their affiliated entities: €170 million

For full details of the calls for proposals, please follow the link to the Participants Portal: H2020 call page

The presentations of the event are now available at http://www.shift2rail.org/calls-for-proposals-to-non-ju-member-info-day-20012016-presentations-now-available/

(Source SHIFT2RAIL)

Transport SME Innovation Day - Brussels, 23 November 2015: Presentations available

Innovation and deployment of new technologies, products, services and solutions are key to economic growth and employment. Therefore, converting outcomes of R&I projects into the market applications is critical. Open to all Small and Medium Enterprises (SMEs) active in the Transport sector and its value chain, the 'Transport SME Innovation Day' was held in Brussels on 23 November 2015 and provided information and useful hints about:

- Opportunities for SMEs in Horizon 2020 and other EU financial instruments in support of innovation;

- Corporate Venture Capital and related investment strategies;

- Intellectual Property Rights to protect an invention;

- Hands-on experience: how SMEs bring their inventions successfully to the market

*To get all presentations and watch the video-recorded event, just **click here:***

http://ec.europa.eu/research/transport/news/items/transport_sme_innovation_day_en.htm

(Source European Commission)