Role of Software Defined Radio in Public Safety Communications

Description: SDR aims to solve the two most challenging issues facing wireless communications today: compatibility and spectrum usage. The base station segment of the software defined radio communications industry requires flexible signal processing capabilities to support many waveform types simultaneously, to host complex, special-purpose waveforms, and detect and cancel interference using digital techniques. As the software radio industry matures, the demand for these base stations will grow as military, civilian, and commercial users take advantage of its increased reliability and capacity. The portable SDR industry, though is still behind, expected to grow and equip first responders and military personnel.

SDR is a logical evolution of the wireless industry, which deals with multitude of standards and frequency bands-it allows supporting all these variables in one device, making interoperability issue non-existing. Marring the best of digital signal processing and advanced software, SDR is not a technology of the future, but the technology of today. Still with many limitations due the current technological status, SDR moving from the defense industry, where it was in existing from the 90th, to many branches of government and commercial applications.

Maybe the most important area of SDR applications is public safety radio. Governments are spending billions of dollars to equip first responders with the most advanced means of communications, and still face the problem of interoperability between various agencies. Even two prevailing standards-P25 and TETRA-still have to deal with such issues as exhaustive spectrum consumption and various frequency bands. SDR is the solution for solving these issues.

This report provides the analysis of SDR technology and markets with emphasis on the public safety radio application. It shows advantages and limitations of SDR at the present time, technology specifics, and stresses that SDR potentially allows to achieve a user dream: to build one universal device capable to support multiple national and international wireless standards in almost any frequency band. Current technological level and associated cost do not allow to make this dream a reality – most of SDR development is concentrated on base stations, leaving implementation of the universal portable to the later time, though military use a bulky SDR portable even now.

We expect this trend to continue with appearance more and more advanced portable, which suffer from weight, power consumption and cost limitations. The SDR evaluation in some way may be compared with the cellular technology development, which went from limited applications of the 80th to almost universal use of present.

We provided the market analysis, supported by our research and included a number of variables. The analysis showed that the majority of the market still belongs to military, and is gradually shifting to commercial areas as well. Police, firefighters, and other government agencies will benefit form SDR use in a great degree.

This report is written in the time when the civilized world is at war with terrorism. Addressing the technical aspects of effective communications between first responders and agencies involved in this war at the first line of offense and defense is very important. This is why we see the report as a necessary document to analyze SDR technologies and the market; and SDR application for public safety radio.

This report consists of the two major parts and it addresses the following major items:

- SDR Technology
  Standardization process
  Trends
  Requirements
  Specifics
  Roadblocks
  Applications
  Architectures.

- Market
The significance of this report is difficult to overestimate. The document analyzes a complex of issues associated with the use of SDR for public safety communications. We show technological trends and developments of the market for radios, and we stress the importance to equip the police, firefighters and others with the most advanced means of communications. In the today environment, this is not a luxury, but a matter of live or death for many people. We found lack of the information in this arena, especially in the public domain.

Research Methodology

Considerable research was done using the Internet and information from various Web sites was studied and analyzed; evaluation of publicly available marketing and technical publications was conducted. Telephone conversations and interviews were held with industry analysts, technical experts and executives. In addition to these interviews and primary research, secondary sources were used to develop a more complete mosaic of the market landscape, including industry and trade publications, conferences and seminars.

The overriding objective throughout the work has been to provide valid and relevant information. This has led to a continual review and update of the information content.

Target Audience

This report is important for the government agencies involved in the first response to critical situations. It is necessary for technical departments of such agencies to have a document, which in simple language explains radio technology and architectures of SDR supporting public safety communications. They also need to have a picture of the market with the major players and their portfolios to select the right equipment.

For vendors this report provides valuable information on technologies and competition. It also supports these vendors with the market assessment.

Contents:

1.0 Introduction
1.1 General
1.2 History
1.3 First Responders
1.4 Current Status of SDR
1.5 Promise
1.6 Why SDR?
1.7 New Concept
1.8 Scope and Goals
1.9 Research Methodology
1.10 Target Audience

2.0 Interoperability Issues in Public Safety Communications
2.1 Road to Interoperability
2.1.1 Categories
2.1.2 Five Elements of Interoperability
2.1.2.1 Coordination and Partnerships
2.1.2.2 Spectrum
2.1.2.3 Standards and Technology
2.1.2.4 Security
2.1.2.5 Funding
2.2 Emergency Communications: Features
2.2.1 New Technology

3.0 SDR Technology
3.1 Wireless Evolution
3.1.1 Multiple Choices
3.2 Versatility
3.2.1 SDR Forum Position
3.2.2 Gaps
3.3 FCC Position
3.4 SDR In Actions
3.4.1 Directions
3.4.2 Multifunctionality
3.4.2.1 Multi-modal
3.4.2.2 Multi-band/Multi-standard
3.5 SDR Contribution-Public Safety Communications
3.6 Decisions
3.7 Non-technical Issues
3.7.1 Regulatory Issues
3.8 Features Summary
3.8.1 Elements
3.9 SDR and OSI
3.10 Developments

4.0 Applications
4.1 Commercial
4.2 SDR and Military
4.2.1 SCA
4.2.1.1 Commercialization
4.3 SDR: Applications Benefits
4.3.1 Benefits to Public Safety Communications
4.3.2 SDR and Spectrum
4.3.3 Migration

5.0 Projects

6.0 Market
6.1 Landscape
6.2 Features
6.2.1 Cost
6.3 Different Perspective
6.4 Drivers-Summary
6.5 Market Forecast
6.5.1 Model Assumptions
6.5.2 Estimate
6.5.3 Public Safety Radio Market Specifics

7.0 Market Players
Adaptix (SW, Broadband Access)
AeroStream (Consumer, Military Radio)
AirNet Communciations (SDR Base Stations)
Altera (Automotive SDR)
Analog Devices (Chipsets)
Array Systems Computing (DSP)
BitWave Semiconductor (Chipsets)
Cambridge Consultants (802.16e)
Cisco (802.11a)
CRC –Canadian Research Center (Software)
Harris (Radio Systems)
Hypres (Chipsets)
ICS (Modules, Software)
ISR Technology (Platforms)
Kaben (Chipsets)
Lyrtech (DSP and FPGA development solutions)
Morpho (Software)
Mercury Computers Systems (Toolsets)
Motorola (SDR in Public Safety)
NavSys (GPS and Communications)
Nova Engineering (Platforms)
Objective Interface (Software)
Pentek (SDR Boards)
picoChip (ICs)
PrismaTech (SDR Development Environment)
RadioScape (SDR Audio)
Rockwell Collins (Radios)
Spectrum Signal Processing (Platforms)
Sundance (Platforms, Modules)
Thales (Radio)
Wind River (Software)
Xilinx (Chips, SDR Development Kits)
Zeligsoft (Software Tools)

8.0 Conclusions

List of Figure and Tables
Figure 1: Simplified Block-Diagram of SDR System (Tier 2)
Figure 2: SDR Market Estimate for the Military Segment ($B)
Figure 3: SDR Market Estimate for Commercial Segment ($B)
Figure 4: SDR Market Estimate ($B)
Figure 5: Market Estimate for SDR Software ($B)
Figure 6: Market Estimate for SDR Hardware ($B)
Figure 7: Market Estimate for SDR Base Stations ($B)
Figure 8: Market Estimate for SDR Portables ($B)
Figure 9: SDR market Geography (2006)
Figure 10: Total Public Safety Radio Market ($B)
Figure 11: Market Estimate: Public Safety Radio (SDR-based) in $M

Table 1: Multiple Tiers
Table 2: SDR Market Drivers

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