Cooperative Hybrid Objects Sensor Networks

Project Overview

Concertation Meeting on WSN & CO
Brussels, Oct. 22, 2008

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Funding Project CHOSEN
Cooperative Hybrid Objects Sensor Networks

Timeframe: 06/2008 – 05/2011 (36 months)

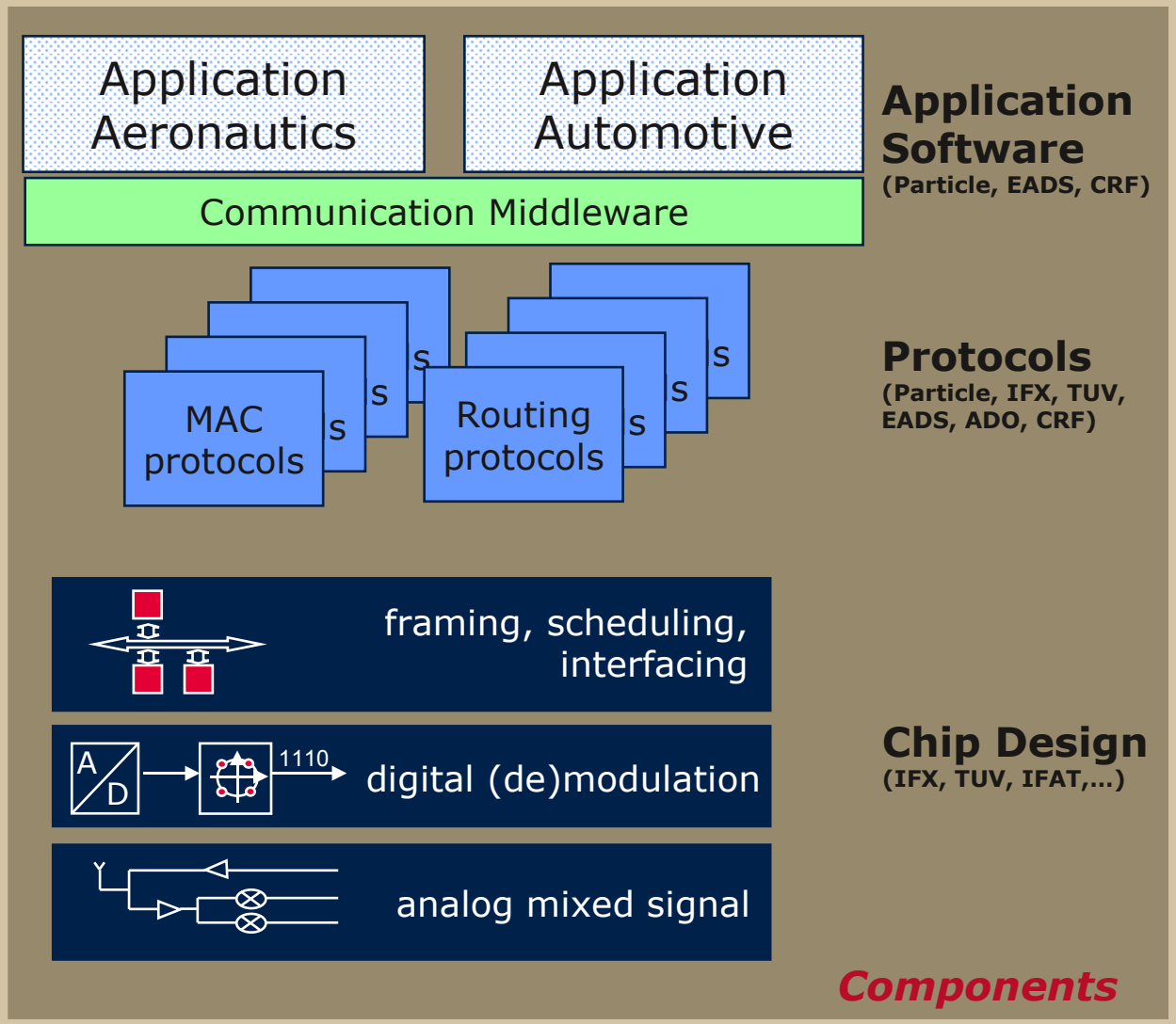
Objective: **Develop and assess** a **generic, wireless, low-power communication platform** supporting **application-specific optimizations**

Partners: Acorde, Ardaco, CRF, EADS, IFX, IFAT, LETI, TU Braunschweig, and TU Vienna

Value:

- **Top-down design flow for application-specific communication technologies** including simulation environment
- **Real-life field application trials** from in the automotive and aerospace domain
- Integration on application, system and chip level
- Development of **application-specific MAC & routing protocols** and virtualization via **communication middleware**
- Development of **transceiver building blocks** and **chip-level prototype with with semi-passive wake-up receiver** and **advanced power management features**

Technical Deliverables



Technical Deliverables

Application / Demonstrator
(EADS, CRF, IFAT)

Application Aeronautics

Application Automotive

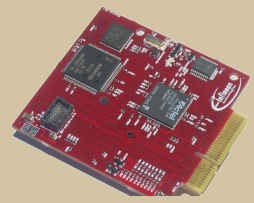
Communication Middleware

Application Software
(Particle, EADS, CRF)

MAC protocols

Routing protocols

Protocols
(Particle, IFX, TUV, EADS, ADO, CRF)



Sensor Node
(Acorde, EADS, CRF)

framing, scheduling, interfacing

A/D 1110 digital (de)modulation

analog mixed signal

Chip Design
(IFX, TUV, IFAT,…)

Silicon Chip
(IFX, IFAT)

Components

Systems

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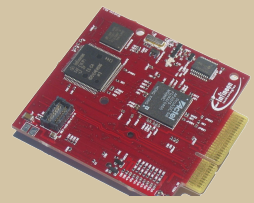

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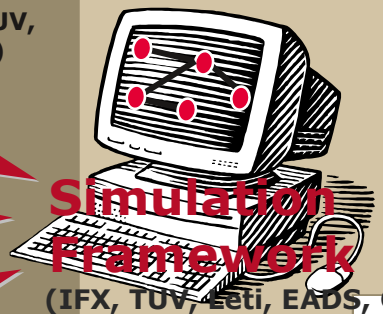

Simulation Framework
(IFX, TUV, Eeti, EADS, CRF)

framing, scheduling, interfacing

A/D 1110 digital (de)modulation

analog mixed signal

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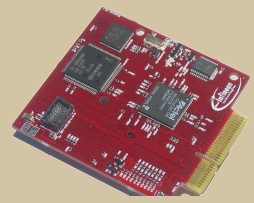

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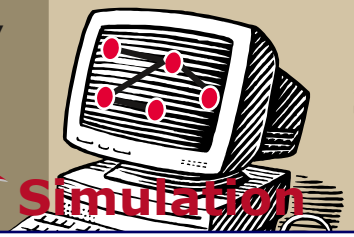


Simulation

framing, scheduling, interfacing

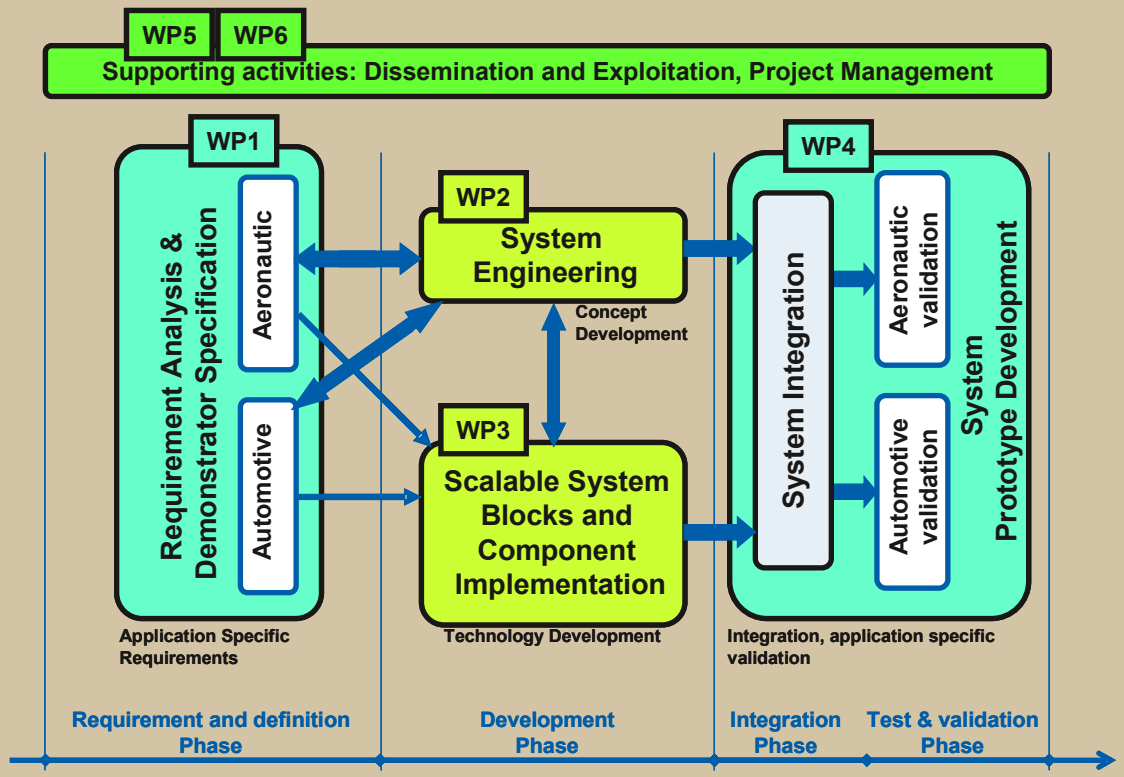
A/D 1110 digital (de)modulation

analog mixed signal

Model-Driven Systems Design Flow allows for application-specific customization of communication technology

Components ***Systems***

CHOSEN Work Package Structure



Work package	Work package title	Activity	Lead	PM
WP1	Requirement analysis & demo specification	RTD	CRF	30
WP2	Systems engineering	RTD	ACORDE	95
WP3	Scalable system blocks & component implementation	RTD	IFX	172
WP4	System Prototype development	RTD	EADS	93
WP5	Dissemination and exploitation	RTD	IFAT	21
WP6	Project management	MGT	IFX	17

Objectives

- **Generic Advanced RF Transceiver Platform**
  - Ultra low power radio receiver
  - Novel wake-up radio architecture
  - Reconfigurable transceiver platform with flexible communication layers dynamically adapting to varying SNR
- **Self-organizing systems in a heterogeneous environment**
  - Multi-Mode MAC that exploits the added PHY wake-up functionality
  - Self-organizing routing architecture
  - Middleware architecture that copes with the heterogeneity of the different network and application requirements
  - Cross layer optimisation
- **Low Power Scalable Protocol Processing Engine**
  - Low power reconfigurable system architecture and technology that retains flexibility at glue-logic equivalent power consumption levels
  - Model-driven design flow to optimize HW/FW/SW partitioning which allows flexible multi-application usage, cross-layer optimization and dynamically reconfiguring architectures
- **Validation in highly challenging application environments**
  - Requirements analysis, field trials and optimization loops in automotive and aeronautics applications
  - Metrics are defined by cost, robustness and reliability, flexibility, and energy autonomy

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