

Specific Targeted Research Projects

SOLDER

Spectrum OverLay through aggregation
of heterogeneous DispERsed bands

FP7 Contract Number: 619687



WP5 – Exploitation and dissemination

D5.5

Workshop Organization

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Abstract: The objective of this deliverable is to capture the organization of a workshop during the last year of the project.

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Executive Summary

This deliverable captures the organization and participation to two workshops by M30 of the project and reports the activities to organize and participate to two more.

1. Introduction	1
2. Workshops organization	2
3. Conclusion.....	4
List of Acronyms.....	5

1. Introduction

The objective of this deliverable is to produce, capture the organization of two workshops during the project until April 2016:

- 1) SOLDER organized its first workshop at IEEE ISWCS 2014.
- 2) SOLDER co-organized (and co-sponsored) for the second time the CRAFT workshop at IEEE ISWCS 2015.

SOLDER will also co-organized and co-sponsored for the third time the CRAFT (Cognitive Radio and Innovative Spectrum Sharing Paradigms for Future Networks) workshop at IEEE PMIRC 2016, and proposed a Workshop to ISWCS'16 in collaboration with ADEL project with title "Spectrum Aggregation and Sharing for Future Wireless Networks".

The D5.5 is classified as Other ('O') without the need for sending a particular report. However, after the communication with the Project Officer, we had been asked to provide a summary of our activities regarding the past and future Workshops organized by the SOLDER team members to disseminate results and trigger the discussion internationally about the evolution of Carrier Aggregation in the 5G networks. It helps in measuring the impact of the project on the scientific community. Moreover, it provides good insights on the SOLDER major outstanding contents to anyone interested in the project.

2. Workshops organization

The following 2 workshops were organized until now.

- [1] F. Foukalas, F. Kaltenberger, G. Vivier, S. Thao, S. Pietrzyk, “**Spectrum Overlay through Aggregation of Heterogeneous Dispersed Bands (SOLDER)**,” IEEE ISWCS 2014, Barcelona, Spain, 26 September 2014, 9:00-16:50.

<http://www.iswcs2014.org/>

Further information: SOLDER has led the organisation of this workshop from the first year of the project. The details can be found in deliverable D5.3 Dissemination and Exploitation report - Year 1, delivered 1 November 2014.

Abstract: 4G mobile communication systems achieve high data rates, which might be comparable with those achieved by landline communication systems. Several key technologies play significant roles towards this end, among them Carrier Aggregation (CA). Carrier Aggregation has been introduced in LTE since Release 10 (LTE-Advance) and is also used in recent WLAN system, sometimes referred as Channel or Carrier Bundling.

Carrier Aggregation consists in combining several carriers available within the communication system to enhance the data rate for the end-user. This could enable access to a very large bandwidth, and has the supplementary benefit of facilitating the use of fragmented spectrum for wireless operators. As a result, Carrier Aggregation has become a hot topic, both from the research perspective and from the commercial deployment standpoint.

This proposed workshop aims to discuss the applications and the challenges of Carrier Aggregation as deployed nowadays, with reflections on experience from prototyping, field trials or commercial deployments. Moreover, the workshop will explore the evolution of Carrier Aggregation by addressing all kinds of aggregation, as pragmatic steps toward full flexible spectrum usage. In particular, the workshop will address the aggregation of heterogeneous radio access technologies and the use of LTE in license-exempt spectrum.

In order to have industrial feedback on the topics of SOLDER, we organized a panel discussion for cognitive radio application in 5G wireless communication system. The following panelists, as experts from industry who are working in the same field, gave a presentation and a talk:

- 1) Markus Mueck, Intel Mobile (Keynote speech for Spectrum Sharing and Inherent challenges for Carrier Aggregation) ;
- 2) Christophe Gruet, Airbus Defence & Space (former Cassidian), CA for typical public safety: Use cases;
- 3) Nathalie Haziza, Thales Communications & Security S.A.S., on behalf of FP7 ICT Call 11 ADEL, Licensed Shared Access with Aggregation Capabilities ;
- 4) Guillaume Vivier, Sequans, on behalf of FP7 ICT Call 11 SOLDER: Practical aspects of Carrier Aggregation implementation.

- [2] O. Holland, A. Kliks, M. Mueck, K. Baddour, P. Demestichas, “**Third Workshop on Cognitive Radio for Fifth-Generation Networks and Spectrum (CRAFT 2015)**,” IEEE ISWCS 2015, Brussels, Belgium, 25 August 2015, 14:00-17:30.

<http://www.iswcs2015.org/index.php/9-authors/18-call-for-papers-6>

Further information: SOLDER has led the organisation of this ISWCS CRAFT workshop in the second year of the project, with KCL leading on the Organising Committee. The details can be found in deliverable D5.4 Dissemination and Exploitation report - Year 2, delivered 2 November 2015.

There was a change in structure ISWCS-wide in 2015 concerning workshops, essentially meaning that for 2015 the workshops had to comprise primarily invited content. Hence, the CRAFT 2015 workshop comprised a number of invited presentations, and a discussion session. Moreover, the exception was made by the ISWCS 2015 leadership to have two published papers presented in the CRAFT workshop, despite the change in structure for ISWCS workshops. These papers fitted nicely into the workshop proceedings.

Abstract: There has been a huge surge in wireless technology deployment over the past decade, which has led to the crowding of existing spectrum. In order to address the resulting congestion and shortfall in projected spectrum availability vs. spectrum need, Cognitive Radio (CR) has been envisioned in the context of 5G networks. CR might increase the efficiency of spectrum utilization in 5G through, e.g., opportunistic spectrum access, and might improve the management, performance and coexistence of heterogeneous networks and devices using diverse radio access technologies.

CRAFT 2015 aims to gather and promote discussion among researchers, industrialists and other stakeholders, the purpose being to inspire the analysis and development of CR solutions for 5G networks and to realise sufficient spectrum for 5G. Topics covered include, but are not limited to: CR for opportunistic spectrum access and sharing in 5G; cognitive networks for 5G; advanced flexible spectrum access techniques; applications for CR in 5G; spectrum and context awareness for CR in 5G; cognitive carrier aggregation aspects and advanced management of coexisting networks; regulatory solutions of efficient spectrum sharing in 5G, including database-driven approaches.

The following workshop will still be organized by the end of the project.

- [3] O. Holland, K. Baddour, P. Demestichas, F. Bader, M. Mueck, A. N. Cadavid, “**Workshop on Cognitive Radio and Innovative Spectrum Sharing Paradigms for Future Networks (CRAFT 2016)**,” IEEE PIMRC 2016, Valencia, Spain, 4 September 2016, 9:00-17:50.

<http://ieee-pimrc.org/workshopsub.html>

Further information: The details of this workshop will be given in deliverable D5.6 Dissemination and Exploitation report - Year 3, to be delivered by 31 October 2016.

- [4] D. Slock and F. Kaltenberger, “**Workshop on Spectrum Aggregation and Sharing in Future Wireless Networks**,” submitted to ISWCS 2016, Poznan, Poland, 20-23 September 2016.

<http://iswcs2016.org>

Further information: The details of this workshop will be given (as long as it will be accepted) in deliverable D5.6 Dissemination and Exploitation report - Year 3, to be delivered by 31 October 2016.

3. Conclusion

Two IEEE workshops were organized until now within the scope of WP5 "Exploitation and dissemination", they have been produced, captured in this deliverable.

- 1) SOLDER organized its first workshop at IEEE ISWCS 2014, <http://www.iswcs2014.org/>.
- 2) SOLDER co-organized (and co-sponsored) for the second time the CRAFT workshop at IEEE ISWCS 2015, <http://www.iswcs2015.org/index.php/9-authors/18-call-for-papers-6>.

It can be seen that SOLDER has been very active in its workshop organization activity until now and will continue this effort by co-organizing a third workshop at IEEE PIMRC 2016, <http://ieee-pimrc.org/workshopsub.html> and one in collaboration with ADEL FP7 project to spectrum aggregation and sharing enabling technologies for future wireless networks.

The deliverable D5.5 is a public deliverable, primarily targeting the European Commission staff as a report of the workshop organization of the SOLDER project. It helps in measuring the impact of the project on the scientific community. Moreover, it provides good insights on the SOLDER major outstanding contents to anyone interested in the project.

List of Acronyms

Acronym	Meaning
3GPP	3rd Generation Partnership Project.
ADEL	Advanced Dynamic spectrum 5G mobile networks Employing Licensed shared access.
FBMC	Filter Bank MultiCarrier
CA	Carrier Aggregation.
CFP	Call For Papers.
CR	Cognitive Radio.
CRS	Cognitive Radio System.
DPD	Digital Pre-Distortion
DSA	Dynamic Spectrum Access.
DySPAN-SC	Dynamic SPectrum Access Networks Standards Committee.
EC	European Commission.
ETSI	European Telecommunications Standard Institute.
EuCNC	European Conference on Networks and Communications.
EuMW	European Microwave Week.
GLDB	Geo-Location DataBase.
ICC	International Conference on Communications.
ISWCS	International Symposium on Wireless Communication Systems.
LSA	Licensed Shared Access.
LTE	Long-Term Evolution.
NEM	Network & Electronic Media.
OSS	Open Source Software.
PAPR	Peak to Average Power Ratio
PIMRC	Personal, Indoor and Mobile Radio Communications.
PMR	Professional Mobile Radiocommunications.
RAS	Radio Access and Spectrum.
RAT	Radio Access Technology.
RCM	Radio Connection Manager.
Rel.	Release.
REM	Radio Environment Map.
RF	Radio Frequency.
RRS	Reconfigurable Radio Systems.
SDR	Software Defined Radio.
SOLDER	Spectrum OverLay through aggregation of heterogeneous Dispersed bands.
TC	Technical Committee.
TCOM	Transactions on Communications.
TMTT	Transactions on Microwave Theory and Techniques.
TWC	Transactions on Wireless Communications.
VTC	Vehicular Technology Conference.
WCNC	Wireless Communication and Networks Conference.
WG	Working Group.
WP	Work Package.
WSD	White Space Device.