European Commission
Information Society and Media

SEVENTH FRAMEWORK PROGRAMME

Network of Excellence

NEWCOM#

Network of Excellence in Wireless Communications#

FP7 Contract Number: 318306

WP3.2 – Education and Training

D32.2
Report on Education and Training Activities during Year 2

Contractual Delivery Date:	October 31, 2014
Actual Delivery Date:	November 21, 2014
Responsible Beneficiary:	VUT
Contributing Beneficiaries:	VUT, CNIT, CNRS, CTTC, PUT
Estimated Person Months:	7
Dissemination Level:	Public
Nature:	Report
Version:	1.0

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Document Information

Document ID:	D32.2
Version Date:	November 19, 2014
Total Number of Pages:	3
Abstract:	This deliverable describes the education and training activities by NEWCOM# researchers within WP3.2 during the second project year. During this time, 3 Seasonal Schools, 1 EuWIn training session, and 1 Emerging Topic Workshop have been organized. The deliverable provides summaries of these events.
Keywords:	summer school, winter school, emerging topic workshop, training session, EuWIn

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Version history

Issue	Date of Issue	Comments
o.1	Oct. 31, 2014	First version compiled by Overall Editor

Executive Summary

There are three main types of education and training activities in WP3.2 of NEWCOM#:

- Seasonal Schools teach new concepts and theories in the form of lectures
- Training Sessions of the European Lab on Wireless Communications for the Future Internet (EuWIn) provide hands-on coaching on real hardware platforms
- Emerging Topics Workshops stimulate an exchange of scientific ideas on recent hot areas in the field

During the second year of NEWCOM#, three Seasonal Schools, one Training Session, and one Emerging Topic Workshop have been organized by NEWCOM# researchers, with administrative support from the European Association of Communications and Networking (EurACoN). The details of these events are as follows:

- Winter School; CTTC, Castelldefels (Spain); Nov. 25-28, 2013; 64 attendees
- Spring School; University of Pisa (Italy); March 18–20, 2014; 73 attendees
- Spring School; Supèlec, Rennes (France); May 21-23; 50 attendees
- Training Sessions; CTTC, Castelldefels (Spain); Nov. 27, 2013, 64 attendees
- Emerging Topics Workshop; Vienna Univ. Technology (Austria); Oct. 27-28, 2014; 39 attendees

All events featured innovative technical programs whose quality was rated very high by the attendees. All WP3.2 milestones during year 2 have been achieved. In fact, there was one more school organized in comparison with the number specified in the Description of Work.

Table of Contents

List of Acronyms

B4G ..... Beyond Fourth Generation
ETW .....Emerging Topics Workshop
EurACoN .....European Association of Communications and Networking
EuWIn ..... European Lab of Wireless Communications for the Future Internet
D2D ..... Device-to-Device
FBMC ..... Filterbank Multicarrier
GNSS ..... Global Navigation Satellite System
HetNet ..... Heterogeneous Network
IoT .....Internet of Things
LTE ..... Long-Term Evolution
MAC .....Medium Access Control
MIMO ..... Multiple Input Multiple Output
mmW .....Millimetre Wave
OFDM ..... Orthogonal Frequency Division Multiplexing
PHY .....Physical Layer
SDR ..... Software-defined Radio

1. Introduction

Education and training are key integration activities within NEWCOM#. These activities are subsumed in WP3.2 (lead by Gerald Matz of VUT) and are considered as fundamentals for achieving excellence in research. There are three types of events organized within this WP, each corresponding to a task:

Task 3.2.1 Seasonal schools; lead by Roberto Verdone (CNIT)

Task 3.2.2 EuWIn training sessions; lead by Sylvain Azarian (Supelec)

Task 3.2.3 Emerging topics workshops (ETW); lead by Miquel Payaró (CTTC)

The *European Lab of Wireless Communications for the Future Internet* (EuWIn, the experimental branch of NEWCOM#) and the *European Association for Communications and Networking* (EurACoN, http://www.euracon.org/) play key roles in these activities. Specifically, EuWIn provides the infrastructure, facilities, and equipment for the hands-on training sessions and EurACoN acts as the administrative backbone of the seasonal schools and ETWs. Specifically, EurACoN has been providing extraordinary administrative support, taking care of booking the catering, accommodation, and restaurants; preparing hand-outs, CDs, and badges; advertising the school via posters, leaflets, and a webpage; and issuing invoices and attendance certificates.

The seasonal schools typically last for several days and consist of short-courses and tutorials on advanced topics in wireless communications. These courses are given by leading international experts from within and outside NEWCOM#. In addition, there may be discussion sessions that give PhD students the opportunity to exchange ideas with their peers and with senior experts.

ETW are held in order to foster the exchange of ideas regarding new trends in wireless communications research and to provide a platform for PhD students to identify suitable thesis topics. The ETWs are also an ideal meeting point for interaction with the industry.
Practical training sessions at the EuWIn facilities allow the participating PhD students to gain hands-on experience regarding various wireless hardware platforms. Like seasonal schools, training stages are open to NEWCOM# beneficiaries and to associate partners.

In this deliverable, we report the education and training activities in the second year of NEWCOM#. Section 2 provides information about the three seasonal schools during M13-M24. Section 3 discusses the EuWIn training session. Section 4 gives details about the second ETW. A summary is provided in Section 5.

2. Seasonal Schools

Seasonal schools are dedicated to fundamental topics of specific relevance to the joint research pursued in Track 1 and typically last for several days. The seasonal schools consist of lectures on basic and state-of-the-art methods, taught by experts from within and outside NEWCOM#. PhD students can thus benefit from the integrated expertise of the NEWCOM# consortium that adds to the guidance provided by the direct PhD supervisor. The courses are sometimes complemented with student discussion (or poster) sessions that are organized to foster the exchange of scientific ideas and improve the networking of PhD students.

2.1 Third Seasonal School in Castelldefels (Barcelona)

2.1.1 Key Facts

School Title: Beyond 4G Networks: From Theory to Experimentation and Back
Chairs: Davide Dardari (CNIT), Claude Oestges (UCL), Miquel Payaro (CTTC), and Roberto Verdone (CNIT)
Venue: CTTC, Castelldefels (Spain)
Date: Nov. 25-28, 2013
URL: http://www.euracon.org/b4gc2013

2.1.2 Keynote Speakers

Werner Mohr (NSN)
“Research Challenges for B4G Mobile and Wireless Communications Systems”

Fabio Dovis (CNIT/PoliTo):
“Localisation by Satellite Systems”

Chiara Buratti (CNIT/UniBo)
“On the Impact of Medium Access Control Protocols on Multi-Hop Networks”

Reiner Thomä (Ilmenau University)
“Experimental Propagation Studies Using Wideband Real-Time MIMO Channel Sounding”

Claude Oestges (UCL)
“Reference and Standardized Channel Models”

Florian Kaltenberger (Eurecom)
“Physical Layer Abstraction for LTE”

Ronald Raulefs (DLR)
“Network Based Localisation”

Roberto Verdone (CNIT/UniBo)
“B4G Networks and the Smart 2020 City”

Roughly half of the speakers were from non-NEWCOM# institutions, with two coming from industry. Thus, there was a substantial know-how transfer from outside to NEWCOM# researchers. The details of the programme are shown in **Errore. L'origine riferimento non è stata trovata.**.

2.1.3 School Summary

The NEWCOM# Winter School on *Beyond 4G Networks in Cities: From Theory to Experimentation and Back* was organized in conjunction with a EuWin Training Session (see Section 2.2) together with the COST IC1004 Action (www.ic1004.org). The school had 64 attendees (including the 14 speakers) from 11 different countries. Out of the 64 attendees, 37 were from NEWCOM# institutions and 27 from non-NEWCOM# ones. This evidences that this school raised a very high interest beyond the NEWCOM# community too.

The aim of the school was to train young researchers working in the area of B4G radio networks, with emphasis on:

Monday, November 25

13h00	Registration and Welcome		
13h30	Werner Mohr, NSN		T1: Research Challenges for B4G Mobile and Wireless Communications Systems
15h30		BREAK	
16h00	Fabio Dovis, PoliTO		T2: Localisation by Satellite Systems
17h30		END OF DAY	

Tuesday, November 26

9h00	Chiara Buratti, UniBO		T3: On the Impact of Medium Access Control Protocols on Multi-Hop Networks
10h30		BREAK	
11h00	Reiner Thomae, Ilmenau		T4: Experimental Propagation Studies Using Wideband Real-Time MIMO Channel Sounding – Part I
12h30		LUNCH	
14h00	Reiner Thomae, Ilmenau		T4: Experimental Propagation Studies Using Wideband Real-Time MIMO Channel Sounding – Part II
15h30		BREAK	
16h00	Nicola Baldo, CTTC	select	T1 Seminar: "Simulation of LTE Systems in ns-3"
16h00	Carles Fernandez, CTTC	or	T2: GNSS-SDR, an Open Source GNSS Software Defined Receiver
16h00	Chiara Buratti, UniBO	or	T3: FLEXTOP, a Remotely Accessible Platform for Multi-Hop Protocols
16h00	Christian Schneider, Ilmenau	or	T4: Preparation to the Lab session on Channel Sounder Data
17h30		END OF DAY	

Wednesday, November 27

9h00	Nikolaos Bartzoudis, CTTC	select	T1 Seminar: "Prototyping the Physical Layer of Modern Wireless Communication Systems: Development Flows, Challenges and Pitfalls"
9h00	Javier Arribas, CTTC	or	T2: Lab experimental activities
9h00	Chiara Buratti, UniBO	or	T3: Lab experimental activities
9h00	Christian Schneider, Ilmenau	or	T4: Lab experimental activities
10h30		BREAK	
11h00	Jesus Alonso-Zarate, CTTC	select	T1 Seminar: "Machine-to-Machine Technologies and Smart Cities"
11h00	Carles Fernandez, CTTC	or	T2: Lab experimental activities
11h00	Chiara Buratti, UniBO	or	T3: Lab experimental activities
11h00	Christian Schneider, Ilmenau	or	T4: Lab experimental activities
12h30		LUNCH	
14h00	Carles Fernandez, CTTC	select	T2: Discussion of Lab experimental outcomes
14h00	Chiara Buratti, UniBO	or	T3: Discussion of Lab experimental outcomes
14h00	Christian Schneider, Ilmenau	or	T4: Discussion of Lab experimental outcomes
15h30		BREAK	
16h00	Claude Oestges, UCL		T4: Reference and Standardized Channel Models
17h30		END OF DAY	

Thursday, November 28

9h00	Florian Kaltenberger, Eurecom		T4: Physical Layer Abstraction for LTE
10h30		BREAK	
11h00	Ronald Raulefs, DLR		T2: Network Based Localisation
12h30		LUNCH	
14h00	Roberto Verdone, UniBO		T3: B4G Networks and the Smart 2020 City
15h30		END OF SCHOOL	

Figure 2-1: Program of the Third NEWCOM# Seasonal School and EuWIn Training Session at the CTTC premises in Castelldefels (Spain).

- the role of experimentation as means to characterize the radio environment and test system performance in real contexts.
- the interplay between theory and experimentation, fundamental to an accurate and efficient system design.
- the relevance of a multi---disciplinary approach to research, requiring knowledge of channel, link and network aspects.

Fort hat purpose, the school was structured into four tracks:

Track 1: B4G networks and the 2020 city: technology bricks, requirements, applications, network scenarios, research challenges;

Track 2: Hybrid localization: from satellite to heterogeneous localization techniques for B4G networks;

Track 3: Multi-hop networks: MAC and routing aspects for the IoT component of B4G networks in the 2020 city;

Track 4: Radio channel characterization: estimation and modelling in urban environments, with the purpose of PHY assessment.

Figure 2-2: During the Keynote Talk of the Third NEWCOM# Seasonal School.

The event featured a keynote speech by Werner Mohr, Head of Research Alliances at Nokia (NSN), entitled “Research Challenges for B4G Mobile and Wireless Communications.“ The main conclusion of that talk was that future communication networks require a holistic approach in research, standardization, regulations and system development, which will be supported by the European Horizon 2020 Framework Program, particularly in the 5G Public Private Partnership on communication network infrastructure. The other, more technical, lectures touched upon topics as diverse as satellite- and network-based localisation, MAC protocols, radio channel sounding and modelling, and smart city aspects of beyond 4G.

A questionnaire was circulated among the attendees and 29 persons provided written feedback (see details in Table I below). Specifically, more than 2/3 of the respondents rated the overall quality of the school Excellent or Very good.

Table 1: Survey results.

Rating	Number of people
Excellent	10
Very good	10
Good	8
Average	1
Bad	0
Very bad	0

2.2 Fourth Seasonal School in Pisa

2.2.1 Key Facts

Title: Advanced Signal Processing Techniques for Heterogeneous Networks
Chairs: Filippo Giannetti, Giacomo Bacci, and Luca Sanguinetti (Univ. Pisa)
Venue: Pisa, Italy
Date: March 18–20, 2014
URL: http://www.euracon.org/asphen2014

2.2.2 Keynote Speakers

Emil Björnson (KTH, Sweden)
Signal processing for optimal radio resource management: fundamentals and recent multi-cell advances

Romain Couillet (Supélec, France)
Introduction to random matrix methods for wireless applications

Petros Elia (Eurecom, France)
Anyhow, anytime feedback in classical multiuser channels

Marco Luise (Univ. Pisa, Italy)
Game theory for wireless communications and sensor networks

Marios Kountouris (Supélec, France)
Analysis and design of heterogeneous cellular networks

Erik Larsson (Linköping Univ. Sweden)
Fundamentals of Massive MIMO

Tuesday March 18, 2014

8.00-9.00:	***Registration & Welcome***
9.00-12.30:	***Game theory for wireless communications and sensor networks, Marco Luise (University of Pisa, Italy)***
14.00-17.30:	***Analysis and design of heterogeneous cellular networks using stochastic geometry, Marios Kountouris (Supélec, France)***

Wednesday March 19, 2014

9.00-12.30:	***Fundamentals of massive MIMO, Erik G. Larsson (Linköping University, Sweden)***
14.00-17.30:	***Introduction to random matrix methods for wireless applications, Romain Couillet (Supélec, France)***

Thursday March 20, 2014

9.00-12.30:	***Signal processing for optimal radio resource management: Fundamentals and recent multi-cell advances, Emil Björnson (Royal Institute of Technology, Sweden)***
14.00-17.30:	***Anyhow, anytime feedback in classical multiuser channels, Petros Elia (Eurecom, France)***

Figure 2-3: Program of the Fourth NEWCOM# Seasonal School in Pisa.

2.2.3 School Summary

The school was motivated by the fact that cellular system deployment has reached practical limits in many dense urban area while the demand for data traffic is steadily increasing. This leaves cellular operators with few options to enhance the area spectral efficiency. Unfortunately, radio link improvements, including coding, cognitive transmission, and multiple antennas, are reaching their theoretical limits.

Consequently, network operators are revisiting conventional cellular system topologies and are considering heterogeneous networks consisting of an irregular deployment of self-learning and intelligent decision-making base stations with different coverage and low transmit powers. This major transition renders the cellular architecture increasingly complex, and rises many issues. Actually, the models and analytical tools, which were developed for the analysis of carefully planned cellular networks, fail to provide a sufficient insight for such increasingly dense heterogeneous networks with all of the above degrees of freedom.

Hence, the objective of the proposed NEWCOM# School was to give PhD students, researchers, and engineers the opportunity to learn from leading experts the most advanced signal processing techniques and mathematical tools for understanding dense hetero-geneous networks and finding the algorithmic solutions to approach their limits. Some impressions from the school are shown in Figures 2-5.

The school gathered 73 participants plus 6 lecturers from 12 different countries. Specifically, 24 of them were internal (i.e., from NEWCOM# partners), and 55 external. Again, this school attracted significant interest beyond project partners.

A survey was conducted to find out how the participants perceived the quality of the event. Some of the results of the survey are shown in Figure 2-4; in general the survey revealed that the majority of participants rated the school as very good to excellent.

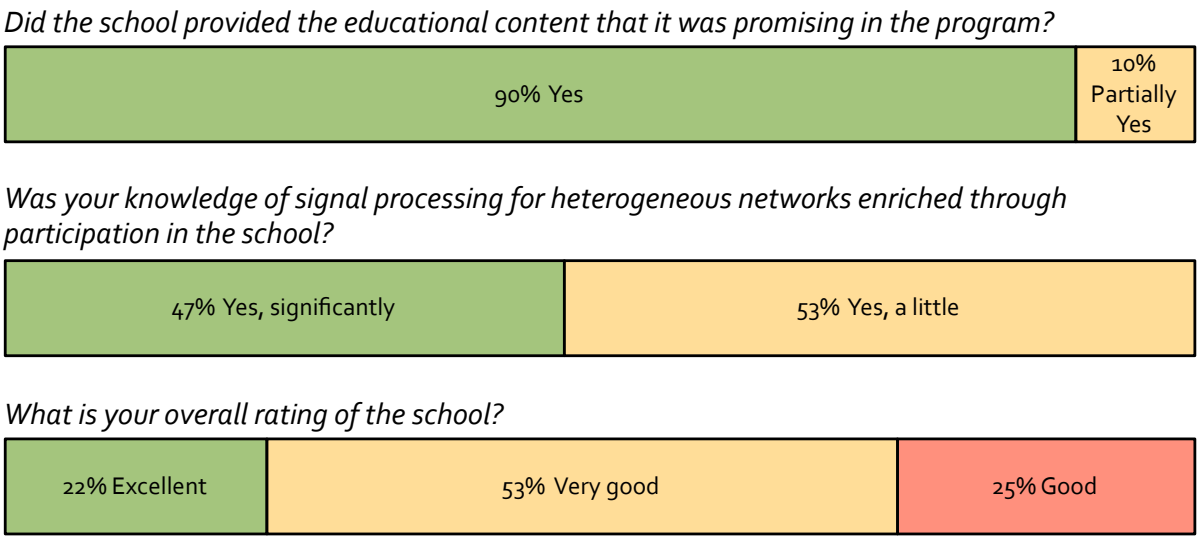

Figure 2-4: Survey results for the Fourth NEWCOM# Seasonal School.

Figure 2-5: Impressions of the Fourth NEWCOM# Seasonal School.

2.3 Fifth Seasonal School in Rennes

2.3.1 Key Facts

Title: Flexible Multi-carrier Waveforms for Future Communications Wireless Networks
Advanced Signal Processing Techniques for Heterogeneous Networks
Chairs: Carlos Faouzi Bader (Supélec) and Adrian Kliks (PUT)
Venue: Rennes, France
Date: May 21–23, 2014

2.3.2 Speakers

The schedule for the two tutorials and seven lectures is shown in Figure 2-6.

Faouzi Bader (Supélec) and Adrian Kliks (PUT)
New modulation formats for future wireless systems

Jerome Louveaux (UCL)
Single and multi-antenna receivers for FBMC transmission

Gerhard Wunder (Fraunhofer Heinrich-Hertz-Institut, Germany)
5G New air interface based on non-orthogonal waveforms

Pierre Siohan (Orange-Labs, France)
An overview of multicarrier modulations: from OFDM to its many variants

Markku Renfors (Tampere University of Technology, Finland)
Fast-convolution based flexible multimode communication waveform processing

Maurice Bellanger (CNAM, France)
Filter bank techniques in communications: deployment issues and perspectives

Xavier Mastre (CTTC, Spain)
Effect of channel frequency selectivity on filterbank multicarrier modulations

Nikolaos Bartzoudis (CTTC, Spain)
Flexible multicarrier waveforms: implementation issues and baseband technologies

Hao Lin, Marc Lanoiselée, and Pierre Siohan (Orange, France)
The Orange labs real-time FBMC/OQAM hardware testbed

2.3.3 School Summary

The goal of the NEWCOM# Spring School on *Flexible Multicarrier Waveforms for Future Communications Wireless Networks* was to discuss and investigate recent achievements in the very important and vivid research area devoted for future multicarrier systems. Currently, OFDM plays the role of the leader in practical realizations of multicarrier signaling. However, it suffers from various limitations, raised by the researchers and manufacturers for many years. Filterbank multicarrier based solutions tend to become the successor of OFDM in the context of future wireless and even wired communications systems. During the three days event all participants were familiarized with new multicarrier modulation formats, covering not only theoretical analysis but also hardware implementation issues. The school had 50 attendees in total (out of them, 42 from non-NEWCOM# institutions), coming from 12 different countries. Pictures from the event are shown in Figure 2-7.

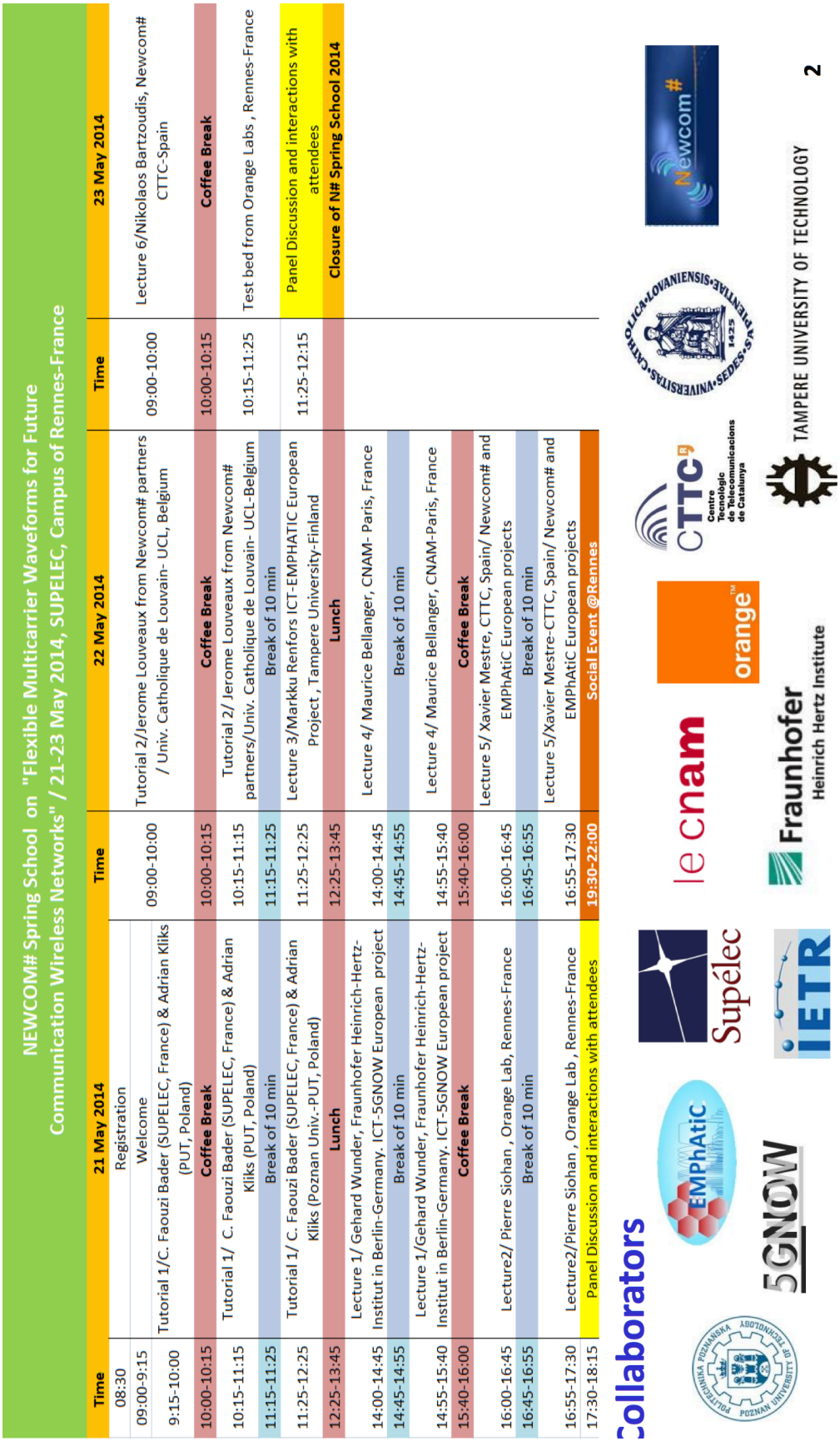

Figure 2-6: Program of the Fifth NEWCOM# Seasonal School.

Figure 2-7: Impressions from the Fifth Seasonal School in Rennes.

2.4 Outlook: Sixth Seasonal School in Turin

From Nov. 19-21, 2014, the sixth NEWCOM# School, dedicated to “Mathematical Foundations of Future WIreless Networks“ will be held at Politecnico de Torino in Turin (Italy). The school will focus on recent results in random matrix theory, free probability, and combinatorics, with applications in cognitive/cooperative networking, multiple-antenna systems design, signal processing in wireless networks, and multi-cell relay-aided networking.

3. EuWIn Training Session

In addition to the seasonal schools, lab training sessions on actual experimental hardware platforms are held at the facilities of EuWIn in order to transfer experimental and implementation know-how. The idea is to allow PhD students to gain hands-on experience on the various measurement and testbed platforms and thereby establish close ties between Tracks 1 and 2 of NEWCOM# with the goal of cross-fertilization between these two tracks. The training sessions capitalize on previous experience and know-how of the main players in teaching hardware and software implementation skills for various wireless communication platforms.

3.1 Second Training Session at CTTC, Castelldefels

The lab training session at the premises of CTTC in Castelldefels (Spain) was organized in conjunction with the Third NEWCOM# Seasonal School on Beyond 4G Networks.

3.1.1 Key Facts

Title: Beyond 4G Networks: From Theory to Experimentation and Back
Chairs: Davide Dardari (CNIT), Claude Oestges (UCL), Miquel Payaro (CTTC), and Roberto Verdone (CNIT)
Venue: CTTC, Castelldefels (Spain)
Date: Nov. 25-28, 2013
URL: http://www.euracon.org/b4gc2013

3.1.2 Trainers and Labs

Nicola Baldo (CTTC)
Simulation of LTE systems in ns-3

Carles Fernandez (CTTC)
GNSS-SDR, an open source GNSS software defined receiver

Chiara Buratti (UniBO)
FLEXTOP, a remotely accessible platform for multi-hop protocols

Christian Schneider (TU Ilmenau)
Lab session on channel sounder data

The detailed schedule and its intertwining with the lectures of the Third Spring School is shown in Figure 2-1.

3.1.3 Training Sessions Summary

The laboratory experimental sessions were based on the EuWIn facilities. EuWIn (European Laboratory of Wireless Communications for the Future Internet) is funded by the EC in the framework of Newcom#. EuWIn is distributed over three locations: the CTTC site is dedicated to radio interfaces and GNSS; the University of Bologna addresses the Internet of Things and Smart City applications; the EURECOM site focuses on flexible radio technologies, and LTE/4G. The CTTC and the UniBO (remotely accessible) facilities were used for Tracks 2 and 3. Track 4 used measurement data made available by the Technical University of Il-

menau. The goal of the event was to provide training for young researchers working in the area of B4G radio networks, with emphasis on i) the role of experimentation as a means to characterize the radio environment and test system performance in real contexts; ii) the interplay between theory and experimentation, fundamental to an accurate and efficient system design; and iii) the relevance of a multi-disciplinary approach to research, integrating knowledge of channel, link, and network aspects. Snapshots from the training sessions are shown in Figures 3-1 and 3-2.

Figure 3-1: Lab session on GNSS positioning systems.

Figure 3-2: Lab session on channel measurement and modelling.

4. Emerging Topics Workshop

NEWCOM# organizes once per year a workshop dedicated to emerging topics in wireless communications which possibly also touch on other disciplines (mathematics, physics, life sciences, etc.). In contrast to seasonal schools, the focus of Emerging Topic Workshops (ETWs) is on recent developments and open problems that are specifically suited as potential topics for PhD theses. These events are a meeting point for interaction with the industry with the specific aim of harmonizing the interests of young NEWCOM# researchers and the practical needs of the European industry in wireless (and neighbouring) businesses. The structure of ETWs is a combination of expert talks and, occasionally student presentations (although, in this year's ETW, expert talks where prioritized). Invited speakers, who typically are internationally recognized top experts from within and outside NEWCOM#, give expert talks. The student presentations are supposed to further stimulate the discussion and help with the identification of PhD thesis topics. Like with Seasonal Schools, the administrative aspects of ETWs are taken care of by EurACoN. The second NEWCOM# Emerging Topic Workshop took place only shortly before the writing of this deliverable.

4.1 Second ETW in Vienna

4.1.1 Key Facts

Title: D2D and mmW – New Paradigms for 5G
Chairs: Gerald Matz, Christoph Mecklenbräuker, and Markus Rupp (VUT)
Venue: Vienna University of Technology, Vienna
Date: Oct. 27-28, 2014

4.1.2 Keynote Speakers

Erik Dahlman (Ericsson Research)
5G radio access - targets and key technologies

Wilhelm Keusgen (Fraunhofer-Institut für Nachrichtentechnik, Heinrich-Hertz-Institut)
Channel Measurement and Modeling for Millimeter-Wave Mobile Communication

Angel Lozano (Universitat Pompeu Fabra, Barcelona)
System-level Analysis of D2D communication

Maziar Nekovee (Samsung UK)
Technologies for unlocking new spectrum for 5G above 6 GHz

Fernando Sanchez Moya (Nokia Solutions and Networks)
D2D mode selection and resource allocation for dense 5G deployments

Olav Tirkkonen (Aalto University)
Cooperative D2D communities

Aggelos Antonopoulos & Christos Verikoukis (CTTC)
Green Cell Offloading: Challenges and Solutions

Jörg Widmer (IMDEA Networks)
Design Considerations for Extremely High Frequency Wireless Networks

4.1.3 Workshop Motivation and Summary

Device-to-device (D2D) and millimeter wave (mmW) communications are two promising paradigms for 5G networks. The proximity of users in D2D promises huge data rates, low latency, and reduced power consumption. Furthermore, the reuse factor can be reduced below 1. D2D also has the potential for improved coverage and enables new services. The huge amount of unused spectrum in the mmW band (3–300GHz) may provide the bandwidth required for future mobile broadband applications. Moreover, mmW communications is attractive for mobile systems due to the small size of components, e.g., antennas.
This workshop brought together researchers from academia and industry to exchange and discuss recent results related to D2D and mmW communications and to identify challenges that need to be addressed for a successful adoption of D2D and mmW in 5G systems. The workshop lasted for two days and consisted of a mix of invited talks by renowned top experts in the field and of presentations contributed from an open call among the NEWCOM# partners. There were 39 attendees in this event, coming from 10 different nations. Out of them, 14 were external to NEWCOM#. A survey was still on-going while this deliverable was prepared.

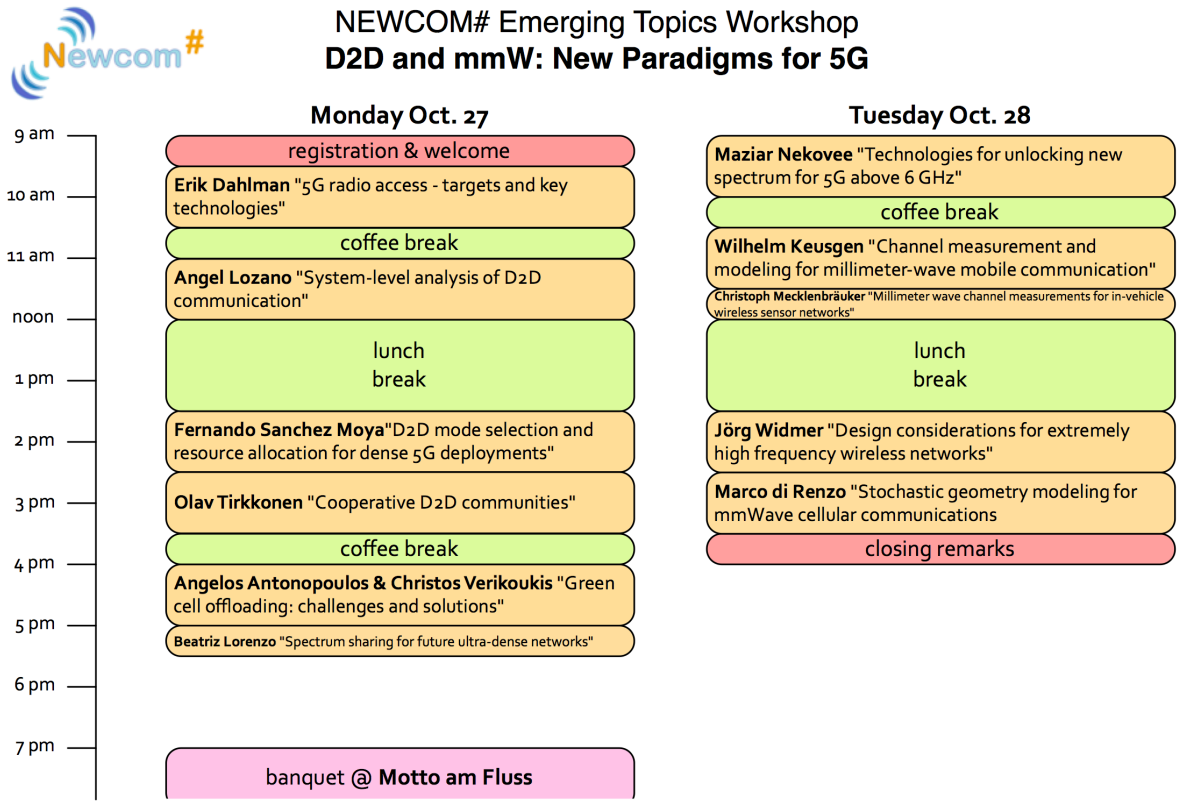

Figure 4-1: Program of the Second NEWCOM# Emerging Topics Workshop.

5. Conclusions

During the second year of NEWCOM#, there has been continued commitment and participation in several education and training activities. In fact, there were actually three Seasonal Schools being organized (rather than the two committed in the Grant Agreement). Specifically, the following events have been organized in the period M13-M24:

- Winter School on “Beyond 4G Networks: From Theory to Experimentation and Back”; Venue: CTTC (Spain); Date: Nov. 25-28, 2013; Attendees: 64
- Spring School on “Advanced Signal Processing Techniques for Heterogeneous Networks”; Venue: Univ. Pisa (Italy); Date: March 18–20, 2014; Attendees: 73
- Spring School on “Flexible Multi-carrier Waveforms for Future Communications Wireless Networks”; Venue: Supélec (France); Date: May 21-23, 2014; Attendees: 50
- Lab Training Session at EuWIn@CTTC
  Venue: CTTC (Spain); Date: Nov. 25-28, 2013; Attendees: 64
- Emerging Topics Workshop on “D2D and mmW – New Paradigms for 5G”
  Venue: Vienna Univ. Technology (Austria); Date: Oct. 27-28, 2014; Attendees: 39

All events were highly successful in terms of quality of the technical program and number of attendees. The feedback received from the participants was throughout positive. All events served as a means to involve relevant industry, specifically by inviting speakers from leading Telecom companies (e.g., Ericsson, Nokia, Samsung, Orange) to give Keynote Talks.

Like in year 1, the European Association of Communications and Networking (EURACON) took much of the administrative burden of organizing such events from the shoulders of the researchers. This is also true for the next event, which is a Winter School on “Mathematical Foundations of Future WIreless Networks” at Politecnico di Torino, Italy.

Comments and suggestions for the improvement of this document are most welcome and should be sent to:

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