European SDR for wireless in joint security operations

EULER project

WinnCom Europe 2011 - Brussels (BE)
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CORDIS

SEVENTH FRAMEWORK
PROGRAMME

Summary

- Euler in brief

- Main objectives

- SDR model & Collaborative developments

- Euler : current status

EULER

European software defined radio for wireless in joint security operations

Project Details

Start Date: 2009-03-01   **End Date:** 2012-02-29   **Duration:** 36 months

Project Reference: 218133

Project Cost: 15.47 million euro

Programme Acronym: FP7-SECURITY

Subprogramme Area:
SEC-2007-4.2-04 Wireless communication
for EU crisis management

Contract Type: Collaborative project

Project Funding: 8.72 million euro

Programme Type:7th FWP (Seventh
Framework Programme)

Project URL: www.euler-project.eu

EULER Partners

THALES Communications SA

EADS Secure Networks SAS

EADS Astrium Ltd

Budapest University of Technology and Economics

Elsag Datamat

Selex-Communications

Telespazio

University of Pisa

Saab communications

T.N.O

Indra

Elektrobit

Supélec-Rennes

Joint Research Center

IMEC

Prismtech

Centre for Wireless Communications

Rohde & Schwarz

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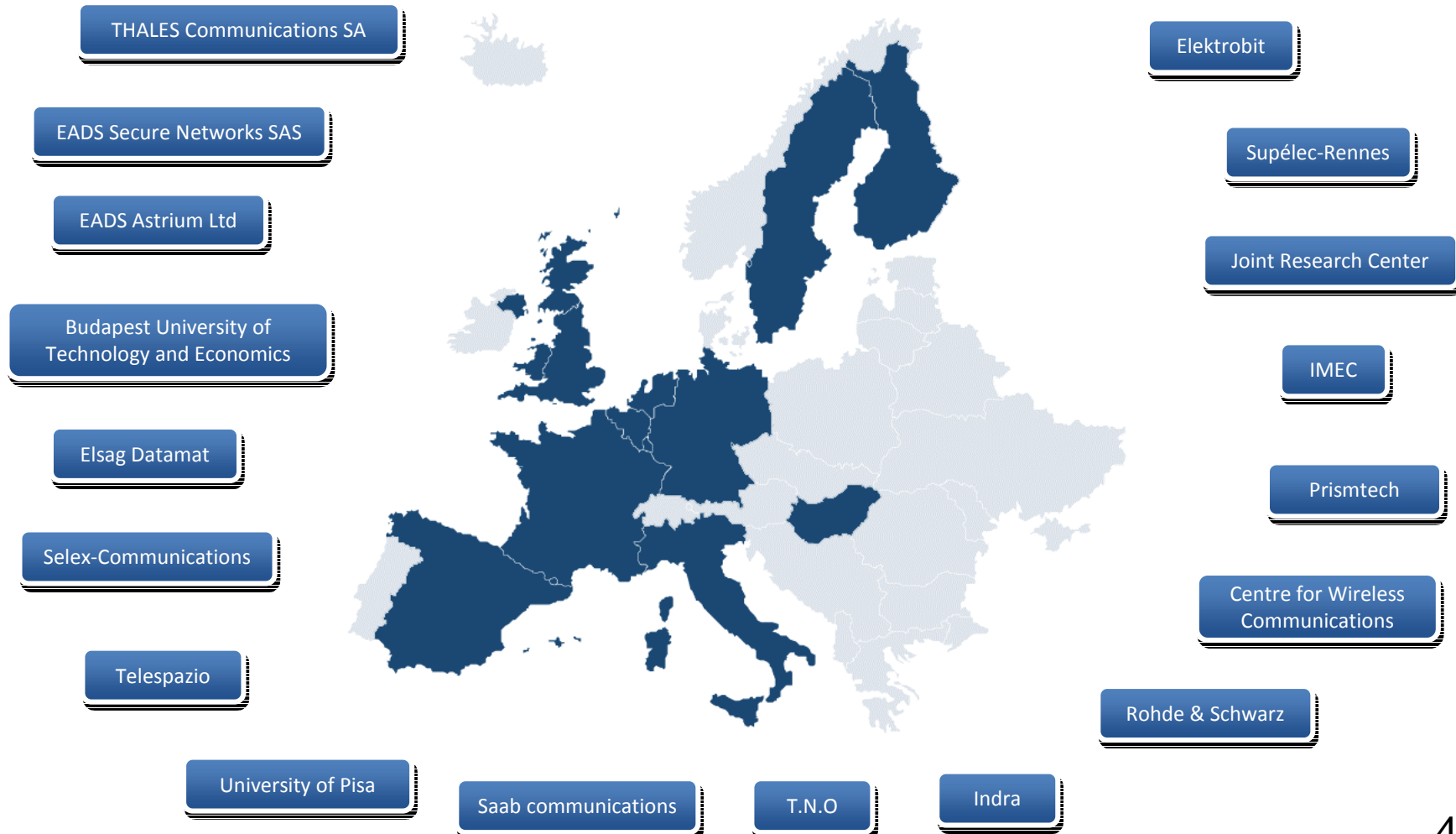
EULER project : main objectives

❑ **Interoperability**

✓ Improving the interoperability between public safety communications systems
✓ Improving the crisis management operations through services enabled by new technology

❑ **Public Safety agencies future communications requirements**

✓ Anticipates that convergence will be a natural progression within the public safety community as new rate-intensive technologies
✓ The gross data rates involve capabilities to be supported by the next generation of public safety wireless, high-speed, digital transport systems (at least 1.5 -> 2 Mbps)
✓ Transparent seamless applications, includ multiple levels of security and encryptions

EULER End Users committee

Nation		Committee member national P&GS agencies (end users)	Partner ensuring liaison
SP	🟦	**Spanish MoI (Telecom Area / Emergency Radio System)**	INDRA
FR	🟦	**French MoI (Group of Police Cooperation)**	EADS,
	🟥	**ENSOSP (Ecole Nationale des Officiers Sapeurs Pompiers)**	THALES
	🟪	**French MoD - CELAR (Centre Electronique de l'Armement)**	
IT	🟨	**Protezione Civile Nazionale**	SELEX,
	🟨	**Fondation Ugo Bordoni**	ELSAG- DATAMAT
SE	🟨	**MSB (Swedish Civil Contingencies Agency)**	SAAB
UK	🟦	**NPIA (National Policing Improvement Agency)**	EADS Astrium
NL	🟦	**Royal Marechaussee (Gendarmerie)**	TNO
	🟥	**Brandweer (Firebrigade)**	
	🟨	**DARES (Radio amateurs)**	

Legend :   🟦 **Law Enforcement**   🟥 **Fire & Rescue**   🟨 **Civil Protection**   🟪 **Military**

Public Safety agencies future communications requirements

❑ **End users group**

✓ One EULER specific objective is to approach in a systematic way the End Users community, to identify, federate and where possible harmonise operational needs and End Users requirements

❑ **Public Safety agencies future communications requirements**

✓ Anticipates that convergence will be a natural progression within the public safety community as new rate-intensive technologies

✓ The gross data rates involve capabilities to be supported by the next generation of public safety wireless, high-speed, digital transport systems (at least 1.5 -> 2 Mbps)

✓ Transparent seamless applications, includ multiple levels of security and encryptions

✓ Dynamic bandwidth and Self-healing Network

✓ For public safety organisations, but also vehicle tracking, environmental monitoring, traffic surveillance, hazardous areas, prisons ...

Public Safety agencies & Interoperability issue

What is Interoperability ?

❑ Interoperability is the ability for first responders from different agencies to communicate among themselves, to exchange voice and/or data on demand and in real time, whenever necessary.

Why Interoperability remains a challenge ?

❑ The reasons that interoperability remains a challenge include both:

   ❑ Technical (Inadequate means for first responder communication due to different and incompatible radio systems)
   ❑ Non-technical issues (e.g., governance, policies, procedures, and training).
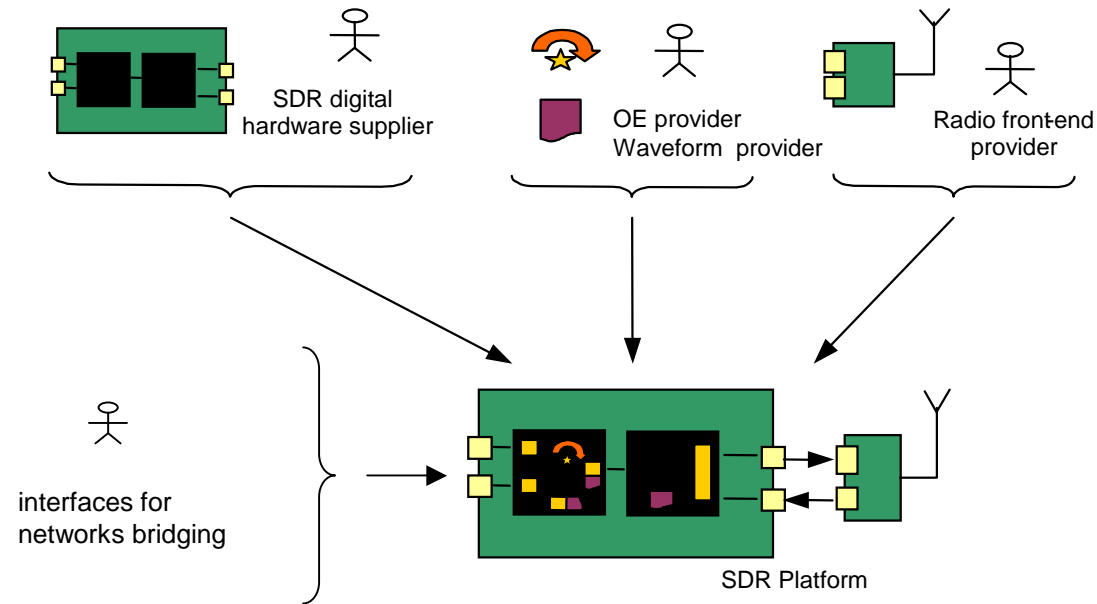
The EULER -project aims to use the benefits of SDR (Software Defined Radio) in enhancing interoperability in case of national and international joint emergency service operations

What is targeted :

➢ **EULER address interoperability and crisis management operations improvment through services enabled by new technology :**

❑ Proposing a high-data-rate waveform supporting the complex requirements of security forces (joint) operations

❑ Implementing the SDR open business model, with separation of roles between SDR platform and SDR waveform providers

❑ Portability leads to interoperability

The EULER -project aims provide proof-of-concept waveform implementation and portability on several software defined radio platforms and realize an integrated demonstrator targeted towards end-users.

EULER : Collaborative R&D project

SDR digital hardware supplier

OE provider
Waveform provider

Radio front-end provider

interfaces for networks bridging

SDR Platform

Transition industry from vertical to horizontal model

System integrators

SDR platforms provider

Waveform & protocol providers

Applications providers

EULER : radio waveform(s)

Providing complete interoperability may request the use of a particular waveform being used across the equipment from several manufacturers

## ❑High-data-rate waveform for emergency and security operations

- Identify Wimax (802.16e 2005) suitable subset targetting both wireless infrastructure and terminals
- Reuse state of the art radio techniques (notably PHY layer)
- Implement IP network functionality atop waveform
- Revisit Wimax Security (AES, security threats analysis)

❑Investigation of Satcom waveform for crisis management in SDR

- Complementary to land-waveform
- Dynamic Bandwidth by automatic flexible bandwidth allocation

EULER : Collaborative R&D project

❑ **Euler High Data Rate Waveform**
   ❑ **Waveform functionality realized in GPPs, DSPs and FPGAs**
   ❑ **Different layers providers**
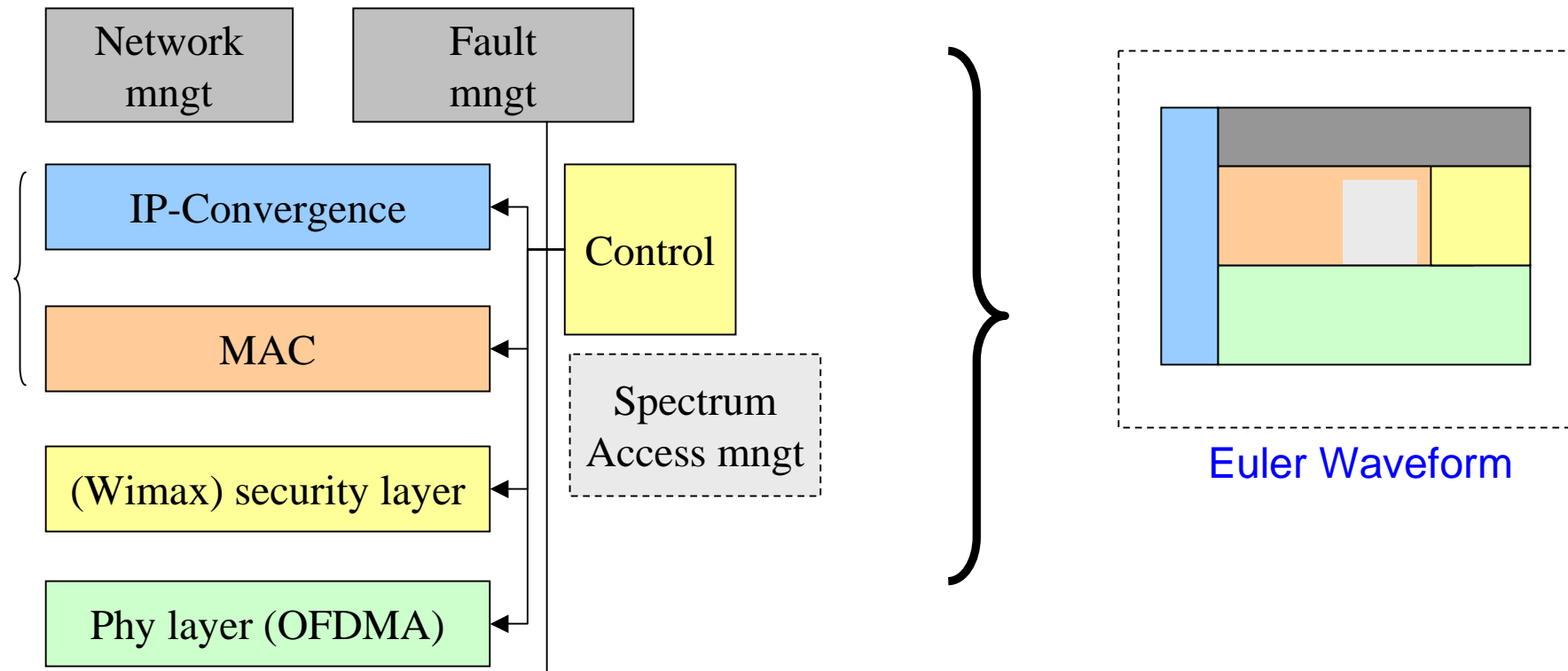
Euler Waveform

# EULER : Collaborative R&D project

❑ SDR Platforms

❑ Different SDR platforms providers

❑ Based on GPP and specialized devices (DSP and FPGA)

> The aim to realize a high-data-rate portable waveform emphasizes use of the DSP and FPGAs specialized devices for performance reasons as weel as specification of general hardware abstraction layers.

EULER : Collaborative R&D project

❑ OE implementation

- ❑ The OE implements a basic set of core services and standardized component interfaces for waveform execution and portability.
  - ❑ As defined by the SCA standard, this OE consists of:
    - ❑ **POSIX conformant operating system**
    - ❑ **TCP/IP stack**
    - ❑ **CORBA**
    - ❑ **SCA core framework**
  - ❑ Different execution environment
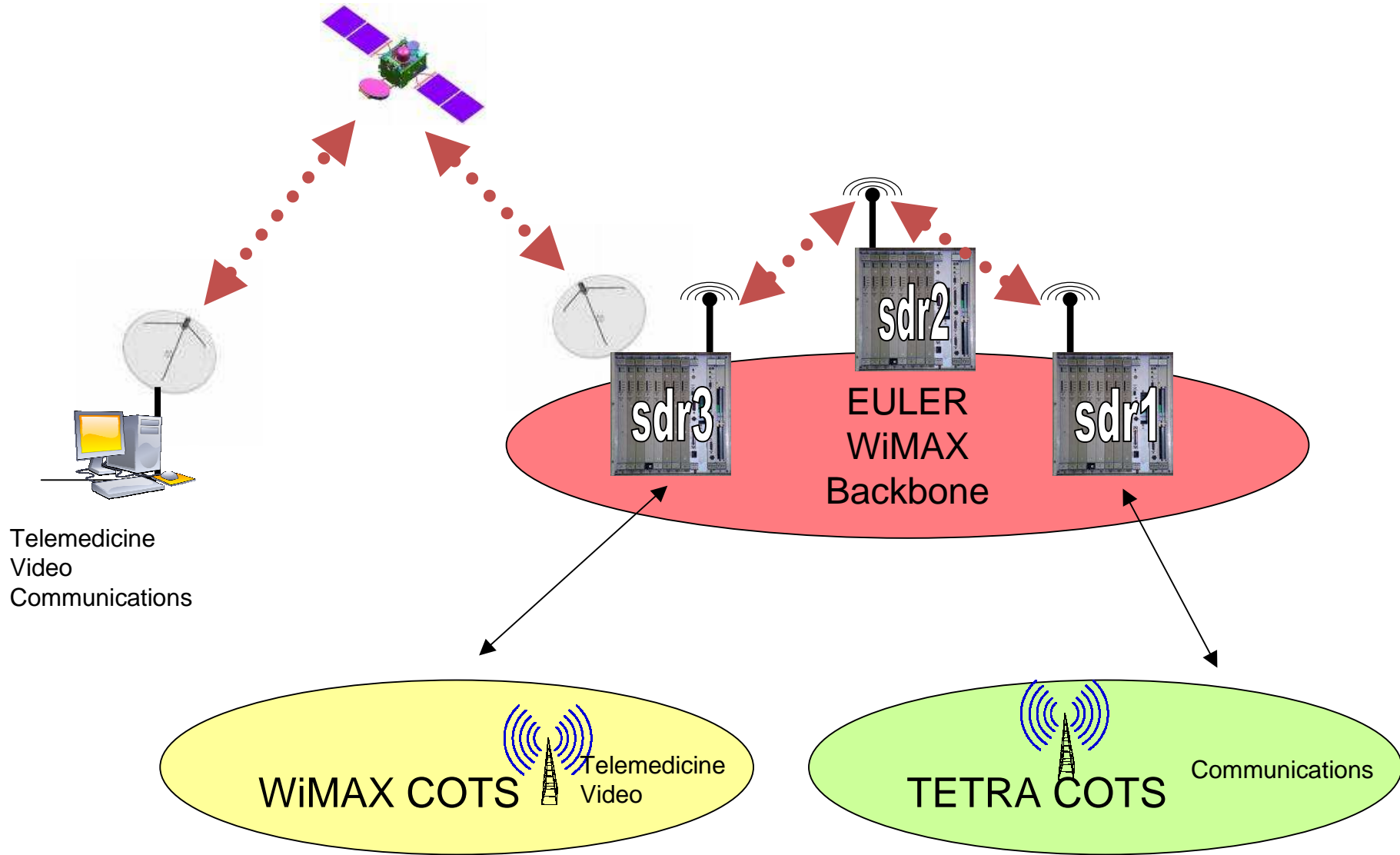   - ❑ CORBA everywhere
    - ❑ MHAL

SDR Plateform
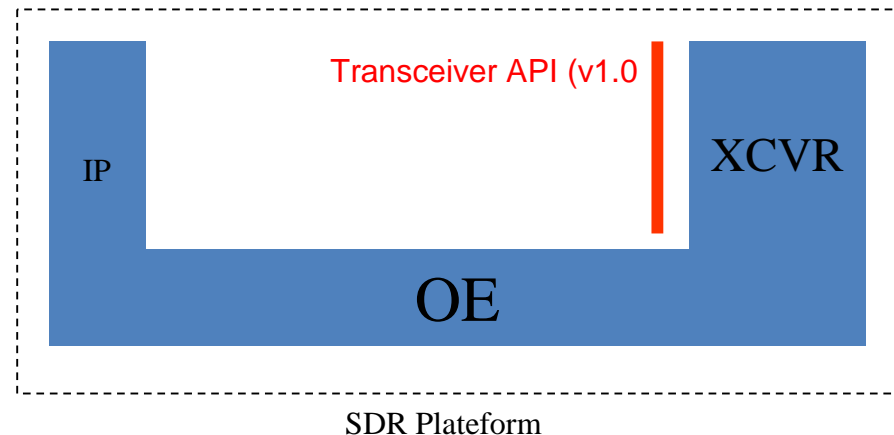
❑ Transceiver Facility

- ❑ EULER SDR Platforms implement a Transceiver API (v1.0 version) compliant interface on top of which the EULER WF will be ported

The Transceiver API (v1.0 version) has been selected as the interface between the WF and the Platforms, enabling the separated PF/WF providers business model

EULER : Possible Demonstration deployment

Telemedicine
Video
Communications

sdr3

sdr2

EULER
WiMAX
Backbone

sdr1

WiMAX COTS

Telemedicine
Video

TETRA COTS

Communications

EULER : Current status

❑ EWF (MAC & PHY) BS MS development

❑ EWF fonctionnal testing on SCA simulator environment

❑ Set up of the Hardware SDR platforms

❑ EWF porting on SDR platforms : on going

To be updated for June 2011 presentation

Thanks!

Questions?