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D8.3: First Report on Dissemination and Communication activities

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Abstract	This deliverable describes the dissemination and communication activities pursued by the ORCA partners in Y1 to guarantee broad and effective visibility, promotion and up-take of the project's work and outcomes. It also outlines the activities planned for Y2

Keywords	Dissemination, communication, events, impact creation.

Document Revision History

Version	Date	Description of change	List of contributor(s)
V0.1	13 August 2017	TOC	MARTEL
V0.2	10 October 2017	First Draft	MARTEL
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V0.4	12 December 2017	Partners' contribution	IMEC, NI, TCD, KUL
V0.5	18 December	Review	TUD
V0.6	21 December	Final review	MARTEL

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** R: Document, report (excluding the periodic and final reports)*

Project co-funded by the European Commission in the H2020 Programme		
Nature of the deliverable:	R	
Dissemination Level		
PU	Public, fully open, e.g. web	✓
CI	Classified, information as referred to in Commission Decision 2001/844/EC	
CO	Confidential to ORCA project and Commission Services	

DEM: Demonstrator, pilot, prototype, plan designs

DEC: Websites, patents filing, press & media actions, videos, etc.

OTHER: Software, technical diagram, etc

EXECUTIVE SUMMARY

The ORCA Work Package 8, WP8, is dedicated to "Dissemination, Communication and Exploitation" and aims at defining, maintaining and coordinating the appropriate mechanisms and tools ensuring broad visibility and impact of the project's work and results. The main objective is to promote the developed project's concepts and technologies, including the four main show cases the consortium's partners are focusing on. Furthermore ORCA Dissemination Plan defines and reports on the promotion of the five Open Calls which will be launched within the project: three Open Calls for Experiments and two Open Calls for Extensions. The first Open Call for Extension has already been launched and a detailed report of the promotion activities is provided in this document.

This deliverable describes how ORCA has followed, in Y1, a comprehensive and effective approach to dissemination and promotion activities as per the strategy defined in D8.1.

During the first year of the ORCA project, the consortium has harvested fruitful results from a wide range of dissemination and promotion activities. The different communication channels and dissemination tools identified at the beginning of the project were used in order to promote the main news, activities and results of the ORCA project. The key activities are listed as follows:

- ORCA organized the Inception Workshop at the EuCNC, Oulu, Finland in June 2017 and the First Inception Workshop at the CROWNCOM, Lisbon, Portugal in September 2017
- ORCA has participated in 12 relevant external events and present itself to relevant stakeholders
- 13 scientific publications have been published presenting advances marked by ORCA and 6 demonstrations were conducted
- The First Open Call for Extension was launched in September and widely communicated till its deadline in early November
- In total, ORCA has widely promoted its results and activities to more than 2000 stakeholders (including subscribers to social media channels, website visitors and mailing lists of both NGI-EXP, 5G PPP among others).

For the second year of the project, the strategic perspective of the ORCA dissemination and communication effort will continue to serve the overall success of the ORCA project and maximize the dissemination and communication impact within the communities of target stakeholders. Such effort includes:

- Launch of the 2nd Open Call for Extensions and the 1st and 2nd Open Calls for Experimentation
- Continuation of the active promotion of the activity of the project through different channels
- Development of online tutorials
- Publication of scientific articles and presentations in international peer-reviewed journals and conferences

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INTRODUCTION

D8.3 is the Report on Dissemination and Promotion Activities for Year 1. This document provides in detail the dissemination and communication activities performed during the first year of the project (January to December 2017), as well as presents a series of actions planned for the second year (January to December 2018). The grounding of such activities was clearly defined and guided by both the Description of Action (DoA) and Deliverable (D) 8.1 – Dissemination, and communication strategy and plan. The purpose of the current deliverable is therefore two-folded:

1. to report on the ORCA project's dissemination and communication activities held from month 1 to month 12, i.e. January – December 2017; that is an intermediate report covering the first year of the project; and
2. to lay out the plan for ORCA's Year 2 (January – December 2018) activities related to dissemination and communication, ensuring the fulfillment of targets and supporting the successful conclusion of the project.

To further detail the dissemination and communication activities conducted during Year 1 and the plan for Year 2, the remaining part of the document is organised as follows:

- Section 1 focuses on activities undertaken and followed in the first 12 months of the project.
- Section 2 foresees planned activities in the second year of the ORCA project.
- Section 3 briefly summarises the key points of the document and orient towards future tasks.

1 DISSEMINATION ACHIEVEMENTS M1-M12 (JAN-DEC 2017)

1.1 Objectives

The main objectives that the ORCA dissemination and communication activities are pursuing can be summarized as follows:

- To **promote broad visibility** of the project's work and disseminate its results to the FED4FIRE+ and NGI community and beyond, while contributing to promote the overall Future Connectivity Systems Unit offering for increased uptake by innovative players.
- To **create and maintain the ORCA project web site**, the media communication channels and the planned dissemination tools to effectively promote the ORCA's work and guarantee broad visibility of the project within the whole scientific and innovation Future Internet landscape.
- To **participate to and organize events** to maximise the dissemination of the information to target stakeholders and promotion of ORCA's Open Calls and project's results. Four workshops and hands-on tutorials are scheduled; including an inception workshop already organized and carried out at M6 as a joint panel special session in cooperation with SOFTFIRE and 5GINFIRE projects, within the EuCNC 2017 event in Oulu, Finland.
- To assist in the **organisation and promotion of the ORCA Open Calls**, as a means to broadly promote and validate the ORCA research outcomes and collect feedback from the work performed by the participants to the competition.
- To **establish liaisons with related initiatives and projects** both within the ORCA programme context and in related initiatives, including in particular the 5G-PPP, Fed4FIRE+ and NGI communities, for mutual exchange of know-how and broad visibility of the ORCA's work. Contribution to related Open Source initiatives and Standardisation activities, with a specific focus on 5GPP, ETSI working groups, WinnF and possibly IETF.

1.2 Target Audience

We have identified the following main target groups.

- **New experimenters** that could potentially join Fed4FIRE+, especially Small and Medium-sized players, in the cognitive radio domain that could benefit from the ORCA concepts, technologies and testbeds to experiment, test and speed up the time-to-market for new applications and services.
- **Innovators and researchers** both in the academic and corporate R&D&I domains working on resources allocation and optimization in dynamic and densely populated wireless networking domains.
- **Industrial players**, including small to medium and large organisations, covering industry manufacturers, telecommunications operators and service providers, such as, but not limited to, the 5G-PPP members and associated members, and industrial organizations that have participated in former FIRE programme.
- **The General public and the society as a whole** including citizens, students, public authorities, etc. that could benefit from enhanced wireless connectivity serving at social inclusion and engagement.
- **Standardization bodies** ORCA is uniquely situated to make contributions to open source initiatives and standardization. The partners involved in the project have already established good working relations with spectrum regulators through several years of related work.

- In relation to the selected showcases, target players are also industrial players, SMEs and researchers in the fields of smart factories, robots-to-human interaction, SDRs, SDN, service-aware wireless infrastructures that could **uptake and/or complement and extend the ORCA technologies**.

1.3 Promotional Materials

The ORCA project supports impact creation activities through a number of dissemination channels and marketing materials. Presentation of different channels and materials developed during Year 1 is included in this subsection.

1.3.1 Project Flyer and Roll-up

As presented in D8.1 ORCA developed a fact sheet brochure at the very beginning of the project. In Year 1 already 1000 copies have been printed and distributed in several events and it has been also shared online through our website and social channels.

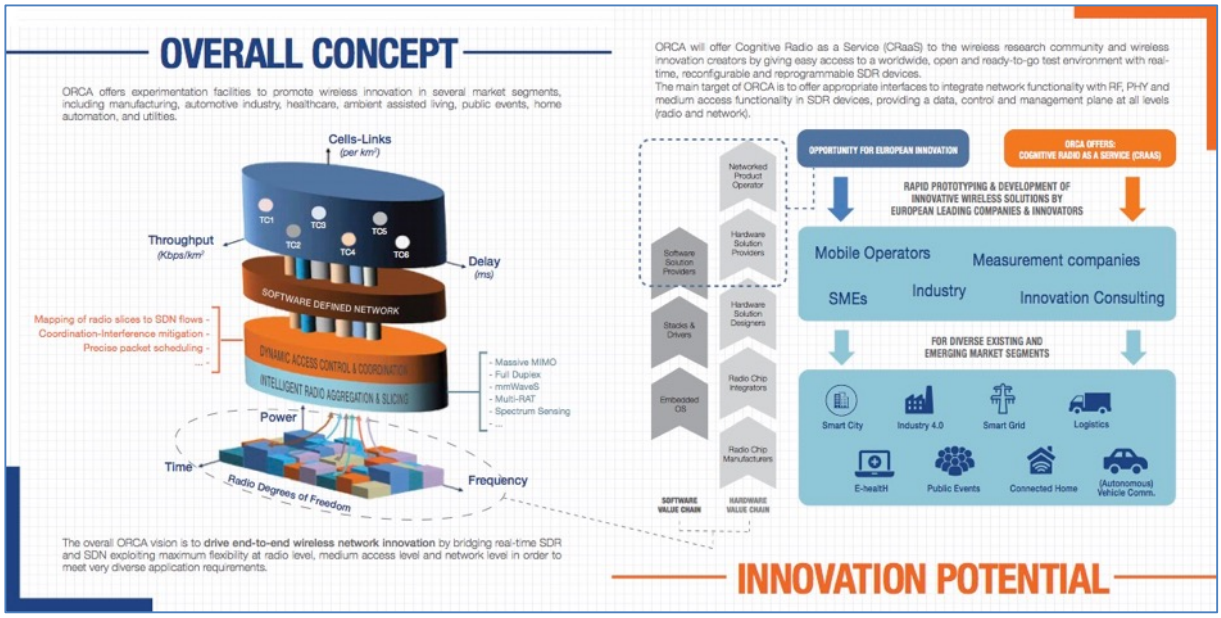


Figure 1: Screenshot of the ORCA's flyer

Following the same design and conceptual approach the project developed a roll-up to be used at several events (including EuCNC, CROWNCOM etc.).

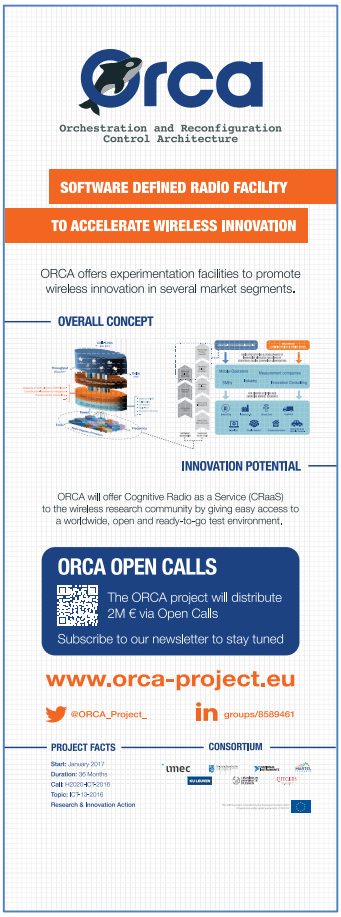


Figure 2: Screenshot of the ORCA's Roll-up

1.3.2 Functionalities Flyers

ORCA realized 24 factsheet flyers to show in a clear, synthetic and easily readable manner the information regarding the testbeds offered in terms of data and control plane functionality, including basic and advanced reconfiguration. All the factsheets are available and organized in a dedicated page on ORCA's website https://www.orca-project.eu/orca-functionalities.

They are listed in three macro-groups:

- SDR Data Plane Functionality
  - Bidirectional, closed loop mmWave link (V-Band) (Link to the PDF)
  - Full duplex link at sub 6 GHz (Link to the PDF)
  - Concurrent operation of multi-RATs on a single SDR (Link to the PDF)
  - Massive MIMO (Link to the PDF)
  - Design-time composition of MAC protocol (Link to the PDF)
  - Design-time composition of PHY (Link to the PDF)
  - Low latency PHY and MAC integration (Link to the PDF)
  - Proposal for a generic PHY and MAC API of multi-RATs (Link to the PDF)
- Basic SDR Control Plane Functionality
  - Runtime parametric control of PHY and lower MAC (Link to the PDF)
  - Runtime switching between MACs (Link to the PDF)
  - Parametric control of higher MAC and upper layer network protocols (Link to the PDF)
  - Providing flexible monitoring and analysis tools for resource management (Link to the PDF)
  - Physical resource slicing (Link to the PDF)
  - Network slicing (Link to the PDF)
  - Management and optimized allocation of radio resource (freq, time, space) and users across radio slices (inter slice) (Link to the PDF)
  - Configuration of virtualised radio instances according to diverse traffic or service (intra slice) (Link to the PDF)
  - Automatic and manual beam steering functionality at MAC layer (Link to the PDF)
  - Sense and abort MAC (Link to the PDF)
  - Coordination strategies between multiple RATs (LTE/802.115/G-NR) (Link to the PDF)
- Advanced SDR Control and Management Functionality
  - Runtime reconfiguration of monitoring schemes (Link to the PDF)
  - Runtime reconfiguration of full duplex MAC (Link to the PDF)
  - Runtime reconfiguration of PHY transceiver chain (Link to the PDF)
  - Runtime reconfiguration of beam steering algorithms (Link to the PDF)
  - Live reprogramming of MAC (Link to the PDF)

The information on the factsheet are a synthesis of the deliverable D2.2 also available in the ORCA's website. See Appendix A for a flyer layout example.

1.3.3 Project's presentation

During the initial phase of the project, ORCA's communication team created a first slide set to be used as overview of ORCA project, which has been made available through the project intranet platform. The following Figure 3 presents a slide as an example of the Project Presentation.

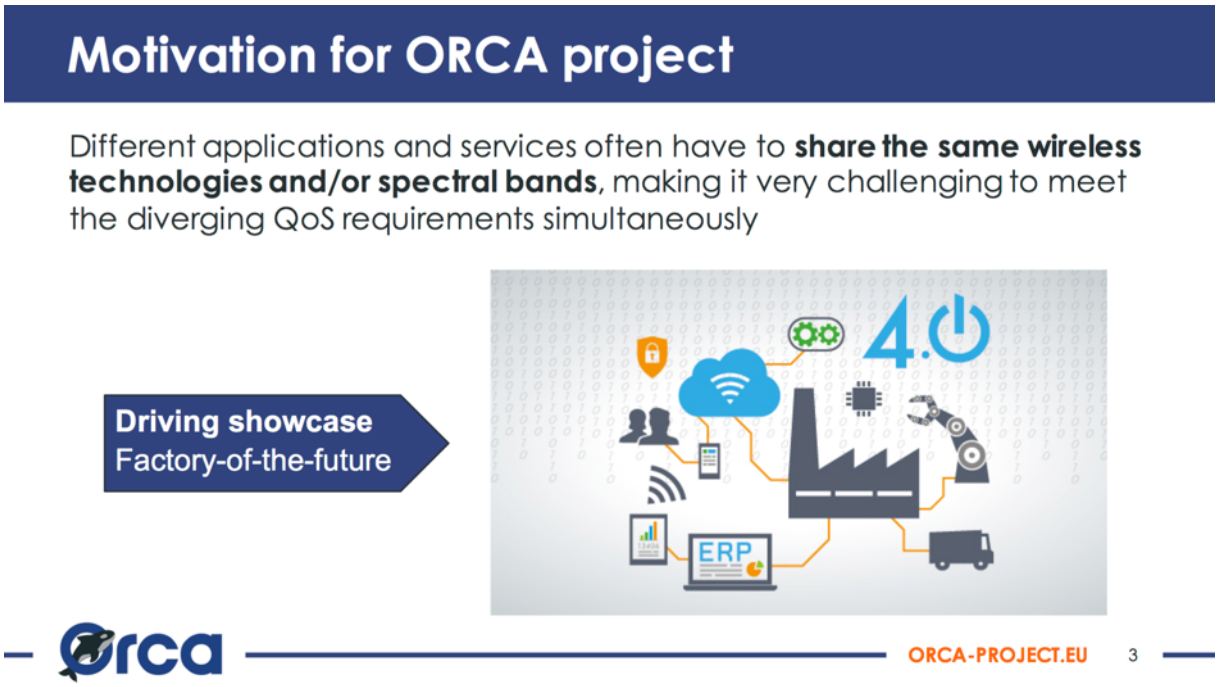


Figure 3: Screenshot of the ORCA's slide set presentation

1.3.4 Video

ORCA project launched the first project's video to support the 1st Open Call for Extension at the CROWNCOM Conference in Lisbon, on 20th September 2017. The video features Dr Ingrid Moerman, Project Coordinator, introducing the project goals and functionalities, while Dr Alessandra Scicchitano briefly presents the key information about the Open Call. The video has been showed at the CROWNCOM Conference to the workshop participants, uploaded on the ORCA YouTube channel and mirrored on ORCA's website. It is also available to all the partners who need a dynamic communication tool at events and presentations. So far it already reached 125 views.

Figure 4: Screenshot of the video presenting the 1st Open Call for Extensions

The second ORCA's video has been released in early December 2017 and it features the project's testbed facilities presented by each involved partner. It is published on ORCA YouTube Channel and mirrored on ORCA's website. In particular, the video provides an overview of:

- IMEC w-iLab.t testbed for heterogeneous environments
- IMEC Portable testbed
- RUTGERS ORBIT heterogeneous multi-node testbed
- TCD IRIS network virtualization testbed
- TUD macro scale testbed
- KUL dense multi-node networks testbed
- NI supported software tools

It has been used to support the 1st Open Call for Experiments.

Figure 5: Screenshot of the video presenting the 1st Open Call for Experiments

1.4 Online Dissemination

1.4.1 Online Communication Guidelines

Martel, leader of WP8, developed and shared with all the partners the ORCA Online Communication Guideline Manual. The short and agile document provides the basic information regarding the online communication tools put in place by the Project (and described in this section) and suggests how to interact in order to maximize the reach and therefore the ultimate impact of the project. It also suggests how to effectively edit content for the website news area, the project's newsletter, the Twitter and LinkedIn Group accounts. The document is available online on the project's online repository.

1.4.2 Website

ORCA's official web portal (http://orca-project.eu) was set up at the beginning of the project (M1).
At the time of writing this deliverable (end of November 2017), the website has yielded 3267 visits with 1618 unique visitors, who generated 8160 page views. The average of page view per user is approximately 2.5 (pages) and the average duration of the visits is 2'33".

The figures below provide the details:

Figure 6: Website Statistics: Overview of the audience

Figure 7: Website Statistics: Visit per month

1.	/	1,663	20.38%
2.	/open-calls/	996	12.21%
3.	/open-calls/1st-orca-open-call-extension/	986	12.08%
4.	/about/	533	6.53%
5.	/testbeds/	372	4.56%
6.	/news/	346	4.24%
7.	/resources/scientific-publications/	330	4.04%
8.	/consortium/	304	3.73%
9.	/overall-objectives/	258	3.16%
10.	/resources/deliverables/	215	2.63%

Figure 8: Website Statistics: Top Visited pages

1.	desktop	2,940	89.99%
2.	mobile	289	8.85%
3.	tablet	38	1.16%

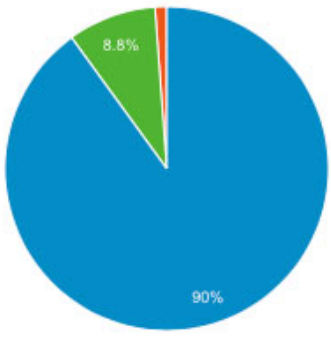


Figure 9: Website Statistics: Visit Devices

An overview of the project website can be found in Deliverable 8.1 Dissemination and communication strategy and plan, where the layout and concept of the web design are illustrated.

1.4.3 Social Media

The social media activity has been concentrated on Twitter (@ORCA_project_) and LinkedIn (https://www.linkedin.com/groups/8589461) since M1 as pointed out in D8.1. These social media channels are a powerful tool to disseminate the most relevant information about the project reaching

specific audiences.

Twitter

So far, ORCA's Twitter account has attracted 114 followers (including project partners, similar projects, interested stakeholders, etc.). Among all 370 Tweets available. ORCA also follows 72 accounts, mostly initiatives and organisations in similar fields or of approximate nature where partners have been involved. Figure 10 shows the current homepage of the ORCA Twitter account.

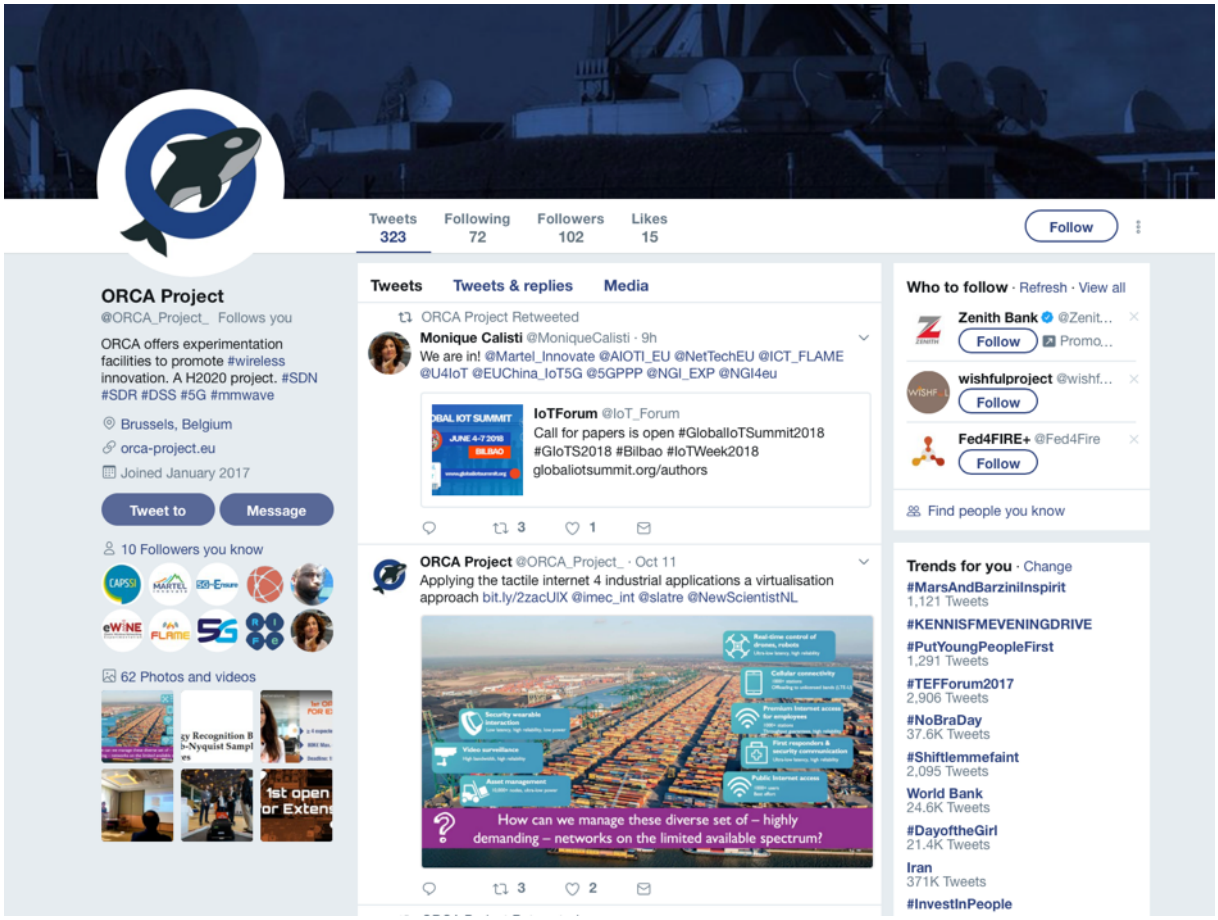


Figure 10: Screenshot of the ORCA Twitter Account

LinkedIn

LinkedIn has been active since the beginning of the project and has gathered 24 members so far. It is mostly used to share the latest progress of ORCA, echoing key promotional messages from Twitter and the Project website. It has posted a total of 11 discussions.

1.4.4 Newsletter

As anticipated, three Newsletters have been done and distributed to stakeholders through ORCA's mailing lists as well as made available on the project website. So far, 75 stakeholders have subscribed to receive ORCA's Newsletters. In terms of further analysis on the efficiency of the communication:

- The first newsletter was sent to 2120 subscribers (ORCA subscribers + FIRE mailing list)
- The second newsletter was sent to 2155 subscribers (ORCA subscribers + FIRE mailing list)
- The third newsletter was sent out to 490 subscribers (ORCA subscribers + projects and DWG

lists)

1) Newsletter 1 (April 2017)

The first newsletter of ORCA, published in April 2017, has announced and introduced the project, announced ORCA's participation at the EuCNC 2017 with the Inception Workshop and a joint booth with eWINE and WiSHFUL project, as well as reported ORCA's presentation at QED Conference and at the IMEC Technology Forum. The following is a screenshots of ORCA's First Newsletter.

Figure 11: Screenshot of the ORCA First Newsletter

2) Newsletter 2 (July 2017)

The second newsletter of ORCA, published in July 2017, has announced the launch of the First Open Call for Extensions at CROWNCOM in September 2017, featured ORCA's presentation at

NetFutures 2017 and reported ORCA's demos at ICC 2017, at the ns-3 workshop and at EuCNC 2017.

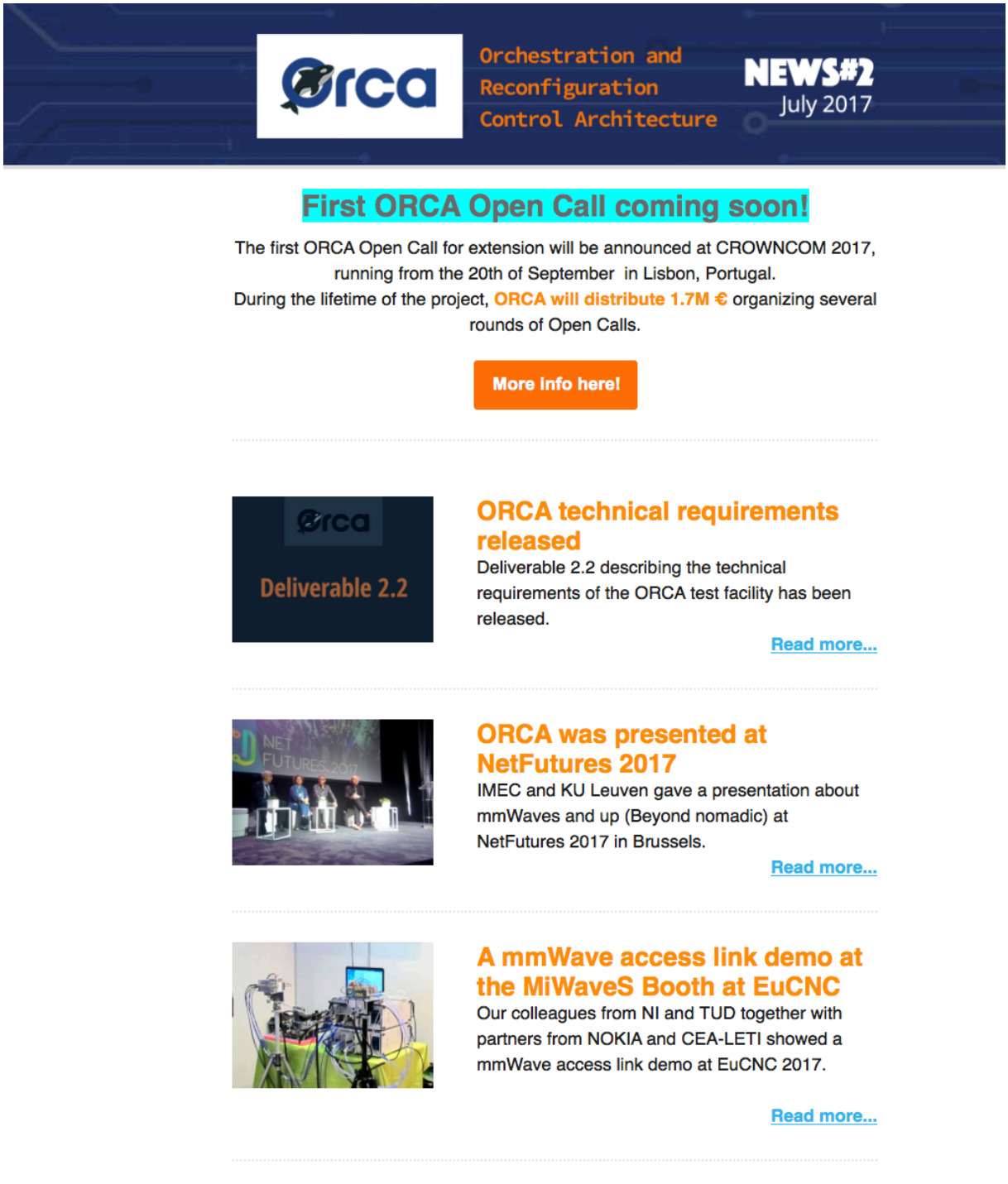


Figure 12: Screenshot of the ORCA Second Newsletter

3) Newsletter 3 (November 2017)

The third newsletter of ORCA, published in November 2017, announced the upcoming opening of the Open Call for Experiments. It also presented the activities run at MOBICOM and CROWNCOM and anticipated the ORCA's participation at GLOBECOM 2017

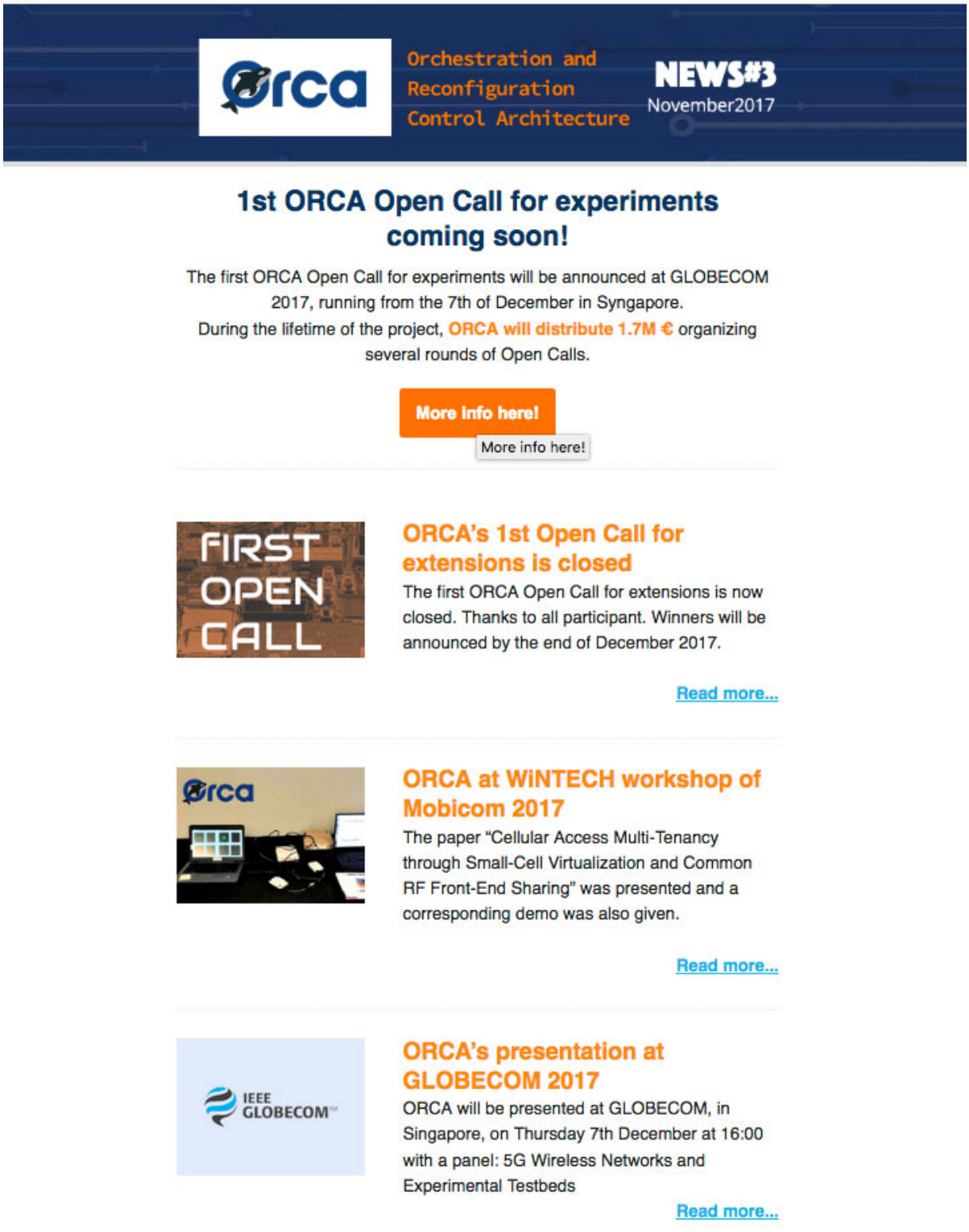


Figure 13: Screenshot of the ORCA Third Newsletter

1.5 Workshops Organized in Year 1

1.5.1 Inception Workshop

The Inception Workshop was held at EuCNC on 13th June 2017, in Oulu, Finland, within the special session "Emerging trends for 5G experimental environments". Around 80 people attended. Dr Ingrid Moerman, ORCA's project coordinator, introduced the project, presented ORCA's functionalities and invited the participants to see ORCA's demo at the joint booth in the exhibition area. The presentation is available on ORCA's website (http://bit.ly/2wWi3wu).

Figure 14: Dr Ingrid Moerman presenting ORCA at the Inception Workshop at EuCNC 2017, Oulu, Finland

1.5.2 First Engagement Workshop

The First Engagement / Hands-on Workshop was collocated with CrownCom, at M09, in Lisbon 20-22 September 2017. Dr Ingrid Moerman and Dr Xianjun Jiao presented the Demonstration "Radio virtualization for coping with dynamic heterogeneous wireless environments". The First Open Call for Extension, along with the related communication materials, was announced during the demonstration. Here below a short synopsis of the Workshop presentation.

Today many wireless standards are applied for supporting different type of traffic streams (e.g. low data rate sensor data versus high throughput data streams). These wireless standards further operate in the same wireless environment without any coordination between standards, often leading to interference and inefficient spectrum usage. In order to increase spectrum efficiency, future radios will have to collaborate and adapt radio settings to limit interference through coordinated control of frequency bands, time slots, power settings, etc. across multiple standards. It is very difficult for wireless developers to design wireless solutions with improved coexistence characteristics, as they have to deal with multiple radio chips and as many different drivers. Software defined radio (SDR) solutions are very attractive because of their easy of programming. However, when real-time operation is required, it is impossible to use software solutions and instead radio processes have to be hardcoded on FPGA (or ASIC) with slower development cycles.

In the context of the ORCA project a SDR architecture is developed on a single chip radio platform (currently implemented in a Zynq-based System on Chip environment) that offers a unified software API with the following capabilities: (1) concurrent data transmission using multiple standards; (2) real-time control of multiple virtual radios through runtime composition and parametric control of transceiver chains; and (3) radio resource slicing, supporting independent operation of multiple standards in different spectral bands, time slots or in different beams. Such an architecture offers a fast development cycle, as only software programming is required for controlling the virtual radio chip using the unified software API. The architecture further allows a very efficient design in terms of hardware resources, as hardcoded radio processing units (PHY accelerated resources) can be shared over multiple standards and multiple virtual radios.
This demo showcases simultaneous detection of two IEEE 802.11 and eight IEEE 802.15.4 traffic streams in concurrent & overlapping channels via two virtual radios using the same PHY hardware accelerators.

Figure 15: Dr Ingrid Moerman presenting ORCA at First Engagement Workshop at CROWNCOM 2017

ORCA first Open Call was announced during the workshop and presented also during the eWINE and WiSHFUL Tutorial on 20th Sept at 4:30pm "Increasing spectrum efficiency" run by Dr Ingrid Moerman and again, as part of the H2020 FIRE+ Workshop on Radio Access Experimentation on 21st September 2017 at 2pm.

1.6 Events attended

Event Name	Date, Place	Type of Audience	Approx size of Audience	Activity run	Partner

QED Conference	31 January 2017, Brussels	Policy Makers, Researchers,	50	Presentation	KUL
IMEC Technology Forum	15-16 May 2017, Antwerp	Researchers, Industry	100	Demo	IMEC
EuCNC	13 June 2017, Oulu, Finland	Policy Makers, Researchers, Industry	100	Joint Presentation	IMEC, MARTEL
EuCNC	10-13 June 2017, Oulu	Policy Makers, Researchers, Industry	500	Joint booth with eWINE and WiSHFUL projects and Demo	IMEC, MARTEL, KUL, TUD, NI
ICC 2017	21-25 May- Paris	Researchers	50	Workshop and DEMO	NI, TUD, KUL
NetFutures 2017	28-29 June Brussels	Policy Makers, Researchers	100	Presentation	IMEC, KUL, TCD
NGI Forum 2017	13 Sept Barcelona	Policy Makers, Researchers, Industry	100	Flyers' distribution	MARTEL
IEEE 5G Summit	19 Sept 2017	Researchers, Industry	500	Demo	TUD
CROWNCOM	20-21 Sept 2017, Lisbon	Researchers, Industry	30	Workshop and demo	IMEC, KUL
MobiCom17	15-16 October 2017, Salt Lake City USA	Researchers, Industry	100	Workshop	IMEC
NI Round table event	16-17 Novembe r 2017,	Researchers, Industry	35	Workshop	IMEC, NI, KUL

	Bristol, UK				
IEEE GLOBECOM 2017	4-8 December Singapore	Research, Industry	50	Workshop , Paper	TCD, NI, KUL

Table 1: Events attended by ORCA in Y1

1.6.1 GLOBECOM 2017, 7 December 2017, Singapore

ORCA was presented at GLOBECOM, in Singapore, on Thursday 7th December at 16:00. Follows a short synopsis:
5G NR standardization has been proceeding in 3GPP with the goal to complete the work on phase 1 by mid-2018 and phase 2 by end of 2019. New access technologies like Massive MIMO, mmWave and a flexible, scalable PHY numerology and frame structure are important elements in 5G NR. The L2/L3 stack is being enhanced to meet the high throughput and low latency requirements in the target usage scenarios. In addition, new architectures and concepts are being discussed such as functional split and network slicing with the goal to enable a more flexible software defined architecture. Enhancements in RAT interworking also plays a central role with improved interfacing options between legacy and future access technologies enabling, for example, tight interworking with LTE leading to faster initial deployments. This panel brings together internationally recognized leaders in industry and academic research and development. The goal of this panel is to gain insight into how the rich set of existing and new technologies can jointly be used for efficient 5G wireless network design. The panel will also discuss how prototyping results can contribute to the design and standardization process by improving the confidence that new technology proposals can be commercialized.
Organizers:
Vincent Kotzsch (National Instruments), Amal Ekbal (National Instruments)
Panelists: Wanshi Chen (Qualcomm), Luiz da Silva (Trinity College Dublin), Slawomir Pietrzyk (IS Wireless), Peter Rost (Nokia), Emilio Calvanese Strinati (CEA/LETI)

Two papers were also accepted at GLOBECOM 2017:

1. The paper "*Spectrum Monitoring for Radar Bands using Deep Convolutional Neural Networks*", presented by TCD
2. The paper "*Distributed Massive MIMO: A Diversity Combining Method for TDD Reciprocity Calibration*", presented by KU Leuven

Figure 16: TUD at the NI booth at GLOBECOM, Singapore

TUD also presented a demo at the NI booth: Frame-by-frame reconfiguration of the flexible #GFDM PHY developed under Orca project with the flexible #PHY already developed in eWINE project.

1.6.2 MobiCom 2017, 15-16 October 2017, Salt Lake City, Utah, USA

The Nation Science Foundation, PAWR Project Office and 5GinFire EU project invited ORCA to a two day workshop "Technological Gaps and Opportunities for Realizing Open Source based end-to-end Network Architecture" co-located with MobiCom'17 on October 15–16 2017 in Salt Lake City, Utah, USA. The presentation "Cellular Access Multi-Tenancy through Small-Cell Virtualization and Common RF Front-End Sharing" was presented in the workshop and a corresponding demo was also given. *Unlike traditional RAN slicing focusing on RB (Resource Block) level manipulation, which is not transparent to current mobile network operation mode, this paper and demo offer a transparent solution which allows different technologies/operators to share the same SDR small cell platform but still use their own spectrum. With this solution, operator's existing base station and UE (User Equipment) operation mode don't need to be changed.*
The paper is runner up of WiNTECH best paper competition, and it will be extended as a journal paper after some future work.

1.6.3 IEEE 5G Summit Dresden, 19 September 2017, Dresden, Germany

TU Dresden presented ORCA's demo at the IEEE 5G Summit in Dresden on 19-20 September 2017. This demo showed the low-latency GFDM waveform applied in the remote control of a mobile robot.

The balancing algorithm is executed in the cloud and the commands are transmitted to the robot wirelessly via the GFDM PHY.

Figure 17: TUD presenting ORCA demo at the IEEE 5G Summit 2017, Dresden

1.6.4 NetFutures 2017, 29-30 June 2017, Brussels, Belgium

Our colleagues from IMEC and KUL gave a presentation about mmWaves and up (Beyond nomadic) at the NetFutures 2017, on 29 June 2017, in Brussels. There were quite some interesting discussion on radio slicing, network slicing, virtualisation and softwarisation, all topics that are addressed in ORCA. The presentation is available on ORCA's website http://bit.ly/2wWi3wu

Figure 18: Dr Ingrid Moerman presenting ORCA at the NetFutures 2017

1.6.5 ICC 2017, 21-25 May 2017, Paris

National Instrument Dresden Gmbh and Technische Universities Dresden presented at ICC 2017 in Paris (21-25 May, 2017) the world's first real-time control loop application with wireless GFDM, showing a robot balancing itself over a wireless link.

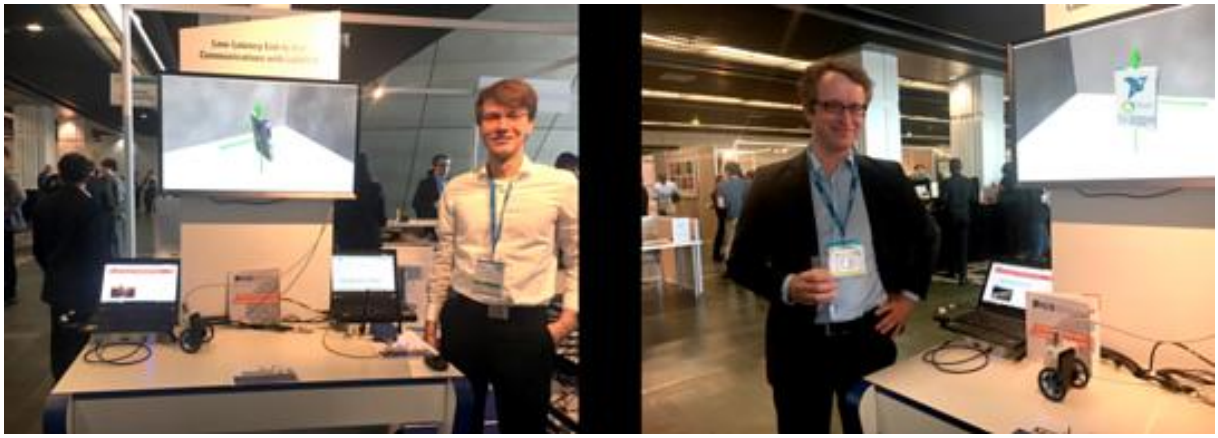


Figure 19: Dr Martin Danneberg (left) and Vincent Kotzsch (right) presenting ORCA demo at ICC 2017

1.6.6 ns-3 Workshop, June 13-14 2017, Porto, Portugal

The Workshop on ns-3 was held on June 13-14, 2017 in Porto, Portugal, and hosted jointly by INESC TEC and Universidade do Porto. The objective of the workshop is to gather ns-3 users and developers, together with networking simulation practitioners and users, and developers of other network simulation tools, to discuss the ns-3 simulator and related activities.

The ORCA partner National Instruments (NI) presented a system which combines an open-source LTE stack and core network in network simulator ns-3, with an FPGA-based real-time implementation of LTE Layer 1 using the NI LTE Application Framework (published on the website http://bit.ly/2ik3ug0). The resulting platform is a building block for testbeds which assist the design of 5G radio interface and network architecture. It facilitates the prototyping of end-to-end applications, which include the functionality of all layers of a wireless communication system, in real-time and over-the-air environments.

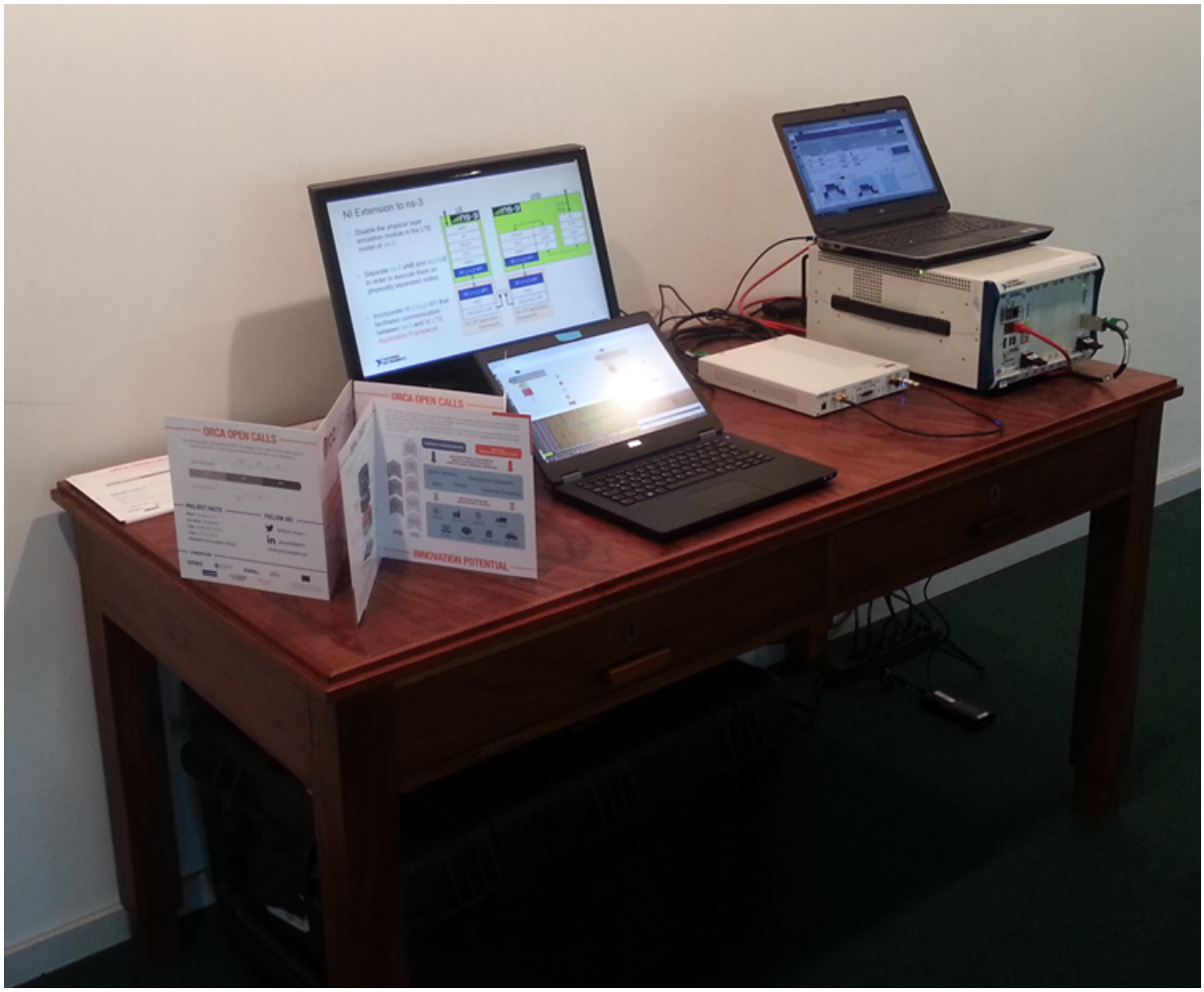


Figure 20: ORCA system presented at the ns-3 Workshop

1.6.7 IMEC Technology Forum, May 16-17 2017, Antwerp, Belgium

IMEC presented ORCA's demonstration at the IMEC Technology Forum 2017. The ORCA's demo shows the concurrent preamble detection of two technologies (Wi-Fi and ZigBee) by one physical hardware module on the Zynq SDR platform. The initial exploration shows promising results for achieving radio virtualization on the end-to-end communication level.

1.6.8 QED Conference 31 January 2017, Brussels, Belgium

Prof Sofie Pollin (KUL) was invited as speaker at the QED Conference on 5G arguing that the key 5G question is how to deliver the required flexibility with sufficient performance. She presented ORCA as a possible solution aiming at building a testbed that allows you to experiment freely (with very flexible

SDR) and hence accelerate your 5G innovation. The presentation is available on ORCA's website http://bit.ly/2wWi3wu

Figure 21: Prof. Sofie Pollin presenting ORCA at the QED Conference 2017

1.7 Journals and Conference Publications

ORCA's partners have been particularly active in submitting scientific papers to conference publications and scientific journal, starting from M1 of the project. In 2017 13 papers have been published already.

Publication title/topic	Submission to	Leading Partner
"Wireless Technology Recognition Based on RSSI Distribution at Sub-Nyquist Sampling Rate for Constrained Devices", Liu, W., Kulin, M., Kazaz, T., Shahid, A., Moerman, I., & De Poorter, E.	Sensors, 2017	IMEC
"Spectrum Monitoring for Radar Bands using Deep Convolutional Neural Networks" A. Selim, F. Paisana, J. A. Arokkiam, Y. Zhang, L. Doyle and L. A. DaSilva	IEEE GLOBECOM 2017	TCD
"Distributed Massive MIMO: A Diversity Combining Method for TDD Reciprocity Calibration", C. Chen, S.Blandino, A. Gaber, C.Desset, André Bourdoux, L.Van der Perrel, S. Pollin	IEEE GLOBECOM 2017	KUL

“Cellular Access Multi-Tenancy through Small-Cell Virtualization and Common RF Front-End Sharing”, J. Mendes, X. Jiao, A. Garcia-Saavedra, F. Huici and I. Moerman	ACM WiNTECH 2017	IMEC
“Radio hardware virtualization for coping with dynamic heterogeneous wireless environment”, X. Jiao, I. Moerman, W. Liu, F. Figueiredo	CROWNCOM 2017	IMEC
“Orchestration and Reconfiguration Control” A. Kazaz, W. Liu, X. Jiao, I. Moerman, F. Paisana, C. Felber, V. Kotzsch, Ivan Seskar, T. Vermeulen, S. Pollin, M. Danneberg and R. Bomfin	EuCNC Conference	IMEC
"Adaptive In-band Full-Duplex Collision Detection for Balancing Sensing and Collision Costs", B. Reynders, T. Vermeulen, F. Rosas, S. Pollin,	EuCNC Conference	University of Leuven
“5G Wireless Networks Prototyping”, N. Michailow, V. Kotzsch, D. Kim	ns-3 workshop	NI
“Softwarization of Radio and Wireless Networks”, I. Moerman, S. Giannoulis, E. De Poorter, X. Jiao	IEEE Software Defined Networks Newsletter (Jan 2017)	IMEC
“Wireless Technology Recognition based on RSSI Distribution at Sub-Nyquist Sampling Rate” for Constrained Devices”	IEEE Access	IMEC
“Demo: WiSCoP - Wireless Sensor Communication Prototyping Platform” Tarik Kazaz, Xianjun Jiao, Merima Kulin, Ingrid Moerman	EWSN2017, the International Conference on Embedded Wireless Systems and Networks	IMEC
“DySPAN Spectrum Challenge: Situational Awareness and Opportunistic Spectrum Access Benchmarked”	IEEE Transactions on Cognitive Communications and Networking (TCCN)	TCD, KUL
“Demo : packetized-LTE physical layer framework for coexistence experiments”	15th ACM Conference on Embedded Networked Sensor Systems (SenSys 2017)	IMEC

Table 2: Publications in Year 1 (M1-M12)

1.8 First Open Call for Extension, Dissemination Campaign

The communication strategy and multimedia campaign to promote ORCA and the first open call has been orchestrated by Martel with the cooperation of all the partners. The key pillars of the campaign were:

- An ORCA website page dedicated to the first open call, complete with the detailed open call information document, a FAQ section and the online submission form. This was designed to be complimentary to the comprehensive set of background scientific information available on ORCA's website, including links to the testbeds, along with the digital flyer for each project's functionality

Figure 22: Promotional banner on ORCA's website and Twitter channel

- A comprehensive ORCA social media campaign that started in late August, teasing the upcoming open call on the @ORCA_Project_ Twitter and the ORCA LinkedIn channels
- An ORCA open call flyer was designed and distributed in Lisbon at CROWNCOM 2017 (20-21st September) and Dresden 5G Week (19th-20th September), also available on ORCA's website.

Figure 23: ORCA's flyer promoting the First Open Call for Extensions

- The realisation of a dedicated video to promote the open call featuring Dr. Ingrid Moerman, the Project Coordinator presenting ORCA and Dr. Alessandra Scicchitano, Martel Project Manager, introducing the open call. The video is available on ORCA YouTube channel.

- The multi-phase campaign targets researchers and SMEs active in the 5G arena, with a focus on the major academic events such as MobiCom17 taking place in Utah, USA in October.

1.9 First Open Call for Experiments, Dissemination Campaign

- An ORCA website page dedicated to the first open call for Experiments, complete with the detailed open call information document, a FAQ section and the online submission form. This was designed to be complimentary to the comprehensive set of background scientific information available on ORCA's website, including links to the testbeds, along with the digital flyer for each project's functionality.
- A comprehensive ORCA social media campaign that started in mid November, teasing the upcoming open call on the @ORCA_Project_ Twitter and the ORCA LinkedIn channels.
- An ORCA open call flyer was designed and distributed in Singapore at GLOBECOM 2017 (4-7th December), also available on ORCA's website.
- Lightning talk was held by Vincent Kotzsch (NI) - "ORCA Open Call for Experiments – Using European Testbed Infrastructure to Validate Innovative Networked SDR Solutions" [link]
- A webinar to present ORCA and the Open Call has been scheduled on January 8th, 2018.The communication towards the webinar will start in early December, as soon as the OC will be announced.

Figure 24: ORCA's flyer promoting the First Open Call for Experiments

1.10 ORCA in the press

Our colleagues from the Science Foundation Ireland-funded Connect Centre at Trinity College Dublin presented the ORCA project to the important journal The Irish Times, which featured the news online http://bit.ly/2jaDndG on January 12, 2017.

Figure 25: Picture of the Connect Centre in Dublin, featured in the Irish Time on Line article

ORCA project was also mentioned by the Silicon Republic online publication on April 5, 2017, the article is available at https://www.siliconrepublic.com/comms/5g-kt-verizon

1.11 KPIs, Deliverables and Milestones

Measure	Indicators	Target number	Results achieved at M12
Brochure	N. of brochures (updated once a year) distributed (by the end of the project)	>1500	2000 + 118 online
Project Website	N. of unique visitors to the website (average per year)	>2000	1618 (Feb-Nov 17)
Social networks	N. of followers in LinkedIn, Twitter, YouTube (average new followers per year)	>100	115 Twitter followers 24 members LinkedIn Group
Newsletter	N of subscribers (by the end of the project)	>200	75
Publications	N of peer-reviewed publications in journals, conferences and workshops	>4 per year	14

Webinars	N. of webinars N. of participants	1-2 per year 15 participants per webinar	The first webinar will be on January 8th 2018 to promote the First OC for Experiment
Inception, Engagement and Final Assessment Workshops	Average number of participants per workshop	At least 30 participants per workshop	Inception Workshop at EuCNC >60 participants Engagement Workshop CROWNCOM >30 participants
Videos	N. of videos published on ORCA YouTube channel and average number of views	At least 5 videos and 300 views per video	First video published in September 2017 51 views of ORCA video on YouTube Second video published in early December 2017 to support the launch of the 1st Open Call for Experiments

Table 3: Dissemination & Communication KPIs

Deliverables and Milestones	Description	Achievements
D8.1	Dissemination and Communication Strategy and Plan	Done by April 2017
D8.2	Exploitation strategy and plan	Done by December 2017
D8.3	First Report on Dissemination and Communication Activities	Done by December 2017
D8.4	Second Report on Dissemination and Communication Activities	Planned December 2018
D8.5	Final Report on Dissemination and Communication Activities	Planned June 2019
MS1	Public website up and running	Done by January 2017
MS4	Inception workshop organized	Done in June 2017 (EuCNC)
MS6	First engagement workshop organised	Done in September 2017 (CROWNCOM)
MS9	Second engagement workshop organised	Planned at FEC3 (March 2018)
MS14	Final assessment workshop organised	Scheduled

Table 4: WP8 Deliverables and Milestones

2 PLAN OF ACTIVITIES M12-M24 (JANUARY 2018- DEC 2018)

2.1 Dissemination Campaign for Open Calls

ORCA project will launch in Y2 four additional Open Calls: three Open Calls for Experiments and one remaining Open Calls for Extensions. Through the Open Calls for Experiments ORCA wants to promote the uptake of state-of-the-art SDR solutions in the early design phase of innovative wireless solutions, while through the Open Calls for Extensions Third Parties will be involved for extending ORCA SDR platforms with missing functionalities identified by the consortium. All Open Calls will be organized on a 6-monthly base. The timeline is shown in figure 25.

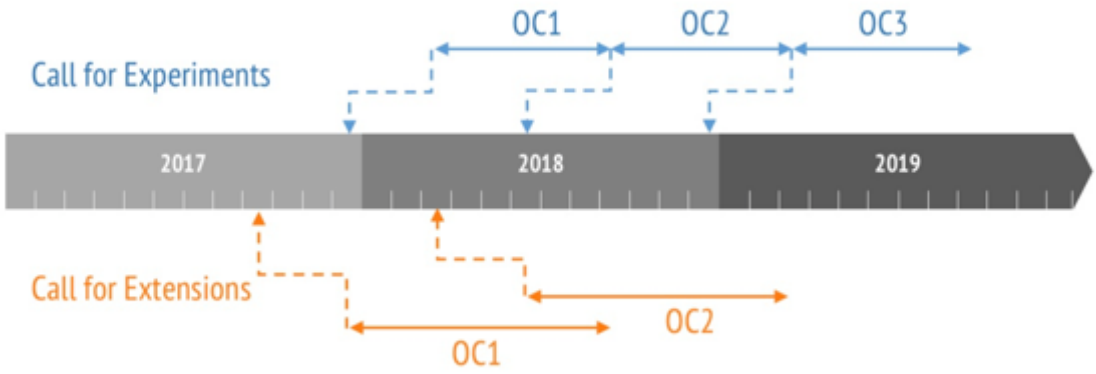


Figure 26: ORCA Open Calls timeline

As successfully implemented for the 1st Open Call, the upcoming ones will be broadly advertised:

- Publication of the Open Call to ORCA website;
- Publication of the Open Call to all relevant FED4FIRE web sites and project web sites, such as: www.ict-fire.eu;
- Dissemination through ORCA social channels, partners and community social channels;
- Dissemination through former FIRE mailing list still running and 5G PPP mailing list
- Flyer to be distributed online and offline;
- A dissemination kit (visual/copy/link) will be distributed to major community websites to further multiply the visibility;

- ORCA will also organize two dedicated workshops in M10 and M15 to introduce the Open Calls to the research community: academics, fresh graduates, SMEs, wireless networking professionals, developers;
- Focused presentations will be given at conferences and third parties workshops to promote the Open Calls opportunity.

2.2 Conferences and Workshops

At the time of writing the partners are outlining the second engagement workshop which will be

organized in order to ensure engagement of a large number of stakeholders into the adoption and deployment of the ORCA concepts, technologies and platform(s). The second engagement workshop will be synchronized with the planned launch of 2nd Open Call for Extensions, (see the Open Calls timeline in Figure 26) in M15 and will be co-located with major events such as FEC3, EuCNC, EWSN, NIWeek Conference. At the time of writing the most suitable option for the Second Engagement Workshop seems to be the FEC3 event which will take place in Paris on 13-15 March. This will allow the creation of an informed audience of potential third party participants, but also contribute to the broad dissemination of project results (initial intermediary and final) to foster uptake and increase exploitation opportunities on a large scale. This workshop will involve ORCA partners as main presenters (demos will also be organized especially in order to provide details on the latest technical progress of the project), but will also aim at inviting a couple of selected experts, including members of the ORCA Advisory Board and dedicate a good portion of the event to an interactive session giving the opportunity to the participants to play an active role in round table discussions guided by the ORCA leaders.

A final assessment workshop will take place, towards the end of the project, at around M34, and will be dedicated to present and showcase the most successful experiments, applications, services and products tested and/or originated within the context of the ORCA project to the broad audience and overall FIRE+ community. This will contribute to demonstrate the value of the work done within the context of the project for all European ICT innovators, especially in related initiatives such as the 5G PPP; and to increase visibility about the FIRE+ initiative and its offering in both the European and international R&D scene. These workshops will be possibly co-located with other major related events and will be broadly advertised via all project's communication channels to guaranteed broad participation.

Event Name	Date, Place	Type of Audience	Approx size of Audience	Activity run	Partner
Second Engagement / Hands-on Workshop FEC3, Paris	March 14, 2018	Researchers, Industry	30	Present project results	IMEC, MARTEL
Final Assessment Workshop Location TBD	M34	Researchers,	30	Present and showcase the most successful experiments, applications, services and products tested and/or originated within by ORCA	TBD

Table 5: Planned ORCA's events

2.3 Presentations and Talks

We will participate to both online and physical selected events as a way to increase awareness of

ORCA's work, outcomes and Open Calls. The main objective is to ensure participation to the most relevant ones in order to better inform potential newcomers and engage all relevant stakeholders to the ORCA technologies, with specific focus on small and medium sized players. ORCA will ensure its presence with technical papers, presentations, demonstrations, and/or talks (e.g. panels) at relevant international conferences, workshops, technical events, industrial forums (see list of events below, scientific dissemination) and cooperation with key European (and possibly international) stakeholders. Moreover, ORCA will participate in joint FIRE+ workshops/sessions, which include for instance the FIRE Forum, the annual editions of the Net Futures and the European Conference on Networks and Communication, EuCNC, and ensure FIRE+ presentations and exhibition booths at major event, including the ICT 2017 event, the annual edition of the Mobile World Congress and events organised by then ETSI RRS. This task will also consider attendance to selected market driven events, exhibitions and fair trades as relevant to the work done in ORCA, organised for instance by the ETSI RRS. ORCA will take any valuable opportunity to contribute to the project dissemination giving presentations, talks, teaching activities, demos and training in third parties' conferences, workshops, and relevant scientific, industrial and EC-driven events. Each participation will be reported and given visibility through the online ORCA's communication channels: website, newsletter, Twitter and Linkedin accounts. The below table shows a pre-selection of events to be attended in 2017.

Event Name	Date, Place	Type of Audience	Approx size of Audience	Activity run	Partner
EuCNC	, Ljubljana	Researchers, Policy Makers, Industry `	400		IMEC, MARTEL
FEC3	Paris	Researchers, Industry	100		IMEC

Table 6: External Events ORCA plans to attend in 2018

2.4 Journals and Conference Publications

Publication title/topic	Submission to	Leading Partner
Radio Hardware Virtualization for Software-Defined Wireless Networks	J. Wireless Personal Communications	IMEC
"Time Agnostic MAC on reconfigurable ZigBee transceiver"	IEEE Access	IMEC
"Cognitive Beamforming for radar bands"	IEEE Transactions on Communications	TCD

Table 7: Planned Publications M12-M24

2.5 Online Tutorials, Training Materials and Video

Via Open Calls, the ORCA project will give access to its testbed facilities to enable innovative communications research.

In order to facilitate the uptake and the use of the offered testbeds, a dedicated webpage (Figure 27) has been created on the ORCA website. The webpage contains all useful information on how to access the testbeds as well as how to use the facilities offered.

In particular, various links to training material and tutorials have been added for each available facility.

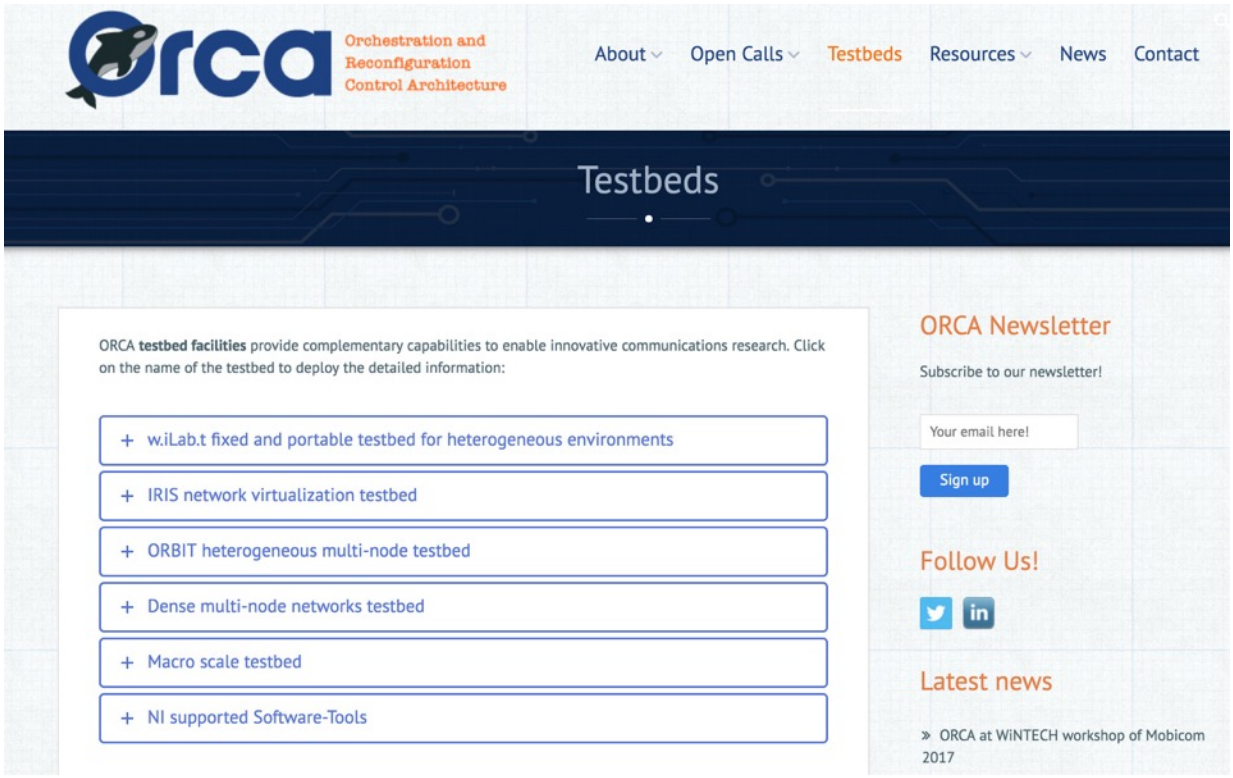


Figure 27 ORCA testbeds webpage screenshot

The outcomes of the various Open Calls will provide the base to generate more online material, like training and tutorials, to facilitate the uptake of the outcome of the project.

At the time of writing, the first Open Call for extensions has just concluded and the first Open Call for experiments is on going.

3 CONCLUSIONS

This document presents the ORCA dissemination and promotion activities run in Y1 and describes a number of key activities that the project's partners are focusing on, and will follow up in the next year, in order to guarantee broad visibility of the project's work and results in the FED4FIRE domain and beyond so as to engage target stakeholders and produce relevant and durable impact.

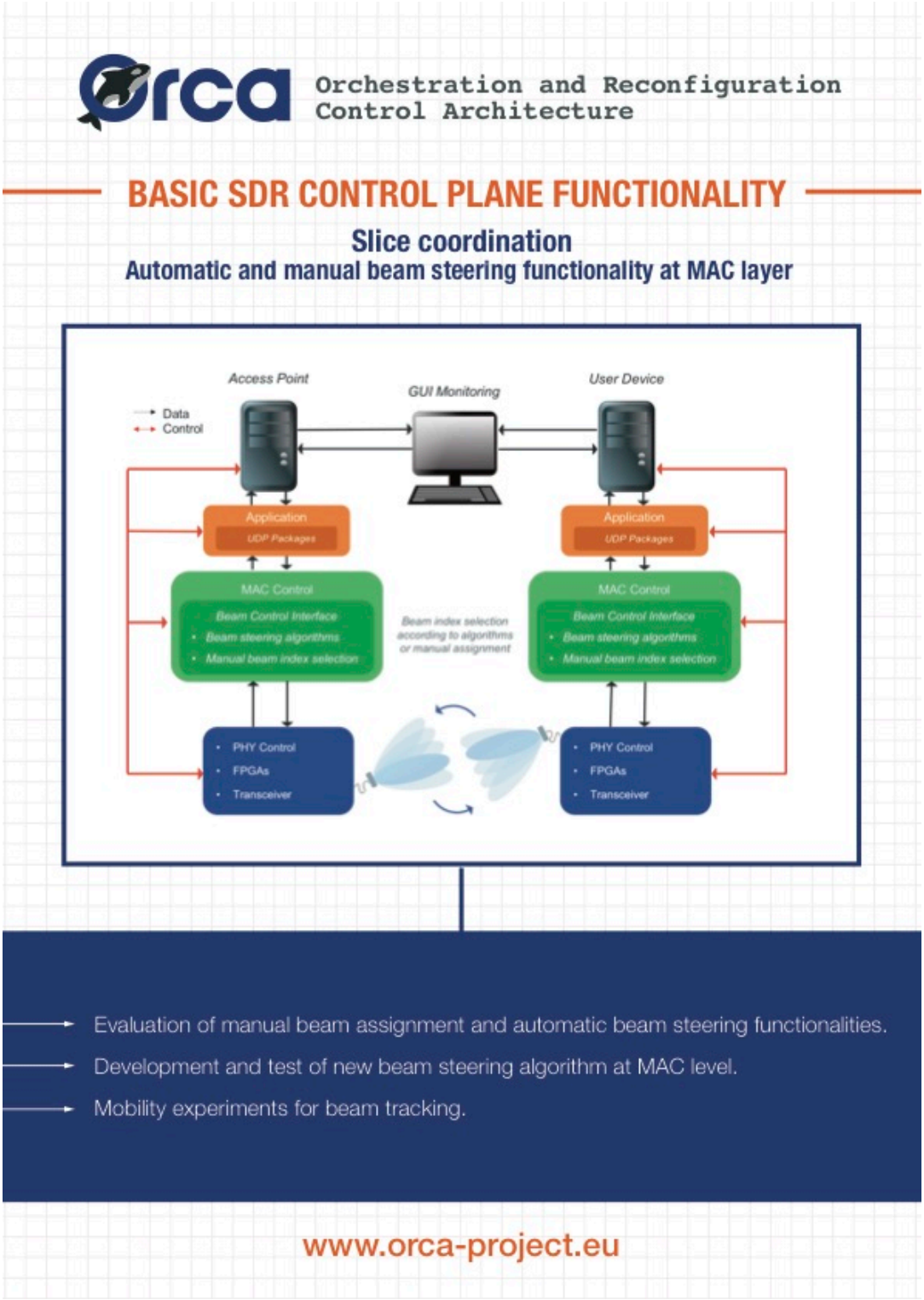
In Y1, the ORCA partners have been active in several ways and pursued various promotional activities, including:

- Presentation of the ORCA project at several conferences and workshops.
- Launch of the 1st Open Call for Extension
- Online promotion of the project through the website and social media channels.
- Contribution to the FED4FIRE+, NGI and 5G community in the form of information about upcoming events, organised workshops/sessions and available material.
- Diffusion of ORCA and overall FED4FIRE+ and 5G related news via the project's communication channels, as well as the various partners' individual social communication means.
- Creation of a slide-based presentation of ORCA, as well as an introductory project's flyer and poster that will be released at project month 4.

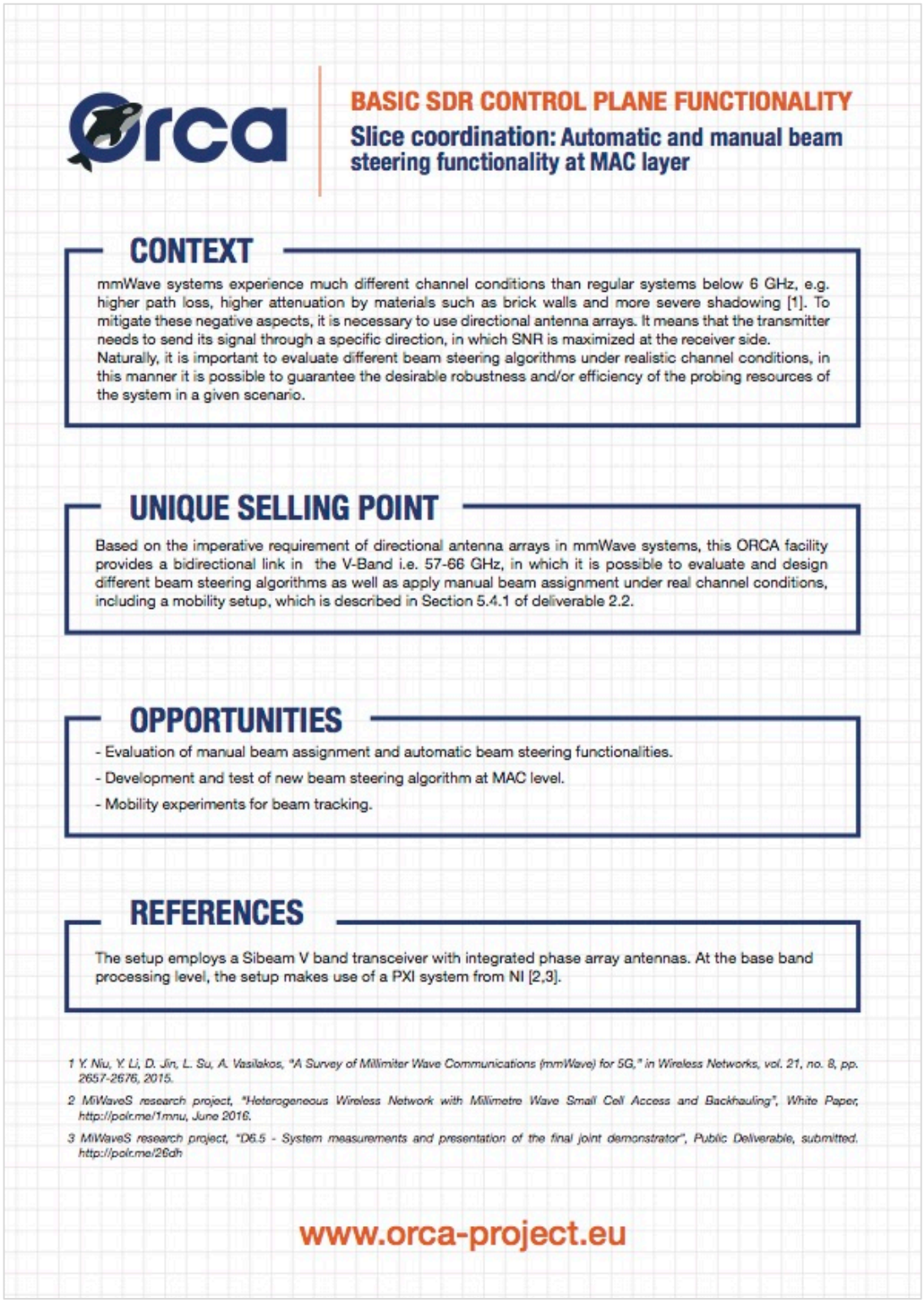
The work of WP8 will continue to be intensive in the upcoming months as several efforts are planned in order to support the broad and effective promotion of various ORCA driven activities including the ORCA 2nd Engagement workshop planned to take place in M15 and the launch of the next wave of Open Call for Extensions in M15 and subsequently in M18.

APPENDIX A

Showcase Flyer - Front



Showcase Flyer – Back



BASIC SDR CONTROL PLANE FUNCTIONALITY

Slice coordination: Automatic and manual beam steering functionality at MAC layer

CONTEXT

mmWave systems experience much different channel conditions than regular systems below 6 GHz, e.g. higher path loss, higher attenuation by materials such as brick walls and more severe shadowing [1]. To mitigate these negative aspects, it is necessary to use directional antenna arrays. It means that the transmitter needs to send its signal through a specific direction, in which SNR is maximized at the receiver side. Naturally, it is important to evaluate different beam steering algorithms under realistic channel conditions, in this manner it is possible to guarantee the desirable robustness and/or efficiency of the probing resources of the system in a given scenario.

UNIQUE SELLING POINT

Based on the imperative requirement of directional antenna arrays in mmWave systems, this ORCA facility provides a bidirectional link in the V-Band i.e. 57-66 GHz, in which it is possible to evaluate and design different beam steering algorithms as well as apply manual beam assignment under real channel conditions, including a mobility setup, which is described in Section 5.4.1 of deliverable 2.2.

OPPORTUNITIES

- Evaluation of manual beam assignment and automatic beam steering functionalities.
- Development and test of new beam steering algorithm at MAC level.
- Mobility experiments for beam tracking.

REFERENCES

The setup employs a Sibeam V band transceiver with integrated phase array antennas. At the base band processing level, the setup makes use of a PXI system from NI [2,3].

1 Y. Niu, Y. Li, D. Jin, L. Su, A. Vasilakos, "A Survey of Millimiter Wave Communications (mmWave) for 5G," in Wireless Networks, vol. 21, no. 8, pp. 2657-2676, 2015.

2 MiWaveS research project, "Heterogeneous Wireless Network with Millimetre Wave Small Cell Access and Backhauling", White Paper, http://poir.me/1mnu, June 2016.

3 MiWaveS research project, "D6.5 - System measurements and presentation of the final joint demonstrator", Public Deliverable, submitted. http://poir.me/26ah

www.orca-project.eu