



**SDR Forum Workshop on  
“Government and Industry R&D Agendas for Next Generation Radio  
Technologies”  
11 September 2008**

The SDR Forum will host a workshop on September 11, 2008 exploring the key issues in radio communications in which both government organizations and industry will be looking to address over the next 3 to 5 years through R&D activities. The objective of the workshop is to provide the SDR Forum's members and guests with insight into the Government's communications needs, and to help the Forum and its members to identify areas for collaborative investment.

This workshop will be held in conjunction with the SDR Forum's 60<sup>th</sup> General Meeting being held September 8 to 11 in Boston, Massachusetts. The outcomes of this workshop will help the Forum to set strategy for the next several years and may act as a basis for the SDR Forum's R&D agenda.

**Workshop Program At a Glance**

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| 8:30 to 8:40   | Welcome – John Chapin, Chair of the SDR Forum  |
| 8:40 to 9:00   | Opening Remarks on End User Perspective on Public Safety Communications – Chief Gerry Reardon, Cambridge Fire Department   |
| 9:00 to 9:30   | Emerging Trends and Technologies in Software Defined Radio, Murat Bicer, Senior Associate, Battery Ventures  |
| 9:30 to 10:10  | “Trends, Drivers, Challenges and Potential of Software Defined/Reconfigurable Radio”, Dr. Jorge Pereira, Principal Scientific Officer, European Commission   |
| 10:10 to 10:30 | Coffee Break   |
| 10:30 to 11:10 | “CERDEC Research on Spectrum Policy and Cognitive Antenna for Optimizing Dynamic Spectrum Access”, Mahbub Hoque, Chief Scientist of the Space & Terrestrial Communication Directorate (STCD), CERDEC |
| 11:10 to 11:50 | “The National Science Foundation's Role in Basic Research to Enable Autonomous, Robust and Flexible Wireless Communications”, Scott Midkiff, Program Director, US National Science Foundation        |
| 11:50 to 12:30 | “JTRS S&T Vision and Technology Insertion”, John Armantrout, CTO, JTRS JPEO  |
| 12:30 to 1:40  | Networking Luncheon with Technology Demonstrations from <b>Adapt4, Anritsu, EtherStack, PrismTech, and Shared Spectrum.</b>  |
| 1:40 to 2:20   | “CRC's R&D activities towards the development of an SDR infrastructure for satellite, broadcast and terrestrial communications”, Claude Bélisle, Vice-   |



President of Satellite Communications and Radio Propagation Research,  
Communications Research Centre, Canada

- 2:20 to 3:00 “Opportunities for Disruptive Change through RF and Wireless Technology Development”, Preston Marshall, Program Manager, DARPA
- 3:00 to 3:20 Coffee Break
- 3:20 to 4:00 “Research and Development toward Dynamic Spectrum Access Network” Presentation by Dr. Kentaro Ishizu, Expert Researcher, National Institute of Information and Communications Technology, Japan
- 4:00 to 4:30 Closing Remarks and Next Steps – Lee Pucker and John Chapin

### **Program Details**

**9:00 to 9:30 Emerging Trends and Technologies in Software Defined Radio, Murat Bicer, Senior Associate, Battery Ventures**

This talk will discuss the emerging SDR technologies and their potential benefits. New developments in the wireless communications landscape such as the transition from 3G to 4G networks, new spectrum auctions, and consolidation of carriers are creating opportunities that can be addressed well by the flexible and adaptive nature of SDR systems. The discussion will cover a wide range of such technologies from chipsets and software to backhaul and services.

**About the Speaker** – Murat Bicer is a Senior Associate at Battery Ventures, a venture capital and private equity firm with \$3 billion under management. At Battery, Murat focuses on investments in wireless communications and semiconductors. Prior to joining Battery, Murat worked at Mercury Computer Systems where he managed the development of SDR-based communications systems and infrastructure solutions. Murat also led the implementation of Mercury’s internal Software Communications Architecture (SCA) Core Framework. Previously, he worked as a software engineer at Intra Information Technologies, a startup company that developed GSM-based mobile transaction devices for financial institutions. Murat currently serves on the Board of Directors of the Software Defined Radio Forum. He holds an M.B.A, summa cum laude, from the Olin Graduate School of Business at Babson College and an M.S.E.E from Northeastern University.

**9:30 to 10:10 “Trends, Drivers, Challenges and Potential of Software Defined/Reconfigurable Radio”, Dr. Jorge Pereira, Principal Scientific Officer, European Commission**

In the area of Software Defined/Reconfigurable Radio, technological evolution and current capabilities are, in most cases, well ahead of the willingness to deploy such systems, even if they have tremendous, obvious advantages: they are flexible, adaptable, future-proof, easier to operate



and maintain, and even in the long run (much) cheaper than conventional multi-system solutions. The presentation briefly discusses current trends and new drivers that seem to be able to fasten the pace of adoption, at least in some sectors. Open challenges, especially those due to these drivers and associated requirements, will be put in contrast with the potential to make systems even smarter and more efficient, paying for their own deployment/upgrade.

**About the Speaker** – Dr. Pereira has been with the European Commission (EC), Directorate General Information Society and Media, since 1996. He is currently responsible for Wireless Sensor Networks and Cooperating Objects in the area of Networked Embedded and Control Systems, after being responsible for the areas of Energy Efficiency and Emergency and Crisis Management. Until 2004, he worked in the area of Mobile and Wireless communications, where he was instrumental in defining the research agenda in the areas of Reconfigurable/Software Defined Radio Networks and 4G. Prior to that, 1993-96, he worked at GTE Labs, Waltham, MA, where he was responsible for the Communications analysis and simulations in the FHWA's National Intelligent Transportation Systems Architecture Study. He was also involved in the launch of the first CDPD wireless data system in the San Francisco Bay Area.

He is a member of the EC's Spectrum Inter-service Group, and is an advisor to the European Defence Agency on issues relating to Communications in general, and Reconfigurable/Software Defined/Cognitive Radio and Spectrum in particular, as well as distributed Sensing, Monitoring and Control. He is a member of the European Security Research and Innovation Forum.

He received the SDR Forum 2003 Industry Achievement Award in recognition of his “outstanding contributions, research and development in the field of SDR”.

Dr. Pereira obtained his PhD. in Electrical Engineering-Systems from the University of Southern California in 1993.

**10:30 to 11:10 “CERDEC Research on Spectrum Policy and Cognitive Antenna for Optimizing Dynamic Spectrum Access”, Mahbub Hoque, Chief Scientist of the Space & Terrestrial Communication Directorate (STCD), CERDEC**

**About the Speaker** – Dr. Mahbub Hoque is presently working as the Chief Scientist of the Space & Terrestrial Communication Directorate (STCD) in CERDEC, and also as a Program Director of the Antennas & Spectrum Analysis (ASA) Division. As a Chief Scientist Dr. Hoque oversees the basic research program of STCD in the areas of network science, nano technology and metamaterial application for active and passive devices. Dr. Hoque's ASA Division is involved in several programs on Antennas, Spectrum Management and Electromagnetic. Dr. Hoque's Division is one of the pioneer group in RDECOM for performing antenna placement optimization using modeling and simulation techniques. The Division is also leading several key spectrum management programs such as CJSMP and cognitive effort developing policy for SDR for dynamic spectrum access and also developing cognitive antenna. Prior to joining CERDEC in 2001, Dr. Hoque worked in Telcordia Technologies as a Director of the EMC and Spectrum Management Group where he led several projects on Wireless Communication and Spectrum Management. In 1996 Dr. Hoque received prestigious Bellcore's 'President's Recognition Award' for developing an automated interference detection tool for ADSL technology deployment. Dr. Hoque has more than 70 publications in the national and



international journals and chaired several sessions in the international conferences such as GLOBCOM, SUPERCOM sponsored by IEEE. Dr. Hoque did his PhD. in Electrical Engineering in 1983 from London University.

**11:10 to 11:50 “The National Science Foundation's Role in Basic Research to Enable Autonomous, Robust and Flexible Wireless Communications”, Scott Midkiff, Program Director, US National Science Foundation**

The National Science Foundation funds basic research in science and engineering, primarily at universities. This presentation provides an overview of the NSF's support for basic research in wireless communication and systems, with particular emphasis on research that integrates advances in communication, computation, and device technology to enable highly autonomous wireless communication systems that are robust and flexible. The presentation also discusses opportunities for industry participation in NSF-funded research.

**About the Speaker** – Scott F. Midkiff joined the National Science Foundation in September 2006 as a Program Director for the Integrative, Hybrid and Complex Systems (IHCS) Program of the Electrical, Communications and Cyber Systems (ECCS) Division in the Directorate for Engineering (ENG). His responsibilities within the IHCS program include cyber systems -- that integrate communication, computation, and algorithms -- as well as signal processing. At the NSF, he is also active in Engineering's Emerging Frontiers in Innovation (EFRI) program and the Foundation-wide Integrative Graduate Education and Training (IGERT) and Cyber-enabled Discovery and Innovation (CDI) programs. Dr. Midkiff is on assignment to the NSF from Virginia Tech, where he is a Professor of Electrical and Computer Engineering. His research and teaching interests include wireless networks, mobile systems, and pervasive computing.

**11:50 to 12:30 “JTRS S&T Vision and Technology Insertion”, John Armantrout, CTO, JTRS JPEO**

This presentation will explore the following items:

- Vision for JTRS
- Current S&T Topics/Issues
- Potential / Future S&T Topics
- Technology Insertion Process for JTRS
- Industry and Academia Input

**1:40 to 2:20 “CRC’s R&D activities towards the development of an SDR infrastructure for satellite, broadcast and terrestrial communications”, Claude Bélisle, Vice-President of Satellite Communications and Radio Propagation Research, Communications Research Centre, Canada**

The Communications Research Centre (CRC) is the Canadian government centre of expertise in telecommunications R&D supporting government’s operation, providing advice for public policy



and engaging in industry partnership. Over its 50 years, CRC has developed a solid expertise in wireless communications systems for terrestrial, satellite and broadcast applications.

This presentation will provide an overview of the various research activities undertaken at CRC in the field of software defined radio and cognitive radio and will also highlight some of the challenges and opportunities for SDR/CR.

**About the speaker** - Claude Bélisle is Vice President of the Satellite Communications and Radio Propagation branch at CRC. For close to 20 years, he has been involved in various R&D projects related to satellite communications for both military and commercial applications. His research topics include military EHF satcom terminal and payload, communications networks over satellites, optical intersatellite links, software defined radios, and microwave-photonics. He holds a Bachelor degree in Engineering Physics from the Royal Military College and a Master degree in Science with a speciality in optics from Université Laval.

**2:20 to 3:00 “Opportunities for Disruptive Change through RF and Wireless Technology Development”, Preston Marshall, Program Manager, DARPA**

This talk will discuss some of the opportunities for RF and wireless technology developments that could have disruptive impact on the capabilities of next generation wireless systems. These include potential technology in RF components, network design, network management and behavioural control and reasoning.

**About the Speaker** – Preston Marshall has 30 years experience in communications and software and hardware system development. Currently he is a Program Manager with the Defense Advanced Research Projects Agency (DARPA) Strategic Technology Office (STO). Before his assignment to DARPA's Strategic Technology Office, Mr. Marshall was employed by a number of systems and electronics companies. Mr. Marshall holds a B.S.E.E and M.S. Information Science from Lehigh University.

**3:20 to 4:00 “Research and Development toward Dynamic Spectrum Access Network”, Dr. Kentaro Ishizu, Expert Researcher, National Institute of Information and Communications Technology, Japan**

National Institute of Information and Communications Technology, Japan (NICT) is investigating Dynamic Spectrum Access Network (DySPAN) as a next spectrum assignment method in order to take measures to resolve lack of vacant spectrum expected in coming 5 to 10 years. NICT has researched DySPAN for more than 10 years. Especially, from 2005 to 2008, our researches on its topics were supported by the Ministry of Internal Affairs and Communications (MIC). After 2008, the MIC is continuously enforcing new R&D projects for DySPAN. This presentation introduces a research overview on DySPAN that NICT has achieved, and an overview of the new R&D projects starting this year.

**About the Speaker** – Kentaro Ishizu received M.E. and Ph.D. from Kyushu University, Japan, with a major of computer science. Ishizu has been working with National Institute of Information



and Communications Technology, Japan (NICT) since 2002. He has been involved in research projects for heterogeneous wireless network, distributed Content Delivery Network (CDN), and cognitive wireless network. His current research interests include high speed wireless communications using Dynamic Spectrum Access technologies and development of large-area database on radio environment for improvement of spectrum utilization efficiency and user experience. Ishizu has been involved in standardizations of IEEE 802.21 and IEEE P1900.4.