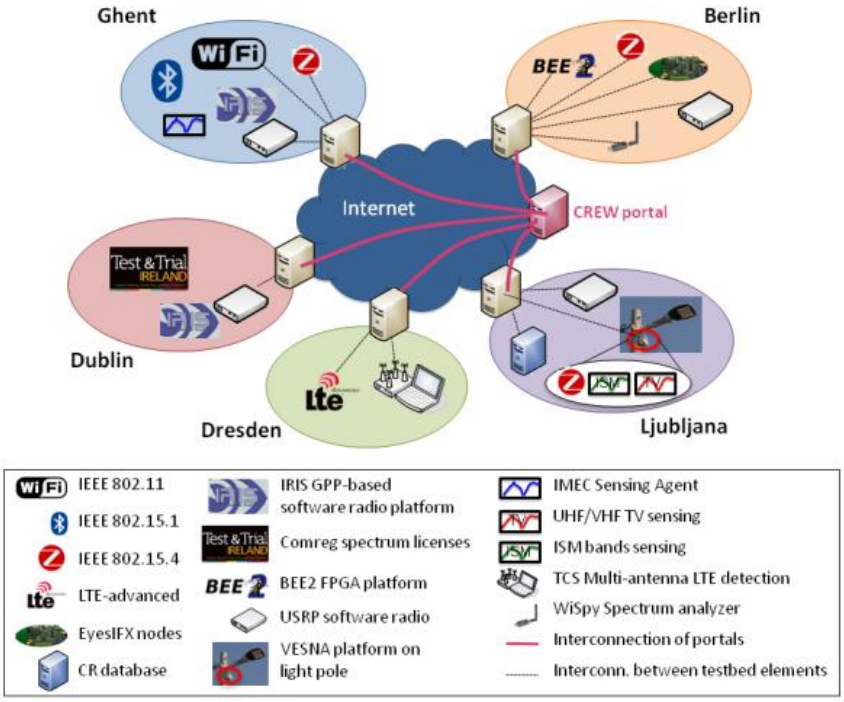
COGNITIVE RADIO EXPERIMENTATION WORLD

a 3rd Open Call is planned!

more info on the back

Scope

The main target of FP7-CREW is to establish an open federated test platform, which facilitates experimentally-driven research on advanced spectrum sensing, cognitive radio and cognitive networking strategies in view of horizontal and vertical spectrum sharing in licensed and unlicensed bands.



The CREW federated platform

The CREW federated platform incorporates 5 individual wireless testbeds incorporating diverse wireless technologies (heterogeneous ISM, heterogeneous licensed, cellular, wireless sensor, heterogeneous outdoor) augmented with State-of-the-Art cognitive sensing platforms.

The combined expertise, software and hardware that is available in the CREW federated platform allows the experimental optimization and validation of cognitive radio and cognitive networking concepts in a diverse range of scenarios, including but not limited to: radio environment sensing for cognitive radio spectrum sharing, horizontal resource sharing between heterogeneous networks in the ISM bands, cooperation in heterogeneous networks in licensed bands, robust cognitive sensor networks, and measuring the impact of cognitive networking on primary cellular systems.

Type of project
Integrated Project (IP)

Contract number
FP7 – 258301

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Project website
www.crew-project.eu

Community contribution to the project
4.884.529 Euro

Project start date
1 October 2010

Duration
60 months

Partners
Core Partners
iMinds, BE
imec, BE
Trinity College Dublin, IE
Technische Universität Berlin, DE
Technische Universität Dresden, DE
Thales Comm. and Security SAS, FR
EADS Deutschland GmbH, DE
Jožef Stefan Institute, SI

Open Call 1 partners
University of Durham, UK
Technische Universität Ilmenau, DE
Tecnalia Research & Innovation, ES

Open Call 2 partners
University of Thessaly, GR
National ICT Australia, AU
Instituto de Telecomunicações, PT
CMSF-Sistemas de Informação, PT
CNIT-Universita di Palermo, IT
WINGS ICT Solutions, GR

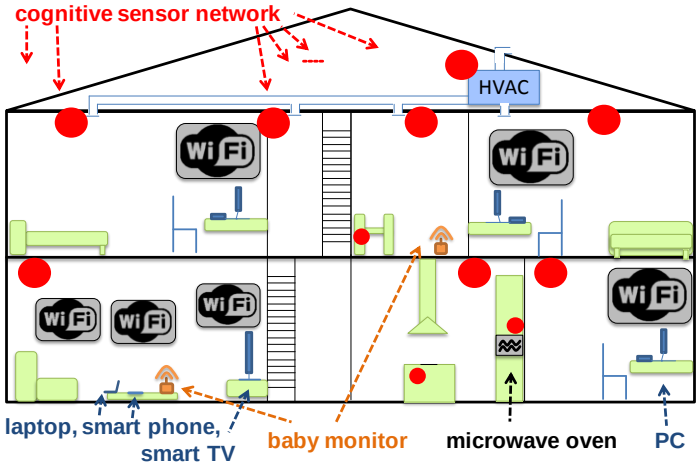
Example scenario

CHALLENGE

Whether at home, in the office, or at conference venues, devices such as laptops, smart phones, or audio systems compete to access the scarce 2.4 GHz wireless spectrum, regularly resulting in slow or failing communication links. For example, a ZigBee-based sensor network used for home automation is likely to be interfered by Wi-Fi devices in the same environment.

SOLUTION

Cognitive radio and cognitive networking solutions optimize the use of the wireless spectrum, by dynamically changing the configuration of the radio transmitters and/or communication stacks, based on the characteristics of the environment in which they are operating. To solve the ZigBee/Wi-Fi coexistence issue, the ZigBee nodes dynamically switch between different communication channels based on local noise power measurements using their built-in radios, or based on distributed spectral measurements collected by dedicated sensing engines.



Statistics – 2nd Open Call

The CREW project received 21 proposals, submitted by 24 proposers.

- Total request for funding: EUR 2 236 460 (oversubscription factor: 5.08)
- Min/avg/max requested funding per proposal: EUR 73 958 / 82 832 / 120 000

After a thorough review process by external independent reviewers, it was found that the quality of most proposals was good to very good. Due to budget limitations, only 4 proposals can receive funding as a result of the second open call:

1. University of Thessaly (GR) and National ICT Australia
2. Instituto de Telecomunicações (PT) and CMSF-Sistemas de Informação (PT)
3. CNIT/Universita di Palermo (IT)
4. WINGS ICT Solutions (GR)

3rd Open Call

CREW will organize a 3rd Open Call through a different, lighter mechanism. This will allow us to accept more small experiments, which will not be funded but for which you can count on elaborated support by the CREW consortium.
More details will be available at :
http://www.crew-project.eu/opencall3 .
If you want to receive further updates, you can register for our newsletter at :
http://www.crew-project.eu/subscribe .

Experiment results - 1st Open Call

Three experiments were selected after the first open call. These experiments are almost finished.

UNIVERSITY OF DURHAM. A sensitivity experiment to characterize the performance of COTS and custom designed sensing engines was performed in the large anechoic chamber at Durham University. Both high end and low cost sensing engines that are available in the CREW federation, as well as the digital frequency swept channel sounder at Durham University were characterized using simple waveforms such as CW and more demanding signals such as frequency hopping. Sensing engines with direct down conversion techniques as well as swept techniques formed part of the experiment. The first results indicate that for some types of waveforms, even low cost sensing devices provide accurate results, but that only the high end devices perform well with all types of signals.

TECHNICAL UNIVERSITY ILMENAU. The TUIL's experiment aims at reducing the sensing latency of a software implementation of a Carrier Sense Multiple Access (CSMA) based MAC protocol by integrating a dedicated spectrum sensing engine. The experiment benefits from two cognitive components from the CREW project: the Iris reconfigurable SDR developed at Trinity College Dublin and the IMEC sensing engine (SE). The SE is connected to the PC via USB and the parallel port and complements the USRP2 as radio transceiver. Preliminary results indicate a 50% reduction of the sensing delay compared to a fully software-based implementation of the CSMA protocol.

TECNALIA RESEARCH & INNOVATION. TECNALIA's experiment focuses on assessing the performance of different data fusion algorithms applied to collaborative spectrum sensing. Hard-decision fusion algorithms are compared to soft-decision ones (based on LSC techniques) and two different algorithms are employed to compute the LSC coefficients: Genetic ones and Tecnalia's own Optimized Harmony Search one. So far, Thales Communications and Security SAS "Transceiver Facility Implementation API" has been employed to control the sensing devices and data fusion algorithms have been implemented as Iris blocks.