France Training Week
22nd - 25th January

Multi-functional Transport Infrastructure Training Week

SMARTI ETN has received funding from the European Union's Horizon 2020 Programme under the Marie Curie-Skłodowska actions for research, technological development and demonstration, under grant n.721493.

"The goal of this training week was to demonstrate how a transportation infrastructure could have more than one functionality. Mobility potential is of course very important and remains the main function transportation infrastructures have to answer. Nevertheless, considering that in a major mature country, land use will increase in the future, it is important to optimize building area giving more than one function, like harvesting energy on a road without compromising the possibility to have heavy traffic.

More than technical and fundamental skills, I hope student have learnt that it could possible to think out of the box, even if civil engineering field. I hope they have understand that it is possible to develop complex transportation infrastructure systems, answering to nowadays environmental problematics. I have been very positively surprise how the fellows had work on the Hackhaton exercise, trying to find technical and economical responses to the exposed infractructure challenge we exposed at the beginning of the week."

Emmanuel Chailleux, IFSTTAR

1st DAY
22/01/2019

The first day of the training week was focused on opportunities for adapting multifunctional approaches into transport infrastructure. We have started off the day with the presentation about **"co-Areva: Sustainable living Demonstrator in "Il-de-France""**.

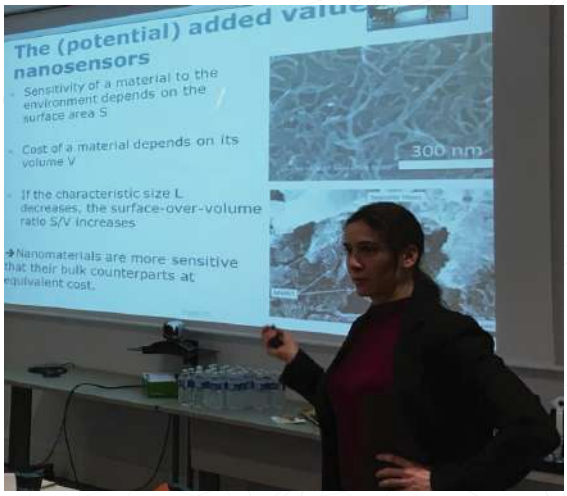
Dr Nicolas Hautiere from **IFSTTAR** introduced to us the challenge and opportunities of the 5th generation roads, and he presented to us a real traffic congestion problem in France, specifically, in Saint Brieuc. We worked in-group to find a possible solution able to solve this problem but at the same time, applying new technologies to smarten the transport infrastructure already built.

Participants had a chance to learn about road transport challenges, circular economy, environment and pollution, road safety, Nanoenergy harvesting, road infrastructure as a CO2 capture factory, **CANOPEE** Project product, external costs, systemic approach and road innovation as a resilient process, R5G concept and aims, etc.

In this framework, the **INFRA-Hackathon** was set to challenge the fellows to work in works and identify a **MULTIFUNCTIONAL** solution for a city facing congestion issues.

2nd DAY
23/01/2019

Participants had a great opportunity to visit **SENSECity** guided by **Dr Berengere Lebental (École polytechnique)**, a climate chamber that can cover two 400m² areas. On each of these areas, a portion of the territory is built on, called a Mini-City, equipped with many sensors to study the performance of facilities and urban materials, monitor the city of tomorrow by sending appropriate information, study air, water and soil pollution. Sensecity will also be used to move forward on the design, improvement and calibration of micro and nanosensors, and improve the chain from the sensor to decision-making.



3rd DAY
24/01/2019

Thierry Sedran (Modular Road) presented the research carried out on the development of removable urban pavement as a solution that allows easy access to the underground network. In this context, **Eric Gennesseaux** presented his research on the mix design of optimized excavatable cement treated materials as a potential subbase of removable urban roads.

During the afternoon **Jean Dumoulin** and **Nicolas Le Touz** during the "NRJ harvesting from infrastructure" lecture talked about the concept of the solar hybrid road as a mean of energy harvesting from infrastructure.

The day was ended with **Denis François** presenting his work on how managers of the road green verges can take action for protecting wild bees.

4th DAY
25/01/2019

Pierre Hornych and **Juliette Blanc** gave a lecture on the objectives of pavement monitoring and recent advances in the development of sensors and data acquisition systems. They also presented the IFSTTAR full scale accelerated testing facilities. The presentation was followed by a visit to the fatigue carrousel and the **FABAC traffic simulators**.

At the end of the day, the fellows presented in groups their solutions for the **INFRA-Hackathon challenge**. They showed highly multifunctional approaches to solve the case study applying all the concepts delivered during the training week. Only one group could win, but the competition was extremely tight!

They also visited the **Accelerating Pavement Testing (APT)** area in IFSTTAR (Nantes) where the mechanical properties of the asphalt generally are analyzed reproducing full-scale the fatigue produced by traffic. We had a great previous explanation of the way of working of these facilities and of all possibilities that they can offer.

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SMARTI European Training Network