Electronic Warfare (EW)  
S&T Community of Interest (CoI)  
Overview

DISTRIBUTION A. Approved for public release. Distribution is unlimited. Case number: 18-S-0989.

Dr. Jeffrey Boksiner, ST (Chair, EW CoI)  
U.S. Army Research, Development and Engineering Command  
Communications-Electronics Research, Development and Engineering Center  
Intelligence and Information Warfare Directorate

21 March 2018
# EW COI Membership

## COI Steering Group

<table>
<thead>
<tr>
<th>Service</th>
<th>Principal</th>
<th>Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Force</td>
<td>Mr. Dale Parsons</td>
<td>Mr. Joseph Koesters</td>
</tr>
<tr>
<td>Army</td>
<td>Dr. Jeffrey Boksiner</td>
<td>Dr. Charles Dietlein</td>
</tr>
<tr>
<td>Navy</td>
<td>Dr. Dan Green</td>
<td></td>
</tr>
<tr>
<td>ASD(R&amp;E)</td>
<td>Dr. Karl Dahlhauser</td>
<td></td>
</tr>
<tr>
<td>MITRE Support</td>
<td>Mr. Marc St. John</td>
<td></td>
</tr>
</tbody>
</table>
Role of the Electronic Warfare (EW) Community of Interest (COI)

- Be the EW S&T leadership body for the DoD
- Define cross-cutting EW S&T investment strategy
- Develop experimentation strategy & recommendations
- Propose/define collaborations, e.g., integrated EW-Cyber effects
- Engage the community in its entirety
  - Government, Industry, Academia, International
- Develop quantifiable metrics
  - How will we know we’ve met goals?
  - How do we know what level is good enough?
  - By when?
- Incorporate (or reference) IRAD into COI strategy/roadmaps
Technical Challenges (TCs)

1. Effectively outpace adversary's tactical options

2. Spatially and temporally diverse awareness, action, and response

3. Prevent or disrupt the adversary's ability to engage our forces

4. EO/IR/RF receivers & transmitters with wideband and extended spectral coverage

5. Software defined; standard interfaces; EMI avoidance; compatible waveforms

6. Blue force protected from jamming and EMI with minimal impact on system performance

Electronic Protection

Interoperable

Pre-emptive Proactive

Distributed Coordinated

Cognitive Adaptive

Broadband Multispectral
TC1: Cognitive, Adaptive Capabilities

• Develop the ability to effectively outpace adversary decision and technical options, using:

  – Real time learning and predictive reasoning software algorithms
  – Autonomous asset and resource optimization in response to threat behavior
  – Automatic synthesis of countermeasure techniques against unknown threats
  – Methods for assessing EW effectiveness
TC2: Distributed / Coordinated (Network-Enabled)

- Achieve spatially and temporally diverse responsiveness to dense and complex threat environments
  - EW architectural “layering” & integrated kinetic/non-kinetic resources
  - EW Battle Management and common/shared electronic order of battle
  - Real time fusion of spectral/temporal knowledge from disparate assets
  - Distributed coherent phase control for sensing and attack
TC3: Preemptive / Proactive Effects

- Prevent or disrupt the adversary’s ability to find, fix, track, target, and engage our forces
  - Real-time active/passive sensing of “silent” threats
  - “Spectrally agnostic” countermeasures
  - Early kill chain techniques and methods
  - Multispectral signature emulation
TC4: Broadband / Multispectral Systems

- Enable the widest possible spectral extent to our control of the electromagnetic spectrum

  - EO/IR/RF receivers & transmitters with wideband and extended spectral coverage
  - Advanced spectrum processing components (filters, modulators, etc.)
  - Wide-band, high power apertures (antennas, windows, beam control, etc.)
  - Spectroscopic signal sensing and ID

**Broadband:**
- Covers all bands at once
- Detects wideband threats

**Multispectral:**
- Different phenomena, observables occur at different wavelengths
TC5: Interoperable & Compatible

- Achieve timely deployment or insertion of advanced EW capabilities in response to rapidly changing conditions with minimal degradation to friendly capabilities
  - Adaptive protocols and standard firmware/hardware interfaces
  - Techniques and waveforms usable across any EW component supplier
  - Software-defined transceivers and processors
  - Scheduling to optimize resource allocation
  - Filters and other suppression techniques, interference cancellation
• Protect against potentially deleterious effects of friendly or enemy use of the electromagnetic spectrum to enable unfettered operations in the increasingly dense electromagnetic spectrum

  – Focus on Electromagnetic Battle management (EMBM) and common aspects of EP
  – Methods to simultaneously transmit and receive through shared or closely coupled apertures
  – Predictive EM and signal modeling
  – Directionality and diversity
Technology Evolution

• **Rapid evolution/advancement in technology**
  - Signal density and complexity
  - Systems becoming adaptable and software defined
  - Global advances in electronics

• **Global focus on Autonomy, Artificial Intelligence and Machine Learning**
  - Opportunity to use AI to understand/manage complexity & shorten response times
  - Training data
  - Battle Damage Assessment
  - Test and evaluation
  - Validation/trust