



Newsletter

HUELLAS

European Project LIFE+

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Editorial

Last October 1st 2013, the LIFE ENV project "LIFE HUELLAS" began, and will last for 42 months until March 2017 with a total budget of 1.4 M€, partly funded by the EC. *HUELLAS*, that means footprints, will develop methodologies and tools to optimize decision making process, reducing carbon and water footprints of railway infrastructure construction works. Thus, *HUELLAS* will allow the development of a series of environmental impact indicators, to minimize environmental impact of railway infrastructure construction works.

LIFE HUELLAS project combines Life Cycle Assessment techniques with data intelligent analysis to reduce carbon

and water footprints of railway infrastructure works. A tool will be developed applying data mining and computational intelligence techniques, which will allow making alternative works scheduling and showing previously selected specific footprint values and environmental indicators. The launch of this Newsletter is intended to regularly report on the actions that we are developing and the results being obtained in the framework of the LIFE HUELLAS project. As well as, serve as a communication media between all the stakeholders involved in the construction and management of railway infrastructures.

Gregorio Sainz Palmero
LIFE HUELLAS Coordinator
Fundacion CARTIF

LIFE HUELLAS Project: Minimizing environmental impact of railway infrastructures

The LIFE HUELLAS project: “LCA, environmental footprints and intelligent analysis for the rail infrastructure construction sector”, intends to improve the railway infrastructure construction processes with regard to their environmental impact, mainly in those aspects related to climate change like carbon and water footprints and other environmental indicators. The consortium, led by Fundación CARTIF, is formed by the companies VIAS Y CONSTRUCCIONES and IK-Ingeniería, jointly with the University of Granada.

Project goal is the development of methodologies and tools to optimize decision making process, reducing carbon and water footprints of railway infrastructure construction related projects, by 10% and 5% respectively. For that purpose, the project will review and analyze the environmental impact of every stage in the construction process.

The first step will be a comprehensi-

ve compilation of basic information in order to analyze the environmental impact of railway networks construction process, based on previously identified variables. Afterwards, project will focus on analyzing the transformation from environmental impact to carbon and

mental indicators.

Tool will be tested in two railway construction projects with different topologies along project development. That way, a parametric adjustment can be performed providing companies with an analysis of the alternatives in the scheduling and exe-

Life Cycle Assessment techniques, combined with intelligent analysis of data coming from railway infrastructure works, would help to reduce their carbon and water footprints by 10% and 5% respectively

water footprints, by means of the development of a consolidated evaluation methodology. A tool will be developed from this information compilation, applying several data mining and computational intelligence techniques, which will allow making alternative works scheduling and showing previously selected specific footprint values and environ-

ment of the construction works and their environmental impact in terms of “footprints”.

Life Cycle Assessment techniques, combined with intelligent analysis of data coming from railway infrastructure works, would help to reduce their carbon and water footprints by 10% and 5% respectively.

LIFE HUELLAS Results Application



Results will allow the development of a series of environmental impact indicators, which will be collected in a best practices manual. The aim is to support railway infrastructure construction companies becoming more sustainable by minimizing their works' environmental impact.

The Sustainable Public Procurement Initiative (SPPI) is nowadays the key

policy instrument to promote sustainable development and move towards a green economy that fosters the development of products and services maximizing social and environmental benefits. The LIFE HUELLAS project seeks to promote the incorporation of environmental criteria for public bodies or bidders prevail using this or similar tools.

Synergies with Road Sector

The road sector shares clear synergies with the railway infrastructure construction. In Spain, the road sector moves 91% of domestic passenger traffic and 85% of domestic cargo traffic, accounting for approximately 10% of the taxes collected by the state, according to data collected by the **PTC** (Spanish Technology Platform for Roads) in its sector Strategic R&D Agenda (2011-2025).

Spain is a world leader in building and operating roads, according to the same source. The Spanish road technology is one of the most advanced in the world on topics such as smart mobility, road safety, energy and sustainability, environment, effective management of infrastructure and transportation and new materials, which are the major challenges of a powerful industry growing business driven by public spending, but also by private investment, particularly in R&D.



Image courtesy of VIAS.

OASIS: Safe and Sustainable Highway Operation

CARTIF is working on R&D infrastructure technologies and has participated in some of the most influential Spanish projects in the sector. One was the **CENIT OASIS** (Safe, Intelligent and Sustainable Highway Operation), funded by the Spanish government between 2008 and 2012 with over 30 M€. OASIS was the first Spanish project addressing the design of the highway of the future and assumed an example of public-private collaboration in strategic industrial research.

The central objective of this project was to significantly improve the safety, sustainability and service of the Spanish motorways.



The CARTIF's research team collaborated on the project, getting involved in embedded sensing and visual auscultation tasks, designing external and embedded sensors for dynamic firm management. These sensors measure variables representing the structural response to the load passage, taking into account installation, performance, power consumption and cost requirements. With these data, we can predict the state of the firm and act accordingly to prevent its degradation.

In a similar research line, the project **VIALCYL**, implemented during the period 2008-2012, developed new technologies for reconstruction, conservation and sustainable and safe

management of the roads in Castilla y León region, in Spain. In this macro project, CARTIF was involved in the development of new technologies for road safety and sustainability of the processes related to road marking. Among the most innovative methodologies in this field is an intelligent guide system for road marking painting based on laser technology and computer vision. Regarding to road inspection, a tool was designed to define and estimate the level of security in a given stretch of road.

On the environmental side, the CARTIF Sustainable Management team successfully investigated new substances with melting capability and potential to replace salt for road winter maintenance.

REHABCAR: Prolonging Infrastructures Lifespan

Another project with complementary objectives to those already mentioned is **REHABCAR**. Concluded in 2013, it was focused on the development of new tools for the transformation of roads and highways on high quality and economically sustainable infrastructures, in order to adapt them to the new needs of traffic and to prolong their lifespan.



Image courtesy of VIAS

CARTIF took part in the development of a system for measuring cross sections that yielded rapidly 3D models of the road and its surroundings. Thus, the necessary survey work was reduced by developing tools that make getting an accurate survey of the track layout.

New Materials Research

In the field of new materials for asphalt mixtures, CARTIF is working on two very interesting projects. The **PAVIREX**, co-funded by the Spanish Ministry of Economy, researches to find a firm that behaves adequately to dangerous situations such as ice formation. The aim is that pavement prevents ice formation by a combination of smart devices - which anticipate their appearance - placed under the bituminous wearing course and the use of additives added to the binder, or the existence of fires in enclosed areas (like tunnels), two

very difficult situations for the driver. CARTIF's intelligent sensing assists on detecting the formation of ice in advance. In this case, tests have been already done in the field with encouraging results.

The second project related to pavement, is a co-funded by the European LIFE project. **EQUINOX** project, which has just begun, wants to show the effectiveness of a treatment applied to asphalt pavements for the removal of nitrogen oxides (NOx) in urban environments. This new method will allow asphalt roads "cap-

ture" the NOx in the atmosphere by a chemical reaction that uses solar radiation and titanium dioxide. If successful, this innovative technology will reduce by at least 25% of the levels of NOx in the air. The idea of the project is to develop the concept of "new decontaminating road" apply in cities, and to achieve scalable results, treatments are tested in streets of Madrid that will act as living labs.



Intelligent Transport Systems

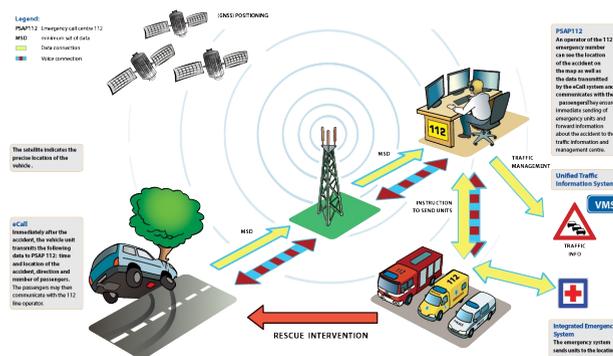
Related to Intelligent Transport Systems (ITS), the **HEERO** European project is also underway. Driven by the EU, it is one of the most important projects to enhance road safety through the introduction of **eCall** from 2017.

eCall is a new road safety service based on the common European Emergency number (112). By using this service, when vehicle sensors detect a strong

impact, the system automatically calls the emergency services even if the driver is unconscious or unable to respond. In the control center, emergency rescue services can see

the exact location of the accident and what kind of vehicles are affected and send the appropriate help.

CARTIF collaborates with the Castilla y Leon regional 112 emergency service conducting cross border tests with Galicia and Madrid, checking for the proper functioning of the system in these areas. Before concluding the project, later this year, interoperability tests in different countries will be conducted.



NEWS

LIFE HUELLAS Kick-off Meeting

October 21st 2013, Valladolid

This European project seeks to minimize the environmental impact of railway infrastructure constructions. The consortium, led by Fundación **CARTIF**, is formed by the companies **VIAS Y CONSTRUCCIONES** and **IK-Ingeniería**, jointly with the **University of Granada**.

The project will be developed during 2013 to 2017. It is endowed with a budget of 1.4 M€ of which 692,276 € are funded by the EU. Its scope is European, although pilot testing will take place in Spain.

LIFE + is the financial instrument of the European Union for the environment, has a total budget of 2,143 M€ for the period 2007-2013. The LIFE + projects cover actions in the fields of

nature conservation, climate change, environmental policy, and information and communication on environmental issues in all EU Member States.



Creation of the Carbon Footprint Databases Technical Working Group

March 7th 2014, Madrid



As a result of the previous meeting held on **OECC** facilities last January, a technical working group focused on Carbon Footprint Databases was established. Initially, the members of such working group are the partners of **LIFE HUELLAS** project, **TECNIBERIA** and **ASA**. **IETcc** (Eduardo Torroja Institute on Construction Sciences) attended also the meeting due to its current work in **OpenDap**, in the frame of **SOFIAS** project.

A private LinkedIn group was created to make easier communication and coordination between group members.

On March 24th **IETcc** facilities hosted the first meeting of the Carbon Footprint Databases Working Group. In order to organise the group, **OECC** was appointed as president and **IETcc** as secretary.

AGENDA

LIFE HUELLAS 2nd Coordination Meeting

May 9th 2014, Madrid

The LIFE HUELLAS project partners will meet next Friday May 9th 2014 at **VIAS Y CONSTRUCCIONES** offices, in Madrid.

The agenda for the meeting includes the following issues: review of tasks performed in the first 6 months of the project, shedule tasks for the next 6 months, review communication and dissemination activities and discuss about the "Inception Report" to be submitted to the EC.

GreenWeek

June 2nd 2014, Brussels

CARTIF will host a stand in the **GreenWeek**. As Spanish leader in **LIFE+** projects assignment, **CARTIF** will present current works in environmental projects.

LIFE HUELLAS Technical Meeting

June 30th 2014, Barakaldo

The LIFE HUELLAS project partners will meet next Monday June 30th 2014 at **IK Ingeniería** offices, in Barakaldo (Bizkaia). This technical meeting will serve as a review of current information gathered by partners to feed the HUELLAS database.

LIFE HUELLAS Consortium

The LIFE HUELLAS project (Ref.: LIFE12 ENV/ES/000686, with the contribution of the European Union LIFE financial instrument), was granted in the framework of the 2012 Call of the LIFE+ European Programme. Project start date is October the 1st, 2013 and estimated project end will be on March 31st, 2017. Consortium is formed by:

- **Fundación CARTIF:** (Coordinator) Private, non for profit, research centre with 20 years of experience researching in energy, environment, ICT, agrofood, automation, robotics and computer vision areas. [1]

- **VIAS Y CONSTRUCCIONES S.A.:** Large construction firm with over 80 years' experience. Leader in railway infrastructure construction, it has been involved in every High Speed line deployed in Spain. [2]

- **Ingurumenaren Kideak Ingeniería S.L.:** Consulting firm specialized on industrial ecodesign, sustainable building and environmental technical training. It has been supporting companies and public bodies on environment innovation applied to products and services improvement since the year 2004. [3]

- **Universidad de Granada:** The research group "Soft Computing and Intelligent Information Systems" (SCI2S) is composed of a number of professors and researchers with widely recognized expertise in Soft Computing and Computational Intelligence fields. [4]



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References

- [1] Fundación CARTIF, <http://www.cartif.com>.
- [2] VIAS Y CONSTRUCCIONES, <http://www.vias.es>.
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