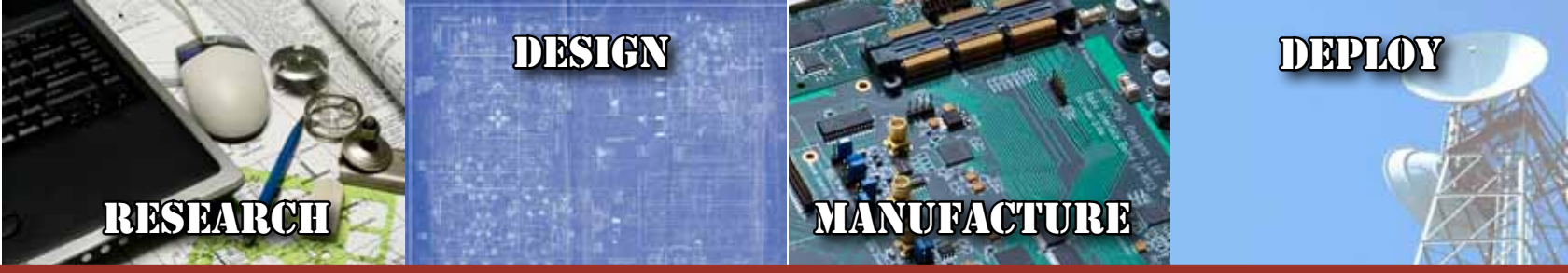

SDR'10

Technical Conference and Product Exposition
30 November - 3 December 2010 ✳ Washington, DC

The premier event for bringing next generation radio technologies to life.

Conference Report

SDR'10 was The Wireless Innovation Forum's (SDR Forum v. 2.0) annual technical conference and exposition. Attendees have called the event the"most valuable conference [to] attend each year," and "THE SDR conference." Attracting attendees representing all aspects of the reconfigurable radio value chain, from research through deployment, this annual event is the ideal place to make an impact on the SDR community and make valuable connections along the way. The only conference of its kind focused on reconfigurable radio technologies, SDR'10 featured tutorials, workshops, demonstrations and more than 100 technical papers in 20 technical sessions.

> **"As always, an excellent quality conference."**
>
> — Kuan Collins, *SAIC*

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WIRELESS INNOVATION FORUM

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

John Glossner, General Program Chair
CTO, *Sandbridge Technologies*

I wish to thank with deep appreciation all the people who have supported SDR'10. The Track Chairs, Vince Kovarik, Benjamin Egg, Mohammed Ismail, Fanny Mlinarsky, and Muru Senthivelan 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, Workshops, Tutorials, and Demonstrations. In addition to the hard work of the Forum staff, more than 70 people contributed on the Technical Program Committee to bring this conference successfully together.

At the core of the conference are the Technical Papers. This year 107 papers were presented. They were split into a Research and Development (R&D) Track and a Design, Manufacture, and Deploy (DMD) Track. Both tracks cover similar topics with the R&D track focusing on novel solutions to unsolved problems. The DMD track tends to highlight real-world implementations of systems with unique contributions on deploying those systems. 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. Perhaps signifying a mainstream transition from R&D to Deployment, we held three sessions just on System Implementation and Testing.

A new initiative this year, led by Dr. Mohammed Ismail of Ohio State and Dr. Jarmo Takala of Tampere University, provides a venue for the very best papers in the R&D technical papers track to be published in the Springer Journal of Analog Integrated Circuits and Signal Processing. Along with this initiative I'm happy to report that the quality of papers submitted to the conference this year was outstanding. I am also pleased to announce that Journal publications will carry forward to the 2011 Conference.

This year six Workshops were organized covering Market trends, Public Safety, Regulatory Issues, Open Source, SDR in Space and Tactical Radios. 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.

Nine tutorials and five expert lectures provided in-depth deep-dive education on specific topics including filter design, programming FPGAs, SCA and security, standards, and the highly popular Modem Design taught by Dr. fred harris.

Continuing our rich tradition of outstanding keynote speakers, this year we welcomed top executives from industry and government. From industry Dick Lynch, CTO of Verizon Communications, Jorgan Lantto, CTO of ST Ericsson, Madan Jagernauth, VP of Marketing at Huawei, and Dr. Masayuki Ariyoshi of NEC Research. From the government we welcomed Dr. Richard North, Technical Director of JPEO JTRS and Dr. Julius Knapp, Chief, Office of Engineering and Technology for the FCC. We also highlighted an industry startup with Thomas Stroup, CEO of Shared Spectrum and Vern Fotheringham, Chairman of CBT Group sharing experiences of supplier and customer.

In the plenary sessions we were also privileged to have two controversial and entertaining panels. The first panel covered TV White Spaces and future radio technologies. It was moderated by Dr. Douglas Sicker, Chief Technologist of the FCC and included the Honorable Meredith Atwell Baker, Commissioner of the FCC, well known and previous General Chair of this conference Dr. Bruce Fette, Program Manager for DARPA, Dr. Paul Kolodzy, Consultant and former Chair of the FCC Spectrum Policy Task Force, Dr. Preston Marshall, Director of USC's Information Sciences Institute, and Dr. Joe Mitola, VP at Stevens Institute of Technology. The second panel moderated by yours truly brought together some of my long-time friends to discuss whether FPGAs or Processors would win the landscape for SDR systems. The lively panel included Kees Vissers from Xilinx, Dr. Chris Rowen, CTO Tensilica, Dr. Sanjay Jinturkar, VP of Engineering Ikanos, Dave Kelf, CEO of Sigmatix, Fanny Mlinarsky, President of Octoscope, and Jeff Bier, President of BDTI.

Last year we added to the conference a demonstrations track to highlight new product offerings. That track was very well received and this year more than 20 demonstrations were displayed.

Uses of Open Source appeared as a common theme across the conference with sessions, papers, tutorials, and a meeting of the GNU radio users groups. The topics covered a wide range from business models to licensing issues as well as technical details of open source implementations.

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'11-WinnComm will be held in the same hotel the first week of December 2011. Along with the existing high quality offerings, an additional Track will be added to focus specifically on Regulatory and Public Policy issues. I am pleased to announce that Peter Tenhula of Shared Spectrum has agreed to chair this track. I am also thrilled to welcome back all the previous Track Chairs. In addition I'm honored to announce that Dr. Jarmo Takala of Tampere University has agreed to be the R&D Track Chair for 2011 and Dr. Sanyogita Shamsunder, Director at Verizon Wireless has agreed to be the DMD Track Chair for 2011.

Finally, all of this would not be possible without our sponsors. Without their support, to 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 2011 conference. I look forward to your participation and thank you for your past support.

All the best,
John Glossner

From the CEO

Lee Pucker
CEO, *Wireless Innovation Forum*

I am pleased to report that your annual technical conference and product exhibition continues to hold its place in the advanced wireless community as the premier event for exploring software defined radio, cognitive radio and dynamic spectrum access technologies. Registrations at SDR'10 once again exceeded 500 delegates, with attendees representing 22 countries around the world. The continued strong participation in this annual event, in spite of the continuing down turn in the economy in many segments of the market, reflects the value placed on this event by you and your peers year after year.

This value is reflected in the key drivers for participation identified in the conference satisfaction survey results: an outstanding technical program providing a "one stop shop" for you to learn the latest advances in reconfigurable radio products and technologies coupled with high quality opportunities to network with your partners, your customers and your competitors. Success in the SDR'10 technical program was largely driven by the volunteer efforts of the program committee, led by Dr. John Glossner, and the hundreds of hours they spent with the over 100 accepted authors and presenters to ensure the highest possible quality. We owe these volunteers a giant note of thanks for their efforts in pulling together this technical program, a summary of which can be found on pages 6 to 10 of this conference report.

The conference's strength in providing opportunities to network comes from the broad mix of participants from all levels of the wireless value chain including investors, commercial network operators, radio manufacturers, system integrators, government procurement officials, regulators, technology providers, engineering service providers and consultants. A breakdown of these participants can be found on pages 12 and 13 of this conference report. This breakdown reinforces the strength of the conference – connecting researchers and technology developers (approximately 48% of attendees) with equipment manufacturers, operators and other acquisition authorities (approximately 52% of attendees) to define the future of radio communications.

This broad base of participants made SDR'10 and outstanding value for our exhibitors and sponsors as well. Through targeted marketing, information on our exhibitors and sponsors reached beyond the conference attendees, build brand awareness for their organizations with tens of thousands people in the advanced wireless community. A breakdown on the success of our communications efforts is provided on pages 11 and 12 of this conference report, and again shows the value your conference has brought to this set of participants.

Even with this success, this event, like all such events, has room to improve. With that in mind, I and my staff, in cooperation with Dr. Glossner, have reviewed the results of the satisfaction surveys in detail and will be working hard to address any identified deficiencies to make SDR'11 even better.

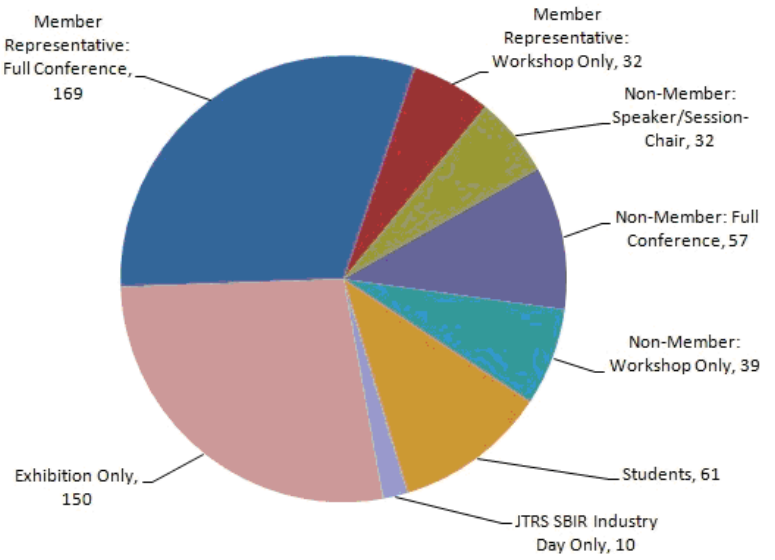
We look forward to your continued participation in your technical conference and product exhibition, your participation in the Wireless Innovation Forum, and we wish you success in driving the future of radio communications and systems worldwide.

SDR'10 Organizing Committee

Thomas Barber, *ST-Ericsson*
Babak Beheshti, *Sandbridge Technologies*
Mladen Berekovic, *TU Braunschweig*
Cosimo Berlingeri, *Selex Communications*
Shuvra Bhattacharyya, *University of Maryland*
Holger Blume, *Leibniz Universitaet Hannover*
Jerker Bjorkqvist, *Abo Akademi University*
Vlad Botchev, *Vlado Consulting*
Claudio Brunelli, *Nokia*
Nadeem Bukhari, *DRS Signal Solutions*
Zhongren Cao, *Calit2*
Sao-Jie Chen, *NTU, Taiwan*
Seungwon Choi, *Hanyang University*
Eric Christensen, *General Dynamics*
Jan Craninckx, *IMEC*
Paul D'Arcy, *Airvana*
Panagiotis Demestichas, *University of Piraeus*
Chris Dick, *Xilinx*
Benjamin Egg, *fred harris & associates* **(Tutorial Track Chair)**
Robert Fahler, *ArgonST*
Peter Farkas, *TU Bratislava*
Ronan Farrell, *Univ. Ireland Maynooth*
Jose Fridman, *Qualcomm*
Joseph Gaeddert, *Virginia Tech*
Georgi Gaydadjiev, *TU Delft*
Mikael Gidlund, *ABB AB*
Kees Goosens , *TU Eindhoven*
Kush Gulati, *Cambridge Analog Technologies*
fred harris, *San Diego State University*
S.M. Shajedul Hasan, *Virginia Tech*
Daniel Iancu, *Optimum Semiconductor Technologies*
Mohammed Ismail, *The Ohio State University* **(Publications Track Chair)**
Marco Jacobs, *ARC / Virage Logic*
Sanjay Jinturkar, *Legitime Technologies*
Friedrich Jondral, *Karlsruhe Institute of Technology (KIT)*
Ben Juurlink, *TU Berlin*
Wolfgang Koening, *Alcatel*
Vince Kovarik, *Harris Corporation* **(Workshops Chair)**
Fahdi Kurdahi, *UC Irvine*
Sébastien Le Nours, *University of Nantes*
Dake Liu, *Institute of Tech Linkoping Univ*
Joe Mitola, *Stevens Institute of Technology*
Fanny Mlinarsky, *OctoScope* **(Demonstrations Track Co-chair)**
Klaus Moessner, *Univ of Surrey*
Jakub Moskal, *Northeastern University*
Mayan Moudgill, *Sandbridge Technologies*
Christophe Moy, *SUPELEC*
Mieczyslaw Kokar, *Northeastern University*
Najam ul Islam Muhammad, *Eurecom*
R Muralidharan, *Tata Power SED*
Walid Najjar, *UC Riverside*
Timothy R. Newman, *Virginia Tech*
Eric Nicollet, *Thales*
Robert Normoyle, *DRS*
Dale Parson, *Kutztown University*
Antti Piipponen, *Nokia*
Nikos Pitsianis, *Aristotle University and Duke*
Kim Rounioja, *Nokia*
Magdalena Sanchez, *Univ Ireland, Maynooth*
Mike Schulte, *UW Madison*
Bob Schutz, *ViaSAT*
William Scott, *GDC4S*
Murugappan Senthilvelan, *Optimum Semiconductor Technologies* **(Demonstrations Track Co-chair)**
Sanyogita Shamsunder, *Verizon Wireless*
Mihai Sima, *University of Victoria, Canada*
Sarvpreet Singh, *Fraunhofer FKIE*
Dean Skuldt, *Motorola*
Leonel Sousa, *TU Lisbon*
Jarmo Takala, *Tampere Univ. of Technology*
Richard Taylor, *Harris Corporation*
Mark Turner, *Harris Corporation*
Manuel Uhm, *Xilinx*
Ben Vigoda, *Lyric Semiconductor*
Kees Vissers, *Xilinx*
Marilyn Wolf, *Georgia Tech*
Stephan Wong, *TU Delft*

A Look Back to SDR'09

SDR09's 550 registered delegates included investors, commercial network operators, radio manufacturers, system integrators, government procurement officials, regulators, engineering service providers and consultants from over 26 different countries. Of these, over 61% had either direct purchasing authority or the ability to significantly influence radio technology acceptance and purchasing decisions.



SDR'09 Registrations

Radio manufacturers and system integrators attending SDR '09 included the following:

Alcatel-Lucent
ArrayComm
BAE Systems
Boeing
Comtech
DRS Signal Solutions
EADS-Astrium
EID
Ericsson
Elektrobit
General Dynamics
General Motors
Harris
Honeywell
Huneed Technologies
Hitachi
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Selex Communications
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SMi LINKING BUSINESS with INFORMATION
Next Generation Networks Europe April 20 - 22
BDTi
4GWE 4G WIRELESS EVOLUTION CONFERENCE
NCW EUROPE 2009 GERMANY

SDR'10 Featured Keynotes from Recognized Industry Leaders:

Dr. Masayuki Ariyoshi
Principal Researcher and Cognitive Radio Research Project Leader System Platforms Research Laboratories Central Research Laboratories, *NEC Corporation*

Vern Fotheringham
Chairman, *CTB Group*

Madan Jagernauth
Vice President, Wireless Marketing and Product Management, *Huawei Technologies*

Julius Knapp
Chief, Office of Engineering and Technology, *FCC*

Jörgen Lantto
Executive Vice President, Chief Technology Officer and Strategy, *ST Ericsson*

Richard J. Lynch
Executive Vice President and Chief Technology Officer, *Verizon Communications*

Dr. Richard North
Technical Director, *Joint Program Executive Office Joint Tactical Radio System (JPEO JTRS)*

Thomas Stroup
CEO, *Shared Spectrum Company*

A Product Exposition featuring:

Agilent
BEEcube Inc.
Coherent Logix
Communications Research Centre Canada
DataSoft Corporation
DRS Defense Solutions
D-TA Systems Inc.
EB (Elektrobit)
Epiq Solutions
Etherstack Ltd
Ettus Research
Green Hills Software
Harris Corporation
Innovative Integration
Lyric Semiconductor
Lyrtec
Mathworks
MDE Systems Inc.
National Instruments
Objective Interface Systems, Inc.
Pentek
PrismTech
RFMD
Rohde &Schwarz
Shared Spectrum Company
Spectrum Signal Processing by Vecima
Tubitak Uekae
xgTechnology
Xilinx

"Very, very highly focused audience. Great one on one interaction with my customers."

- John Irza,
The Mathworks

Monday, 29 November

18:00-20:00 Early Registration, sponsored by Green Hills Software, Inc. (Regency Foyer)

19:00-21:00 Technical Program Committee Appreciation Dinner (Arlington Room)

Tuesday, 30 November

08:00 Breakfast (Regency Foyer), Speakers' Breakfast (Potomac II)

	Regency C	*Regency D*	*Regency E*	*Regency F*	*Potomac III & IV*	*Potomac V & VI*
10:00	**Workshop 1A** Understanding the Rules for TV Band Devices **BEGINS at 09:00**	**Tutorial 1B** Radio-In-The-Loop: Design Tools for Software Radios ***John Irza***	**Tutorial 1C** ETSI Reconfigurable Radio Systems (RRS) ***Markus Mueck***	**Tutorial 1D** Migrating Legacy Radios to the SCA ***Toby McClean, Mike Williams***	**Tutorial 1E** Open Component Portability Infrastructure (Open CPI) ***Michael Pepe***	**Workshop 1F** Public Safety Communications

12:00 Lunch

13:30 Conference Welcome: John Glossner, Sandbridge Technologies and Conference Chair

13:40 Keynote: Masiyuki Ariyoshi, Principal Researcher and Cognitive Radio Research Project Leader, System Platforms Research Laboratories, Central Research Laboratories, NEC Corporation

14:20 Keynote: Tom Stroup, CEO, Shared Spectrum Company, with Vern Farthingham, Chairman, CTB Group

15:00 Coffee Break

	Regency C	*Regency D*	*Regency E*	*Regency F*	*Potomac III & IV*	*Potomac V & VI*
15:15	**Session 2A** SCA ***Chair: Eric Christensen***	**Session 2B** Cognitive Radio I ***Chair: James Neel***	**Session 2C** Education & Radio Challenge ***Chair: Peter Farkas***	**Expert Lecture 2D** Air Interface Innovations Applicable to Cognitive Radio Systems ***Donald Steinbrecher***	**Workshop 2E** Open Source in Military and Commercial Wireless Applications	**Workshop 2F** Public Safety Communications

18:00 - 21:00 Welcome Reception and Forum Awards, Sponsored by General Dynamics, held at the International Spy Museum

GENERAL DYNAMICS
C4 Systems

Want the complete story behind some of the most intriguing espionage cases in history? What about spies and spying in the world right now? Join us for tapas and drinks at the Spy Museum and get the latest intel on all things spy. The International Spy Museum opened in Washington, DC on July 19, 2002. It is the only public museum in the United States solely dedicated to espionage and the only one in the world to provide a global perspective on an all-but-invisible profession that has shaped history and continues to have a significant impact on world events. The Museum features the largest collection of international espionage artifacts ever placed on public display. Many of these objects are being seen by the public for the first time. These artifacts illuminate the work of famous spies and pivotal espionage actions as well as help bring to life the strategies and techniques of the men and women behind some of the most secretive espionage missions in world history.

Wednesday, 1 December

08:00 Breakfast (Regency Foyer), Speakers' Breakfast (Potomac II)

08:30 Introduction to Day 2 and Announcements: John Glossner, Sandbridge Technologies and Conference Chair

08:40 Regulatory Keynote: Peter Tenhula, Shared Spectrum Company and Chair, Wireless Innovation Forum Regulatory Committee

09:20 Break

	Regency C	*Regency D*	*Regency E*	*Regency F*	*Potomac III & IV*	*Potomac V*	*Potomac VI*
09:50	**Session 3A**	**Session 3B**	**Session 3C**	**Workshop 3D**	**Tutorial 3E**	**Tutorial 3F**	**Tutorial 3G**
	Security ***Chair: Mark Turner***	Cognitive Radio II ***Chair: Sherin Kamal***	Communications Signal Processing I ***Chair: Kamran Arshad***	Regulatory I	IPA ***Peter G. Cook, James Neel***	Two-Thirds of SDR is SD ***Bruce Trask***	A Graphical Approach to FPGA Programming ***Christian Amadasun***

11:50 Lunch and Exhibits (Independence A&B)

	Regency C	*Regency D*	*Regency E*	*Regency F*	*Potomac III & IV*	*Potomac V*	*Potomac VI*
13:45	**Session 4A**	**Session 4B**	**Session 4C**	**Workshop 4D**	Expert Lecture 4E	**Tutorial 4F**	**Tutorial 4G**
	System Implementation and Test I ***Chair: Fanny Mlinarsky***	Cognitive Radio III ***Chair: S.M. Hasan***	Communications Signal Processing II ***Chair: fred harris***	Regulatory II	Multipath Interference Characterization in Wireless Communication Systems ***Michael Rice***	Rapid Prototyping Digital SCA-Based SDR Waveforms with OSSIE: Hands-On ***Carl B. Dietrich, Frank Kragh, Donna Miller***	Extending the SCA to Meet International Security Needs ***Scott Leubner and Chuck Linn,*** Harris Corp.

15:45 Coffee Break

16:00 Panel - The Future of Radio Technologies

Cognitive radio technologies are enabling dynamic spectrum access and interference suppression, and they will soon be transitioning into a wide range of commercial and defense wireless products and services. The FCC's TV "white spaces" decision and the DARPA WNaN and EPLRS-XF efforts are just a few examples. Standards are beginning to emerge in 3GPP and IEEE that are integrating these technologies into "4G" and beyond. Although these near-term prospects are very promising, there remain many more exciting areas in which advanced radio and networking technology will have a profound impact. The impact will be felt in areas such as radio network robustness, spectrum efficiency, regulations and enforcement, dynamic spectrum access to additional "white spaces", device and network performance, improved broadband user experiences and applications, etc. This panel of expert "radio futurists" will discuss the new vistas for smarter and smarter radio technologies, the impact of these technologies on regulatory frameworks and business models, and the challenges that remain in moving forward at Internet speed.

MODERATOR: Dr. Douglas Sicker, Chief Technologist, Federal Communications Commission
PARTICIPANTS:

- The Honorable Meredith Atwell Baker, Commissioner, Federal Communications Commission
- Dr. Bruce Fette, Program Manager, Defense Advanced Research Projects Agency (DARPA)
- Dr. Paul Kolodzy, Kolodzy Consulting (former Chair, FCC Spectrum Policy Task Force)
- Dr. Preston Marshall, Director, Univ. of Southern California, Information Sciences Institute
- Dr. Joe Mitola, VP for the Research Enterprise, Stevens Institute of Technology

17:30 Exhibits and Technology Showcase (Independence A&B, please see page 22-28 for more information)

19:30 GNU Radio Users Group, Sponsored by Ettus Research (Potomac V & VI)

Thursday, 2 December

08:00 Breakfast (Regency Foyer), Speakers' Breakfast (Potomac II)

08:30 Introduction to Day 3 and Announcements: John Glossner, Sandbridge Technologies and Conference Chair

08:40 Keynote: Dick Lynch, Executive Vice President and Chief Technology Officer, Verizon Communications

09:20 Break

	Regency C	*Regency D*	*Regency E*	*Regency F*	*Potomac III & IV*	*Potomac V*	*Potomac VI*
09:50	**Session 5A**	**Tutorial 5B**	**Session 5C**	**Workshop 5D**	**Workshop 5E**	**Expert Lecture 5F**	**Session 5G**
	System Implementation and Test II ***Chair: Fanny Mlinarsky***	Emerging Commercial Wireless and Cognitive Radio Standards ***Chair: James Neel***	Waveform and Software Design I ***Chair: Daniel S. Iancu***	Analysts I	SDR in Space I	GNU Radio: Introduction and Computational Capabilities ***Tom Rondeau***	Processors ***Chair: Raghavan Muralidharan***

11:50 Lunch, Exhibits, and Technology Showcase (Independence A&B, please see pages 22-27 for more information)

	Regency C	*Regency D*	*Regency E*	*Regency F*	*Potomac III & IV*	*Potomac V & VI*
13:45	**Session 6A**	**Session 6B**	**Session 6C**	**Workshop 6D**	**Workshop 6E**	**6F**
	Applications ***Chair: Sanjay Jinturkar***	System Implementation and Test III ***Chair: Fanny Mlinarsky***	Networks ***Chair: Sanyogita Shamsunder***	Analysts II	SDR in Space II	SCA Next Roll Out

Thursday, 2 December (continued)

15:45 Break

16:00 Keynote: Madan Jagernauth, Vice President, Wireless Marketing and Product Management, Huawei Technologies

16:30 Keynote: Jörgen Lantto, Executive Vice President, Chief Technology Officer and Strategy, ST Ericsson

17:10 Panel Session - Comparing FPGA + C compilers with multi-core technology

Field Programmable Gate Arrays (FPGAs) traditionally have been a replacement for low volume Application Specific Integrated Circuits (ASICs). Recently FPGAs have emerged with large amounts of logic, memory, DSP, CPU, and connectivity components making them a full Multi Processor System On a Chip (MPSoC) system. Historically these devices have been difficult to program following a hardware (HDL) design methodology with difficult placement, wiring, and timing closure constraints. Thus programming FPGAs has historically been difficult.

Processors, in contrast, have historically been programmed in high level languages such as C. Compilers have been developed that efficiently map the high level language to optimized assembly code. Even special purpose DSP types such as fixed point arithmetic have recently been efficiently dealt with in C languages. Parallel compilation has even been effective for modern Vector/SIMD loop nests. However, except for certain special cases of multithreading loop nests, parallelization of arbitrary codes distributed across multiple processors remains difficult.

Historically, the time to develop applications in a Processor has generally been faster because the long iterative cycles of place/route/timing in an FPGA. Recently FPGA vendors have tried to reduce this gap with innovative programming environments, the use of libraries, and the incorporation of processors on the same FPGA fabric.

This panel will look at the costs, programmability, performance, power, and time-to-market of multiprocessor designs versus FPGAs in a shoot-out to see who will ultimately dominate future SDR platforms.

ORGANIZER: Kees Vissers, Xilinx
MODERATOR: John Glossner, Sandbridge Technologies
PARTICIPANTS:

- Jeff Bier, BDTI (balance)
- Seungwon Choi, Hanyang Univ (GPUs)
- Dave Kelf, Signmatix (programming)Fanny Mlinarsky, octoScope (test and verification)
- Chris Rowen, Tensilica (Multi core)
- Kees Vissers, Xilinx (C tools + FPGA + small cores)
- Sanjay Jinturkar, Ikanos Communications, Inc. (Compilers)

18:00-20:00 Wireless Innovation Forum Members Reception (Regency A) and Annual Meeting (Regency EF)

Friday, 3 December

08:00 Breakfast (Regency Foyer), Speakers' Breakfast (Potomac II)

	Regency C	*Regency D*	*Regency E*	*Regency F*	*Potomac III & IV*	*Potomac VI & VI*
	Session 7A	**Session 7B**	**Session 7C**	**Session 7D**	**Expert Lecture 7E**	**Tutorial 7F**
08:30 (p. 20)	Waveform and Software Design II ***Chair: Richard Taylor***	RF, IF, ADC ***Chair: Mohammed Ismail***	Spectrum, Regulatory, and Standards ***Chair: Zhongren Cao***	Communications Signal Processing III **Chair: Joseph Gaeddert**	Modem Tutorial **fred harris**	ESSOR SDR Architecture – Motivation and Overview

10:30 Coffee Break

10:45 Keynote: Rich North, Technical Director, Joint Program Executive Office Joint Tactical Radio System (JPEO JTRS)

11:30 End Note, Conference Close and Satisfaction Survey Prize Drawing

Logo impressions online

The Forum established a dedicated website (http://Conference.WirelessInnovation.org) as the primary vehicle for communicating information on the conference, with the conference sponsors featured prominently on all pages throughout the site. Internet presence was enhanced through the use of Google AdWords. The website had 21,277 visits in 2010, representing 61,371 page views and 3 pages per visit. This included 10,772 unique visits. The exhibitor page received more than 1,300 visits.

Print and Online Advertisement

Print and banner ads featuring sponsor logos were produced for placement in the following:

- *EETimes* (536,000 circulation)
- *Mission Critical* (36,937 circulation)
- Open Systems Media web site banner (9,000 impressions)
- *Embedded Computing* (20,423 circulation)

Other Print Collateral

Call for papers flyers and conference brochures were printed and distributed at sponsored events including:

- 4GWE
- IET Seminar on Wireless Communications
- Next Generation Mobile Devices
- Next Generation Networks and Mobile Basestations
- Broadband Expo
- LTE Forum
- SDR Europe10
- 8th Annual Software Defined Radio
- International Software Radio

Direct eMail Campaign

The Forum sent out weekly announcements related to SDR'10 including the call for papers, program updates (keynotes, workshops, tutorials, demos and paper sessions), exhibitor updates, and registration. The emails were shaped to have a targeted message and specific announcement each. There was an average open rate of 15% and sponsors logos were included in all messages, with direct home page links, amounting to 4,098 logo impressions.

Updates were also made as appropriate in the members only SDR News and Opportunities eNewsletter, reaching an average of 1000 member representatives every other week, and through email announcements and calendar postings from our media sponsors reaching tens of thousands of additional potential participants.

SDR'10 Marketing Performance (con't)

Press Releases

Press releases were issued to provide updates to the media and the broader community on advancement of the event. All releases included mention of event sponsors.

Release	Release Views	Date
Exhibitors	1,132	5 October 2010
Tutorials, Program	1,059	19 October 2010
Award Finalists	2,480	18 November 2010
Award Winners	2,152	8 December 2010
Board of Directors	1,629	16 December 2010
Total Sponsor Name Views	**8,452**	

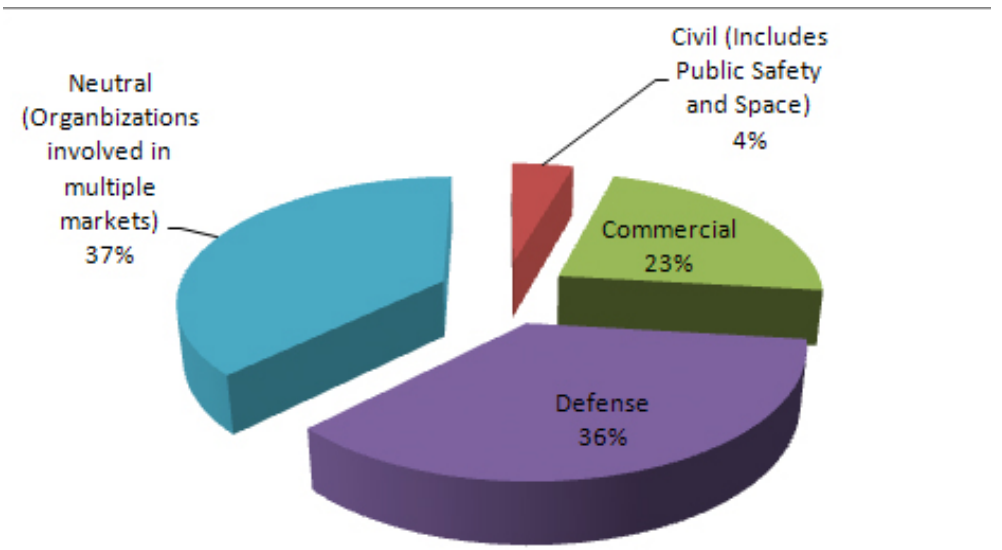
Releases were retargeted to the Forum's social media outlets, including RSS, LinkedIn, Facebook and Twitter, to provide additional coverage.

Delegate Profile

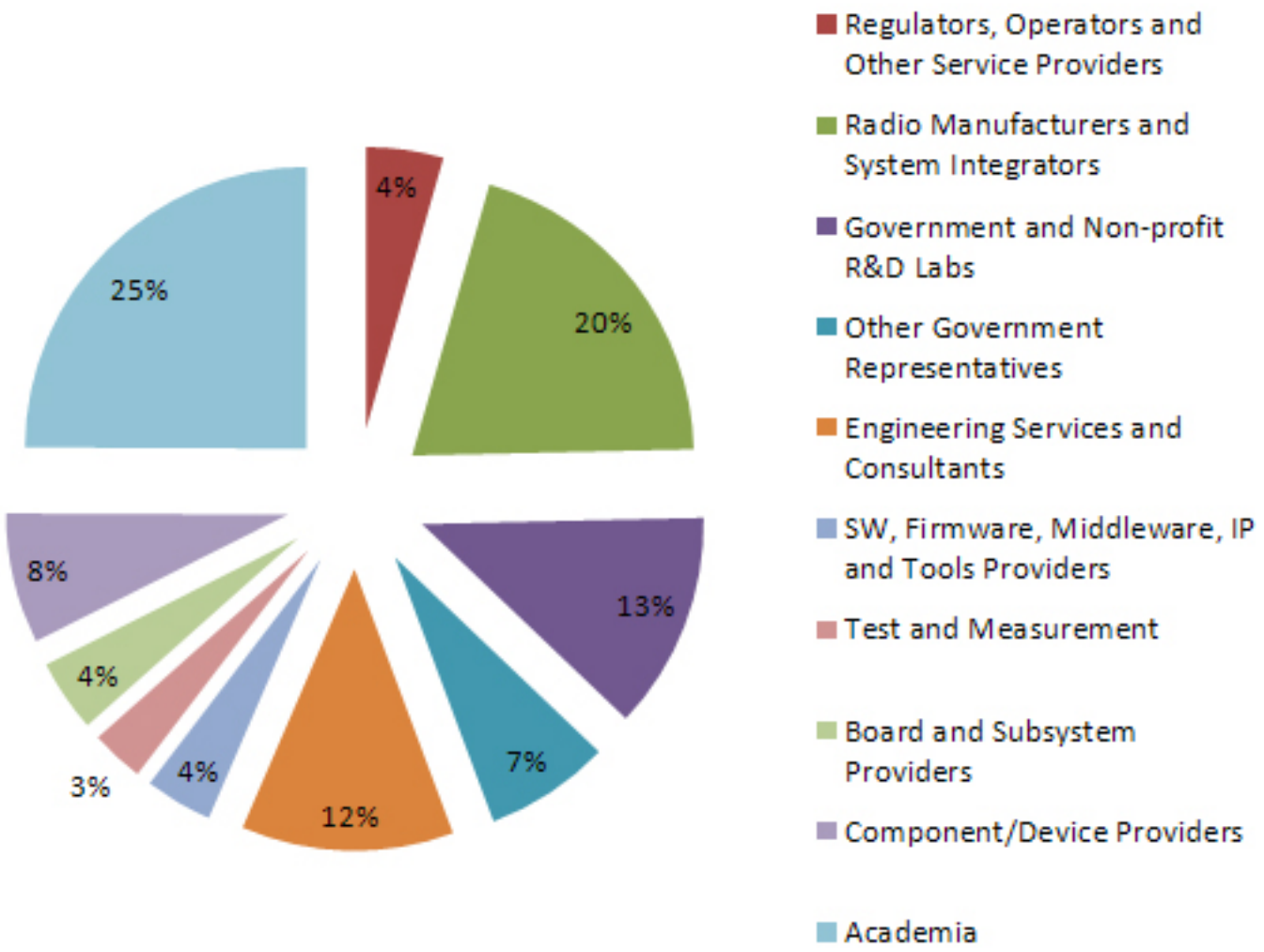
SDR'10s 540 registered delegates included investors, commercial network operators, radio manufacturers, system integrators, government procurement officials, regulators, engineering service providers and consultants from over 22 different countries. Review of the registration list and satisfaction surveys indicates that attendees at SDR'10 generally fall into one of two categories:

- Researchers and Technology Developers (48% 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 (52% 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.

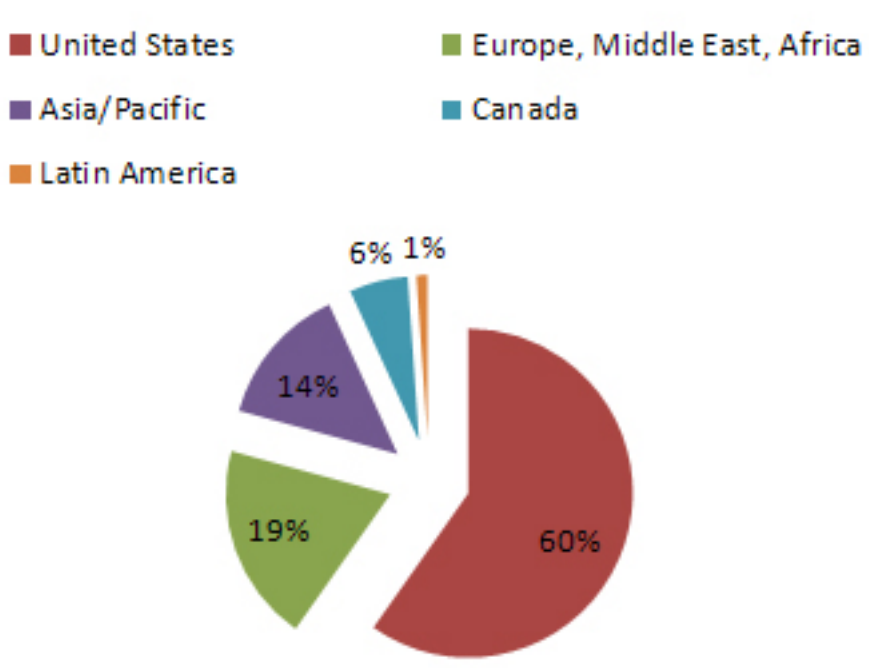
A key driver for all participants was the ability to network with their customers, partners and suppliers from around the world to identify new business opportunities or to better understand the future of the industry.



SDR'10 Registrations by Primary Market



SDR'10 Delegates by Value Chain Position



SDR'10 Delegates by Region

Delegate Profile (con't)

Radio manufacturers and system integrators attending SDR '10 included the following:

Argon ST
Boeing
Cisco
Datron World Communications
DRS Signal Solutions
Elektrobit
General Dynamics
Harris
Huawei Technologies
Indra Sistemas
ITT
L3 – Communications
Lockheed Martin
Meteorcomm
Motorola
NEC Corporation
Nokia
Northrop Grumman
Raytheon
Rockwell Collins
Rohde and Schwarz
Samsung
Selex Communications
Shared Spectrum
Thales Communications
Toyota
Ultra-TCS

Government organizations with representatives in attendance at SDR010 included:

Air Force Research Labs
Brazilian Navy Research Institute
Brazilian Naval Commission
Brazilian Air Force
Communications Security Establishment Canada
Communications Research Centre Canada
Defense Advanced Research Projects Agency
European Space Agency
Federal Communications Commission
Federal Network Agency, Germany
German Armed Forces
Joint Program Executive Office - JTRS
Naval Research Lab
National Institute of Science and Technology
NASA Glenn Research Center
National Institute of Justice
National Telecommunications and Information Administration
Navy Surface Warfare Center
Organisme Conjoint de Coopération en matière d'Armement (OCCAR)
Swedish Defence Research Agency
Tubitak UEKAE
United States Department of Homeland Security
United States Department of Defense
United States Department of Justice
US Army CERDEC
The White House

Become an SDR'11 Sponsor or Exhibitor

he 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.

Recognition for Sponsors:

- 21,277 Logo Impressions were made Recognizing Conference Sponsors through last year's Conference Website
- 4,098 Logo Impressions were made Recognizing Conference Sponsors through conference related emails (based on weekly conference update emails sent containing sponsor logo with an average open rate of approximately 15%)
- 8,452 Name Impressions were made recognizing Conference Sponsors through release views of Press Releases
- Thousands of Logo Impressions were made through brochures and flyers distributed at the Forum's various meetings and workshops and related co-sponsor events
- Complementary Event Registration for one Sponsor Representative

Opportunities for Exhibitors:

- Last year's 500+ 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.

"The value proposition of the Wireless Innovation Forum technical meetings and exhibitions in the U.S. and Europe for vendors is a quantum leap better than anything else that is available in the SDR market, bar none. Attendance is larger than any other SDR event, and the attendees are all focused on your target market."

- SDR'10 Exhibitor

2011 Sponsorship and Exhibiting Rates

	European Conference	US Conference	Both
Sponsors	2500€	$5000	Save 10%
Exhibitors			
Members:	500€	$1500	Save 10%
Non-members:	750€	$2000	Save 10%
Sponsors and Exhibitor	2500€	50% Discount on Exhibition	Save 10%

Learn more about our European conference at http://Europe.WirelessInnovation.org.

Interested in expanding your marketing base by exhibiting at SDR11? Visit http://Conference.WirelesssInnovation.org/page/SponsorshipandExhibiting or contact Allan Margulies at asm@wirelessinnovation.org.

Additional sponsorship information available at http://www.wirelessinnovation.org/page/sponsorship_opportunities

About the Wireless Innovation Forum

The Wireless Innovation Forum (SDR Forum version 2.0) is an international industry association dedicated to supporting the development and deployment of software defined and cognitive radio systems. Our **global membership** is comprised of decision makers, planners, policy makers, technical leaders, suppliers, manufacturers and educators.

Become a member and gain insight to emerging technologies. Access key technical documents, industry reports and market surveys. **Network**. **Collaborate**. **Participate** in committees, workgroups and workshops to define market requirements, establish the regulatory landscape, and develop specifications for SDR 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, space, 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:

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