

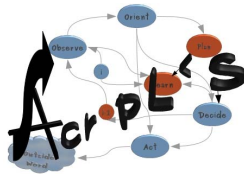


ACROPOLIS: Advanced coexistence technologies for radio optimisation in licensed and unlicensed spectrum

The primary objective of ACROPOLIS is to research and develop optimisation techniques for cooperative and cognitive wireless systems. The core of the Joint Research Activities in this NoE is using the concepts of these two twin paradigms within the context of cognitive radio, opportunistic spectrum access, flexible radios, and self-organizing networks to increase efficiency of such future networks.

At A Glance: ACROPOLIS

Advanced coexistence technologies for radio optimisation in licensed and unlicensed spectrum



Project Coordinator

Petri Mähönen

RWTH Aachen University

Tel: +49 241 80 20900

Project website: www.ict-acropolis.eu

Project Manager

Sylwia Antonina Romaszko

Email: sar@inets.rwth-aachen.de

Partners: RWTH (DE), Uniroma1 (IT), IASA (GR), TUD (DE), UPRC (GR), EIT+ (PL), KCL (UK), KTH (SE), UKIM (MK), CTTC (ES), JRC (BE), PUT (PL), UoS (UK), EURECOM (FR), UnivLeeds (UK), EADS (DE)

Duration: October 2010 - September 2013

Funding scheme: NoE

Total Cost: €4.13m

EC Contribution: €3m

Main Objectives

ACROPOLIS brings together 16 partners from 10 countries in order to integrate European research efforts in the domains of cooperative and cognitive communications such that coexistence and capabilities of future networks operating both in the licensed and open spectrum bands can be significantly increased.

The project aims at strengthening European knowledge and leadership in the focused area of cooperative communications with coexistence specifically considering the intersection of cognitive radio, opportunistic spectrum access, flexible radios, and self-organizing networks. The overall Joint Programme of Activities (JPA) in ACROPOLIS not only accounts technical issues, but also considers economical, regulatory and standardization related challenges and boundary conditions.

Nowadays, most of the existing optimisation and cooperation concepts focus on single-layers being either rather static or concentrated on fixed algorithm-based control loops. In contradiction to this focus of interests ACROPOLIS is a holistic and dynamic approach, where cooperation, flexibility and certain learning capabilities (cognition) can yield significant benefits for future systems.

ACROPOLIS targets three classes of applications: (1) Cognitive Radio Systems and other spectrum sharing paradigms (Dynamic Spectrum Allocation, Opportunistic Spectrum Allocation, Secondary Market Mechanism etc.), (2) Self-organizing Networks, and (3) Legacy Network Optimization based on novel approaches.

The NoE will also focus on the education of European researchers on advanced coexisting and cooperating communication technologies.

ACROPOLIS fosters European researchers to jointly optimize techniques in cooperative and coexisting cognitive communications

Technical Approach

ACROPOLIS aims to bridge over the gaps in the European research repertoire, to complete the spectrum of European expertise ensure continuing European Pre-dominance. The project is structured around seventeen work packages (WPs), combined into *foundations* and *pillars*.

Foundations provide knowledge base and integration of fundamental aspects and theories that are required to model, develop, benchmark and analyze more practical research aspects of JPA. These foundations are organized into: knowledge toolbox, technical enablers and business aspects and regulation.

Pillar 1: Context Awareness and learning

(*Spectrum Awareness; Neighborhood and Network Awareness; Learning Mechanisms and Knowledge Management WPs*) handles harmonization, integration and cooperation of research topics. It is responsible for coordinating, monitoring and integration European wide research work on context awareness and learning in cognitive radios and networks.

Pillar 2: Decision Making

(*Metric Identification, Decision Making Algorithms and Solutions WP*) addresses the decision making engine, and how to integrate and exploit knowledge. The identification of appropriate metrics, constraints, and solutions are all aspects that must come together in order to drive the design of the feasible decision making engine. This pillar takes an holistic view on these issues.

Pillar 3: Action (*Decision Execution; Conformance Monitoring, Assessment and Security Issues WPs*) closes the loop by defining the point at which the decision must be put into action, and how the directives and decisions of the decision-making engine affect the functionalities of all protocol layers. The decision execution process includes monitoring and control of misbehaviour as well as conformity assessment and security. All these operations need to be mapped on to the different layers of the communication protocol stack.

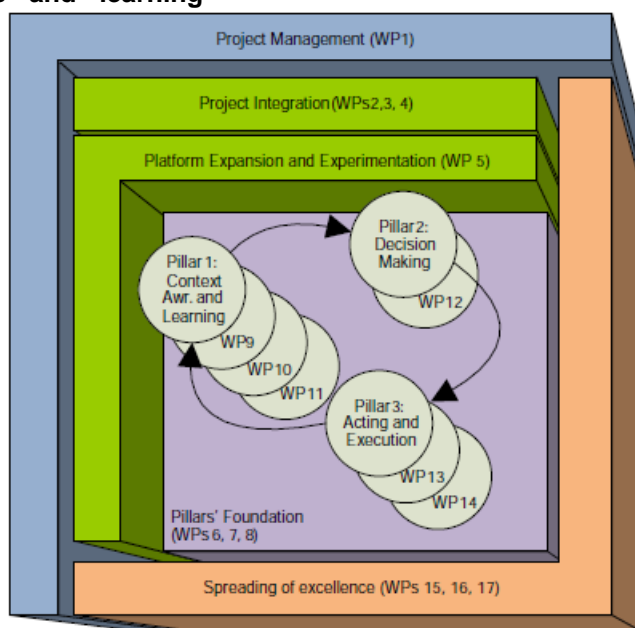
Three further cross-cutting activities support the pillars ensuring long-term success of NoE:

Management ensuring operational efficiency, leadership and quality controls.

Integration guaranteeing strong interaction, and supports researcher mobility, education, visibility, and overall European level build up of an integrated research area. The NoE will organize summer/winter schools, and Ph.D courses.

Spreading Excellence is a key issue function for NoE. We disseminate results both to European researchers and various entities.

Finally, ACROPOLIS aims to establish the capability to exchange best practices, open source code, and even radio hardware between its member organizations.



Consortium

The consortium consists of 16 partners from 10 different countries, and their collective network of research and industrial contacts span literally the whole globe. The consortium will also seek out to nominate industry advisors to help its dissemination towards wider audience.

Expected Impact

A significant portion of the European dynamic spectrum management and cognitive systems community is participating in ACROPOLIS, and therefore the consortium is expected to have impact on harmonization of European research. A series of collaboration activities targeting other well recognized organizations and experts in the field is planned. The recent advances and achievements will be shared and elaborated during jointly organized events with external teams and experts. ACROPOLIS will organize and participate in workshops, round-tables meetings, and conferences, establish electronic facilities for collaboration, and in general promote a higher level of visibility of results.