SEVENTH FRAMEWORK PROGRAMME

IP CREW

Cognitive Radio Experimentation World

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On behalf of the CREW consortium

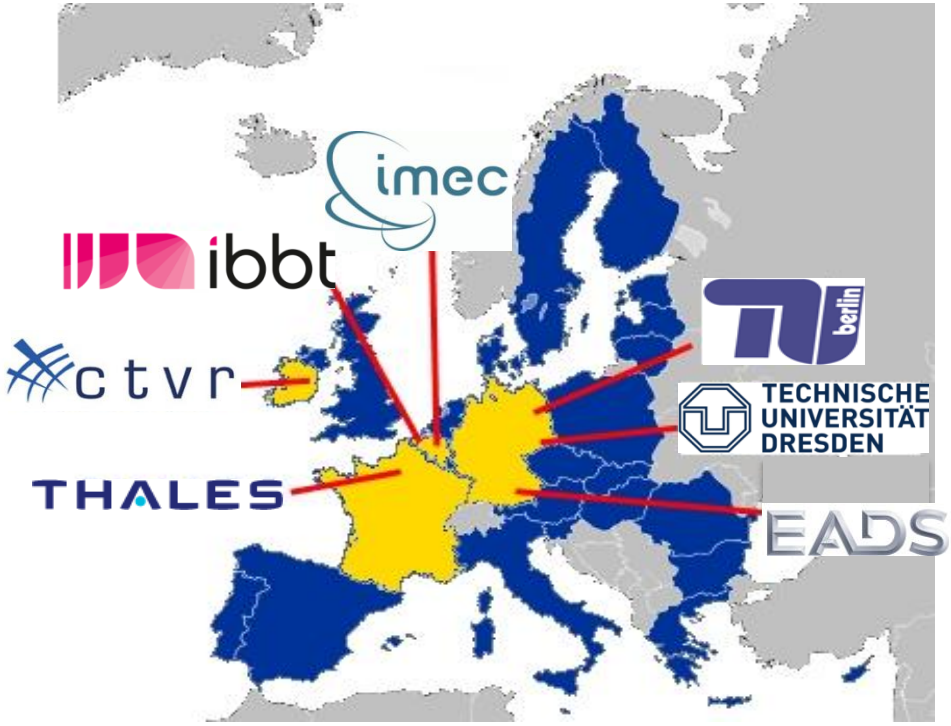
The research leading to these results has received funding from the European Union's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 258301 (CREW project).

ibbt imec ctvr TU berlin TECHNISCHE UNIVERSITÄT DRESDEN THALES EADS

IP CREW

Cognitive Radio Experimentation World

- FP7 call 5
- Project started October 2010
- 7 partners
- 1 extra partner to join in July 2011: CREW enlarged



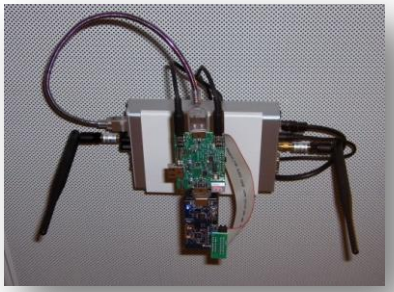
Wireless developer's questions

- **How to evaluate cognitive radio solutions?**
  - … in a configurable environment
  - … in a repeatable way
  - … allowing fair comparison of results

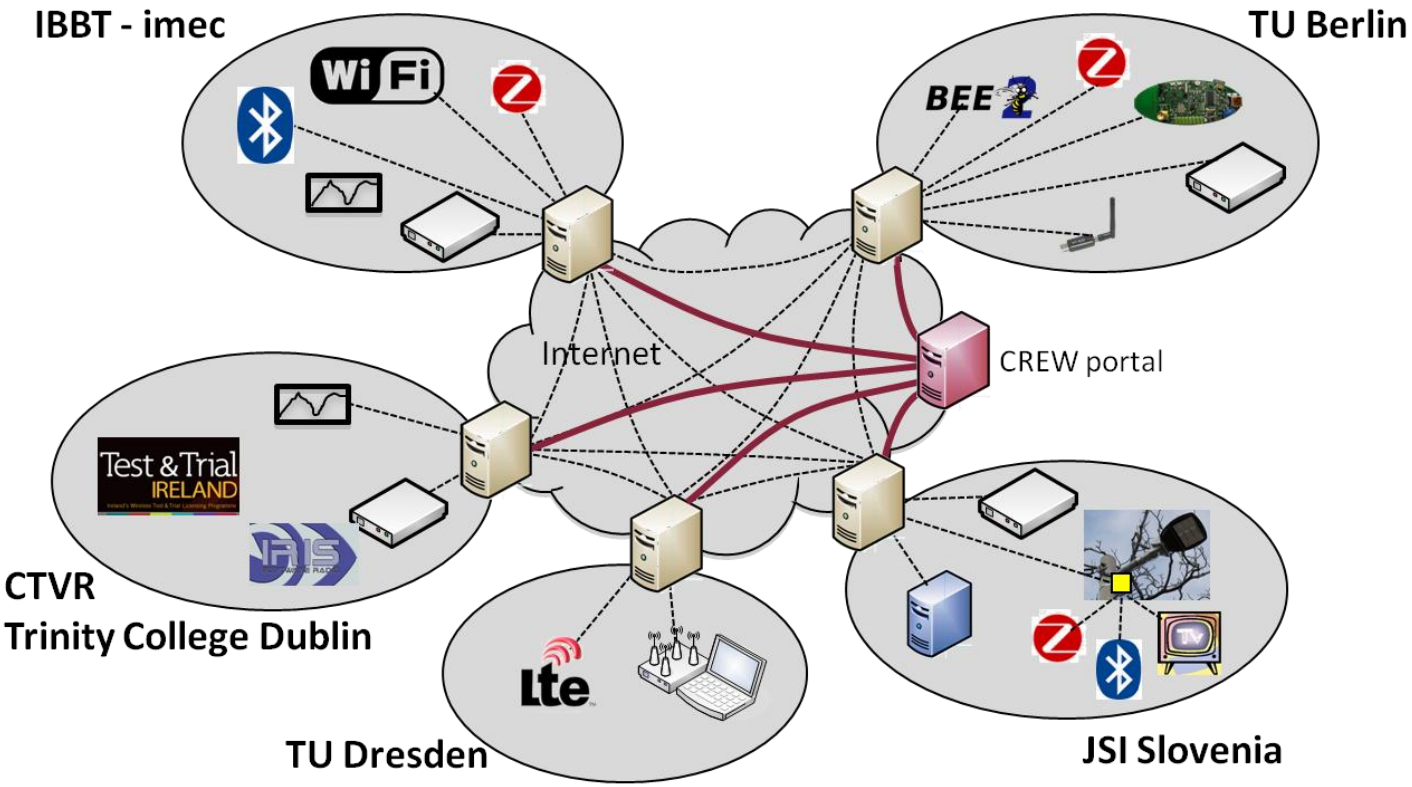
- **Should/can I build my own heterogeneous testing environment?**

IP CREW: Target

- **establish an open federated test platform, facilitating experimentally-driven research on:**
  - advanced spectrum sensing
  - cognitive radio
  - cognitive networking
  - spectrum sharing
    in licensed and unlicensed bands

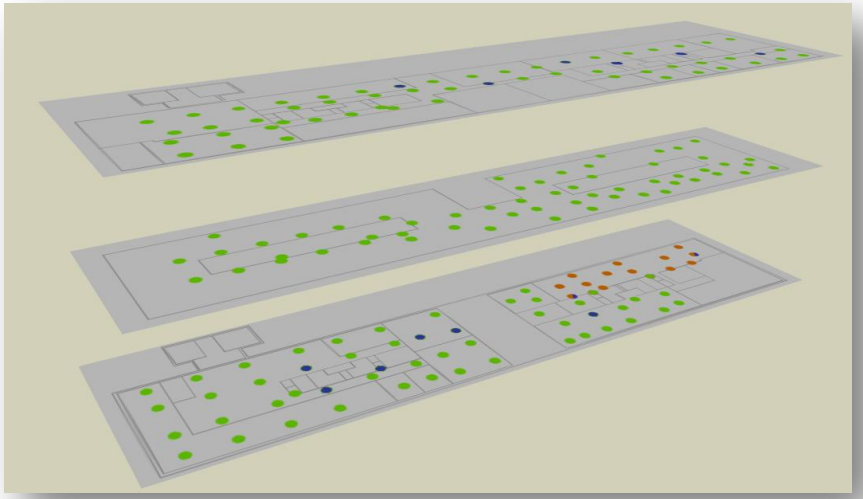


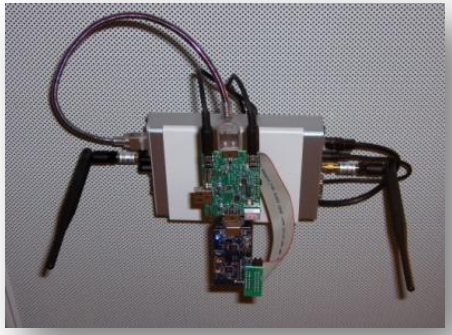
CREW platform



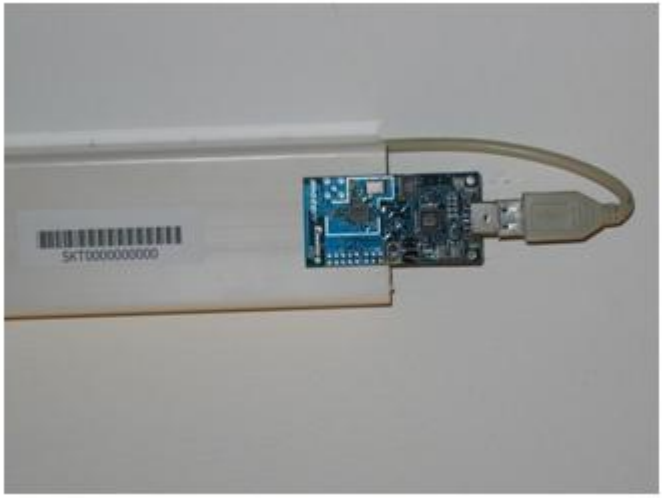
IEEE 802.11	imec Sensing Agent	WiSpy Spectrum analyzer
IEEE 802.15.1	USRP software radio	EyesIFX nodes
IEEE 802.15.4	IRIS GPP-based software radio platform	BEE2 FPGA platform
LTE	Comreg spectrum licenses	THALES advanced sensing platform
UHF/VHF TV	Versatile Sensor Node on Light pole	Interconnection of portals
CR data base		Interconnection between testbed elements

IBBT w-iLab.t





TU Berlin TWIST testbed

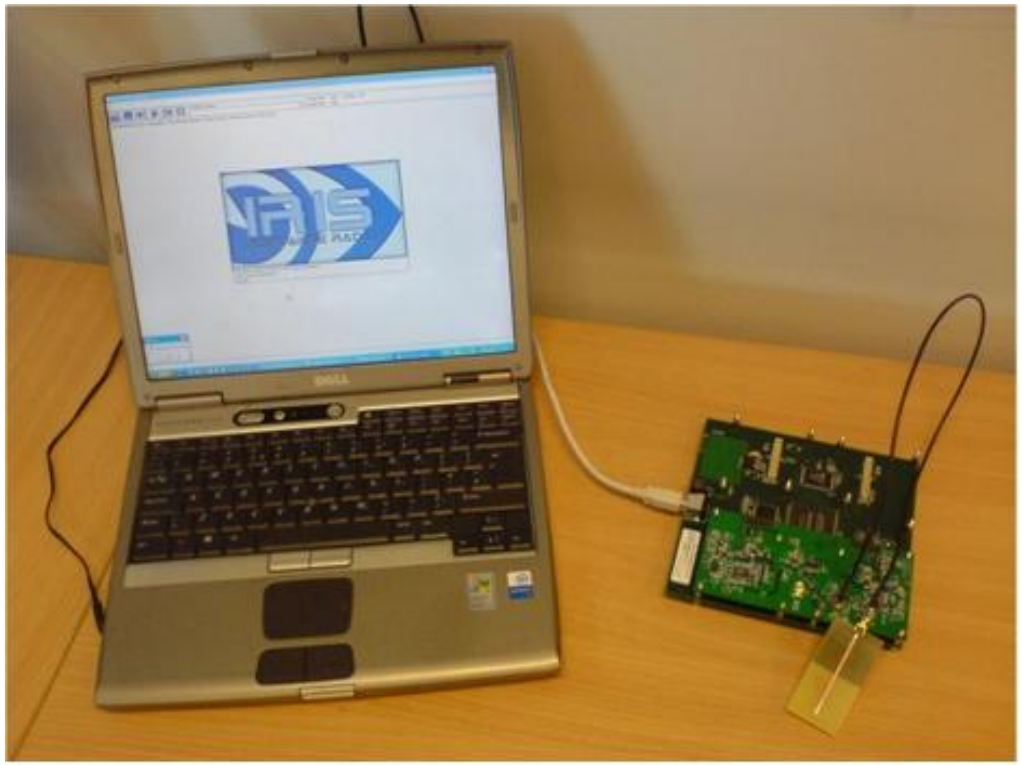


The TKN Wireless Indoor Sensor Network Testbed (TWIST) is a multiplatform, hierarchical testbed architecture .

EASY-C testbed

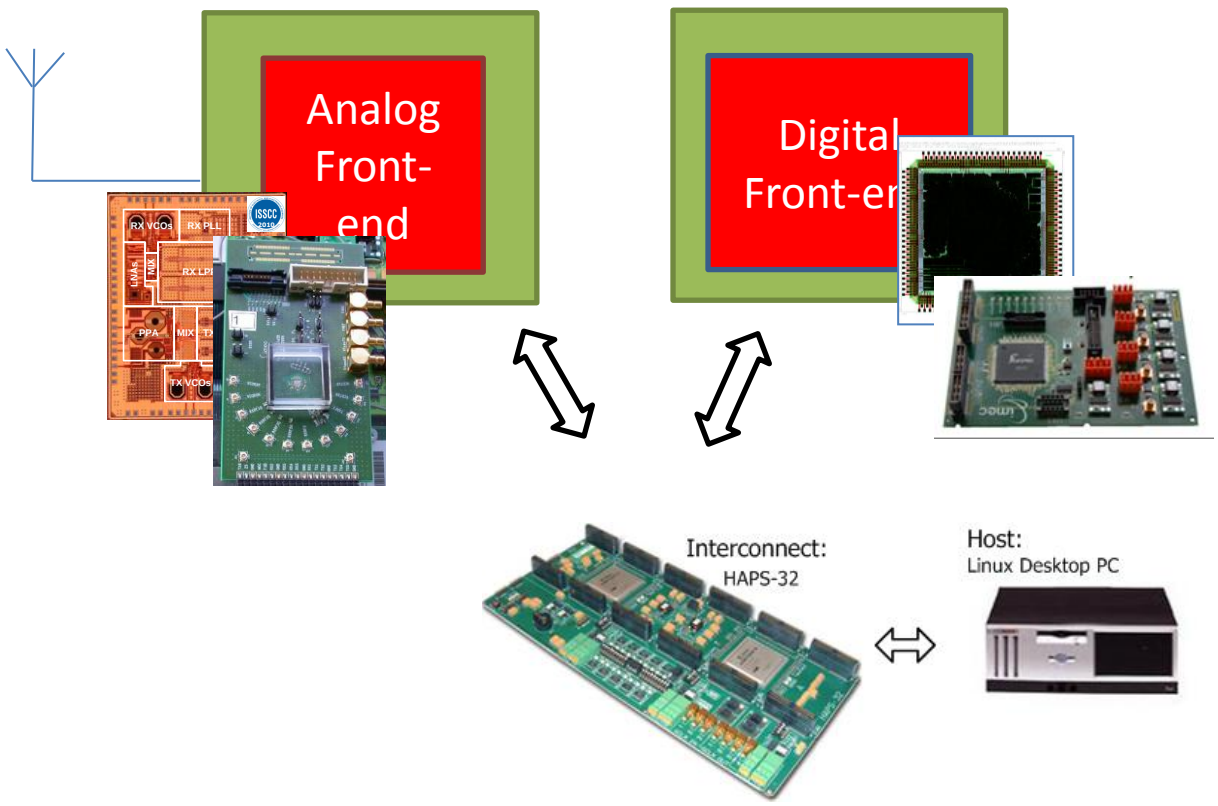
A variety of advanced concepts such as cooperative MIMO are currently in discussion as future LTE extensions. Such novel schemes are researched within EASY-C.

IRIS reconfigurable radio



IRIS can be used to create software radios that are reconfigurable in real-time.

imec advanced spectrum sensing



CREW – other partners

EADS is a global leader in aerospace, defense and related services and will implement an aeronautics use case.

Thales Communications France is a key player of SDR technology development, being involved in development of demonstrators, advanced research programs and standardization activities.

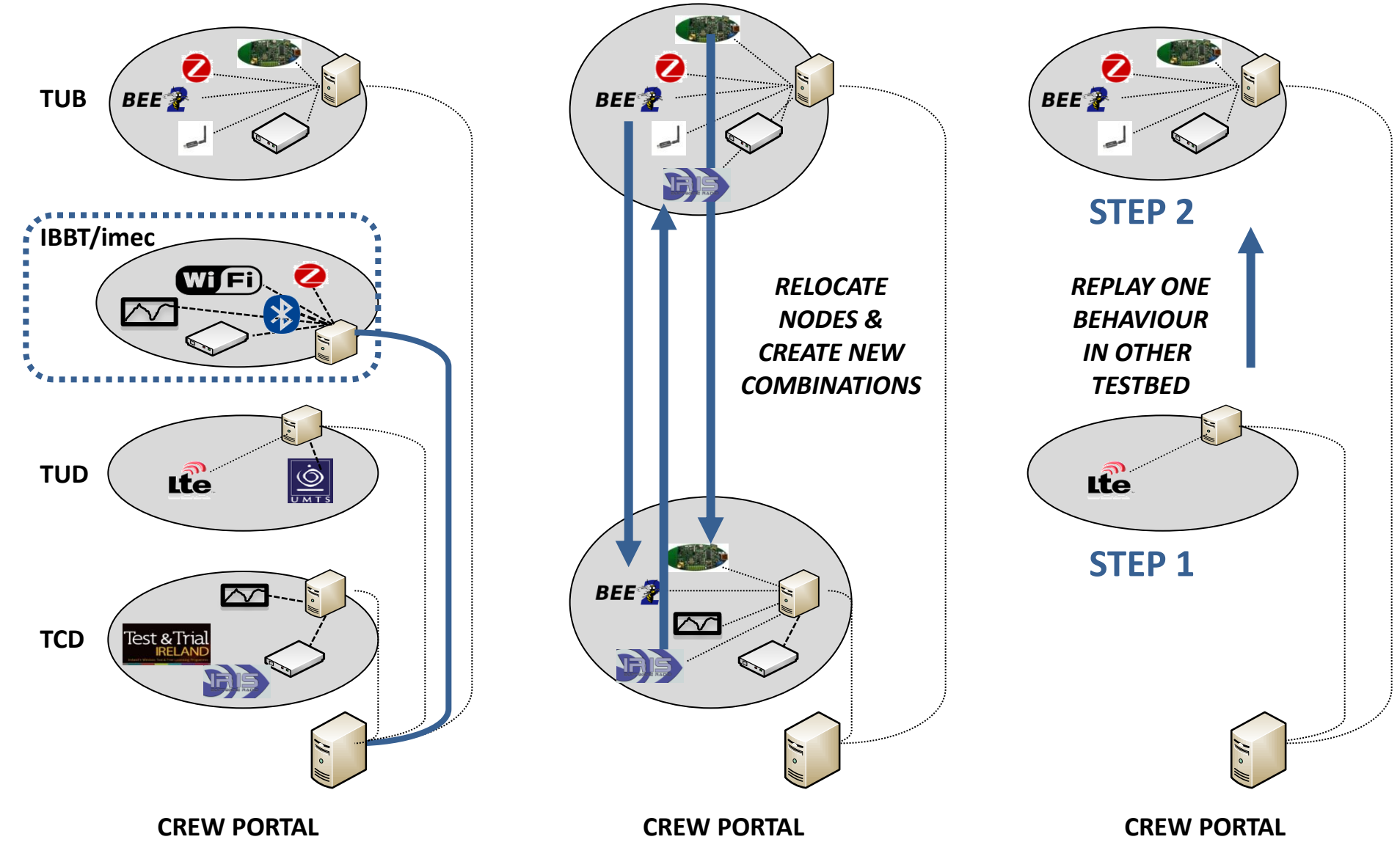
CREW Federated platform: key aspects

- common portal
- novel cognitive components

  linking together software and hardware entities from the different partners using a **standardized API**
- creation of open data sets

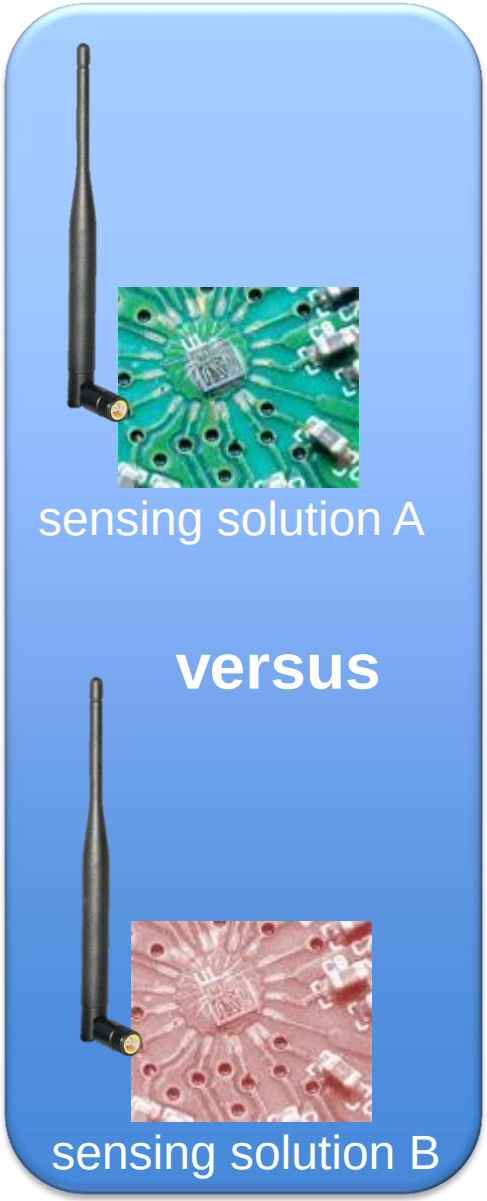
  a common data structure enables the emulation of CREW components in other experimental environments or in a simulator
- benchmarking framework
  - enables experiments under controlled and **reproducible test conditions**
  - offering **automated procedures** for experiments and performance evaluation,
  - allow fair comparison

CREW federation modes

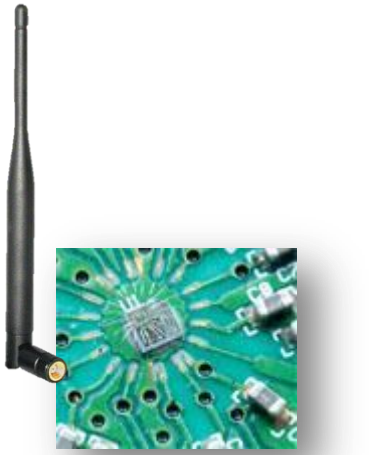


Sensing in ISM bands

See paper @ SDR forum : A Performance Comparison of Different Spectrum Sensing Techniques



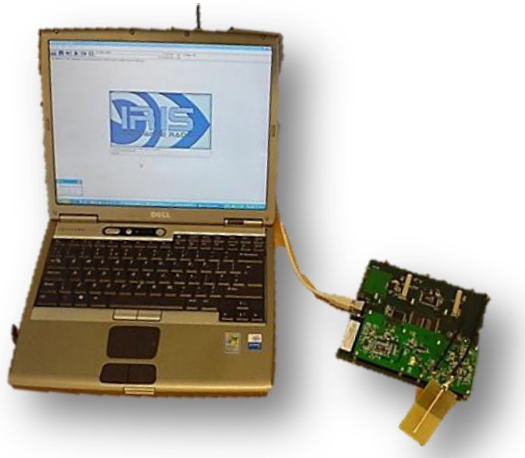
Sensing in licensed bands



sensing solution A

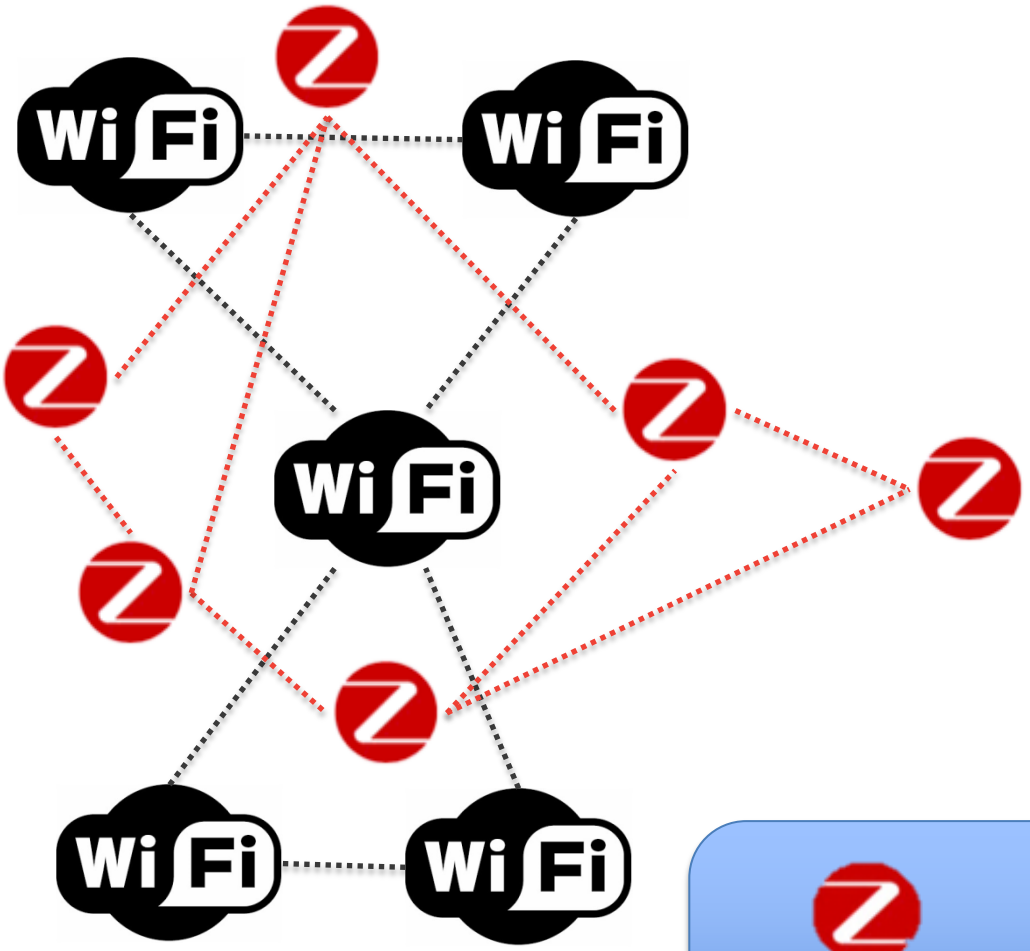
versus

database approach



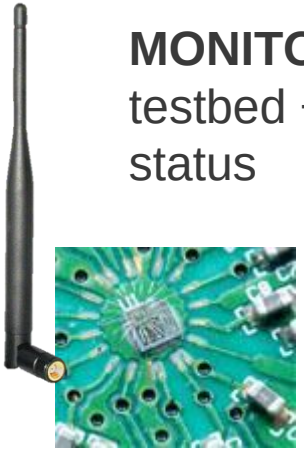
sensing solution B

Cognitive networking in ISM



MONITORING:
{CN protocol + nodes}
under test

MONITORING:
testbed + environment
status



sensing solution

distributed
sensing
(many & cheap)

VS

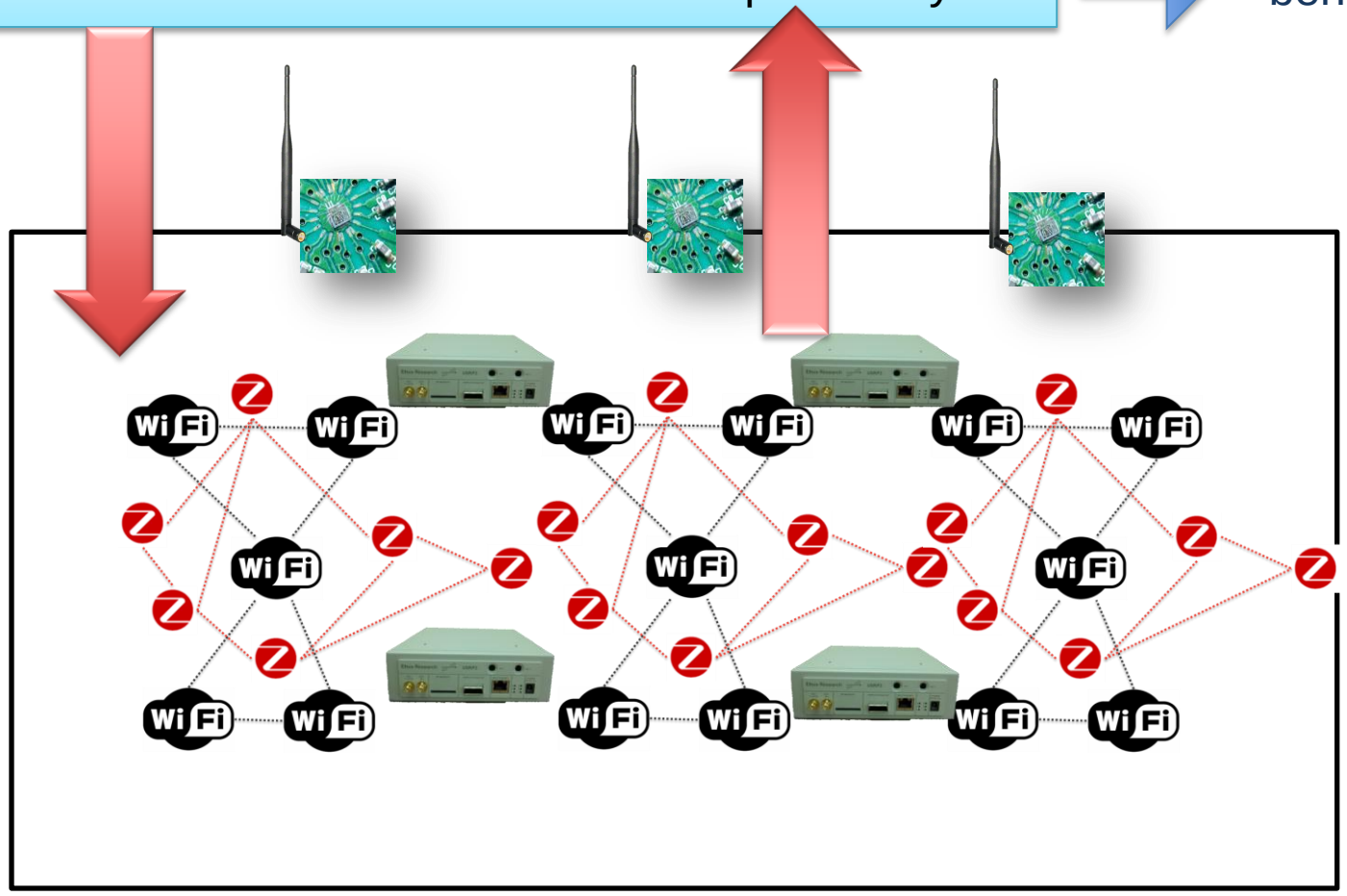
ACTIVE USE:
use advanced sensing for
network optimization:
distributed sensing
(few & expensive)

Controlled experimentation environment

inject RF interference
and/or background traffic

MONITORING
➔ repeatability

wireless
benchmarking

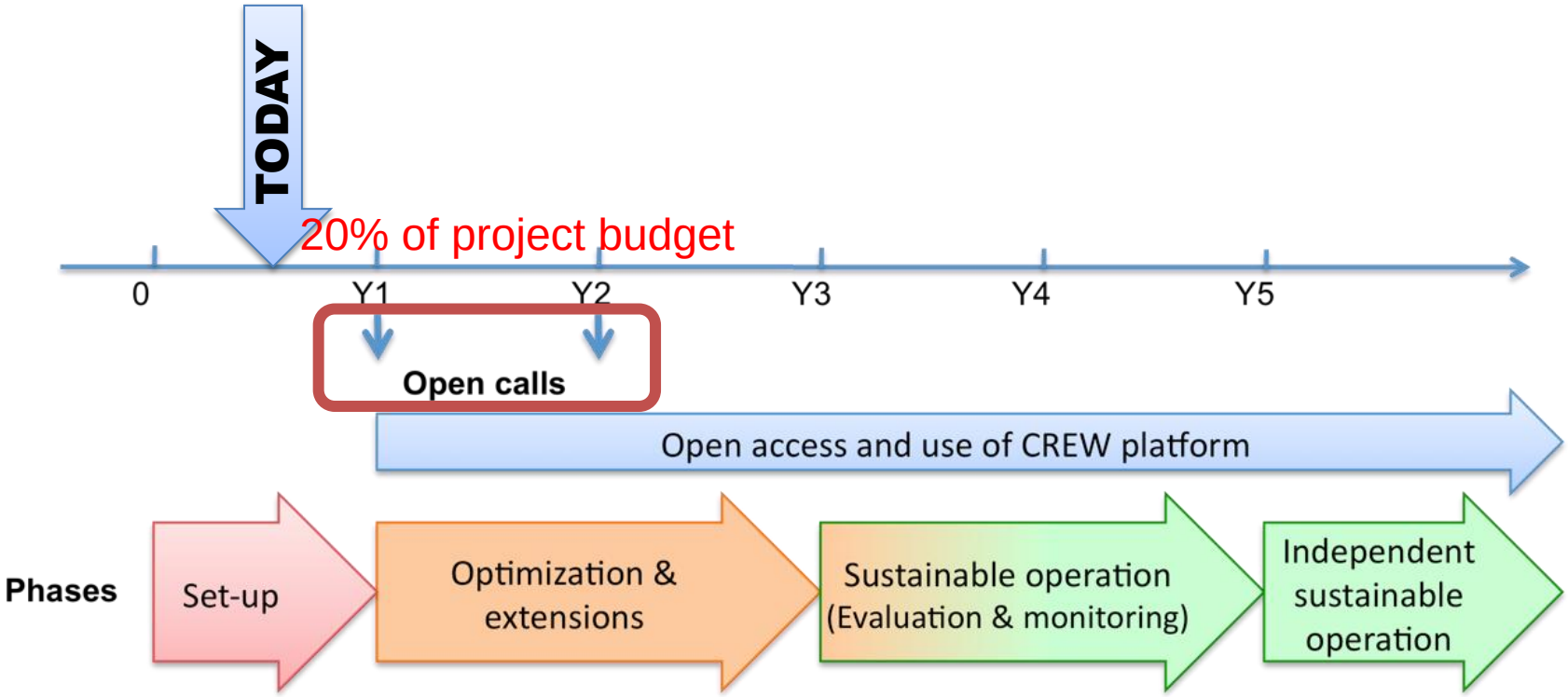


experimentation environment

CR hardware available to experimenter

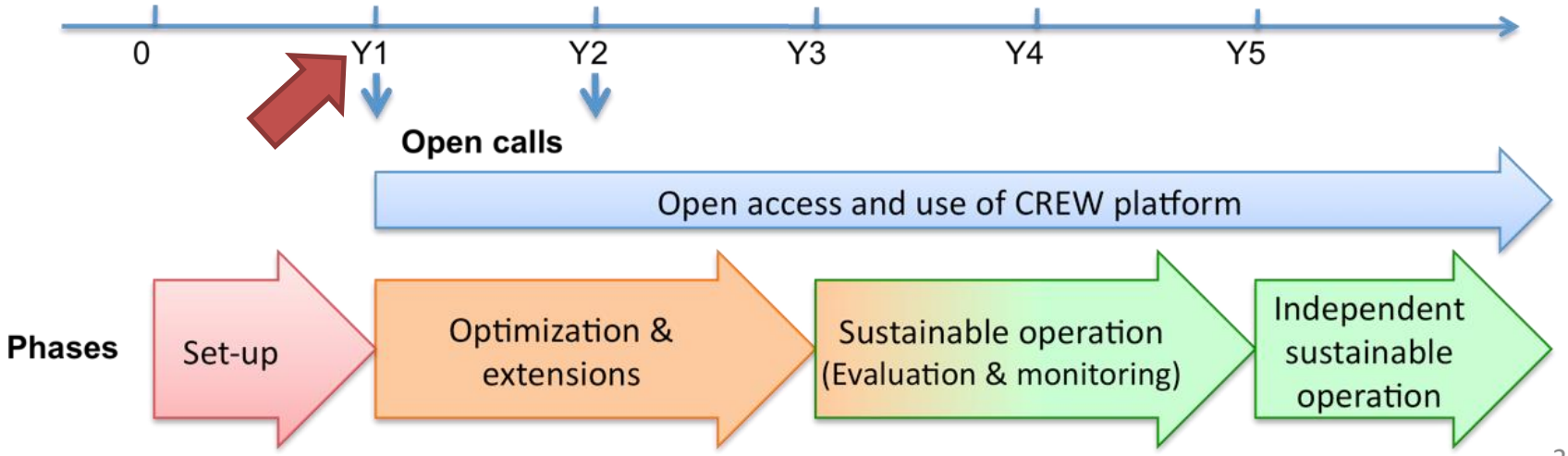
CREW roadmap

- **Start**
  - October 2010
  - Duration 5 years



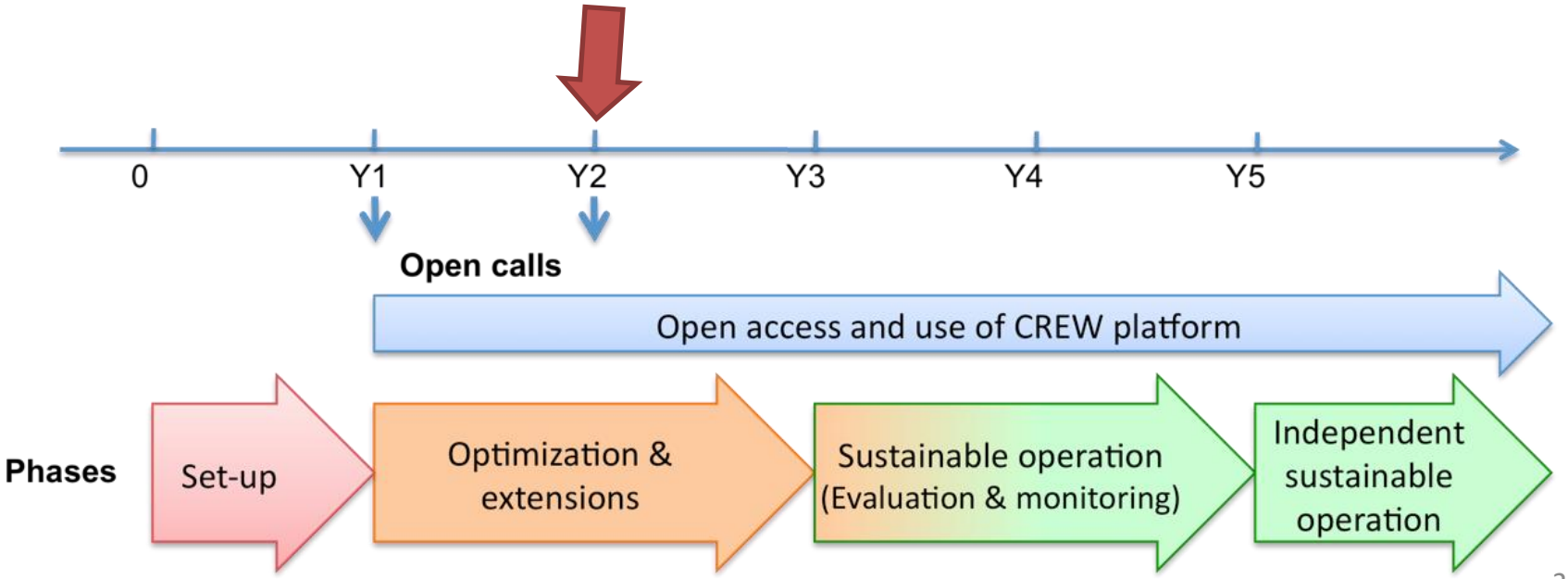
CREW roadmap: open call 1

- **1 year into the project (Sept-Oct 2011):**
  - limited open access:
    - internal experimenters
    - external experimenters funded by CREW
      - open call 1 – www.crew-project.eu
    - external experimenters, not funded
      - no guarantees on availability
      - feedback



CREW roadmap: open call 2

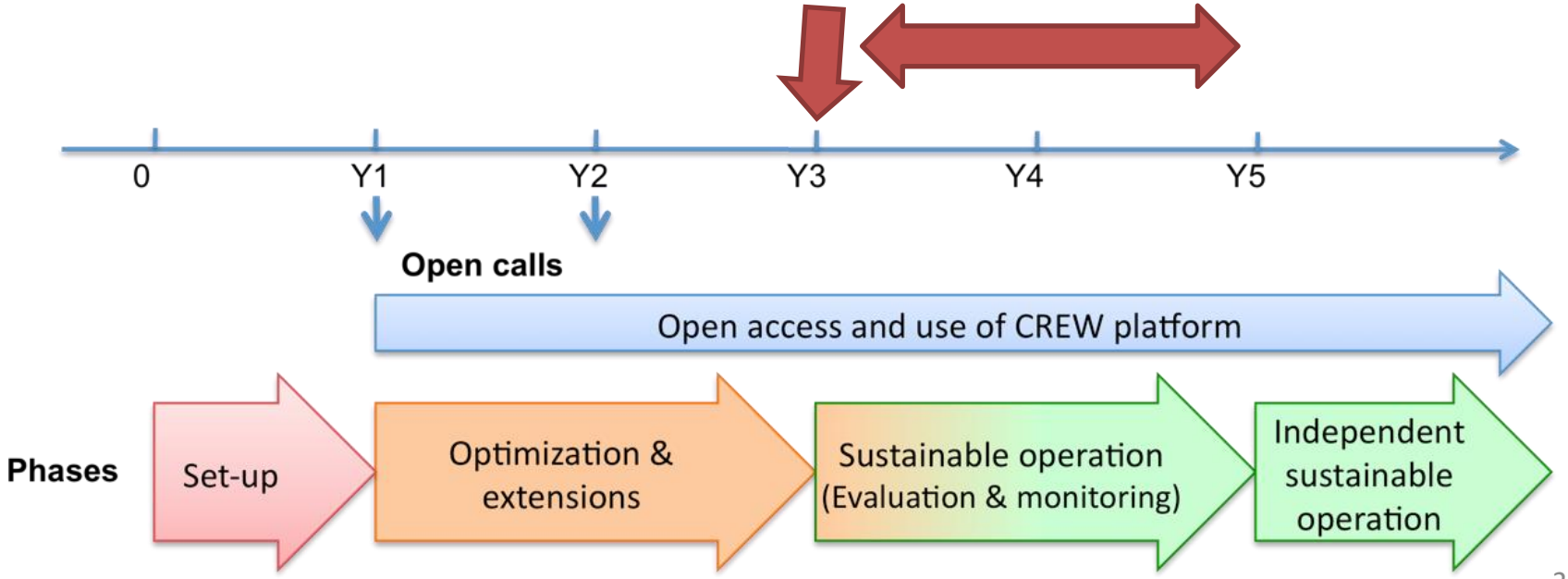
- **2 years into the project (Sept-Oct 2012):**
  - open call 2: demand-driven extensions
    - www.crew-project.eu



CREW roadmap: sustainability

- **Year 3 (Sept-Oct 2013)**
  - federation functionality and extensions completed
  - development of business model
    - access policies
    - pricing

• evaluation and adaptation of business model
• maintenance and 'natural' extensions



IP CREW: Summary

- **Creation of an open federated testbed**
  - Means to match your experiment with hardware available
  - Means to get access to more hardware (union of testbeds)
  - Means to study benchmarking of experiments

- **Elaborates on four existing testbeds**

- **Get involved through one of 2 open calls:**
  - Sept-Oct 2011
  - Sept-Oct 2012

Contact

- **Website**

  http://www.crew-project.eu/

- **Project coordinator**

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http://www.crew-project.eu/