

# Highlights

## Celtic Excellence Gold Award and First Celtic Innovation Award go to WINNER+

The 2012 edition of the Celtic-Plus Event saw the premiere of the new Celtic Innovation Award. The award was created to acknowledge the actual industrial market impacts of Celtic projects results. The worthy winner of the first Celtic Innovation Award was the project with the auspicious name WINNER+, which stands for Wireless World Initiative New Radio.

iTEAM has been the only Spanish partner of this project, which has been the continuation of an FP6 EU project (WINNER), now finalised as WINNER+ in Celtic. The project verified and implemented the new 4G mobile technology standards LTE and LTE-advanced in trials, thus making a major contribution to the high-speed mobile communications of tomorrow with European industry in the leading role. WINNER+ had a strong international impact in shaping the technology choices and standards for the fourth generation (4G) wireless communication technologies. The project achieved an important number of 59 contributions to ITU, 3GPP and ECC standardisation bodies that was the initial goal of the project, thus paving the way to future roll-out of LTE-Advanced (Release 10). In addition, the project was elected as one of the external evaluation groups in the ITU-R assessed IMT-Advanced candidate technologies. The iTEAM Mobile Communications Group was one of the major contributors to the ITU-R evaluation, together with Ericsson and Nokia-Siemens Networks. There is a huge expected market potential for this new 4G mobile technology, which will strengthen the strong position of the European industry in this area. The world's first commercial 4G/LTE network was launched in Stockholm in 14 December 2009, and there are today about 10 million 4G/LTE subscribers worldwide. Because of these excellent and outstanding results, the WINNER+ project also received the Celtic Excellence Award in Gold and was published as an EUREKA success story.



## iTEAM sets up the first HDTV test transmission over DVB-T2 in Spain

On March 2012 the Institute of Telecommunications and Multimedia Applications (iTEAM) set up the first DVB-T2 transmission with HDTV contents in Spain. The test was carried out by means of the DVB Test-Bed deployed by iTEAM in the campus of the Universitat Politècnica de València, which allows R&D researchers of iTEAM to investigate and evaluate the most advanced technologies of Digital Terrestrial Television (DTT) standards through field measurements. DVB-T2 is the second generation European standard for the provision of digital terrestrial television. It is the most advanced DTT system of the world. Combined together with the MPEG4 video coding, DVB-T2 can provide up to 45 Mbps per multiplex in 8 MHz bandwidth channels (70% more capacity than first generation standard, DVB-T), enabling the efficient transmission of HDTV and even 3D-TV services. DVB-T2 specification was submitted to ETSI in 2008 and was finally adopted in 2009. The first DVB-T2 deployment was in the UK, where DVB-T2 services were launched in March 2010, overcoming the existing DVB-T service. Years 2010 and 2011 also saw the launch of DVB-T2 services in Italy, Sweden, and Finland, all of which will be nationwide in the short term. Outside Europe DVB-T2 pay-TV services have been launched in Zambia, Nigeria, Kenya and Uganda and many more are expected to follow soon. Advanced trials are currently taking place across the Globe and up to 47 countries are currently considering DVB-T2 services adoption in the mid-term.



## Prof. Narcis Cardona elected Chairman of COST IC1004

Since May 2011, Prof. Narcis Cardona is in front of the European COST Action IC1004 on Cooperative Radio Communications for Green Smart Environments, which belongs to the ICT Domain. COST (European Cooperation in Science and Technology) is one of the longest-running European instruments supporting cooperation among scientists and researchers



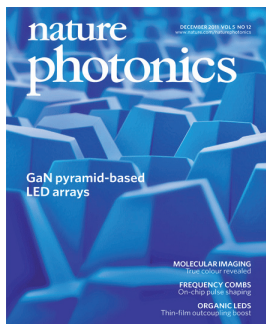
across Europe. The Action IC1004 addresses research issues in the field of cooperative radio communications to make our society cleaner, safer, and more energy efficient. This is one of the largest FP7 COST Actions, with a total number of registered participants above 250, from 38 countries, 9 of them out of the EU. COST IC1004 is a four years Action, ending on May 2015.

## New iTEAM research project supported by the 2012 Call of the Spanish Ministry

The project "Distributed and Collaborative Sound Signal Processing: algorithms, tools and applications" led by Prof. Alberto González has been elected by the Spanish Ministry of Economy and Competitiveness to be supported with a total budget of 526.000€ during the period 2013 - 2015.

The project addresses the problem of distributed collaborative sound signal processing. It considers the physical, computational, signal processing, technology and energy consumption aspects in distributed and collaborative scenarios. Their potential applications will benefit from the properties of ubiquity, versatility, scalability, energy efficiency and cooperative processing of the smart (sound processing) network nodes. This project will be held in collaboration with the Computation and Communications Group of the UPV led by prof. Antonio Vidal, the Telecommunications' Department of Universidad de Jaén, the Applied Signal Processing Group of Universidad de Alcalá, and the Center for Artificial Intelligence of Universidad de Oviedo.

## ITEAM research published in Nature Photonics



The December 2011 issue of Nature Photonics publishes a featured article on the advances achieved by ITEAM researchers in the application of Slow light technologies to Microwave Photonics. The article reviews the work that our researchers have reported in the context of the European FET project GOSPEL (Governing the Speed of Light) and includes several pioneering

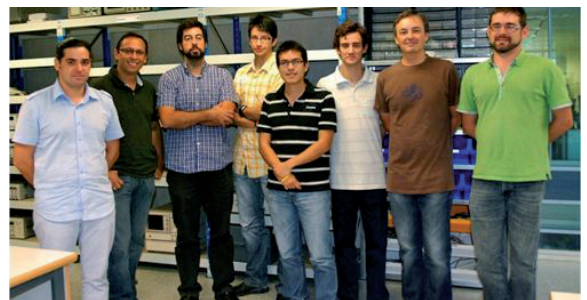
techniques as well as world record results in the design of broadband fully tunable RF-Photonic phase shifters, filters and optical delay lines. More information: J. Capmany, I. Gasulla and S. Sales, 'Microwave Photonics: Harnessing slow light', Nature Photonics 5 (12), pp. 731-733, (2011)

## Towards full integration of microwave photonic systems on a chip

ITEAM researchers together with colleagues from THALES in France have developed the first low-loss dispersive photonic crystal waveguide tailored to microwave photonic applications. This component allows the implementation of a delay line with a footprint of 1.5 mm which is several orders of magnitude smaller than currently employed optical fibers. Moreover, it enables the possibility of incorporating this component on a photonic chip. This pioneering result has been published in Nature Communications. More information: Juan Sancho, Jerome Bourderionnet, Juan Lloret, Sylvain Combrié, Ivana Gasulla, Stephane Xavier, Salvador Sales, Pierre Colman, Gaelle Lehoucq, Daniel Dolfi, José Capmany, Alfredo De Rossi, 'Integrable microwave filter based on a photonic crystal delay line', Nat. Commun. 3: 1075 doi:10.1038/ncomms2092 (2012)

## New world record in Quantum Communications

ITEAM researchers have demonstrated the successful simultaneous transmission of 40 quantum keys over a fiber optic link. The system, implemented in the laboratory spans a distance of 11 Km and it is based on a proprietary two-tier multiplexing (subcarrier+wavelength) scheme which makes a maximum profit of the available transmission spectrum. This result is a current world record in terms of number of transmitted keys and opens the way to the incorporation of quantum key distribution channels together with classical channels in the same fiber. More information: J. Mora, W. Amaya, A. Ruiz-Alba, A. Martinez, D. Calvo, V. García Muñoz, and J. Capmany, "Simultaneous transmission of 20x2 WDM/SCM-QKD and 4 bidirectional classical channels over a PON," Opt. Express 20, 16358-16365 (2012)



## Successful test of first Art-SENSE prototype



ITEAM researchers have participated in ARTSENSE, an European research project dedicated to pushing the role of emerging technology in museum interpretation. Developed as the next step in interactive guides, the project is based around wearable devices that react to the visitor experience. Using eye tracking, audio monitoring and environmental data, the device follows the user's biological response to (and engagement with) an artwork or artifact, pushing information to them accordingly. For the museum visitor the result is an enhanced, personalized experience, taking them on an innovative journey through the hidden stories of the artworks and artifacts. The first integrated prototype was successfully tested in September 2012 in the Museo Nacional de Artes Decorativas (Madrid).

