2012 Wireless Innovation Forum European Conference on Communications Technologies and Software Defined Radio (SDR'12 – WInnComm – Europe)

27 - 29 June • Brussels, Belgium

Conference Report

SDR'12-WInnComm-Europe, the premier event to present and see the latest in Cognitive Radio (CR) and Dynamic Spectrum Access technologies, as well as CR and Software Defined Radio programs and requirements, featured

- daily Keynote presentations from recognized leaders in advanced wireless communications,
- three days of technical presentations
- GNU, CREW and Labview tutorials
- panel presentations and discussions from ACROPOLIS and on TV White Space, and
- product exhibition featuring the latest SDR and reconfigurable radio products and technologies

Keynotes by:

Robert Horvitz
Director, Open Spectrum Foundation, Amsterdam
Europe's New Opening for Cognitive Radio: ASA/LSA

Claus Vesterholt
Program Manager, Satellite Communication activities, GateHouse A/S, Denmark

Thomas Kaiser
Chairman of the Board, mimoOn GmbH, Duisburg, Germany

Harald Welte
Consultant and co-founder, sysmocom, Berlin, Germany

Gustavo Nader
Head of Business Development & Strategy in the Americas, Inmarsat

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Presented by:

Established in 1996, the Wireless Innovation Forum (SDR Forum v. 2.0) is a non-profit international industry association dedicated to promoting the success of next generation radio technologies. The Forum's 114-strong membership comprises world class technical, business and government leaders from EMEA, Asia and the Americas. The Forum is the only organization in the world dedicated to serving the industry's needs through advocacy, opportunity development, commercialization and education. For more information, please visit www.wirelessinnovation.org.

From the Chair

Kuan Collins, General Program Chair
SAIC

I want to thank everyone who supported SDR'12-WInnComm Europe. The Track Chairs, Paul Sutton, Linda Davis, David Renadeau, and Gerd Ascheid did a great job providing a breadth of presentations and seminars on a wide range of subjects. Continuing last year's successful format, the Track Chairs organized the conference into Technical Papers and Workshops. In addition to the hard work of the Forum staff, 36 people contributed on the Technical Program Committee to bring this conference successfully together.

The Technical Papers are at the center of the conference. This year 42 papers were presented. They were split into a Software Defined Radio (SDR) Track, a Cognitive Radio (CR) Track, and a Programs Track. This year's paper topics included Software Defined Radio implementations and architectures, Communications Signal Processing, Physical Layer Techniques, Chip Implementations, GPUs, FPGAs, Processors, RF technologies, Security, Software systems, SCA, Spectrum sharing and Cognitive Radio.

Following the successful initiative started by the SDR '10 team, led by Dr. Fredrick Jondral of Karlsruhe Institute of Technology and Dr. Jarmo Takala of Tampere University and continued by Dr. Gerd Ascheid of RWTH Aachen University, the European conference continues to provides a venue for the exemplar papers to be published in the Springer Journal of Analog Integrated Circuits and Signal Processing. As we've seen continuously at our conferences, the quality of papers submitted this year was outstanding. I am also pleased to announce that Journal publications will carry forward to the 2013 Conference.

This year several sessions/workshops were organized covering Acropolis Program, Spectrum Sensing, SCA Implementations, SDR Implementations, Tactical Radio Programs and Technologies, Shared Spectrum Access, SDR Architectures and Compnents, SDR Standards and Verification, and SDR and CR Programs. Session and workshops provide an opportunity for participants to spend a day exploring topical issues in-depth. Some are business oriented, others are technical in nature. Some include a blend of both and are attended by both researchers, government employees and industry practitioners. Three tutorials were also offered on LabView/USRP, CREW Spectrum Sensing and GNU Radio Blocks.

Continuing our rich tradition of outstanding keynote speakers, this year we welcomed top executives from industry and government. Our keynotes included Robert Horvitz from Open Spectrum Foundation, Gustavo Nader from Inmarsat, Claus Vesterholt from Gatehouse, Thomas Kaiser from mimoOn and Harald Welte from sysmocom.

Our exhibitors demonstrated the latest product offerings across a vast range of the SDR value chain. New product announcements and demonstrations of the latest SDR products were on display.

I am pleased to announce that SDR'13-WinnComm will be held in Aachen, Germany, 11-13 June 2013. Along with the existing high quality offerings, we'll be continuing with the Programs Track since it was very well received. David Renadeau of Thales has agreed to continue to chair the Tactical Radio Workshop and has already confirmed some exceptional speakers for this workshop. We still need some volunteers for the SDR, CR and Programs Track Chairs. In addition I'm honored to announce that Gerd Ascheid of RWTH Aachen University will be the Vice Program chair and Paper Review chair.

Finally, all of this would not be possible without our sponsors. Without their support, for which I am personally grateful, we would not be able to provide such nice facilities and of course all the refreshments. Please thank and support them!

The general comments and attendance at this year's conference have me very excited for the 2013 conference. I look forward to your participation and thank you for your past support.

Regards,
Kuan Collins

Thank you to our Technical Program Committee

Kuan Collins, *SAIC* (Program Chair)
SDR Track Chair: Linda Davis, *Institute for Telecommunications Research*
CR Track Chair: Paul Sutton, *CTVR*
Program Track Chair: David Renaudeau, *Thales*
Guest Editors, Springer Journal: Gerd Aschied, *RWTH Aachen University* and Marc Adrat, *Fraunhofer FKIE*

Committee members:
Anwer Al-Dulaimi, *Brunel University*
Masayuki Ariyoshi, *NEC Corporation*
Claudio Armani, *Selex ELSAG*
Kamran Arshad, *University of Surrey*
Gerd Ascheid, *RWTH Aachen University*
Fabio Casalino, *Selex ELSAG*
Alexander Chemeris, *Fairwaves*
Luca De Nardis, *Sapienza University of Rome*
Simon Delaere, IBBT-SMIT, *Vrije Universiteit Brussel*
Panagiotis Demestichas, *University of Piraeus*
Daniel Devasirvatham, *SAIC*
Maria-Gabriella Di Benedetto, *University of Rome La Sapienza*
Christoph Heller, *EADS*
Jens Elsner, *Karlsruhe Institute of Technology*
Jair Gonzalez, *TELECOM Paristech*
Jalaa Hoblos, *Kent State University*
Joseph Jacob, *Objective Interface Systems*
Ruediger Leschhorn, *Rohde and Schwarz*
Dake Liu, *Linkoping University*
Fa-Long Luo, *Element CXI*
John McAllister, *Queens University*
Natalia Milio, *Institute of Accelerating Systems and Applications (IASA)*
Klaus Moessner, *Mobile VCE*
Eric Nicollet, *Thales*
Dominique Noguet, *CEA-LETI (Minatec)*
Keith Nolan, *CTVR*
Jorge Pereira, *European Commission*
Venkatesh Ramakrishnan, *Intel Mobile Communications GmbH*
David Renaudeau, *Thales*
Michael Street, *NATO C3*
Paul Sutton, *CTVR*
Paul Tindall, *Cognovo Limited*
Tom Vander Aa, *IMEC*
Dariusz Wiecek, *National Institute of Telecommunication*
Daniel Willkomm, *Technische Universitaet Berlin*
Olga Zlydareva, *Eindhoven University of Technology*

Exhibitors

etherstack wireless software

Etherstack is a wireless communications software company, and a leading independent waveform specialist. The company has been developing waveforms for radio manufacturers and defence clients internationally for over ten years - since the outset of commercial Software Defined Radio (SDR) - and pioneered many unique techniques and tools key to successful SDR waveform development. Etherstack's engineers combine waveform design best-practice with a detailed knowledge of communications standards such as APCO P25, TETRA, DMR, MPT1327, UMTS, WiMAX, LTE and military specifications. They also specialise in multi-protocol IP core networks, which can be used with waveforms for completely flexible wide-area, field-deployable communications.

GateHouse specializes in technical software development and system integration for advanced satellite communications and tracking systems. GateHouse is the leading independent provider of complete embedded software for Inmarsat BGAN terminals and a Software Defined Radio competence centre providing a BGAN waveform.

GATEHOUSE

HARRIS

Harris is an international communications and information technology company serving government and commercial markets in more than 150 countries. Headquartered in Melbourne, Florida, the company has approximately $6 billion of annual revenue and more than 16,000 employees -- including nearly 7,000 engineers and scientists. Harris is dedicated to developing best-in-class assured communications® products, systems, and services.

Inmarsat has been at the forefront of mobile satellite services for more than 32 years and is the leading provider of global voice, data and IP communications solutions. We deliver mission-critical communications where terrestrial networks don't go or are ineffective. Inmarsat owns and operates a fleet of 11 satellites providing seamless mobile voice and data communications around the world, enabling users to make phone calls or connect to the internet - whenever and wherever they need - on land, at sea or in the air. We also offer unrivalled expertise in a range of cross-platform mobile and fixed satellite, microwave and wireless technologies.

inmarsat

Innovative Integration provides board-level hardware products that integrate the best analog I/O and reconfigurable FPGAs to provide cost-effective solutions for challenging data acquisition and signal processing applications.

National Instruments transforms the way engineers and scientists around the world design, prototype, and deploy systems for test, control, and embedded design applications. Using NI open graphical programming software and modular hardware, customers at more than 30,000 companies annually simplify development, increase productivity, and dramatically reduce time to market. From testing next-generation gaming systems to creating breakthrough medical devices, NI customers continuously develop innovative technologies that impact millions of people.

Objective Interface Systems, Inc. (OIS) is the global provider of high assurance communications middleware solutions for software defined radios (SDR). The ORBexpress product family is the most widely deployed communication framework for use in complex and demanding environments where failure is not an option. The ORBexpress architecture is used in hundreds of thousands of software defined radios already deployed in the field around the world. ORBexpress is a secure high performance implementation of the real-time CORBA standard. It is the first communications middleware to be evaluated under the Common Criteria, the world's most widely adopted security certification standard. For more information and product evaluations, visit www.ois.com.

PrismTech is an acknowledged leader in Software Defined Radio infrastructure solutions. Our Spectra product suite for SDR/SCA developers includes:

- Spectra CX - a model-driven development tool that greatly simplifies, accelerates, and validates the SCA development process.
- Spectra OE - a high-performance, low-overhead, core framework and middleware implementation that runs on any mix of GPP, DSP, and FPGA processor technologies.

System-on-Chip engineering (SoC-e) offers specialized design services and products based on reconfigurable devices. SoC-e is focused on the following sectors: Sofware-Defined Radio and Rugged FPGA based systems, Industrial Networking and Video Processing. SoC-e products include SoPCs, IP cores, software and electronic boards. Furthermore, SoC-e can develop custom FPGA designs, feasibility studies, training and consultory jobs in its areas of expertise.

SELEX Elsag is a Finmeccanica company specialized in engineering and development of hi-tech systems, products, solutions and services for the following business areas: automation, defense communications, professional communications, Information & Communication Technology, logistics and mobility, safety, avionics systems.

The company counts about 7.500 workers and headquarters in Genoa.

SELEX Elsag is one of Finmeccanica's three strategic poles within the electronics sector for defense, along with SELEX Sistemi Integrati – which works within defense, homeland security and surface radars circles – and SELEX Galileo – avionic and electro-optics competences center. In addition to these, DRS is a US company specialized in defense and security electronics - particularly within C4I – and electro-optics for ground and ISTAR applications, as well as within signal intelligence systems.

Thales is a global technology leader for the Defence & Security and the Aerospace & Transport markets. In 2009, the company generated revenues of €12.9 billion with 68,000 employees in 50 countries. With its 22,500 engineers and researchers, Thales has a unique capability to design, develop and deploy equipment, systems and services that meet the most complex security requirements. Thales has an exceptional international footprint, with operations around the world working with customers as local partners.

Thales is an industry leader in the development and manufacture of battle-proven, software-defined radio equipment and solutions, developing international software radio solutions, working on standards and systems interoperability.

Thales has pioneered SDR technology in US, participating in all JTRS domains and deploying the JTRS-approved handheld radio AN/PRC-148 JEM and introducing the Liberty, a multi-band SDR handheld radio for public safety. Thales contributes to key European SDR Programs, such as ESSOR or the German SVFuA program. Thanks to its cooperation with Rockwell Collins, Thales is in a position to currently offer FlexNet, the first SCA-compliant international SDR platforms with a powerful high data rate ad-hoc networking waveform for Network Centric Operations transition.

Wednesday, 27 June 2012

08:30	Conference Registration		
10:30	**Tutorial 1.1** Labview/USRP	**Tutorial 1.2** CREW Spectrum Sensing	**Tutorial 1.3** GNU Radio Blocks
12:00	Lunch and Registration		
13:30	Introduction & Keynote: Robert Horvitz, Open Spectrum Foundation		
14:10	ACROPOLIS Industry Panel with: Christophe Le Martret, THALES, France T. Russell Hsing, Telcordia Technologies, USA Maziar Nekovee, BT Research, UK James 'Jody' Neel, Cognitive Radio Technologies, USA		
16:00	Break		
16:30	**Session 2.1** Spectrum Sensing	**Session 2.2** SCA Implementations	**Session 2.3** SDR Implementations I
18:00			ACROPOLIS General Assembly

Thursday, 28 June 2012

08:30	**Introduction & Keynotes:** Gustavo Nader, Inmarsat, and Claus Vesterholt,Gatehouse Thomas Kaiser, mimoOn		
10:00	Break		
10:30	**Session 3.3** Tactical Radio Workshop	**Session 3.1** Shared Spectrum Access	**Session 3.2** ACROPOLIS Workshop
12:00	Lunch and Exhibits		
14:30	**Session 4.3** Tactical Radio Workshop	**Session 4.1** SDR Architectures and Components	**Session 4.2** ACROPOLIS Workshop
16:00	Break		
16:15	**Session 5.3** Tactical Radio Workshop	**Session 5.1** SDR Standards/Verification	**Session 5.2** ACROPOLIS Workshop
18:00	Reception and Exhibits		

Friday, 29 June 2012

08:30	**Session 6.1** Cognitive Radio/Networks	**Session 6.2** SDR Implementations II	**Tutorial 6.3** LTE PHY & LTE Network Planning
10:30	Break		
11:00	**Future of White Space Panel** with panelists: Andrew Stirling, Project Director for the Cambridge White Spaces Trial Bob Stewart, Steepest Ascent Ben Smith, Senior Advisor, Radiocommunications Agency Netherlands Mrs. Aimilia Bantouna, University of Piraeus Michael Fitch, BT		
12:05	**Endnote:** Harald Welte, sysmocom		
12:45	Conference Close & Satisfaction Survey Prize Drawing		

Logo impressions online

The Forum established a dedicated website (http://Europe.WirelessInnovation.org) as the primary vehicle for communicating information on the conference prior to registration, as well as a conference site for registrants with access to the final agenda and proceedings. Sponsors are featured prominently on all pages throughout both sites. Combined, the websites had 19,608 visits and 28,856 pageviews in 2012.

Direct eMail Campaign

The Forum sent out multiple announcements related to SDR'12-WInnComm-Europe including the call for papers, program updates (keynotes, workshops, tutorials, demos and paper sessions), exhibitor updates, and registration.

The Forum sent 100 total emails in 2012, with an average open rate of 18%. Platinum Sponsors logos were included in all messages, with direct home page links. Gold Sponsor logos were included in with the event in each email. The Forum's database consists of approximately 1,150 member representatives and 1,950 non-member contacts.

Press Releases

Press releases were issued to provide updates to the media and the broader community on advancement of the event. Thousands of views were recorded and each release included mention of event sponsors.

Release	Date
Call for Submissions	11 September 2011
Conference Announcement, Program	15 March 2012
New Projects	28 June 2012

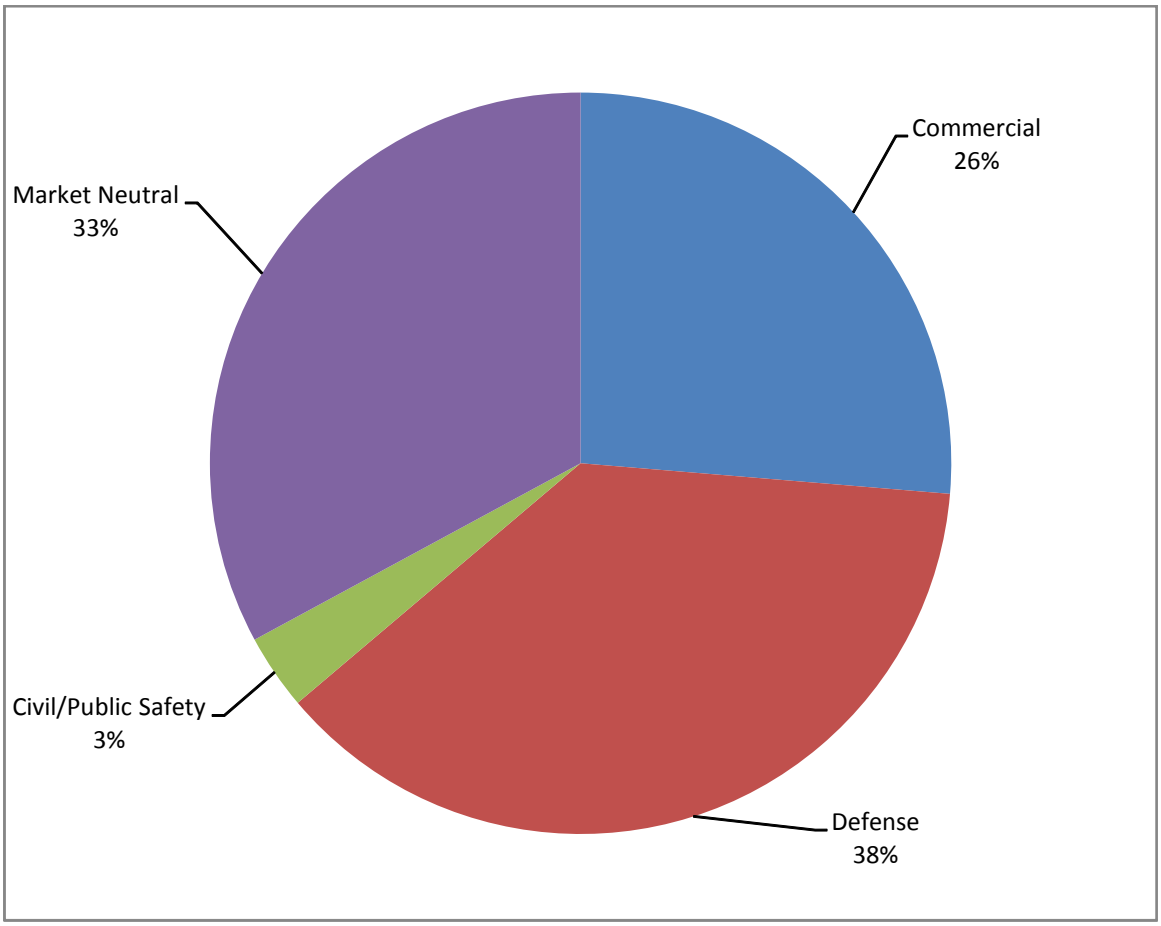
Releases were targeted to the Forum's social media outlets, including RSS, LinkedIn, Facebook and Twitter, to provide additional coverage.

Delegate Profile

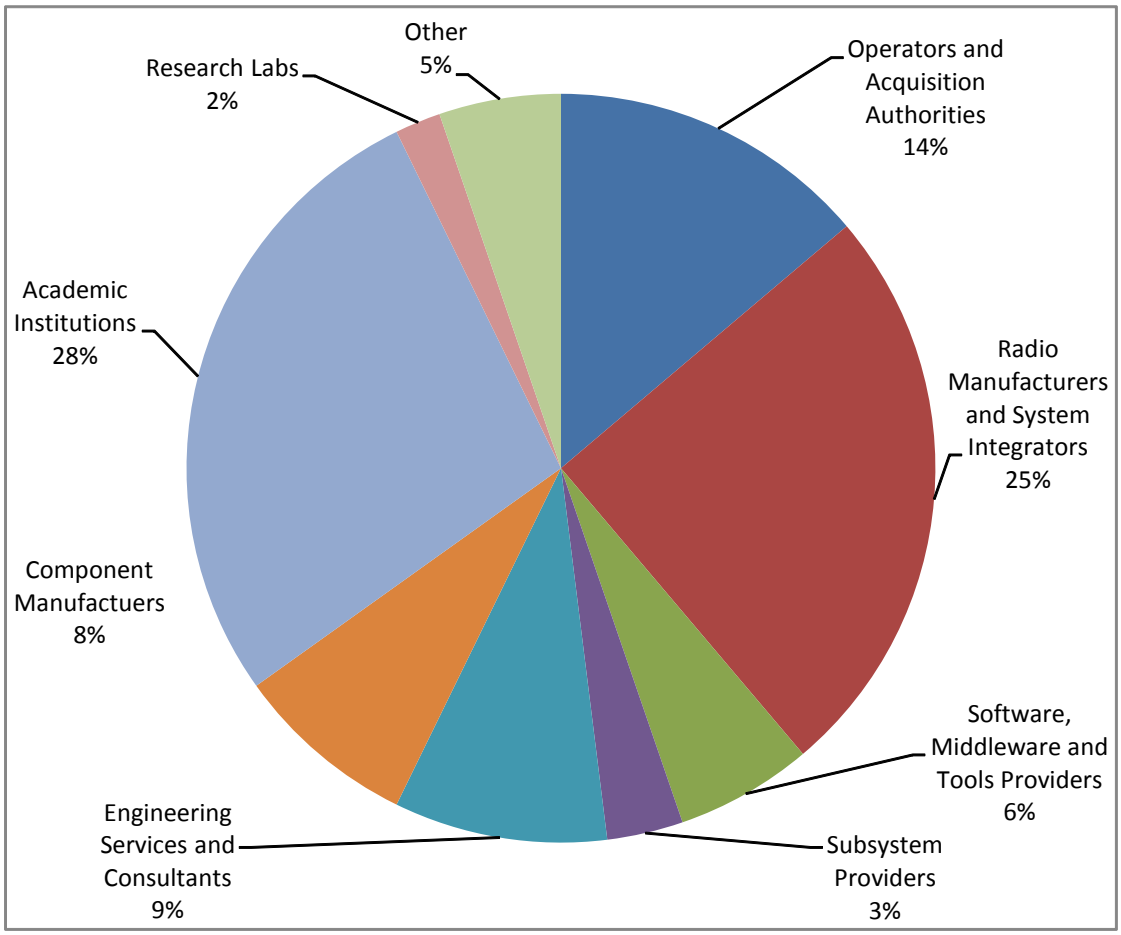
SDR'12-WInnComm-Europe's 149 registered delegates included investors, commercial network operators, radio manufacturers, system integrators, government procurement officials, regulators, engineering service providers and consultants from over 22 different countries. Review of the registration list and satisfaction surveys indicates that attendees generally fall into one of two categories:

- Researchers and Technology Developers (56% of Attendees): These individuals attended to showcase the work they are doing in advancing software defined radio, cognitive radio and dynamic spectrum access technologies to get recognition and to get feedback on requirements and future directions.
- Equipment Manufacturers and Acquisition Authorities (39% of Attendees): These individuals attended to identify new innovations in software defined radio, cognitive radio and dynamic spectrum access technologies that could be adopted by their organization to address their specific needs in developing and deploying advanced wireless systems. Many of these delegates also attended to gain a better understanding of the changes in the regulatory and business environment around these technologies that could impact their organization.

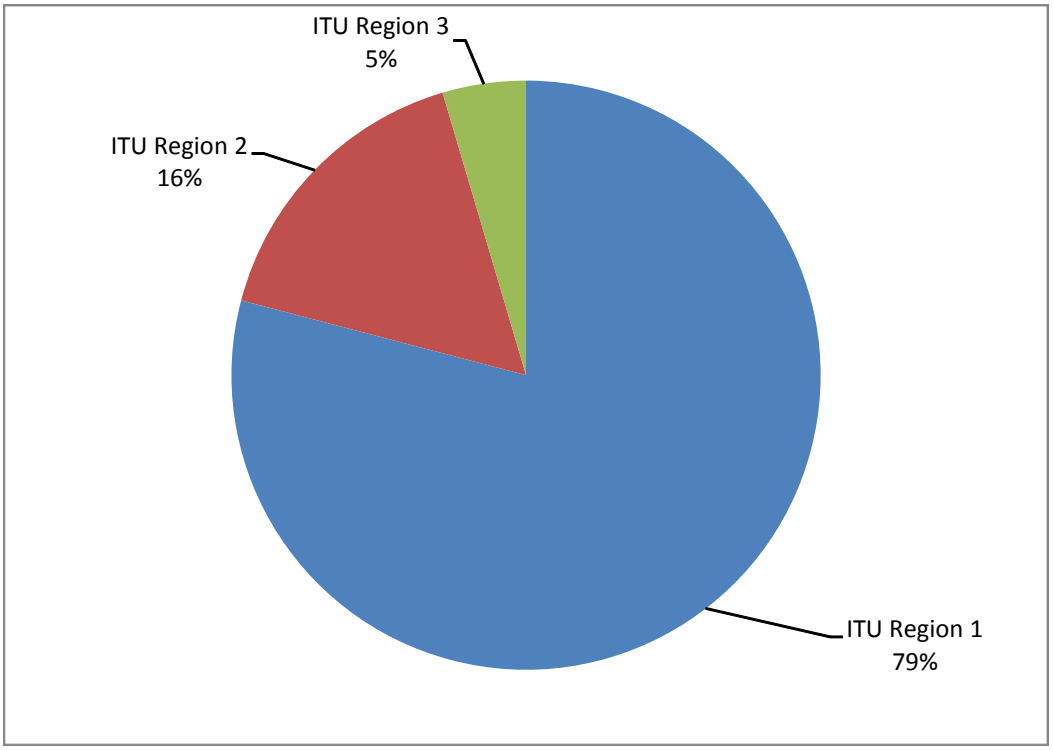
A key driver for all participants was the ability to network with their customers, partners and suppliers from around the world to identify new business opportunities or to better understand the future of the industry.



Registrations by Primary Market



Delegates by Value Chain Position



Delegates by Region

Delegate Profile (con't)

Radio manufacturers and system integrators attending included the following:

- Al Yah Satellite Communications Company
- Alcatel Lucent
- BT
- Elektrobit Wireless Communications
- General Dynamics C4S
- Harris Corporation
- Hitachi Kokusai
- Indra Sistemas
- ITT Excelis
- Motorola Solutions
- Nokia Siemens Networks
- Radmor SA
- Rafael Advanced Defense Systems
- Rhode & Schwarz
- Rockwell Collins
- Selex ELSAG
- Tata Power SED
- Thales
- xG Technologies

Government organizations with representatives in attendance included:

- The Centre Tecnològic de Telecomunicacions de Catalunya (Spain)
- CERDEC S&TCD (USA)
- Communications Research Centre (Canada)
- Defense Science and Technology Agency (UK)
- Direction générale de l'armement (France)
- European Defense Agency (Belgium)
- Finnish Air Force material Command (Finland)
- Finnish Defence Forces Technical Research Defence (Finland)
- Fraunhofer Institute (Germany)
- JPEO JTRS (USA)
- NATO (Belgium)
- OCCAR (France)
- Radio Communications Agency Netherlands (The Netherlands)

Become an SDR-WInnComm-Europe 2013 Sponsor or Exhibitor Today

The Forum's annual Conference and Product Exposition provides sponsors and exhibitors with an outstanding opportunity to further establish their leadership in the advance wireless community and network with partners and customers at all levels of the wireless value chain. At Forum events and through our communications, **your organization's logo and url are being viewed directly by your target audience.**

Benefits for Sponsors:

- 28,856 logo impressions were made recognizing conference sponsors through last year's conference website
- Weekly logo impressions were made recognizing conference sponsors through Forum emails with an average open rate of 18%.
- name impressions were made recognizing conference sponsors through views of press releases
- Complimentary event registration for one sponsor representative

Benefits for Exhibitors:

- Last year's 149 registered delegates included investors, commercial network operators, radio manufacturers, system integrators, government procurement officials, regulators, engineering service providers and consultants from over 22 different countries.
- Of these, over 52% had either direct purchasing authority or the ability to significantly influence radio technology acceptance and purchasing decisions (see Delegate Profile in the Conference Summary for More Details).
- Exhibitors are also recognized on the exhibitor page of the conference website, through listing in the Conference program, and through a dedicated press release highlighting the exhibition.

2013 Sponsorship and Exhibiting Rates

Sponsor:	2500€
Exhibition:	1000€ (Free for members with two paid registrations)

To become an exhibitor or sponsor today, contact:

Don Kaiser
Wireless Innovation Forum
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WIRELESS INNOVATION FORUM™

SDR Forum Version 2.0 WirelessInnovation.org

Driving the future of radio and communications systems worldwide

The Wireless Innovation Forum (SDR Forum version 2.0) is an international industry association dedicated to driving technology innovation in commercial, civil, and defense communications around the world. Our global membership is comprised of recognized thought leaders in the advanced wireless market including wireless service providers, component and equipment manufacturers, hardware and software developers, research institutes, government agencies and academia.

Through the Forum, representatives of member organizations gain insight into emerging technologies. Access key technical documents, industry reports and market surveys. Network. Collaborate. Participate in committees (see the other side of this flyer for committee list) that define market requirements, establish the regulatory landscape, and develop technical reports and specifications for Software Defined Radio (SDR), Cognitive Radio(CR) and Dynamic Spectrum Access (DSA) technologies.

Want to know more, get involved? To participate in the Forum's advocacy, opportunity development, commercialization and education activities in the defense, public safety, satellite, and commercial communications markets, contact the Forum's CEO at Lee.Pucker@WirelessInnovation.org.

Want to become a member?

Visit the Forum's web site: **www.WirelessInnovation.org**

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(Scan the QR code with your mobile device to be taken directly to the Forum's web site)