

Wireless Innovation Forum's Top 10 Most Wanted Wireless Innovations

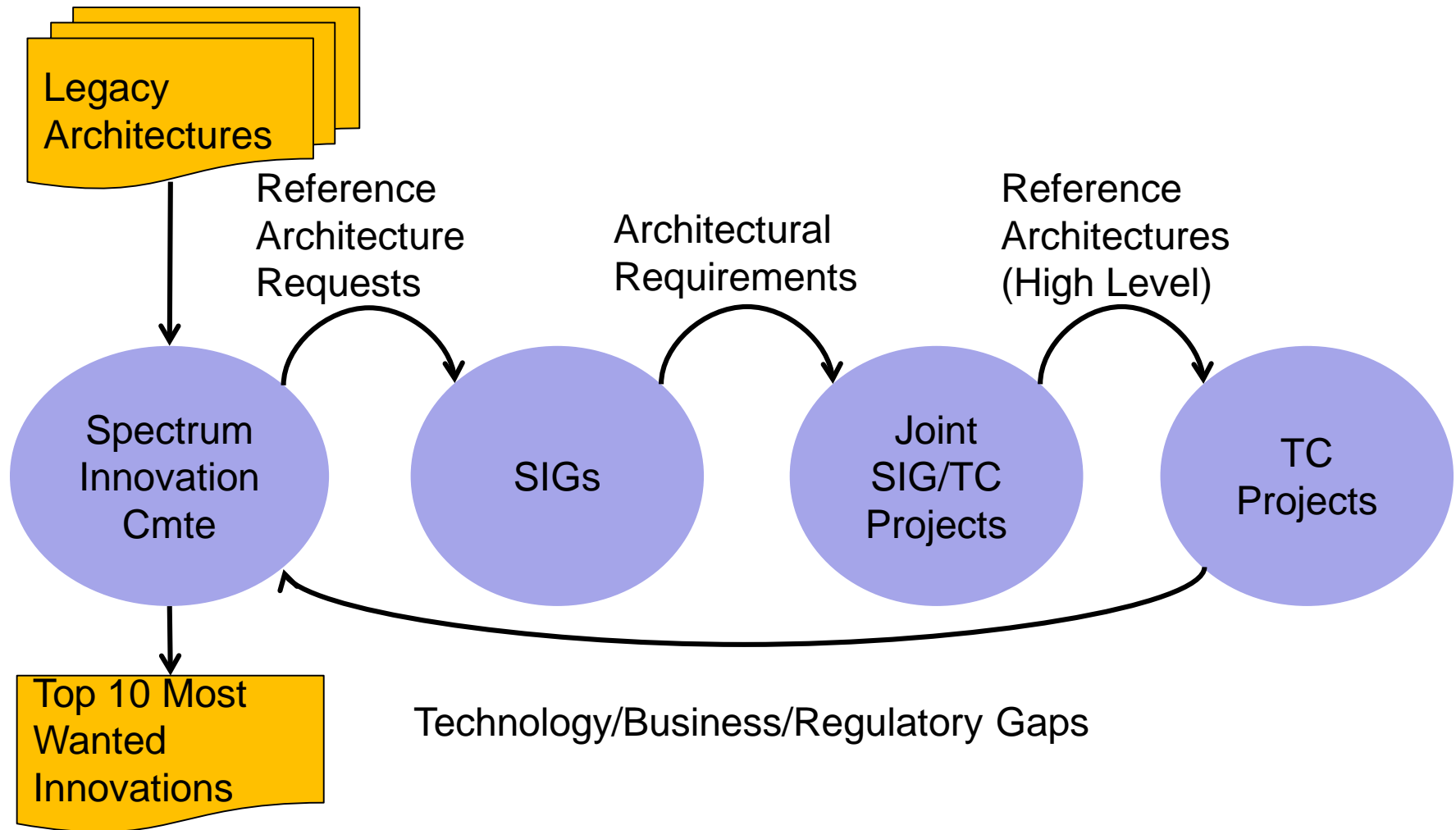
New Version 4.0 (Pending Approval)

What is a Most Wanted Wireless Innovation?

...innovations, either **technical, business or regulatory**, that if realized, would address various shortcomings in existing wireless communications from the point of view of the different stakeholders in the wireless industry value-chain...

Source: http://groups.winnforum.org/winnforum_top_ten

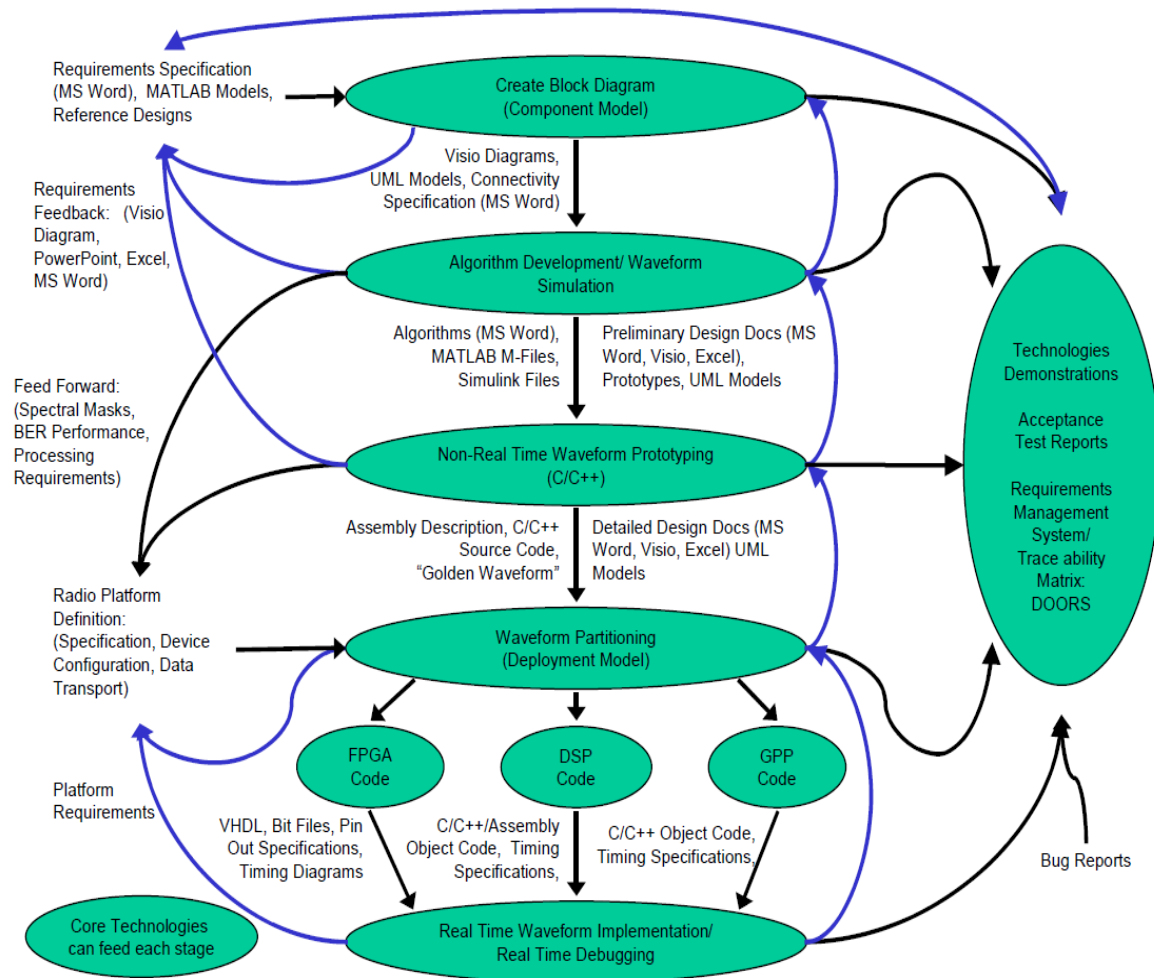
High Level Process



Slide 3

Innovation #1:

Techniques for Efficient Porting of Waveform Applications Between Heterogeneous Platforms (REVISED)

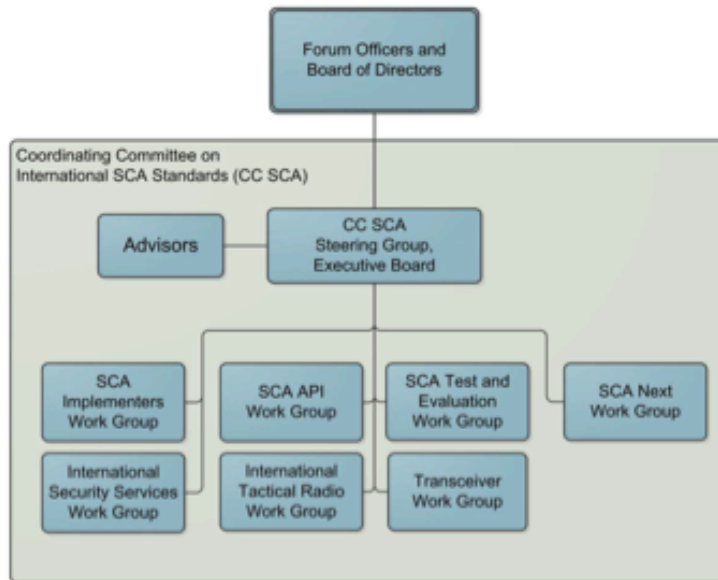


Source: <http://groups.winnforum.org/d/do/1566>

Innovation #1 Forum Activities

Structure for Coordinating Committee on International SCA Standards

17 April 2013



AEPs Improvements for SCA 4.1

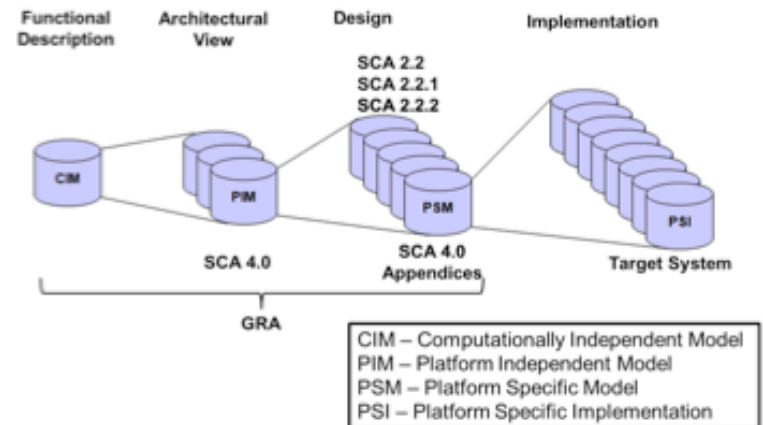
Document [PD_SCA_2013_003](#)

IDL Profiles Improvements for SCA 4.1

Document [PD_SCA_2013_002](#)

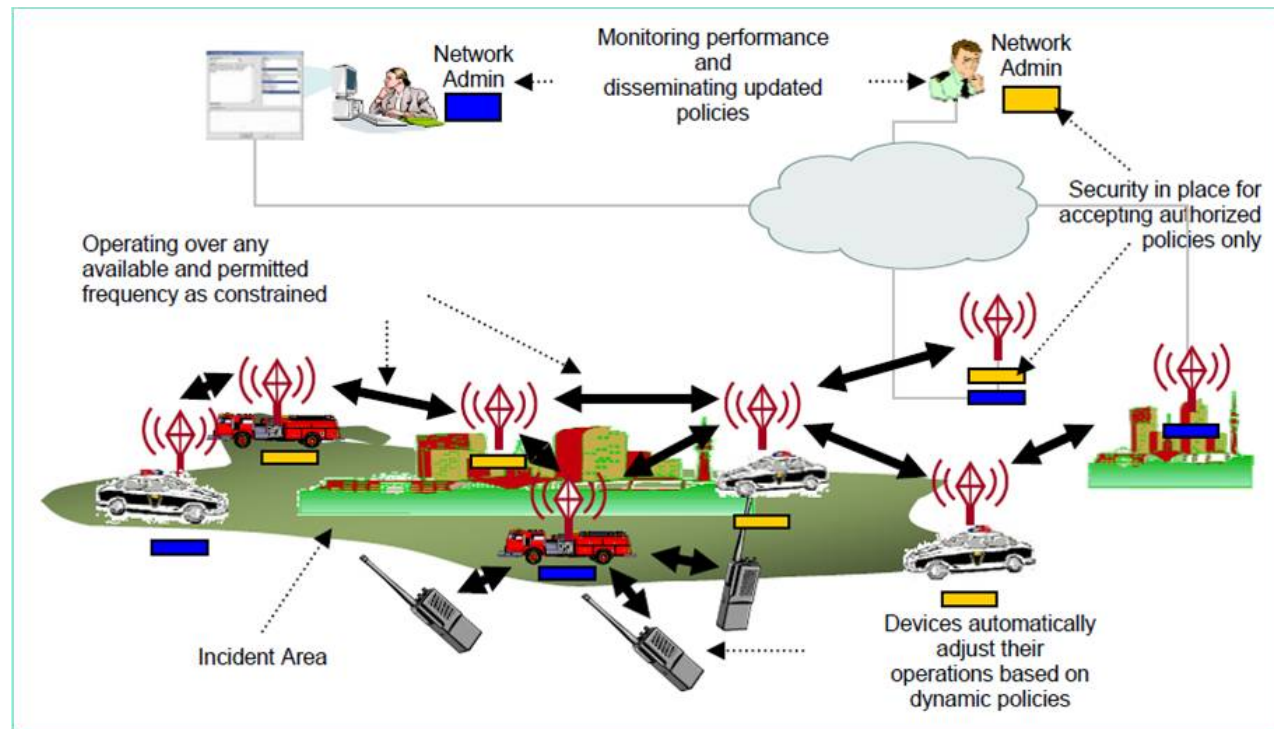
Integrated Communications System Modeling (ICSM) Group

[PAC-2012-002](#)



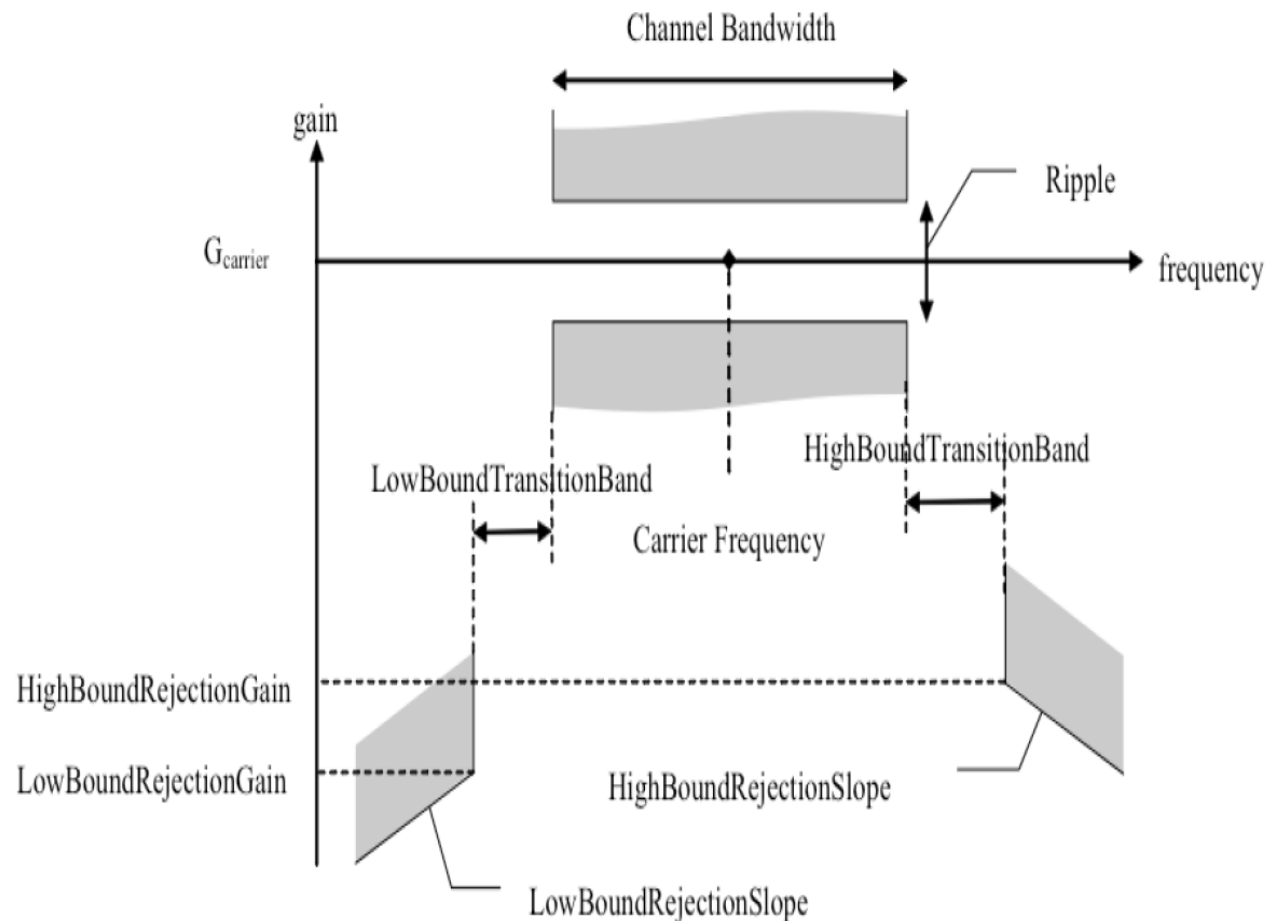
ICSM: Develop and integrated systems model for communications systems that can be used as a foundation for software-based communications systems across a variety of domains, hardware types and applications. This model is developed using a SysML/UML tool to represent and capture the architecture aspects of the communications system model.

Innovation #2: Network Management of Mobile Ad- Hoc Radios (NEW)



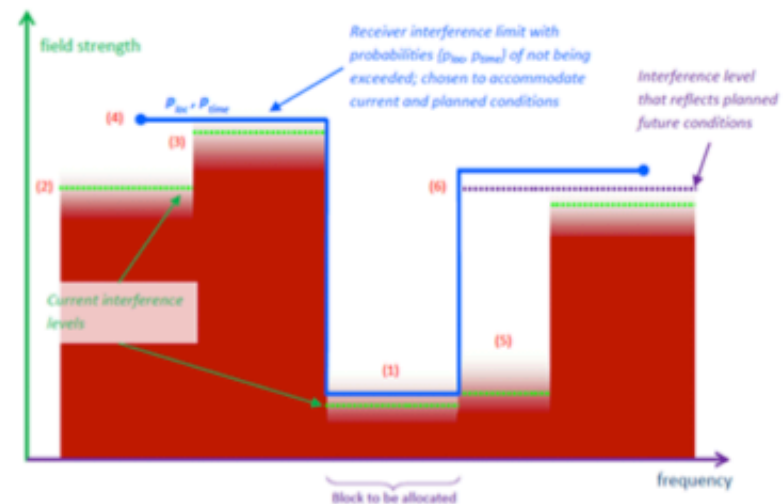
Source: SDRF-07-R-0024-V1_0_0_700_Mhz.pdf

Innovation #3: Receiver Performance Interference Thresholds (REVISED)

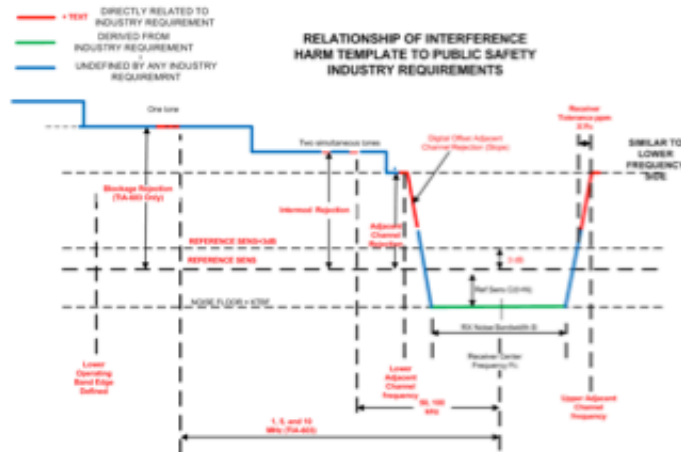


Innovation #3 Forum Activities

Receiver Performance Guidelines and Evaluation Criteria Task Group PAC-2012-004



Reference Sensitivity and Relationship to Floor of Harm Template



- Reference Sensitivity is signal level where a min received signal quality is achieved (usually 5% BER or 12 dB SINAD)
- $\text{Ref Sens} = \text{Noise Floor} + C/N_{\text{ref}}$
- C/N_{ref} varies with modulation (values in TSB-88)
- $\text{Noise Floor} = KTBF$
- $B = \text{RX Filter Noise Bandwidth}$ Chosen to balance Adj Ch Rejection vs Sensitivity

Innovation #4:

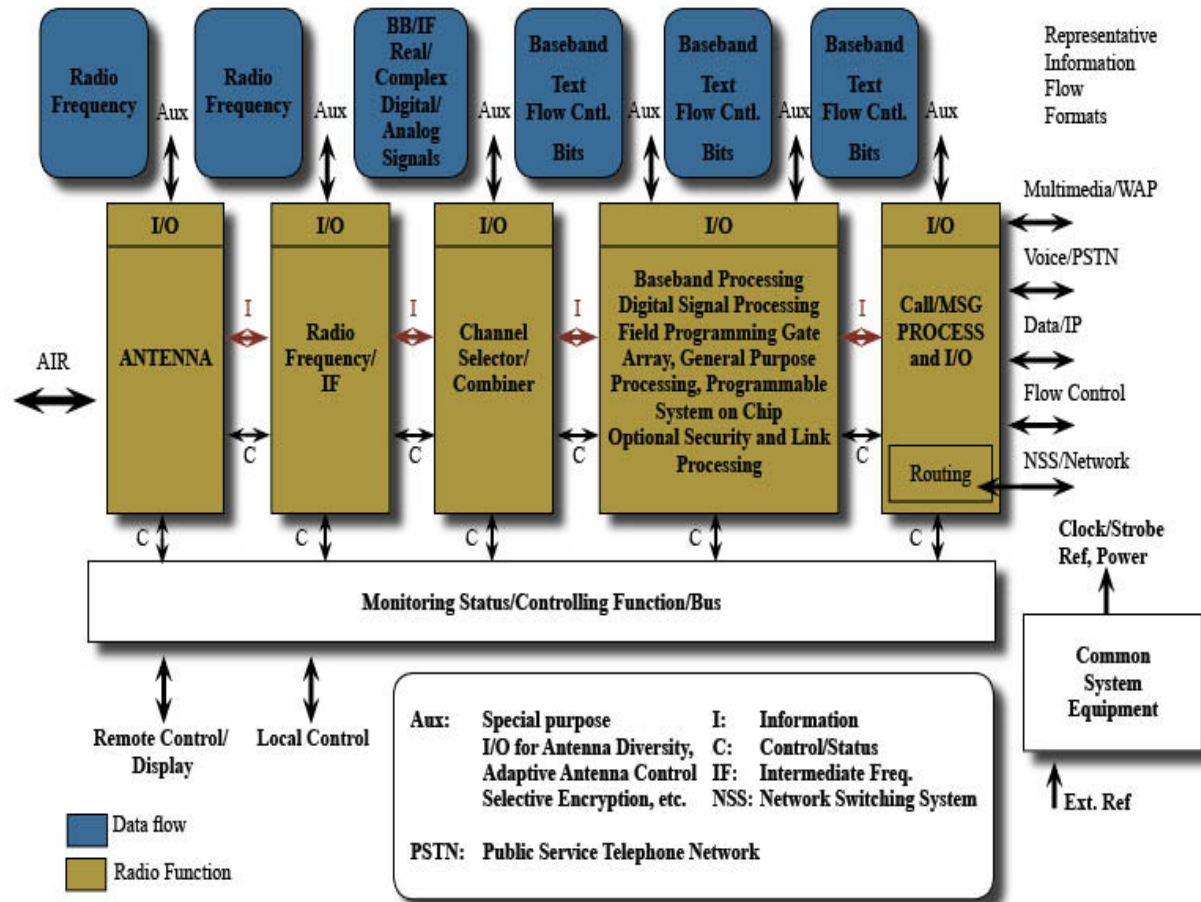
Low Cost Wide Spectral
Range RF Front-End
(Multi-octave Contiguous)
(Tx,Rx) (REVISED)

Innovation #5:

Techniques to Minimize
Power Amplifier Spectral
Regrowth in Non-
contiguous Spectral
Environment (REVISED)

Innovation #6

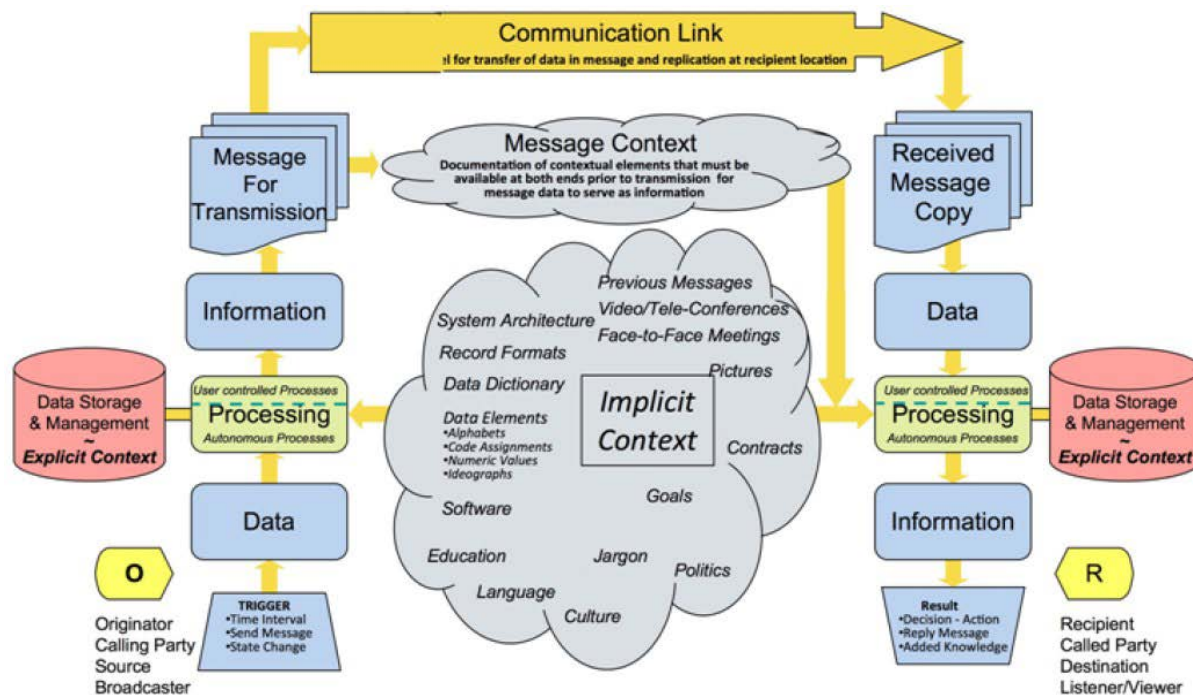
Increase Communications
Time on Battery Charge
by an Order of Magnitude
(REVISED)



Source: <http://groups.winnforum.org/d/do/1574>

Innovation #7

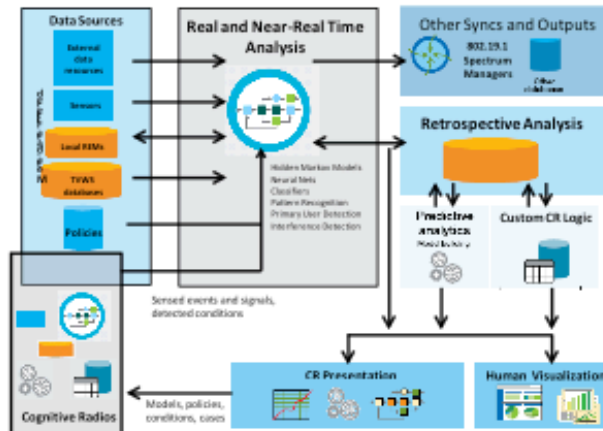
Context Aware Cognitive Radio



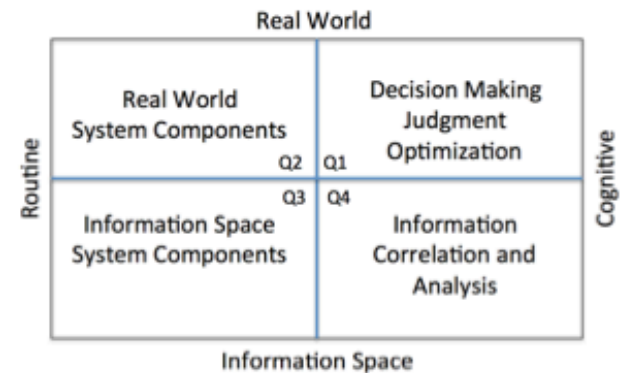
Source: <http://groups.winnforum.org/d/do/5689>

Innovation #7 Forum Activities

Big Data Tools for Big RF Solutions

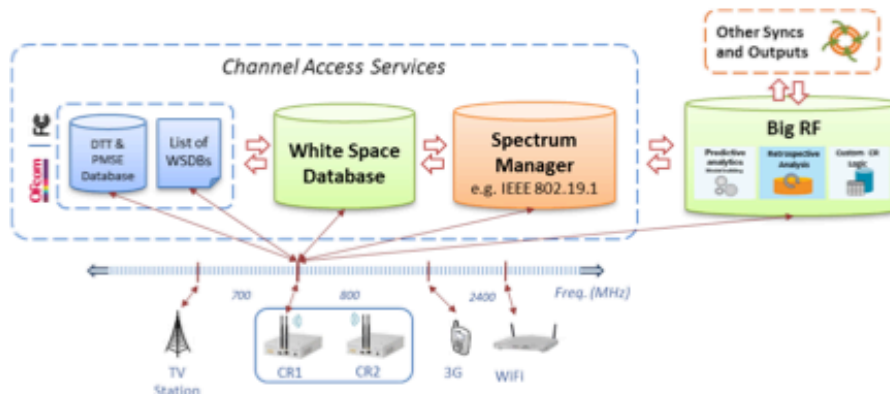


Wireless Information System Descriptive Model (WISDM).



Information Process Architecture (IPA) v3: Context Aware Cognitive Radio

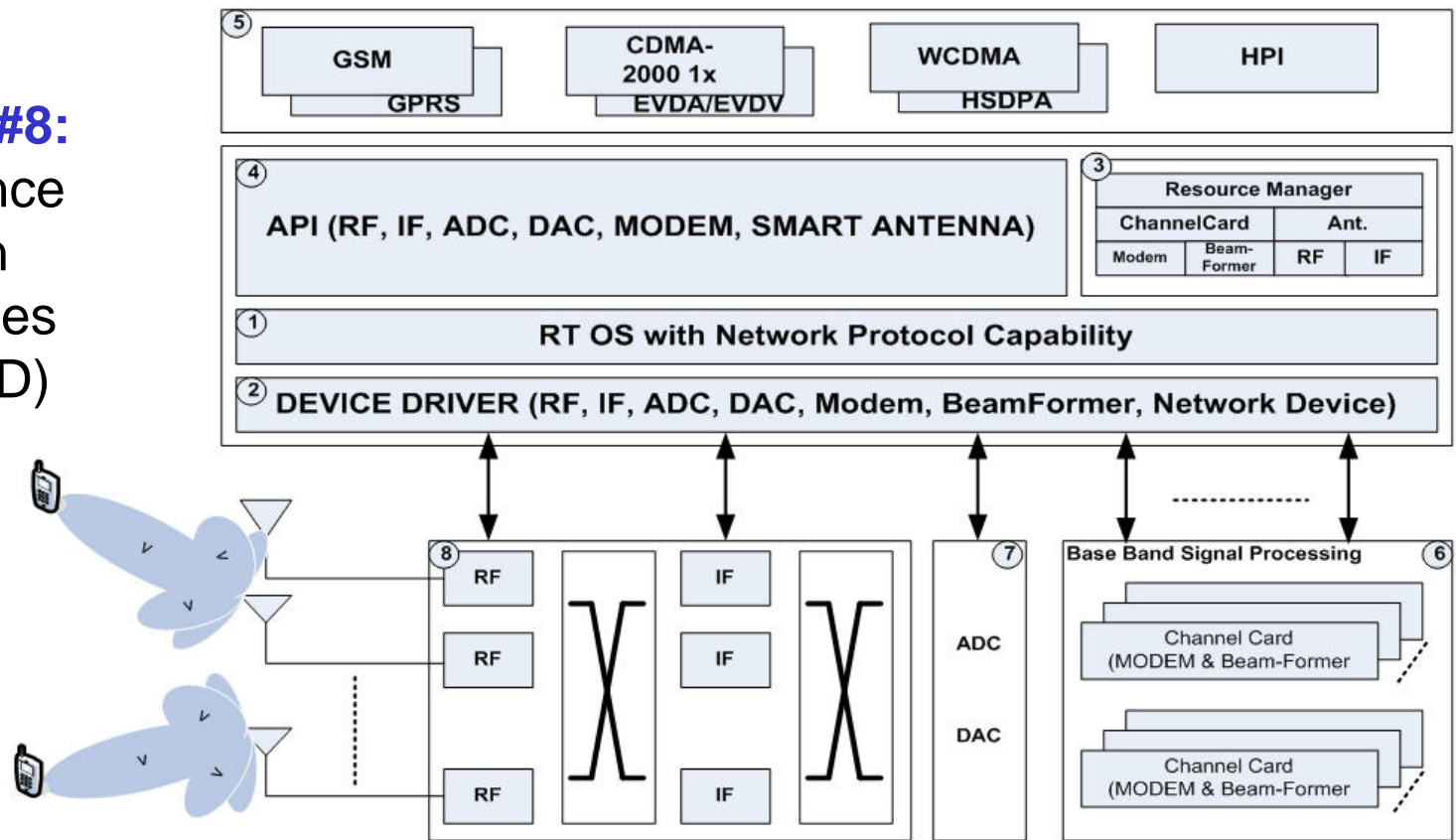
PAC-2013-001



Big RF in White Space Database Ecosystem

Big RF can provide real time intelligence to improve the performance of channel access services provided by white space database providers and spectrum managers and to the decisions of individual cognitive radios

Innovation #8: Interference Mitigation Techniques (REVISED)



Source: <http://groups.winnforum.org/d/do/1555>

Innovation #8 Forum Activities

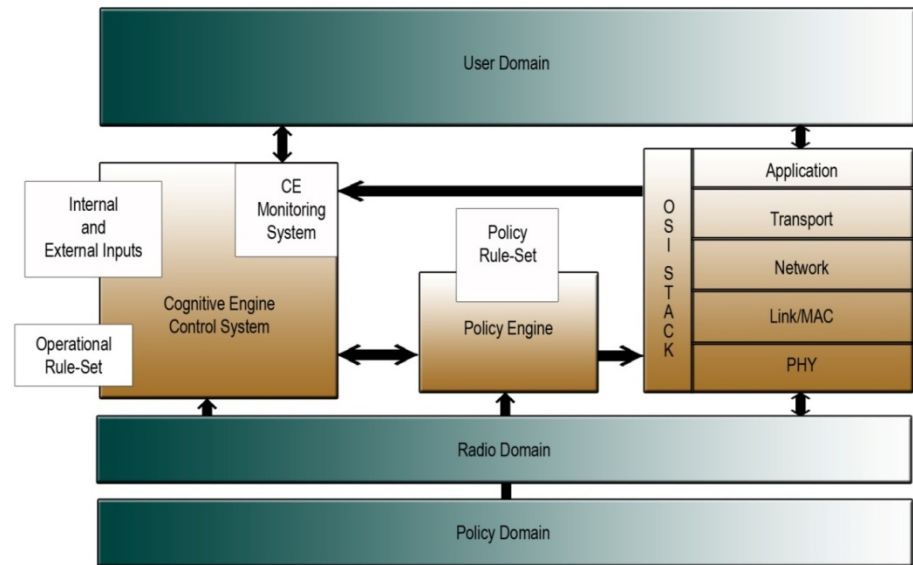
Key Focus of Proceedings and Workshops

Sample Titles of Proceedings and workshops in the WinnF Library

- Strategies for Pushing Software Radio Closer to the Antenna
- An Efficient Digital Pre-Distortion Filter For Ultra-Wideband QAM Modems
- Interference Mitigation using Adaptive Polarization
- A Tunable Wideband RF Front-End for SDR
- IF and Baseband Signal Processing
- Implementation of an ASIP based SDR platform for MIMO OFDM transceivers
- Antenna and Transceiver Architectures
- Tutorial for Fundamental Hardware System Design for SDR System
- A Cognitive Radio with Multi-antenna Interference
- ANALOG-TO-DIGITAL Conversion – The bottleneck for Software Defined Radio Frontends
- Single-Configurable Chip Solution for Digital-Front End with Supporting Multiple Standards
- RF Sampling Software Defined Radio for HF Band
- Cascade Linear Phase Recursive Half-Band Filters Implement the Most Efficient Digital Down-converter
- Reconfigurable Continuous-Time Delta-Sigma Analog-to-Digital Converters
- An Analysis of Active Interference Cancellation for Wideband OFDM System from Multi-band
- Improving MIMO Sphere Detection Through Antenna Detection Order Scheduling
- Adaptive Antenna Array to Improve Cognitive Radio Performance
- The ADCs of SDR
- RF System Aspects for SDR - A Tutorial

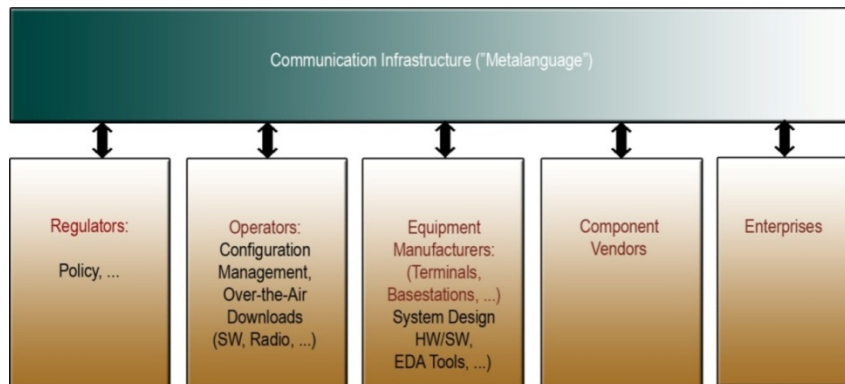
Innovation #9:

Standardize
computer
interpretable policy
language for
cognitive radio
(REVISED)



Wireless Innovation Forum Cognitive Radio Concept
Architecture

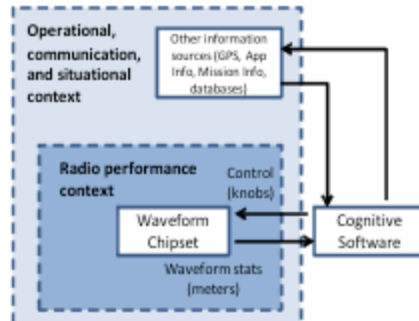
Source: <http://groups.winnforum.org/d/do/1563>



Source: <http://groups.winnforum.org/d/do/1562>

Innovation #9 Forum Activities

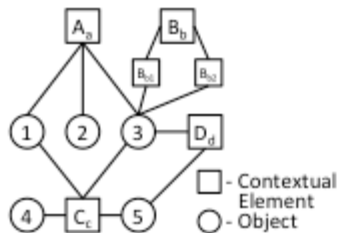
The Role of Context in Cognitive Systems



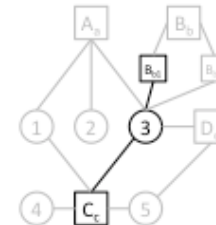
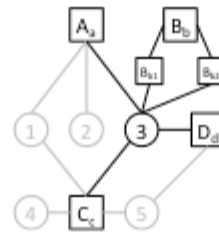
A Context-Aware Cognitive Radio incorporates sources of information beyond what is available to a baseband chipset.

WinnF - Modeling Language for Mobility (MLM)

Supporting IEEE 1900.5 Working Group (WG) on Policy Language and Architectures for Managing Cognitive Radio for Dynamic Spectrum Access Applications. Defining a vendor-independent set of policy-based control architectures and corresponding policy language requirements for managing the functionality and behavior of dynamic spectrum access networks.

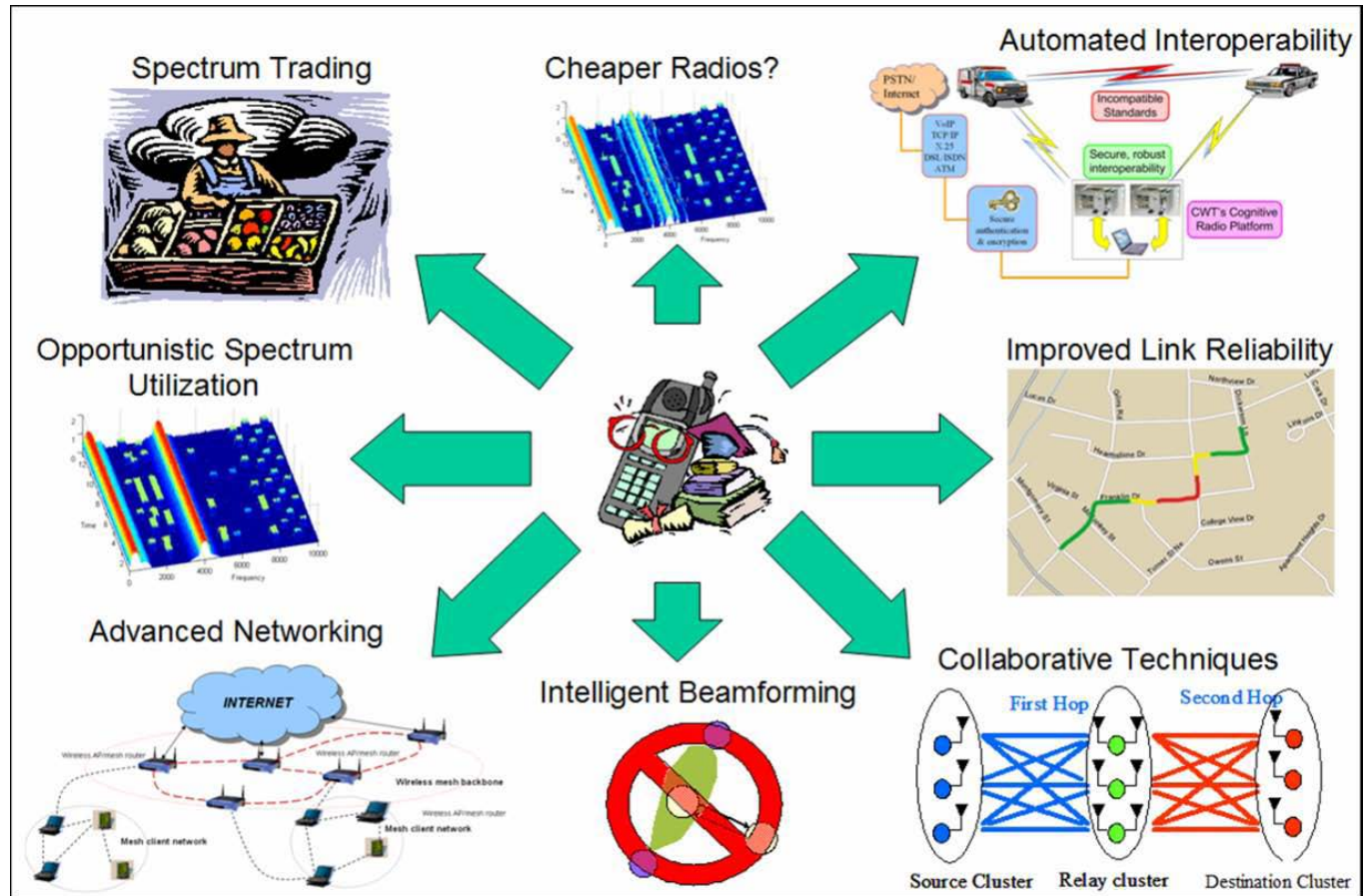


System Contextual Model



Contextual & Intext Model. Left: The complete context for Object 3 includes six other modeling elements. Right: An intext (perspective) for Object 3 which only depends on two modeling elements

Innovation #10: Flexible Regulatory Framework for Temporary, Cooperative and Opportunistic Access (REVISED)

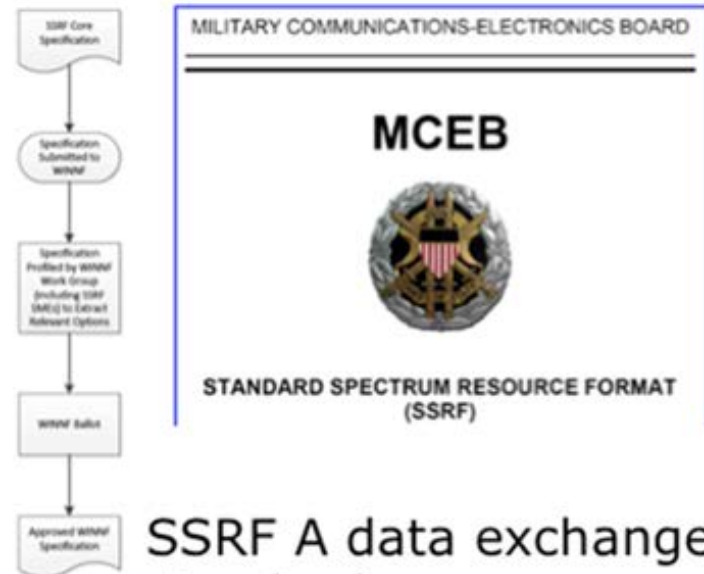


Innovation #10 Forum Activities



Wireless Innovation Forum Advocacy
Agenda

Document WINNF-R-12-0007



SSRF A data exchange standard:

- Explains how to pack datasets for transmittal
- Explains how to unpack received datasets
- Performs quality-checking *IF* desired

Next Steps

Promotion and support of Research and Development programs addressing target innovations

Continuous evolution...



Wireless Innovation Forum Memberships and Partnerships