

PUBLIC



FP7-ICT Future Networks
SPECIFIC TARGETTED RESEARCH PROJECT
Project Deliverable

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Abstract: During this third semester, the dissemination activity has mainly consisted in the publication of papers at the conferences whose scope includes the technical area of the project and the organization of the project workshop in cooperation with the IEEE-SPAWC conference. In the fourth semester, simulation results will become available and the demonstration will take shape. This will give opportunities for additional forms of dissemination, particularly through the website.

Table of Contents

- 1 INTRODUCTION
- 2 JOURNAL ARTICLES AND CONFERENCE PAPERS
- 3 PHYDYAS WORKSHOP
- 4 STANDARDIZATION
- 5 WEBSITE

Annex 1 : technical program of the Phydyas workshop

1 INTRODUCTION

This document describes the actions of dissemination taken by the phydyas project members during the third semester.

List of partners:

Beneficiary Number *	Beneficiary name	Beneficiary short name	Country
1(coordinator)	Conservatoire National des Arts et Métiers	CNAM	France
2	Technische Universität München	TUM	Germany
3	Tampere University of Technology	TUT	Finland
4	Université Catholique de Louvain	UCL	Belgium
5	SINTEF - Trondheim	SINTEF	Norway
6	Centre Tecnologic de Telecomunicacions de Catalunya	CTTC	Spain
7	Research Academic Computer Technology Institute	RA-CTI	Greece
8	University of Napoli Federico II	UNINA	Italy
9	CEA-LETI	LETI	France
10	Agilent-Belgium	AGI	Belgium
11	Alcatel-Lucent Swindon	ALUK	United Kingdom
12	Alcatel-Lucent Deutschland	ALUD	Germany
13	COMSIS	COMSIS	France

The dissemination activities have mainly consisted in the submission of journal articles, the presentation of papers at conferences and the organization of a workshop in cooperation with the IEEE – SPAWC conference.

2 JOURNAL ARTICLES AND CONFERENCE PAPERS

The following articles and papers were presented or submitted during the first semester of 2009 by the partners, in relation with their work in the project.

Journal articles

T. Fusco, A. Petrella and M. Tanda, "Data-aided symbol timing and CFO synchronization for filter bank multicarrier systems" IEEE Transactions on Wireless Communications, Vol. 8, No 5, pp. 2705-2715, May 2009.

T. Fusco, L. Izzo, A. Petrella and M. Tanda, "Blind symbol timing estimation for OFDM/OQAM systems", IEEE Trans. on Signal Processing, vol. , N° , 2009, pp.

C.Lélé and D.LeRuyet, "Decoding schemes for FBMC with single delay STTC", submitted to EURASIP JASP, June 2009.

H. Zhang, D. Le Ruyet, M.Terré « Spectral efficiency comparison between OFDM/OQAM and OFDM based CR networks", to be published in "Wireless Communications and Mobile Computing", Wiley, 2009.

Conference papers

T.Ihalainen, A.Viholainen, T.H.Stitz, M.Renfors and M. Bellanger, "Filter Bank Based Multi-Mode Multiple Access Scheme for Wireless Uplink", Proc.of EUSIPCO'09 conference, Glasgow, August 2009.

A.Viholainen, T.Ihalainen, T.H.Stitz, M.Renfors and M. Bellanger, "Prototype filter design for filter bank based multicarrier transmission", Proc.of EUSIPCO'09 conference, Glasgow, August 2009.

T.Fusco, A.Petrella, and M.Tanda, "Joint symbol timing and CFO estimation in multiuser OFDM/OQAM systems", Proc.of IEEE-SPAWC'09 conference, Perugia, 22-24 June 2009.

A.Ikhlef and J. Louveaux, "An Enhanced MMSE Per Subchannel Equalizer For Highly Frequency Selective Channels for FBMC Systems", Proc.of IEEE-SPAWC'09 conference, Perugia, 22-24 June 2009.

A.Ikhlef and J. Louveaux, "Per subchannel equalization for MIMO FBMC/OQAM systems," Proc. of the conference IEEE PACRIM09, Victoria, Canada, August 2009.

Y. Medjahdi, M. Terré, D. Le Ruyet, D. Roviras, J.A. Nossek and L. Baltar, "Inter-Cell Interference Analysis for OFDM/FBMC Systems", Proc. of IEEE-SPAWC'09 conference, Perugia, 22-24 June 2009.

M. Bellanger, T. Ihalainen and M. Renfors, "Filter bank based cognitive radio physical layer", Proc. of ICT-Mobile Summit, Santander, 10-12 June 2009.

A.Kuzminskiy and Y.Abramovich, "Adaptive antenna array interference mitigation diversity for decentralized DSA in licence-exempt spectrum", Proc.of IEEE-ICC'09 conference, Dresden, 15-18 June 2009.

A. M. Kuzminskiy, Y. I. Abramovich, "Performance bounds for dynamic spectrum allocation based on adaptive antenna array interference mitigation diversity," in Proc. IEEE-SSP, Cardiff, Sept. 2009.

A.Kuzminskiy and Y.Abramovich, "DSA based on adaptive antenna array interference mitigation diversity: algorithms and Markov chain analysis", Proc.of IEEE-ICASSP conference, Taipei, April 2009.

H. Zhang, D. Le Ruyet, M. Terré, " On spectral efficiency analysis between OFDM/OQAM and OFDM based CR networks", Proc.of IEEE-VTC-spring conference, Barcelona, March 2009.

L.G. Baltar, D. Waldhauser and J. Nossek, "MMSE subchannel decision feedback equalization for FBMC systems", Proc.of IEEE- ISCAS'09 conference, Taipei, May 2009.

D.Waldhauser, L.G. Baltar and J. Nossek, "Adaptive decision feedback equalization for FBMC systems", Proc.of IEEE- ISCAS'09 conference, Taipei, May 2009.

Q. Bai and J. Nossek, "A cross-layer assisted resource allocation scheme in multicarrier systems", Proc.of IEEE-ICC'09 conference, Dresden, 15-18 June 2009.

T.H.Stitz, A.Viholainen, T.Ihalainen and M.Renfors, " CFO estimation and correction in a WiMAX-like FBMC system", Proc. of IEEE-SPAWC'09 conference, Perugia, 22-24 June 2009.

U.Rahim, T.H.Stitz and M.Renfors, "Analysis of clipping-based PAPR reduction in multicarrier systems", Proc.of IEEE-VTC-spring conference, Barcelona, March 2009.

M. Shaat and F. Bader, "Power Allocation and Throughput Comparison in OFDM and OFDM/OQAM Based Cognitive Radio systems", Proc.of IEEE-VTC-spring conference, Barcelona, March 2009.

T.Fusco, A.Petrella and M.Tanda," Data-aided symbol timing estimation for multiple access OFDM/OQAM systems", Proc.of IEEE-ICC'09 conference, Dresden, 15-18 June 2009.

T.Fusco, A.Petrella, and M.Tanda. ,"A data-aided symbol timing estimation algorithm for OFDM/OQAM systems", Proc.of IEEE-ICC'09 conference, Dresden, 15-18 June 2009.

M. Shaat, F. Bader, "Power Allocation with Interference Constraint in Multicarrier Based Cognitive Radio Systems" . Proceedings in book titled: Multi-Carrier Systems and Solutions MCSS'09. Chapter 4: AdaptiveTransmission .Eds. Plass, S.; Dammann, A.; Kaiser, S.; Fazel, K. Springer© 2009. ISBN: 978-90-481-2529-6 (HB) [4]. Netherlands.

N. Zorba, S. Pfletschinger, F. Bader, "Increasing the Performance of

OFDM-OQAM Communication Systems through Smart Antennas Processing”, Proc. of the 1st ICST International Conference on Mobile Lightweight Wireless Systems (Mobilight'09). Athens, Greece. May 2009.

M. Shaat, F. Bader, “Power Allocation and Throughput Comparison in OFDM and FBMC Based Cognitive Radio”, the 22nd Meeting of the Wireless World Research Forum (WWRF'2009), Paris, France. May 2009.

3 PHYDYAS WORKSHOP

The project workshop took place at Perugia, Italy, on 21 June 2009, in connection with the IEEE SPAWC conference, scheduled on 22-24 June 2009. The workshop consisted of talks delivered by project partners and invited presentations by renowned scientists in the field of cognitive radio.

The technical program is given in annex 1. It consisted of 9 presentations by partners and 3 invited talks.

The first invited talk, by Prof. Farhang Boroujeny (univ. of Utah-USA) was focused on the potential of filter banks, on both the transmission and the sensing functions of cognitive radio systems. Obviously, he shares many of the objectives of Phydyas. His work is supported by NSF and, in subsequent private discussions, the possibility of establishing a cooperation was discussed and it will be investigated.

The second talk by prof. Mahonen and Petrova (Aachen university) provided a general view of cognitive radio, with emphasis on the spectrum availability. Results of recent and on-going measurement campaigns were commented. Management and system simulation tools developed in other EU projects were described. In their response to questions and in subsequent discussions, the authors expressed their interest for the Phydyas results and their willingness to integrate FBMC in their cognitive systems tools.

The third talk, given by M. Gosh (Philips-USA) presented the context of using spectrum holes in TV bands in the USA. An overview of the standard IEEE 802.22 was provided, including the physical layer aspects. The standard is based on OFDM, but the figures given are very relevant to the work in Phydyas and they will be helpful in preparing contributions to standardization. Although M. Gosh made clear that it is too late to make an FBMC contribution to the IEEE 802.22 standard, she declared her interest for the work in Phydyas and her willingness to establish some cooperation, in view of future evolutions of the standard.

A fourth invited talk had been planned, but it had to be cancelled and it was replaced by a presentation entitled “Dynamic spectral allocation with MAC layer synchronization” and given by A. Merentitis (RA-CTI).

The meeting was followed by a cocktail organized jointly with the SPAWC conference, to foster discussions and exchanges.

4 STANDARDIZATION

Cognitive radio was introduced on the agenda of the World Radio Conference (WRC) in 2007 and a question was put to ITU-R, in order to advance the issue and prepare the next meeting, WRC 2011. It was stated that the corresponding studies should be completed by the year

2010.

Question ITU-R 241-1/5, entitled “Cognitive radio systems in the mobile service”, includes the following sub-question:

Q7: what spectrum sharing techniques can be used to implement cognitive radio systems to ensure coexistence with other users?

The question is handled by study group 5 and working party WP5A, which organizes two meeting per year to discuss the contributions submitted by the members.

In this context, two kinds of contributions can be envisaged by Phydyas, about

- 1) some basic parameters in the cognitive radio physical layer, in both the transmission and spectrum sensing sections,
- 2) an example of scenario exploiting this physical layer.

The project coordinator, M.Bellanger, as a member of URSI (International union of radio science) , an official member of ITU, has registered to the WP5A and will participate in the upcoming meeting. A contribution will be prepared, in cooperation with the standardization group in the FP7-RAS cluster.

5 WEBSITE (<http://www.ict-phydyas.org>)

The website is an important means of dissemination of the work of the project. It contains information, news and the formal publications of the partners.

The deliverables of the first year have been made available in the public area of the website. The presentations given at the workshop have been uploaded and are also available.

As soon as they become public, the deliverables of the third semester will also be made available, as well as the results of the simulations and the demonstrations.

Annex 1: technical program of the Phydyas workshop

