RF Initiatives

Electromagnetic Maneuver Warfare (EMW)

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DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.
An Uncertain Future

Advancing Threats

Challenging Resources

Smartly leverage RF resources to achieve the advantage

More Demanding Environments

The President’s Fiscal Year 2014 BUDGET

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Electromagnetic Maneuver Warfare

- Fundamental warfighting domain
- Enable rapid, agile and synergistic electromagnetic exploitation
- Increase affordable non kinetic options
- Exploit the EM-cyber environment
- Collective effects are more effective than individual RF actions

“Enhances our ability to maneuver freely in the electromagnetic spectrum, while denying adversaries’ ability to do the same.”

ADMIRAL JONATHAN GREENERT, U.S. NAVY, CHIEF OF NAVAL OPERATIONS, BEFORE THE HOUSE ARMED SERVICES COMMITTEE
Know, shape, and exploit the electromagnetic environment for military advantage:

- Demand modular, open and scalable systems
- Enable algorithm and technique re-use across systems
- Provide agile and flexible RF access
- Achieve real time electromagnetic battle management
EMW Toolbox

• Design and build affordable distributed RF systems that can:
  – coordinate and deliver specific spatial-spectral-temporal RF effects on demand
  – support arbitrary time shared and concurrent functions
  – perform beyond narrowly focused functions
  – deliver open and accessible spatial, spectral, and temporal deconfliction, scheduling, execution, reception, processing, exchange, and fusion
  – Incrementally insert, reuse, and improve capabilities

Agile Flexible Reconfigurable Hardware and Software to Win the Electromagnetic War
Industry Opportunities

• Electronics
  – Wideband, high power, linear RF components
  – Opto-electronics for interconnects

• Apertures
  – Efficient, wideband, affordable and manufacturable

• Tools
  – Logic and software portability
  – Spatial and spectral visualization and awareness

• Open Architectures
  – Modular and reusable hardware and software across systems and vendors
  – True interchangeability across common COTS interfaces – eg Ethernet
  – Government-Owned Standards

Achieve game-changing cost per channel, from RF to Ethernet
Open Architecture RF

Government Ownership of Open Architectures, Systems Specifications and Interfaces.
INtegrated TOPside (INTOP)

Consolidated SatCom for Submarines and Ships
Primary Functions:
- C thru Q Band SatCom
- 4 to 8+ Simul. Links
Secondary Functions:
- IO / EW Support
- LOS Comm Augment

Sub SatCom – TO 0002
TRL-6 goal FY-13
Transition to AdvHDR/ for all Submarines

Consolidated Low Band IO/Comm/EW
Primary Functions:
- VHF thru C Band Comm
- IO / SSEE Support
- EW Support
Secondary Functions:
- AIS
- JTIDS
- Other Omni Comm

FlexDAR – TO 000X
TRL-6 goal FY-15/16

Transitioned to SEWIP Block 2

Multibeam EW/IO/Comm
Primary Functions:
- C thru Ka Band EA
- EA Support (Rx)
- Hawklink, CDL-S
- Network Links (HNW)
- SEI/ES Support
- IO Support
Secondary Functions:
- SatCom Augment

MFEW ADM (complete)
Primary Functions:
- HPOI Acq/PDF ESM
- ASMD
- Sit. Awareness
- SEI Support
Secondary Functions:
- EA Support
- IO Support
MFEW FNC
TRL-6 FY-09
Transitioned to SEWIP Block 2

Open, Re-usable, Arbitrary RF Capabilities... Multi-function.

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Electronic Warfare

Control the Electro-Magnetic Spectrum by exploiting, deceiving, or denying the enemy use of spectrum while ensuring its use by friendly forces. Technologies include:

• High Band Electronic Sensing Technologies and High Power Amplifiers
• High Band EW Subsystem Demonstrators
• Low-Band Compact Efficient Antennas
• Effective and Responsive Automation
• See ONR BAA 14-006

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EWM-Cyber Operations

As part of Electro-Magnetic Maneuver Warfare Information research in the Cyber domain advances the science of security to ensure safe and secure operations.

- Secure software for network-enabled devices
- Securing the host and network architectures
- Automated threat mitigation, graceful degradation, remediation
- Moving target defenses
- Automated information countermeasure
- Metrics for information assurance
- Quantum computing and communication for security
RF Sensing and Deception

Sense wide area distributed picture
Discern and defeat point and distributed deception
Project consistent coherent scene
Preserve military effort, options, and resources
Summary

- Science & Technology to enable Cyber and EMW
- Demonstrate collective effects to impact affordability
- Require flexible, agile, open, reusable RF systems
- Develop RF command and control to achieve any desired effect
- Exploit what we have, add what we need

Agility and Flexibility is Essential to Win the Electromagnetic War