



eltic-Plus⁺

Smart Connected World



Celtic-Plus Event

27-28 May 2015, Vienna

**Celtic-Plus Award winning projects
present their results**

SPECTRA



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SPECTRA





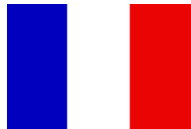
SPECTRA Project



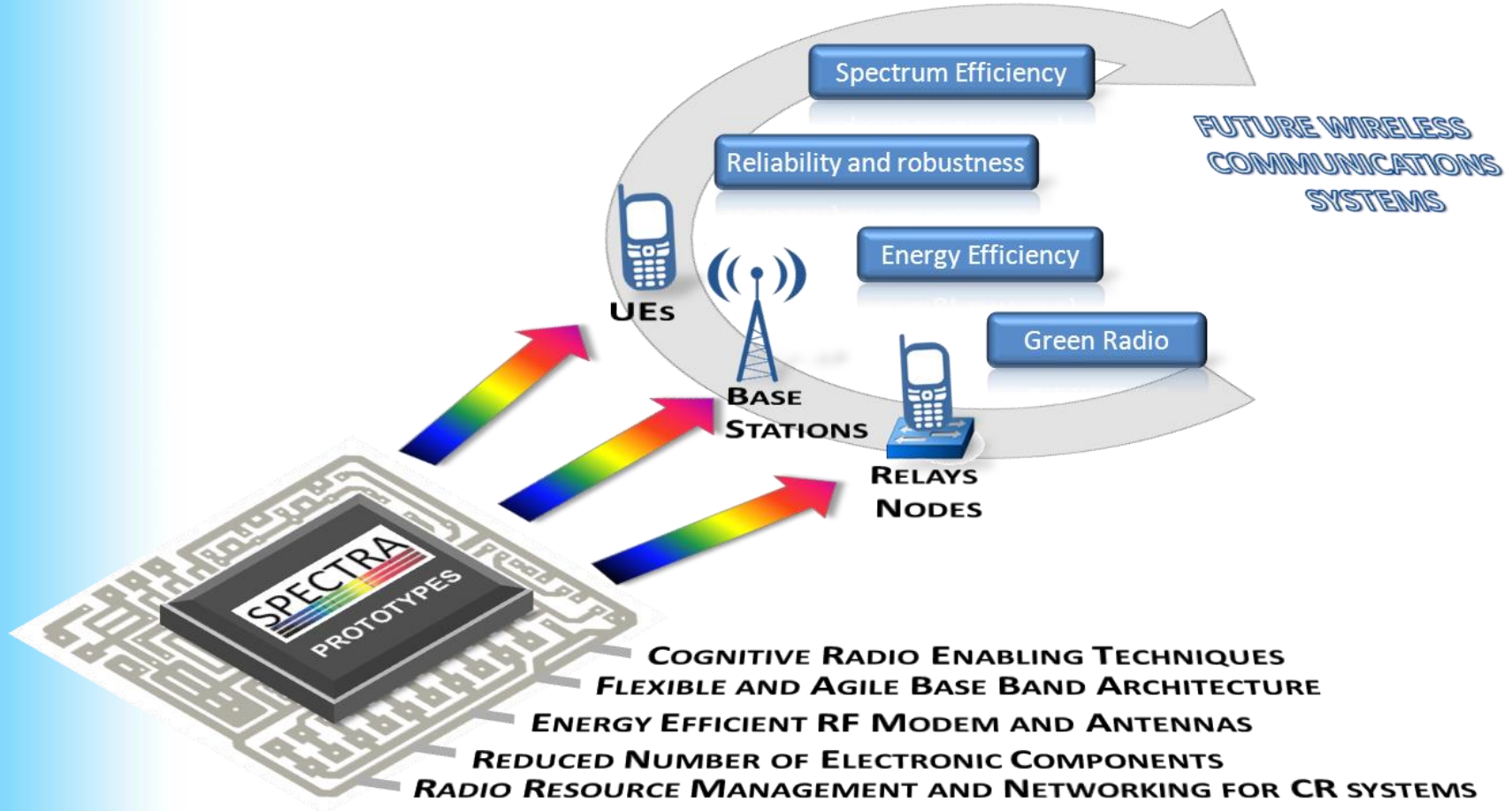
THALES



TELLEMENT MONACO



SPECTRA approach



Some numbers

- 2 demonstration platforms
 - Full compliant LTE platform
 - USRP-based Cognitive Radio implementation



Some numbers

- 2 demonstration platforms
- 30 prototypes of components
 - Antennas, circuits...



Some numbers

- 2 demonstration platforms
- 30 prototypes of components
- 4 open source softwares released
 - OpenAir Interface
 - Embb

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Acknowledgements

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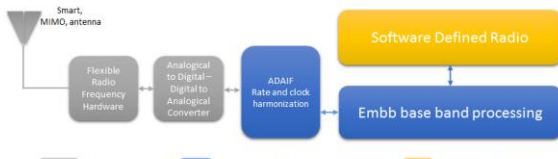
The Embb project is supported by the Celtic-Plus project on SPECTRA.

Embb, a generic hardware and software architecture for digital signal processing

Embb is a generic hardware and software architecture initially dedicated to the Digital Signal Processing (DSP) for Software Defined Radio (SDR) applications. The Embb name used to be written EMBB and meant ExpressMIMO baseBand, in reference to its first target FPGA-based prototyping board. Today Embb is just a name and, as such, shall be written in lower case with an upper case initial E. It does not mean anything any more. Even if Embb is still mainly oriented towards DSP for SDR applications, it can be used for many different application fields like, for instance, image processing, network processing, security applications,.... To make it short, Embb is especially useful for applications that:


- Have strong digital processing requirements requiring hardware acceleration (fast Fourier transforms, high speed enciphering - deciphering,...)
- Consist in series of very different kinds of digital processing algorithms that cannot be all implemented on the same hardware accelerator (channel convolutional decoding, modulation, vector processing, bitwise interleaving,...)
- Have hard real time constraints.
- Can be represented as data flows and controlled by a General Purpose micro-Processor (GPP).
- Are very flexible in nature (SDR applications targeting several Radio Access technologies from Bluetooth to LTE-A).

In a SDR context Embb can be used to implement most of the demanding digital signal processing. It is controlled by a software application that runs on its General Purpose Control Processor, hence the *Software Defined*.



Legend: Hardware Hardware, DSPs provided by Embb Software-defined radio

Components Collaborative WEB Tools Our projects



OVERVIEW

Welcome to openairinterface.org

OpenAirInterface is an open-source hardware/software development platform and open-for innovation in the area of digital radio communications. It was created by the **Mobile Communications Department at EURECOM** based on its experience in publicly-funded R&D carried out in the context of collaborative research projects (French ANR and European Framework programs). As an evolution of the wireless3g4free.com platform, it targets demonstrating innovation in the following subject areas :

- **Real-time Radio Signal Processing**
 - Hardware/software architectures in support of real-time signal processing (Software Radio, multi-processor system-on-chip)

Open Air Interface was created by the Mobile Communications Department at EURECOM based on its experience in publicly-funded R&D carried out in the context of collaborative research

Some numbers

- 2 demonstration platforms
- 30 prototypes of components
- 4 open source softwares released
- Several products improved and basis for new line of products
 - SDR line of products
 - DPD in TV line of products



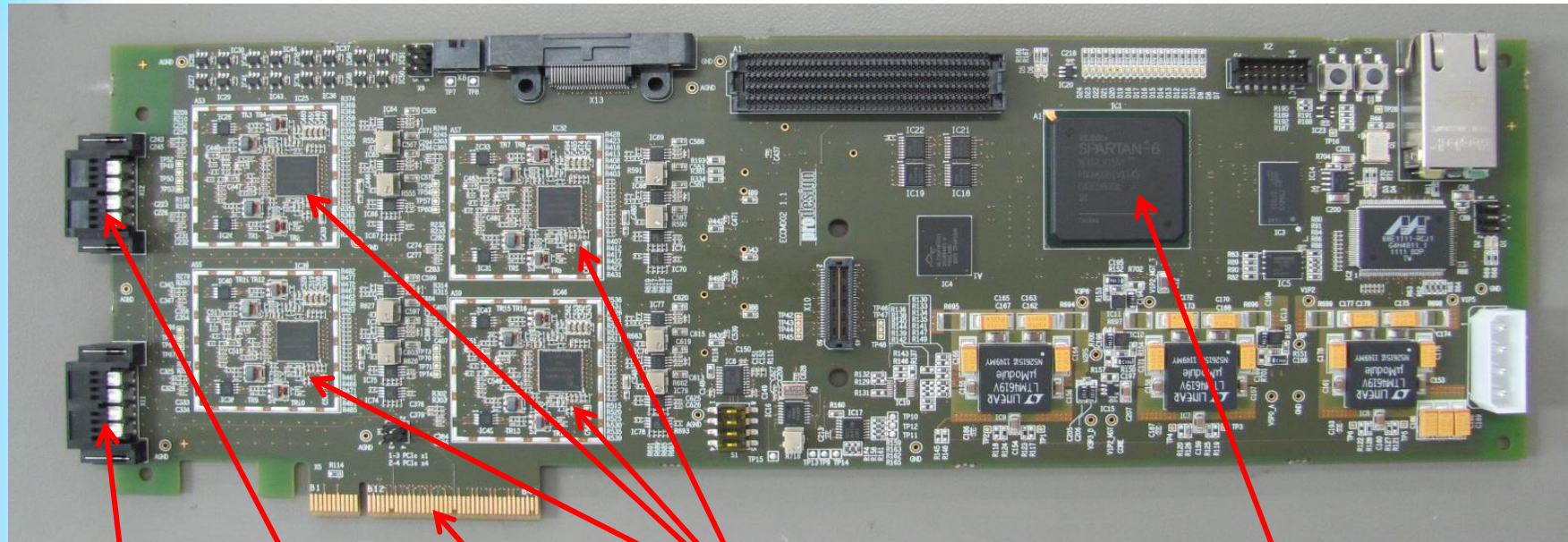
Some numbers

- 2 demonstration platforms
- 30 prototypes of components
- 4 open source softwares released
- Several products improved and basis for new line of products
- More than 30 scientific publications
- 1 foundation around SPECTRA software

- Experimental network in Monaco:
 - 2 bands 700 MHz and 2.6 GHz
 - Real field trials, with a SPECTRA experimental cellular network.
 - Interoperability with a commercial equipment (real-time over-the-air operation between the SPECTRA relay and a commercial LTE equipment)



Platform 1: EXPRESSMIMO2



RF RX
(4 ways)

RF TX
(4 ways)

PCIe
connector

RF transceivers
LIME LMS6002D

FPGA

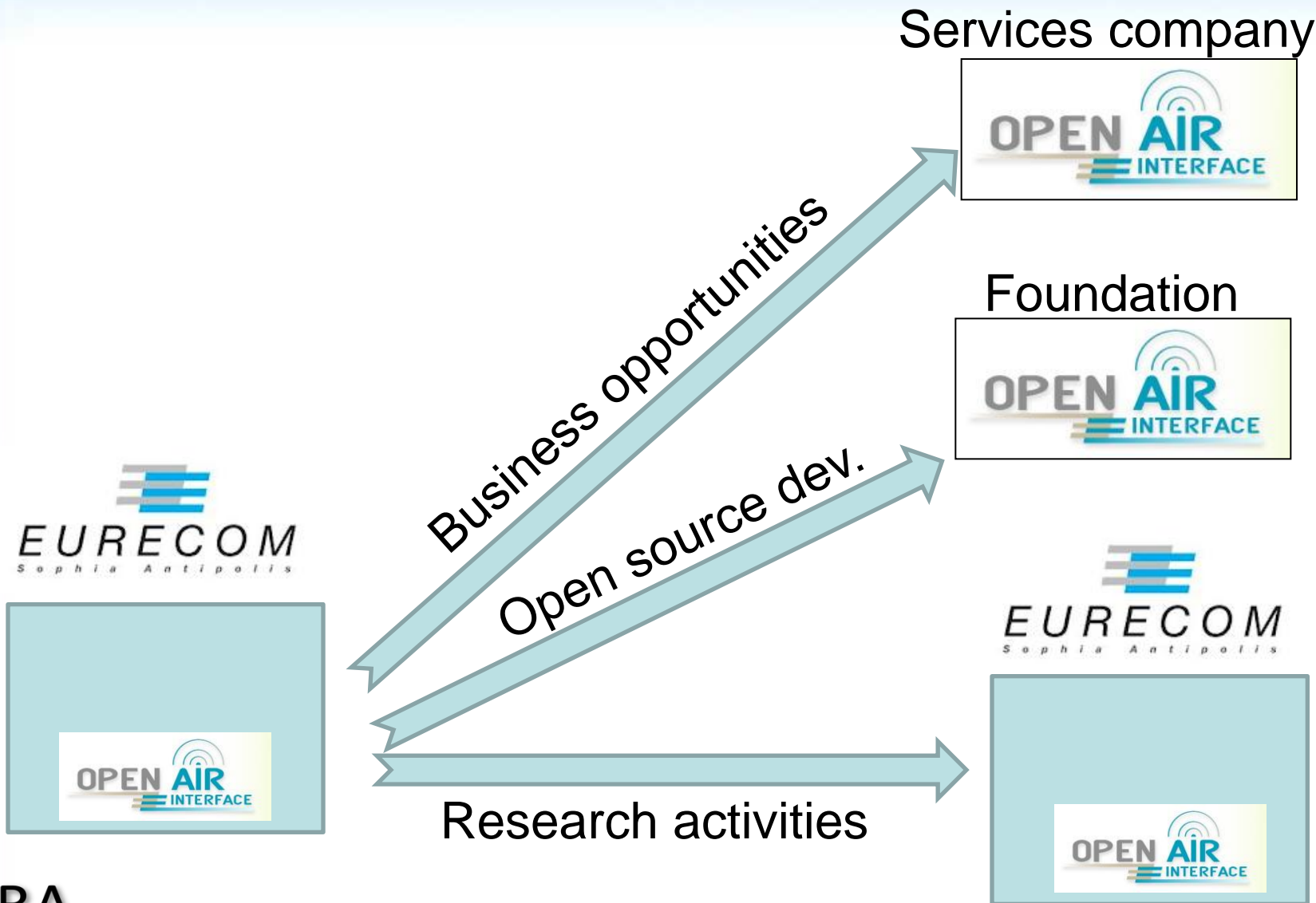
- 300 MHz to 4 GHz
- MIMO 4*4 (4 TX and 4 RX) : LTE-A compliant
- FDD and TDD
- Flexible and reconfigurable card, usable in real deployments



Commercialization of SPECTRA HW



- Clients:
 - Academics: Telecom Paris Tech (FR), UoA (Gr), KCL (UK)...
 - Large companies: Agilent, TCS, Volkswagen, ...
 - SMEs: Ercom, Air-Lynx
- 92 boards produced so far (70 sold)
- Contract with Telmat (French SME, www.telmat.com)
→ TELMAT is now the official distributor of EXPRESSMIMO2 (exclusive in Europe)
- EURECOM is in discussion with a company in Malaysia to distribute the board in Asia



Thank you!



Contact Info

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