



Experimental platforms for 4G and beyond wireless systems

Workshop



**February 23, 2012
Sophia Antipolis**

**EURECOM
2229 Route des Crêtes
06560 Sophia Antipolis**

**Meeting room :
Amphi MARCONI**

THALES

Fraunhofer
IIS



**ΕΘΝΙΚΟΝ & ΚΑΠΟΔΙΣΤΡΙΑΚΟΝ
ΠΑΝΕΠΙΣΤΗΜΙΟΝ ΑΘΗΝΩΝ
NATIONAL & KAPODISTRIAN
UNIVERSITY OF ATHENS**

NEC
NEC Technologies



EURECOM
Sophia Antipolis



Contents

| | | |
|----------|--|-----------|
| 1 | WORKSHOP PROGRAM..... | 3 |
| 2 | SACRA PRESENTATION..... | 4 |
| 3 | PRESENTATIONS: SESSION #1..... | 8 |
| 3.1 | WELCOME TO THE SACRA WORKSHOP 2012 | 8 |
| 3.2 | SACRA MODEM PRESENTATION..... | 9 |
| 3.3 | EMBB: A HARDWARE/SOFTWARE ARCHITECTURE FOR SOFTWARE DEFINED RADIO BASEBAND | 17 |
| 3.4 | PRESENTATION ON SDR4ALL..... | 20 |
| 3.5 | CEA PRESENTATION (MAGALI/ARTIST 4G)..... | 25 |
| 3.6 | FARAMIR PRESENTATION | 31 |
| 4 | PRESENTATIONS: SESSION #2..... | 32 |
| 4.1 | COGEU: "TV WHITE SPACE, THE LOW-COST 4G SPECTRUM" | 32 |
| 4.2 | HDCRAM MANAGEMENT FOR COGNITIVE RADIO REAL-TIME DEMOS WITH USRP | 33 |
| 4.3 | THE CROWN FET PROJECT: SPATIAL COGNITIVE RADIO | 34 |
| 4.4 | C2POWER: COOPERATIVE ALGORITHMS TOWARDS ENERGY SAVINGS: EVALUATION AND BUSINESS MODELS | 37 |
| 4.5 | OPENAIR PRESENTATION | 38 |
| 5 | DEMONSTRATION SESSION..... | 48 |
| 5.1 | SACRA RF MODEM BUILDING BLOCKS..... | 48 |
| 5.2 | SYMPA MAIN PROTOTYPING RESULTS | 56 |
| 5.3 | HDCRAM MANAGEMENT FOR COGNITIVE RADIO REAL-TIME DEMOS WITH USRP | 61 |
| 5.4 | CROWN DEMONSTRATION | 64 |
| 5.5 | CEA DEMONSTRATION (MAGALI/ARTIST 4G) | 66 |
| 5.6 | SDR4ALL DEMONSTRATION | 69 |

4 PRESENTATIONS: SESSION #2

4.1 COGEU: "TV white space, the low-cost 4G spectrum"

"ROGÉRIO DIONISIO received his Bachelors and Masters Degree in Electronics and Telecommunications Engineering from the University of Aveiro (Portugal), in 1997 and 2004 respectively. Since 1999 he is Professor at Polytechnic Institute of Castelo Branco and participates in several National and European research projects on wireless communications (AGILE, COGEU) and optical communications (MOTION, THRONE, TOMAR-PON, CONTACT). He is now a Research Fellow at the Instituto de Telecomunicações - Aveiro, Portugal, working as co-technical manager of the EU funded FP7-ICT-COGEU project. His research interests include advanced signal processing techniques for wireless communications and cognitive radio networks. His current focus is on the development of efficient sensing algorithms to exploit spectral opportunities in TV bands and radio spectral coexistence analysis (PHY level)."

Summary of the presentation

The regulatory scenario in Europe is very diverse, and hence innovative solutions to address harmonization and coexistence issues become crucial for the successful exploitation of the TV white spaces (TVWS) among member states. This presentation introduces the approach of the FP7 COGEU (*COgnitive radio systems for efficient sharing of TV white spaces in EUropean context*) project in exploiting the TVWS. COGEU proposes a bicameral geo-location database separating bands for unlicensed usage and for secondary spectrum trading. The unlicensed bands are for access without the need for guaranteed quality of service (QoS), while secondary trading bands are for access with a need for guaranteed QoS. Temporary exclusive rights for operating in the TVWS may be bought from a broker. An application scenario is the cellular extension of LTE-A over vacant TV channels in urban scenarios. Details of the operation of the COGEU broker are given with the associated business models presented.

Moreover, the COGEU geo-location database, populated with the TV white spaces maps for the Munich area, a PMSE booking platform designed to protect professional wireless microphones devices, a TVWS repository and the initial COGEU broker that implements online spectrum auctions is demonstrated.