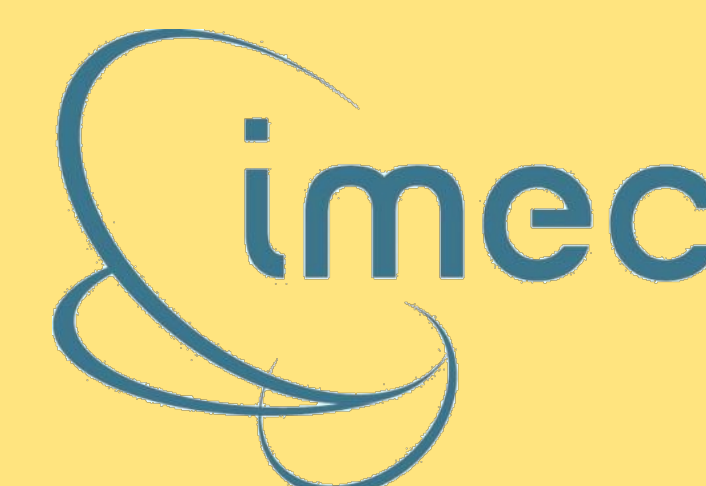# CREW

Cognitive Radio Experimentation World

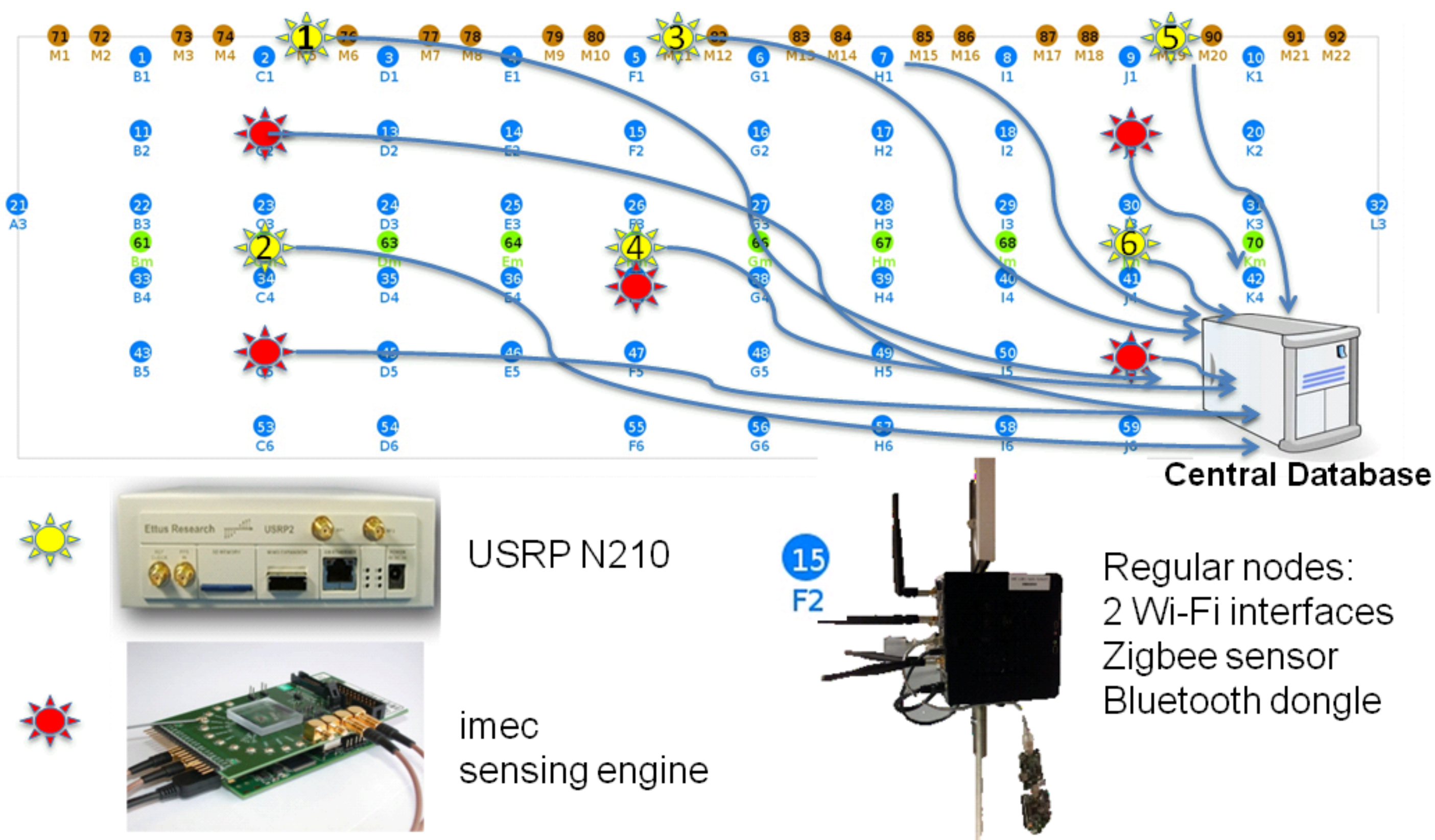# Building a radio environment map for tracking a moving interfering robot
- Showcase of an experiment on the federated platform -

iMinds **imec**

The testbed topology and distributed sensing system

Central Database

USRP N210

imec sensing engine

Regular nodes:
2 Wi-Fi interfaces
Zigbee sensor
Bluetooth dongle

Mobile robot based on vacuum cleaning robot, extended with:
- iMinds Robot control (developed in OpenLab)
  - ✓ In-house designed circuit board for power control
  - ✓ radio for remote control (ez430 – 868MHz)
- Embedded PC
- External battery pack
- Webcam
- Wireless interfaces
  - IEEE 802.11a/b/g/n
  - Bluetooth
  - iMinds-Rmoni sensor node (IEEE 802.15.4)

OpenLab

Fixed nodes

Robot in action!

The experiment

- **Step 1: Experiment definition**:
  - *The robot* moves according to predefined track and behaves as an interferer, *two fixed Wi-Fi nodes* transmit to each other.
  - The interaction between the sensing engine database and the RSSI visualization tool allows constructing a *dynamic radio environment map (REM)*
 - Fixed Wi-Fi nodes adapt the channel according to the REM
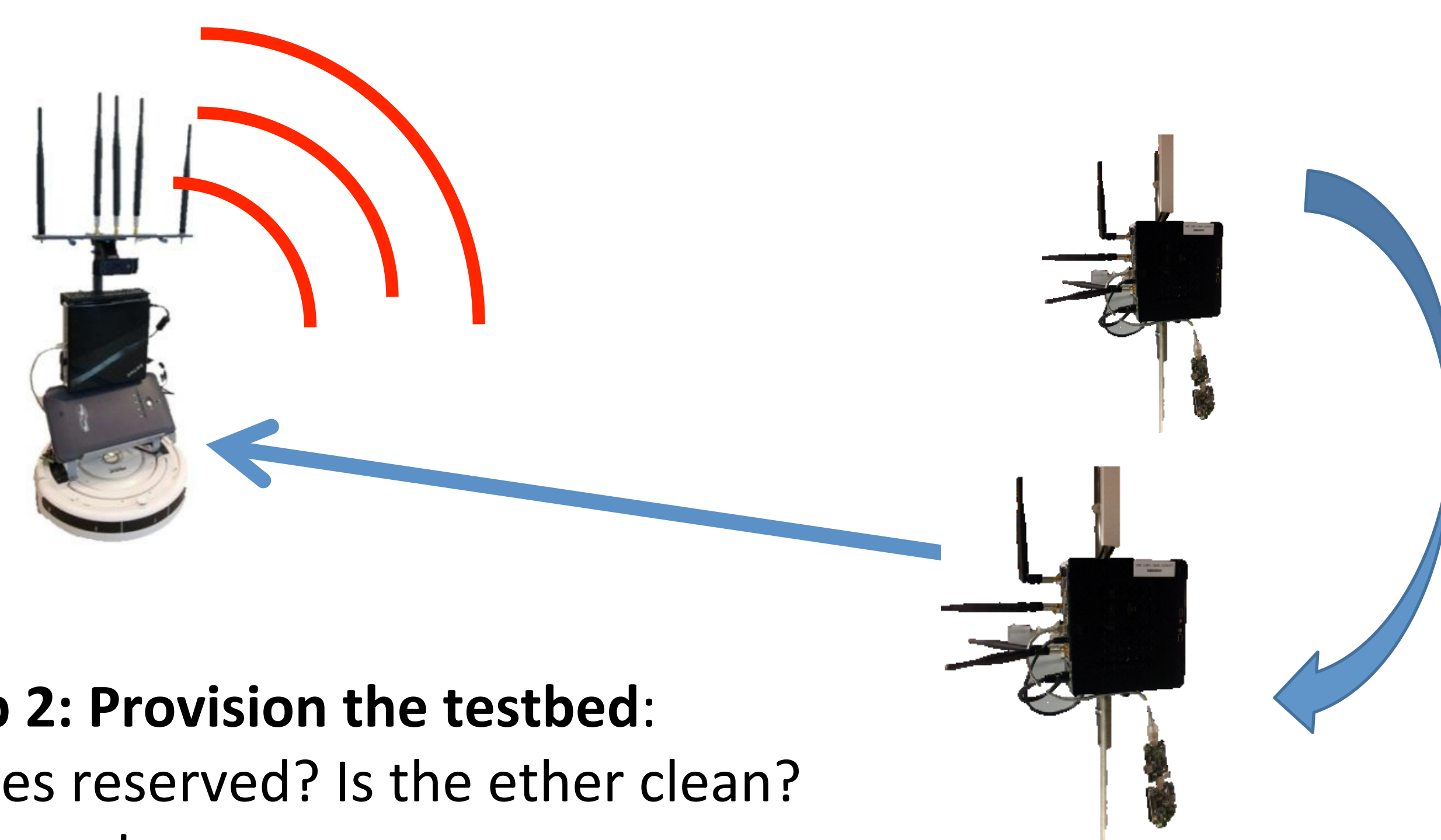
- **Step 2: Provision the testbed**:
  Nodes reserved? Is the ether clean?
  Then go!

- **Step 3: Get the result**
  - Monitoring tool during wireless experimentation
  - Distributed spectrum sensing as cognitive radio solution

  Step 4: Share your result? Upload to the repository
  http://www.crew-project.eu/repository
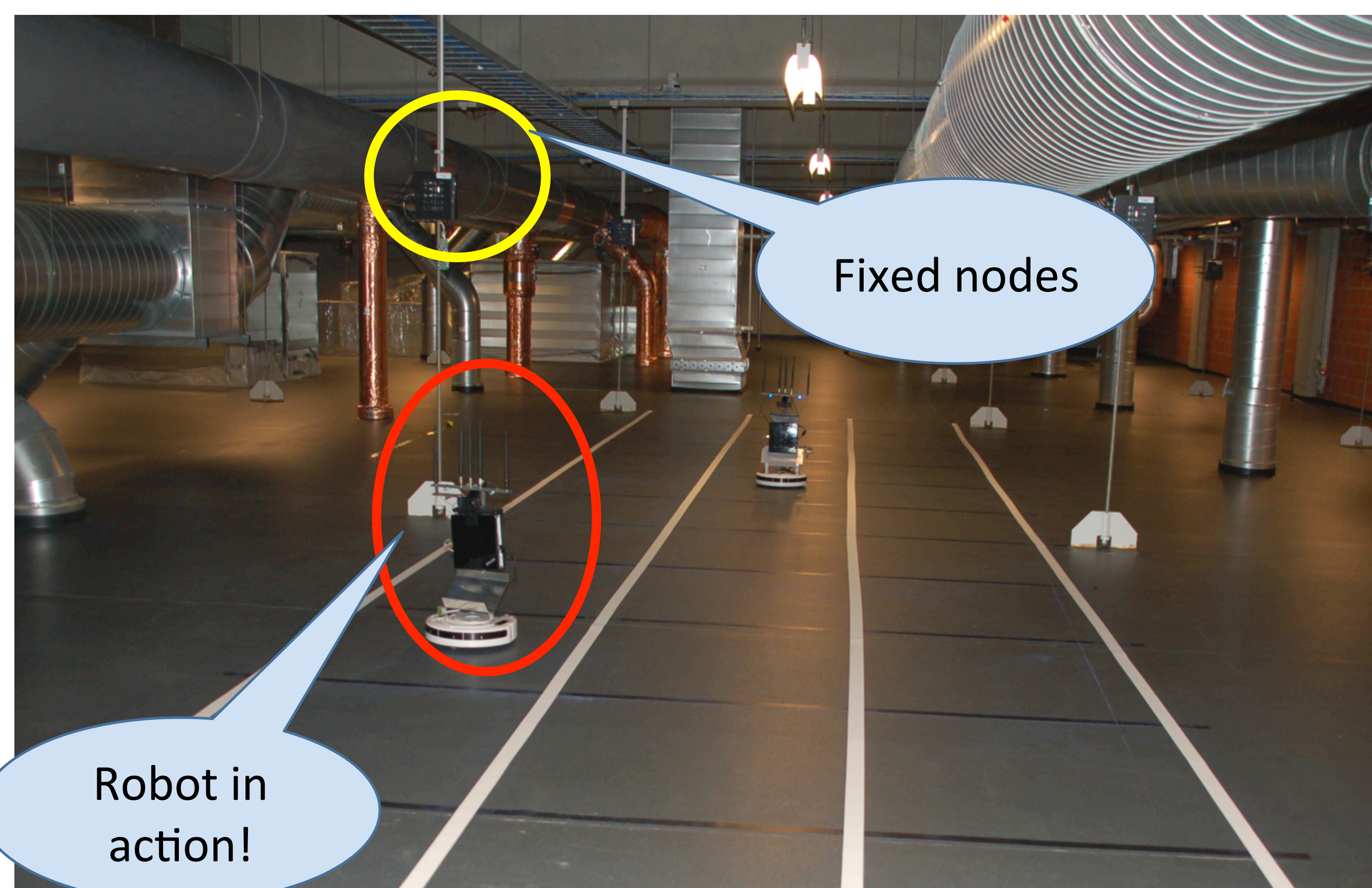
Real-time RSSI visualization web tool
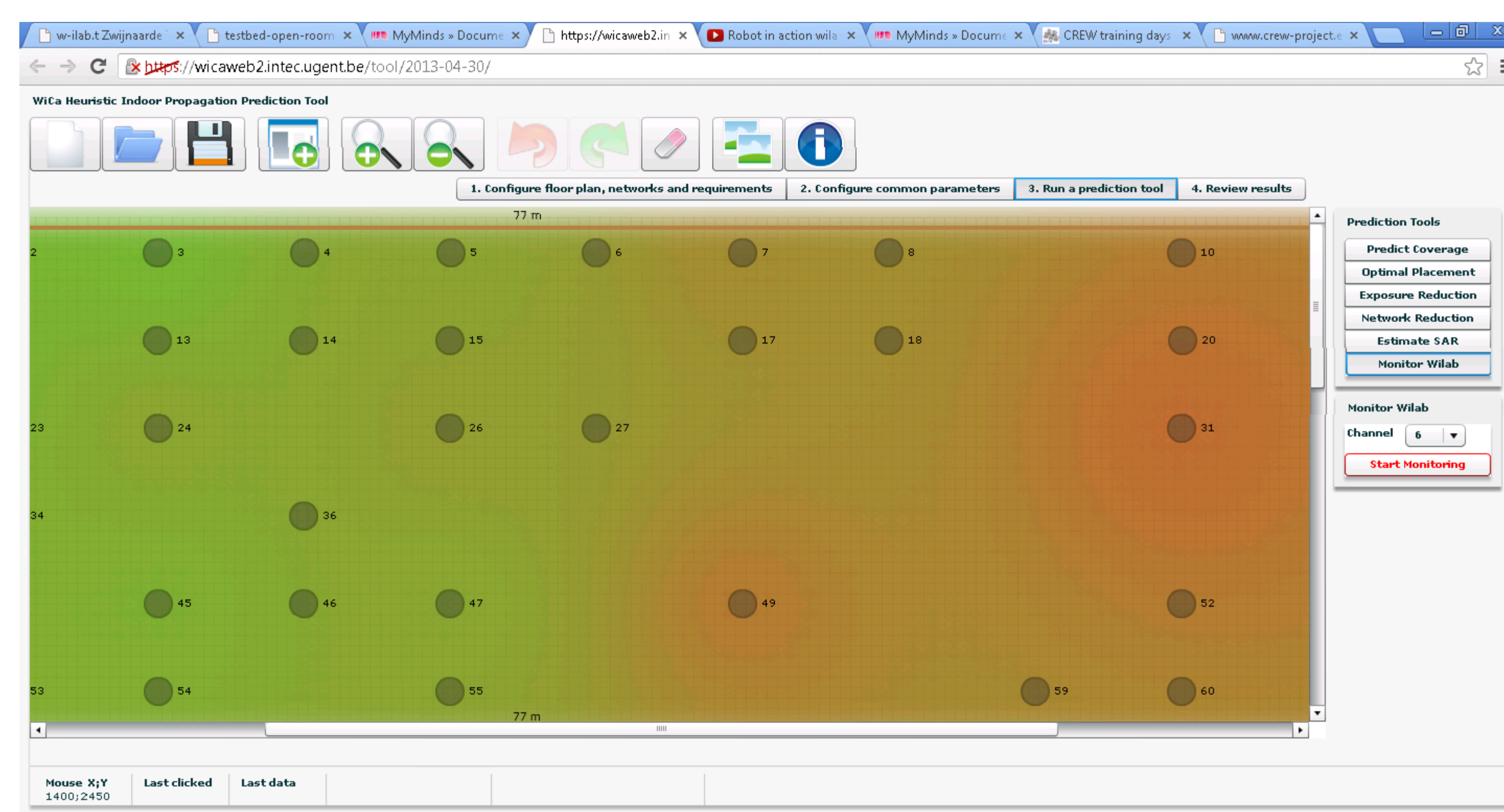
The iMinds (WiCa) Heuristic Indoor Propagation Prediction (WHIPP)

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UNIVERSITY OF THESSALY NICTA cnit WINGS ICT Solutions instituto de telecomunicações CMSF Sistemas de Informação

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