A Complete Guide to the Latest Programs, Capabilities, Opportunities and Architectures in Programmable Radios...

SDR SOFTWARE DEFINED RADIOS

Presented by Accomplished Authority

Dr. John Bard

Washington, DC
May 6-7, 2002

San Diego, CA
May 13-14, 2002

Las Vegas, NV
May 20-21, 2002

Washington, DC
June 6-7, 2002

- Understanding the programs & initiatives that are driving the use, technology development and funding of SDR: JTRS, NTDR, DMR, JTT, Zebra, JCIT
- A detailed analysis of JTRS
- Developing your organization's SDR-based enterprise — "future proofing" your infrastructure & services
- Secrets to finding more business opportunities for SDR
- What government, military and commercial architectures are emerging?
- What new capabilities are now more economically viable in programmable radios?

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ABOUT THE PROGRAM

In DoD's vision of a single, seamless data environment, flexibility and interoperability is paramount. The lack of flexibility in legacy radios drives the DoD's need for software defined radio (SDR), where many communications functions that were formerly carried out solely in hardware can now be performed by software that is in high-speed digital signal processors. The radios can be programmed to transmit and receive signals over a wide range of frequencies, as well as emulate virtually any desired transmission format. What new capabilities are more economically accessible in SDR? Where are the pitfalls? What new programmable radio architectures are available to field the "future-proof" infrastructure services the DoD is now demanding? What are the architecture trade-offs? What are the critical limitations? What's the prognosis for the future of SDR?

This powerful seminar offers you a comprehensive view of the crucial tools and techniques associated with designing, implementing and fielding programmable radio architectures for the 21st century. These techniques range from partitioning the system design into modules for which reusable components may be developed or procured, to quantitatively characterizing software resource demands and managing those resources to achieve robust system performance. Attend this cutting-edge seminar and learn to identify the most promising military and commercial real-time distributed tactical applications to pursue including: secure and encrypted communications; mission reconfigurability; portable command posts; networked radios, routers and computers; and international connectivity. Critical questions addressed include:

- How SDR will improve interoperability between different military services?
- How will DoD's portability objectives be achieved?
- What are the limitations and cost implications of current software defined radio technology?
- What government, military and commercial architectures have emerged?

ABOUT THE SPEAKER

John D. Bard, Ph.D., has been an industry leader in the development of the SDR concept for almost two decades. Dr. Bard is principal and owner of **Space Coast Communication Systems, Inc.**, specializing in military SDR implementations by merging commercial SDR hardware technology with advanced DoD software architectures. Dr. Bard presides as Technical Committee Chairman of the **Software Defined Radio Forum,** a highly distinguished organization dedicated to supporting the development, deployment, and use of open architectures for advanced wireless systems. Dr. Bard oversees development of an open-source Reference Implementation of the Software Communications Architecture (SCA) and serves as liaison to the Joint Tactical Radio System (JTRS) **Joint Program Office (JPO),** where he is directly responsible for promoting commercial application of the SCA.

Dr. Bard has been significantly involved in the evolution of DoD's SDR heritage. A **leading-edge pioneer** in his field, Dr. Bard influenced CECOM's JTT architecture, incorporating COTS single board computers, commercial operating environments and CORBA inter-processor communications. As a waveform architect for the Naval Research Laboratory's JCIT radio, Dr. Bard successfully realized the Tactical Information Broadcast System (TIBS) waveform within a distributed real-time, programmable context. For SPAWAR's Digital Modular Radio (DMR) program, Dr. Bard is the inventor of the CORBA-based modem design for the complex MIL-STD 188-series DAMA waveforms. Dr. Bard will explore the many specific issues of JTRS programs, implementations and compliance in his upcoming, highly anticipated book, "Software Communications Architecture (SCA) — Practical Waveform Deployment", due Fall 2002.

SOFTWARE DEFINED RADIOS

I. A BLUEPRINT FOR UNDERSTANDING SDR

- An Advance Look at Emerging International, Military and Commercial Architectures
- Finding New Business Opportunities with SDR
- What New Capabilities are Now More Economically Viable in SDR?
- How Can SDR Improve:
  - Interoperability Between the Services?
  - Efficiency of Spectrum Usage?
  - Waveform Portability and Reuse?

II. CURRENT AND FUTURE SDR PROGRAMS

- Joint Tactical Radio System (JTRS)
- Digital Modular Radio (DMR)
- Joint Combat Information Terminal (JCIT)
- Army's Near Term Digital Radio (NTDR)
- Zebra Systems
- Joint Technical Terminal (JTT)
- Specific Limitations of Current Programs
- Examining the Architecture Trade-offs Between Programs

III. JTRS: THE FUTURE OF SDR?

- Background and Current Status
- Is the SCA an Architecture or an Implementation?
- 3 Key Challenges JTRS Must Overcome
- Why is the Software Communications Architecture Fundamental to JTRS success?
- What does It Mean to be JTRS compliant?

IV. TOOLS & TECHNIQUES FOR CONSTRUCTING AN SDR ARCHITECTURE

PART 1: BUILDING A SOFTWARE COMMUNICATIONS ARCHITECTURE (SCA)

- Investing in Your Infrastructure & Services
- Key Insights on SCA's Layers
- The Real Impact of SCA Networking
- Grasping the SCA Hardware Architecture
- Understanding the SCA Operating Environment
  - PSE-52
  - Services
  - Core Framework
  - Domain Profile
  - XML
- Utilization of Application Factories
- Minimalist Interpretation for SCA Compliance

PART 2: IMPLEMENTING SDR HARDWARE COMPONENTS

- The Real World of Smart Antennas
  - Type I, II, III
- Getting Results with Programmable Analog Filters
- Down Conversion
  - Digital RF
  - Zero IF
  - Hybrid Heterodyne
- A Formula for Bandwidth Control
- Coping with Analog-to-Digital Conversion/Digital-to-Analog Conversion
- Meeting the Requirements of Up Conversion
- Understanding Adjacent Emissions
- The Power Amplifier

PART 3: INTEGRATING SDR'S DIGITAL SUBSYSTEM COMPONENTS

- Application of Reconfigurable Computing
- A Candid Assessment of Digital Signal & General Purpose Processors
- Interfacing Legacy Baseband Devices
- Unifying the Man-Machine Interface

PART 4: INCORPORATING FRAMEWORKS & MIDDLEWARE

- Middleware's role in SDR?
  - TCP/IP
  - JCIT
  - CORBA
  - JAVA
  - ACE/TAO

V. REAL-TIME DISTRIBUTED TACTICAL APPLICATIONS

- How SDR Ensures Secure & Encrypted Communications
- How Does SDR Promote Mission Reconfigurability?
- How Does SDR Achieve Real-Time Flexibility?
- SDR & Portable Command Posts
- How Does SDR Ensure International Connectivity to Prevailing Networks?

VI. A COMPLETE GUIDE TO SDR WAVEFORM APPLICATIONS

- Latest News on Distributed Object Analysis
- Coping with the Rules of Development
- Ensuring Portability
- Estimating Timing & Sizing
- The Trade-off between Packet Size & Latency
- Selecting the Right Concurrency Model
- Bottleneck Identification: Flow Modeling Tools
- Getting the Most from Threading Models

VII. GUIDELINES FOR CREATING AN SDR

- Life Cycle Cost Comparison
- Expert Insights on Development Environments
- Never Underestimate the Infrastructure!
  - Tools for Confidence Testing
  - Secrets to Successful Waveform Integration
- Test Cases & Live Examples
- Proven Methods for Upgrades and Regression Testing
- Determining the Real Benefits

VII. THE FUTURE OF SDR

- Analysis of SDR Market over the Next Five Years
- International Developments
- Future Trends in SDR Deployment

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