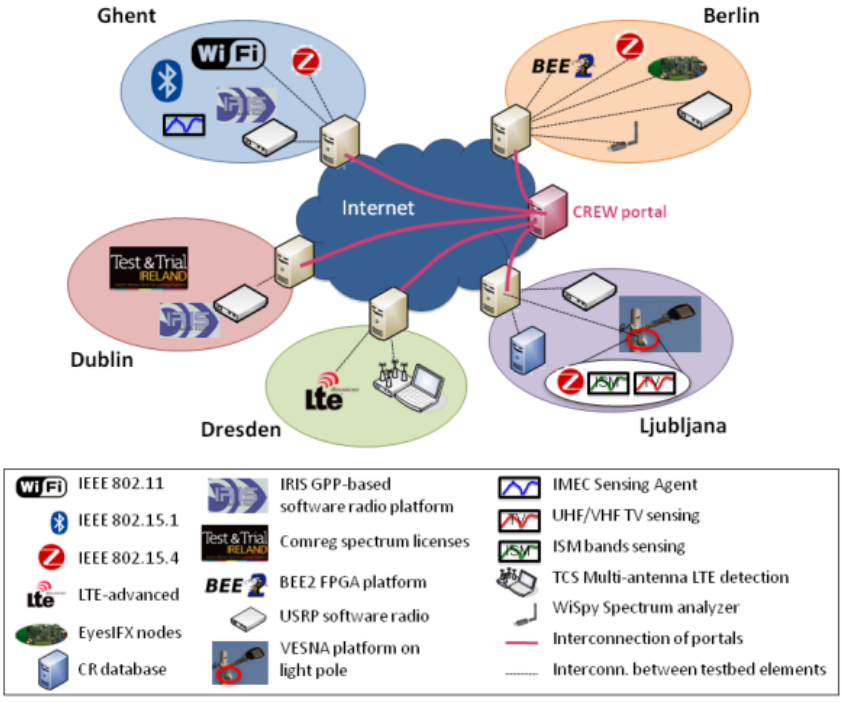
COGNITIVE RADIO EXPERIMENTATION WORLD

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
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Community contribution to the project
4.884.529 €

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, IT
WINGS ICT Solutions, GR

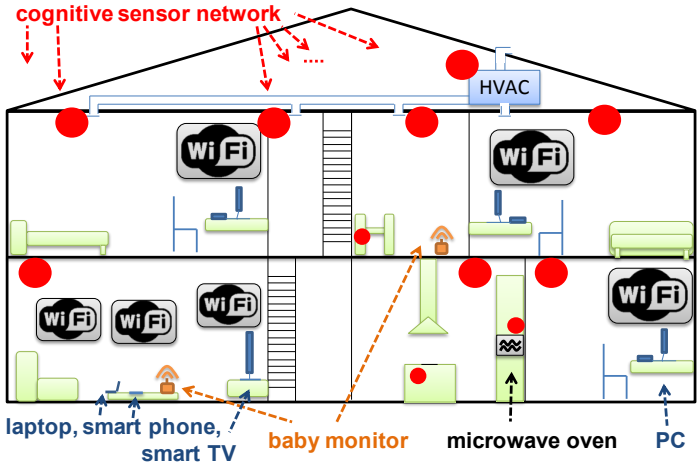
Example scenario

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.



2nd Open Call

In 2012, four experiments were selected after the second open call:

- CABIN-CREW: The Wireless MAC Processor over CREW; enabling Cognitive Access BenchmarkINg (CNIT)
- CREW-TV: Experimental coexistence study in TV bands (Instituto de Telecomunicações and CMSF-Sistemas de Informação)
- Online gathering of Spectrum Sensing Delay and Energy Consumption Measurements in the CREW Benchmarking Framework (University of Thessaly and National ICT Australia)
- EVOLVE: Experiment-based Validation of Control Channels for Cognitive Radio Systems (WINGS ICT Solutions)

These experiments started in early 2013 and first results are expected soon.

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 by the EC, 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

1st Open Call - experiment results

Three experiments were selected after the first open call in 2011. These experiments are now finished.

DEVICE SENSITIVITY AND ENVIRONMENT MEASUREMENTS. Cognitive radio (CR) relies on sensing its environment to identify unoccupied frequencies. The success of CR depends on the sensitivity of the used devices to detect the primary user, and the environment which can cause the signal to be undetectable due to either blockage by buildings or terrain or due to the presence of multiple paths connecting the transmitter to the receiver. To avoid causing interference to the primary user, the experiments at Durham University tested several devices to identify their sensitivity and measured three environments: the air cabin at EADS, TUB and iMinds. (University of Durham)

CCA AGENT IN A CSMA MAC USING IRIS. This experiment resulted in the integration of the imec sensing engine (SE) as a clear channel assessment (CCA) agent into a carrier sense multiple access (CSMA) based medium access control (MAC) protocol implemented on the basis of Iris. In particular, the experiment shows how the MAC, in conjunction with the SE, coordinates access to the shared medium and allows a live video conference over the system. (Technische Universitat Ilmenau)

COLLABORATIVE SPECTRUM SENSING. Information of different sensors at different locations is integrated to have a picture of the spectrum occupation. Measurements from the different sensors are integrated through different algorithms in order to feed a data base of spectrum occupation. Users on a dynamic spectrum access system could connect to this data base and know which frequency bands are already occupied and which are free and could therefore be employed by them. Different CREW testbed facilities have been mixed in order to build this system. (Tecnalia)

Participation in the project has been extremely interesting and fruitful for the Open Call partners. First of all, it has provided a great opportunity to test and validate some of their advanced cognitive radio technical developments, which was extremely difficult without CREW. CREW has given access to advanced cognitive components in a single set-up. Additionally, it has allowed the partners to learn great lessons about testbed usage.