

# ***ONR Electronic Warfare S&T Industry Day***



# **ONR**

*Revolutionary Research . . . Relevant Results*

**16 January 2009**

**Dr. Peter Craig**

**Electronic Warfare Program Manager**

**C4ISR Department**

**Office of Naval Research**

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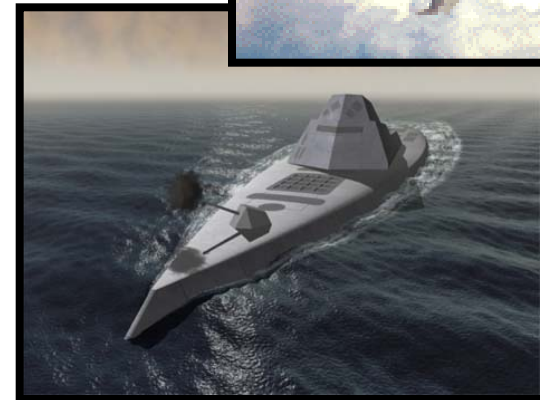
# Office of Naval Research Science & Technology



***ONR Mission:*** To plan, foster, and encourage scientific research in recognition of its paramount importance as related to the maintenance of future naval power, and the preservation of national security; and to manage the Navy's basic, applied, and advanced research to foster transition from science and technology to higher levels of research, development, test, and evaluation.

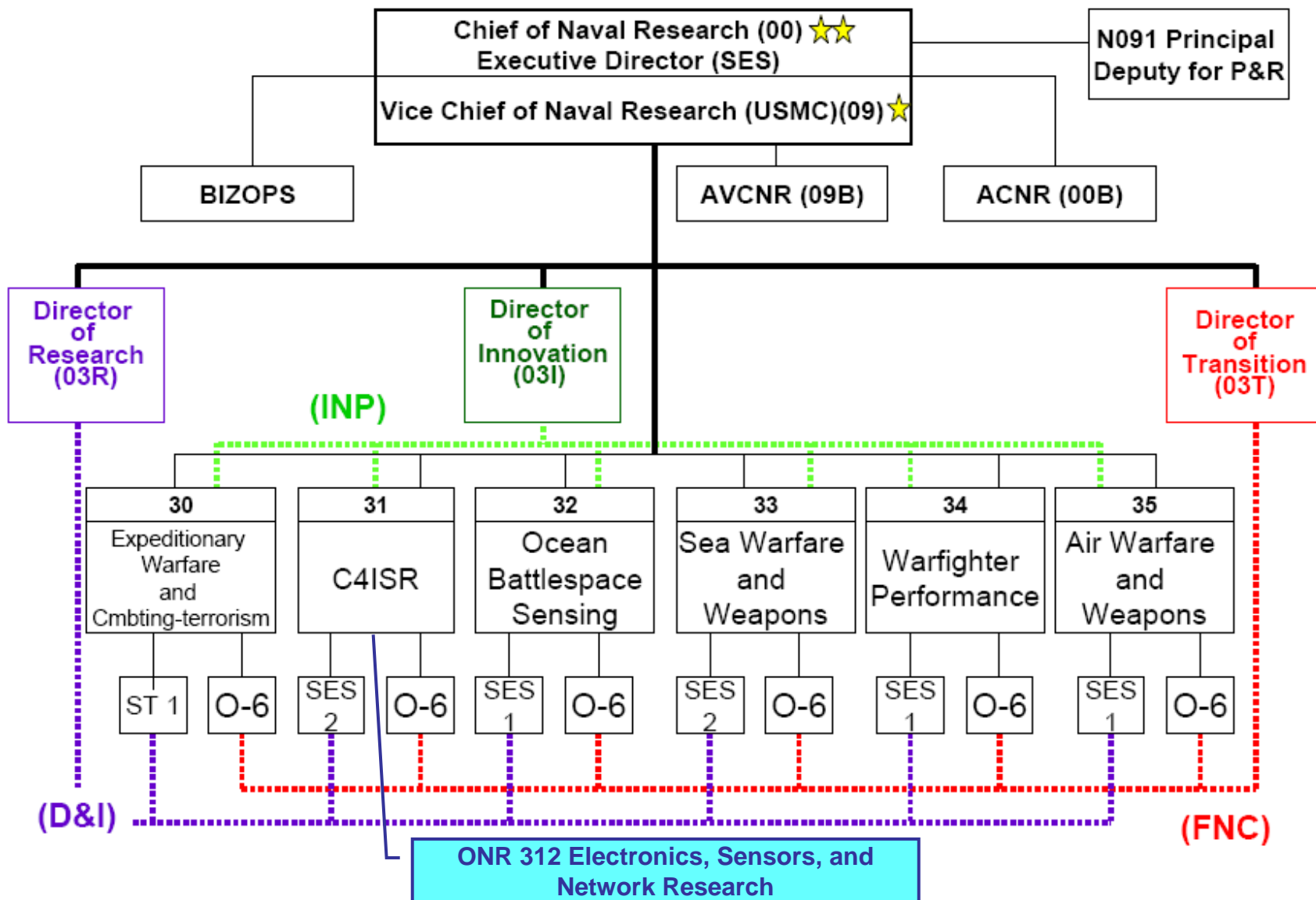
***Naval S&T Vision:*** Sponsor scientific research and technology to:

- ***Pursue revolutionary capabilities for Naval forces of the future,***
- ***Mature and transition S&T advances to improve naval capabilities,***
- ***Respond to current critical needs,***
- ***Maintain broad technology investments to anticipate and counter potential technology surprise.***





# Office of Naval Research Organization (S&T)

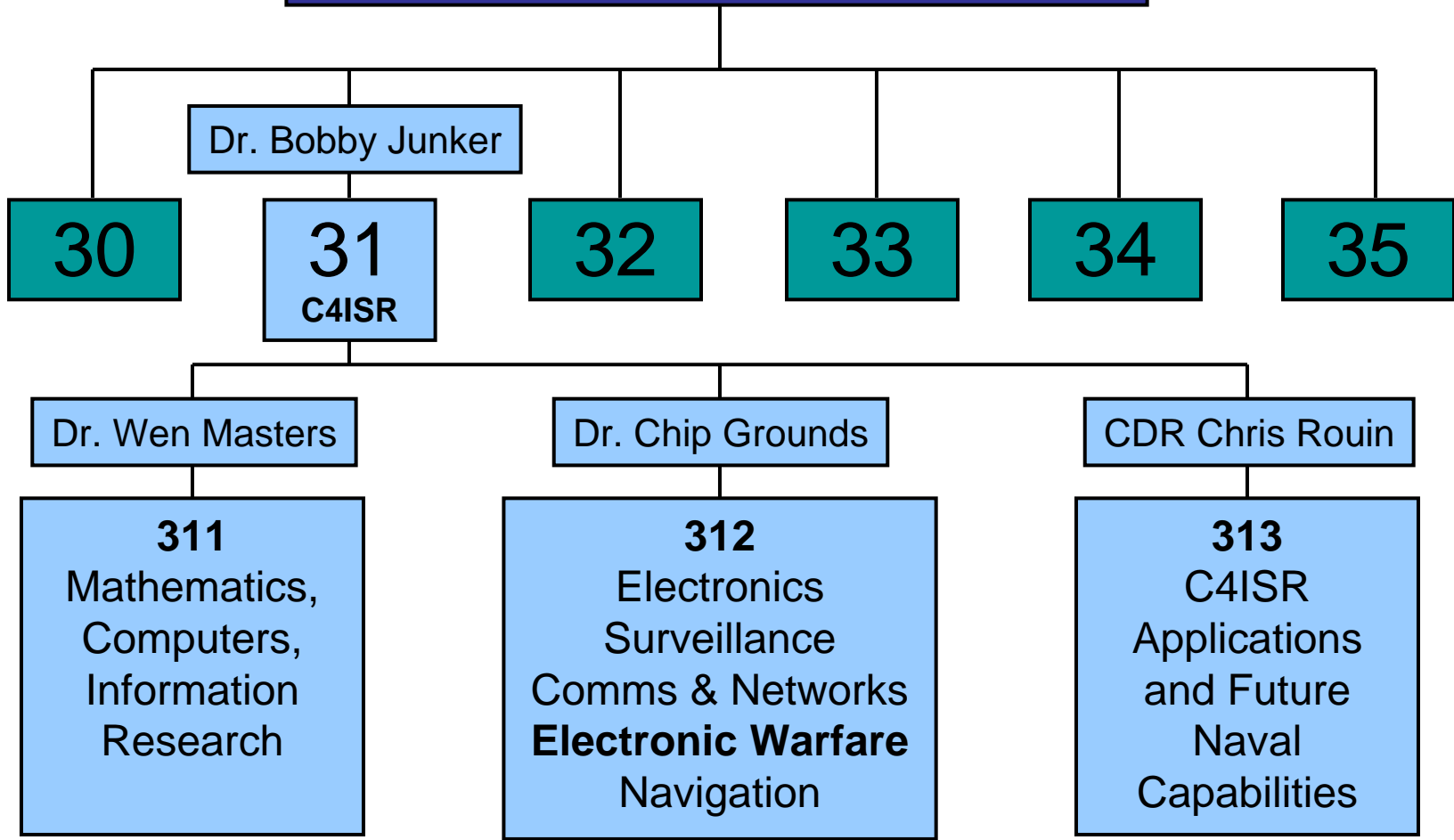




# ONR Organization - S&T



## Chief of Naval Research





# ONR 312 Electronic Warfare



## Electronic Warfare Technology Program

**Dr. Peter Craig**  
**EW Program Manager**

**Mr. Dave Tremper**  
**EW Program Officer**

**Mr. Bob Kusuda**  
**CACI**

**Mr. Tom Jesswein**  
**CACI**

**EW Receivers & Transmitters**  
**Countermeasures for Emerging Threats**

**6.2 Discovery & Invention**  
**EW Signal Processing**  
**Antennas and Components**

**EW Modeling & Simulation**  
**Network Centric EW**

### **Future Naval Capabilities (Sea Strike & Sea Shield)**

#### **Surface/Subsurface**

**EA Techniques Countermeasures**  
**Shipboard EO/IR Self Protection**  
**Enhanced SEWIP**  
**Enhanced NULKA**  
**Next Generation CM Techniques**  
**for Ship Missile Defense**

#### **Air**

**EO/IR Protection for Rotary Wing Acft**  
**IDECM P3I**  
**Next Generation Airborne EW**  
**CM for Advanced Imaging IR Seekers**  
**CM for Millimeter Wave Seekers**

#### **Marine Corps**

**EW Integrated Sys for Small Platforms**  
**Marine Portable EW Technology**  
**Multifunction Capabilities for MWS**

### **SBIR/STTR EW Technologies**



# Doing Business with ONR



## Business Opportunities

- Broad Agency Announcements (BAA)
- Small Business Innovative Research / Small Business Technology Transfer (SBIR/STTR)
- Multidisciplinary Research Program of the University Research Initiative (MURI)
- Defense University Research Instrumentation Program (DURIP)
- DoD Experimental Program to Stimulate Competitive Research (DEPSCOR)

Detailed information can be found on the ONR website

[http://www.onr.navy.mil/doing\\_business](http://www.onr.navy.mil/doing_business)



# What is Electronic Warfare? Joint Service Definition



**Development of technologies that maximize the operational use of the electromagnetic (EM) spectrum by U.S. forces, ...while denying same from the enemy, ...by using EM means to detect and attack enemy sensor, weapon and command infrastructure systems**

- Immediate battlespace recognition of hostile scenario/intent and optimized, automated response decisions**
- Electronic denial, degradation, disruption or destruction of enemy C4ISR, IADS, acquisition and associated targeting/weapon systems**
- Timely EM control over the entire battlespace: temporal, spectral, spatial**



# Electronic Warfare in Perspective



## The RED Kill Chain...



## ... and the Electronic Warfare Response Chain...



### Situational Awareness/Threat Warning

Requires capability to:

- Continuously monitor all critical portions of the spectrum
- Quickly and accurately classify emitters/emitter function
- Provide specific emitter identification
- Precisely and rapidly locate platforms, events
- Conduct accurate long term monitoring/tracking
- Share key info in near real time

### Counter Targeting/Jamming/ Self-Protection

Requires capability to selectively:

- Limit/deny access (jamming)
- Provide false/misleading information (countertargeting, decoys)
- Counter communications and networks
- Damage/degrade threat sensor capability



*EW Networked Capabilities, Analysis & Assessment, Electronic Protection*

**Battlespace Awareness**

**Spectrum Control**

**Information Dominance**





# Electronic Warfare Terminology

## DoD / JCS Definitions



**Electronic Warfare (EW):** “Any military action involving the use of EM radiation ... to control the EM spectrum or to attack the enemy.”

- **Electronic Support (ES):** Actions to search for, intercept, ID & locate intentional / unintentional EM sources for the purpose of immediate threat recognition
  - Provides information/data for immediate decisions regarding operations & tactical actions (avoidance, targeting, cueing)
- **Electronic Attack (EA):** Use of EM ... to attack with the intent of degrading, neutralizing or destroying enemy combat capability
  - Includes jamming, EM deception, decoys/expendables
- **Electronic Protection (EP):** Actions taken to protect ... from any effects of friendly or enemy employment of EW that degrade, neutralize, or destroy friendly combat capability



# ONR Electronic Warfare S&T Area Objectives



## Own the Spectrum

**Provide Battlespace Awareness - Know who is out there, where they are, and what they are doing...**

Requires capability to:

- Continuously monitor all critical portions of the spectrum (RF/EO/IR)
- Quickly and accurately classify emitters/emitter function
- Provide Specific Emitter Identification (SEI)
- Precisely and rapidly locate platforms, people, things, events
- Conduct accurate long term monitoring/tracking
- Network sensors and share key info in near-real time

ES

**Provide Effective Spectrum Control - Determine who sees what...**

Requires capability to selectively:

- Limit/deny access (jamming) (RF/EO/IR)
- Provide false/misleading information (countertargeting, decoys)
- Damage/degrade threat sensor capability (RF/EO/IR)

EA

**Provide Unrestricted Spectrum Access to Blue Forces – Protect our own ISR capabilities...**

Requires capability:

- Negate the impact of hostile jamming on U.S. and allied sensors (RF/EO/IR)
- Preserve the integrity of critical networks and data links
- Precisely navigate and target weapons in a GPS-denied environment

EP



# Electronic Warfare S&T Challenges



**Must remain responsive to wide array of changing, asymmetric threats ... and span of conflict / rules of engagement (ROEs)**

- Peace-time transit ... “watch” operations ... urban conflict ... operations other than war (OOTW) ... to full scale conflict

**Trend towards System of Systems (SoS)**

- Modularity / scalability
- Multiple geometry, effective ES/EA, when needed
- Positive command & control of assets

**Distributed, self-networking of EW assets**

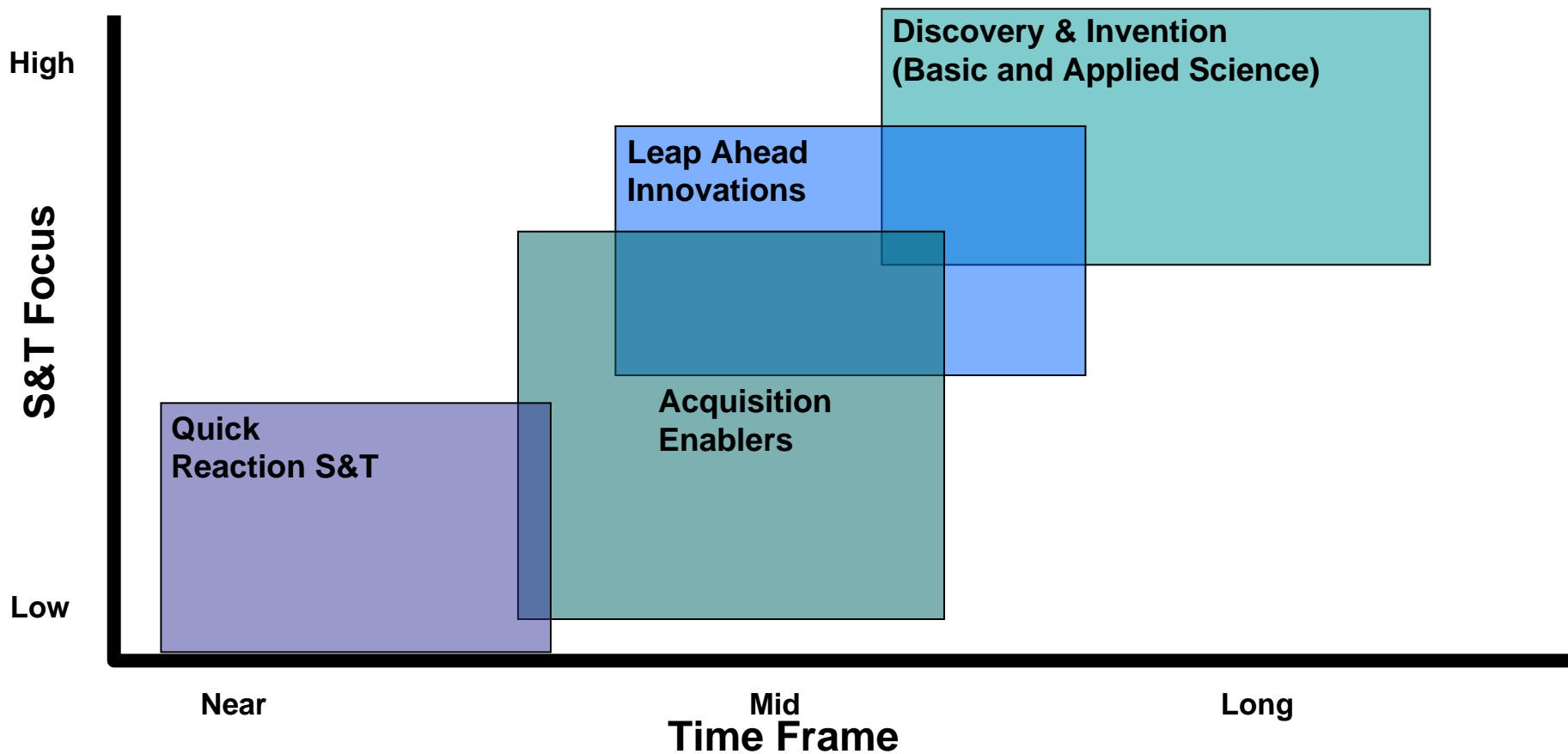
- “Distributed Survivability”
- Automated, unmanned operations (sensor management, optimized positioning, decision-making, ...)
- Larger context: Network Centric Warfare (NCW)

**Transformation of EW**

- Proactive: take the fight to the enemy
- Dominate & control: opens a new realm of Information Warfare (IW) opportunities



# ONR S&T Portfolio Balance



## OSD Partnered / Quick Reaction S&T (12%)

- Advanced Energetic Materials
- Energy and Power
- Surveillance & Knowledge Systems
- Research Tools Consortia
- OSD Initiatives
- Tech Solutions

## Acquisition Enablers (34%)

- Future Naval Capabilities
- Warfighter Protection
- Capable Manpower

## Leap-ahead Innovations (13%)

- Innovative Naval Prototypes
- NSPs
- Swampworks
- Experimentation

## Discovery & Invention (41%)

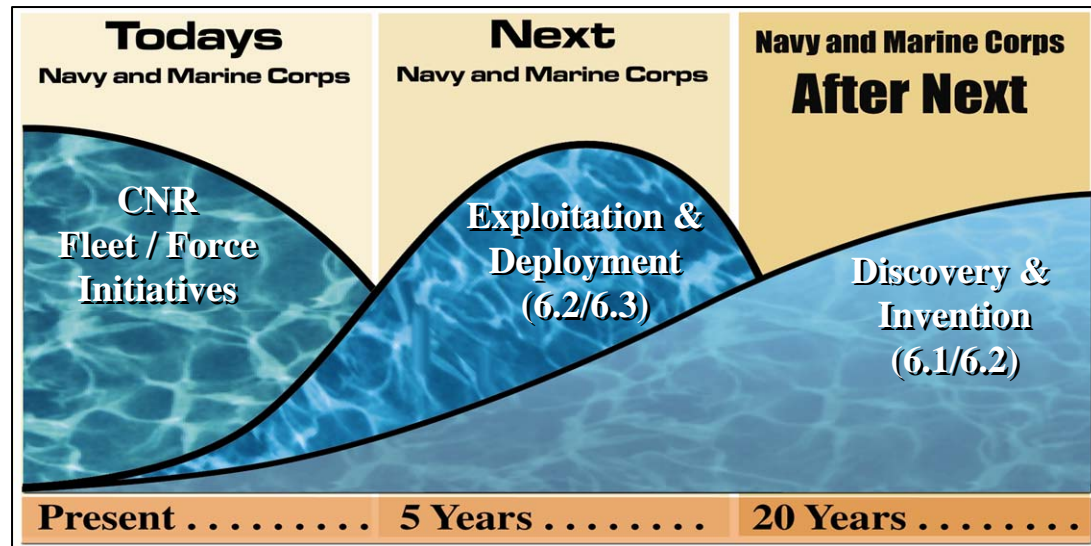
- Basic & Early Applied Research
- National Naval Responsibilities
- Education Outreach HBCU/MI



# Discovery & Invention (D&I)



- **What is Discovery & Invention (D&I)?**
  - A process to focus basic research (6.1) and exploratory development (6.2) efforts to develop and mature technology to meet future Navy needs
- **Why have Discovery & Invention?**
  - Identify and investigate new and transformational concepts that could fundamentally change the way we fight
  - Mature high risk / high impact / high payoff technologies
  - Avoid technological surprise





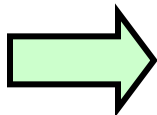
# ONR EW S&T Development Process Annual D&I Refresh



**Oct - Nov**

**ONR EW S&T Future Vision**

- Capability gaps (OPNAV guidance, OAG's)
- Roadmaps (S&T, Acquisition)
- Emerging threats (intell reporting)
- Technology trends (to avoid surprise)



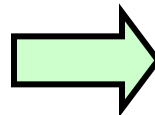
**Dec - Jan**

**D&I BAA**

- Industry
- Academia

**D&I Solicitation**

- NRL
- Warfare Centers
- FFRDC / UARC



**February**

**Review White Paper Submissions**

- Evaluate technical merits/innovation, Naval relevance, prior experience, cost realism
- Down-select 4-10 (\$\$ available)

**March**

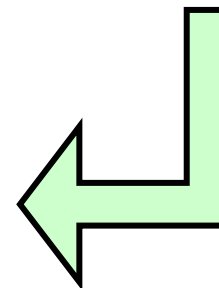
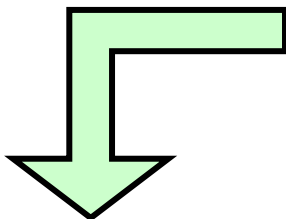
**EW S&T Review (Gathering) – Invitation Only**

**Agenda:**

- Threat briefing (ONI)
- EW Requirements view (OPNAV)
- EW Acquisition view (NAVSEA, NAVAIR, MCSDC)
- Briefings of current D&I, SBIR, FNC efforts
- Briefings of proposed D&I new starts for following FY

**Actions:**

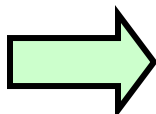
- Invited reviewers advise on D&I new start selection
- Begin dialog regarding new FNC needs
- De-conflict with other service reps (Army, Air Force)



**April**

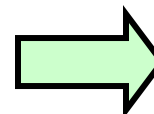
**Select new D&I projects**

- Request full proposals



**Jun - Aug**

- Initiate contract actions
- Prepare FM documentation



**October**

- Award Contracts
- Send Funding Documents



# ONR Discovery & Invention

## Last year: ONR BAA 08-004



### Advanced EA System Architectures

Investigate concepts, techniques, and components of advanced RF EA systems

- Wideband, high sensitivity receivers with embedded high-speed EA cueing capability
- Dynamic Technique generators based on received waveform, not pre-canned responses
- RF apertures with rapidly selectable and reconfigurable Rx/Tx capabilities
- End-to-end, real-time modeling and characterization of EA system architecture to permit performance optimization analyses

### Advanced RF Countermeasures (CM)

Increase Naval capabilities to defeat advanced RF threats which can have one or more of the following characteristics or features:

- Wide bandwidth
- Waveform agility / diversity
- Wide dynamic range / power management
- Imaging capability (SAR / ISAR)
- Passive detection / tracking capability
- Advanced Electronic Protection (EP)
- Networked sensors
- Data fusion

### CM Development Methodology

Provide Naval forces with a standardized methodology for evaluating CM effectiveness, thereby minimizing the need for costly and time consuming developmental field testing at military test ranges.

- Modeling and simulation
- Design tools
- Databases
- Measures of effectiveness

### Real-time EA Effect Monitoring

Develop methods to determine in real-time if an EA technique is working, assess how well it is working, and provide feedback to permit dynamic control of EA systems to more efficiently utilize limited EW resources.

- EA artifacts and feedback mechanisms
- M&S of EA system interactions and impacts
- Modifications of Naval sensors to exploit EA characteristics



# ONR Discovery & Invention

## ONR BAA 08-004 Funded Efforts



### Advanced EA System Architectures

- Direction Finding of LPI Emitters (NRL)

### Advanced RF Countermeasures (CM)

- Concurrent Multi-Spectral RF Carrier Generator (USC)

### CM Development Methodology

- Integrated On-board / Off-board EA Effectiveness (NRL)

### Real-time EA Effect Monitoring

- Radar Exploitation for Real-Time EA Effectiveness Monitoring (NRL)





# ONR Discovery & Invention

## This year: ONR BAA 09-014



## ONR BAA Announcement # ONR 09-014



- **Posted:** *8 January 2009*
- **Agency Name:** *Office of Naval Research*
- **Research Opportunity Title:** *Electronic Warfare Technology*
- **Program Name:** *Electronic Warfare Discovery & Invention (D&I)*
- **Response Dates:**
  - **White Papers:** *3 February 2009*
  - **Full Proposals:** *12 May 2009*



# ONR Discovery & Invention

## This year: ONR BAA 09-014



**ONR 312 Electronic Warfare (EW) seeks white papers for efforts that shall develop and demonstrate technologies for the next generation components and systems in Electronic Warfare. Although **white papers addressing any truly innovative EW S&T will be considered**, the primary emphasis of this BAA is on technologies to Detect and Defeat Imaging Infrared and Multi-Mode Threats. Proposed efforts should focus on development of technology and techniques to detect and/or counter advanced threat tracking systems, missiles, and other Precision Guided Munitions (PGM) that:**

- Employ imaging sensors (both scanning and Focal Plane Array (FPA)-based) operating in the infrared spectral bands, or
- Employ multiple passive and/or active modes of tracking and guidance spanning the EO, IR, and RF spectra that can operate sequentially or simultaneously.



# ONR Discovery & Invention

## ONR BAA 09-014 Research Area 1



### 1. Detect and Defeat Imaging Infrared Threats

The objective is to **increase Naval (Navy and Marine Corps) capabilities to detect and/or defeat Imaging Infrared (IIR) threat systems**. Potential areas of investigation include:

- a. **Passive or active detection methods that cover all potential infrared spectral bands, provide full spherical (or, at minimum, hemispherical) field of regard, and contain no moving parts**
- b. **Infrared emitting decoys that will spectrally, temporally, and spatially mimic the infrared signatures of naval platforms with sufficient fidelity and intensity to deny the targeting and/or tracking of IIR sensors.**
- c. **Highly efficient, compact, and multi-band infrared emitting laser sources with sufficient power to effectively jam IIR sensors.**
- d. **Airborne obscurants that can block the infrared signature of naval platforms for a sufficient duration to negate the effective targeting and/or tracking of IIR guidance.**



# ONR Discovery & Invention

## ONR BAA 09-014 Research Area 2



### 2. Detect and Defeat Multi-Mode Threats

The objective is to **increase Naval (Navy and Marine Corps) capabilities to detect and/or defeat threats operating with multiple modes of tracking and guidance, passively and/or actively and that span multiple domains of the EMS. Potential areas of investigation include:**

- a. **Passive or active detection methods that are not reliant upon the particular mode or spectral band of the multi-mode threat**
- b. **Decoys that mimic multiple signatures of naval platforms across the EMS with sufficient fidelity and intensity to deny targeting and/or tracking of multi-mode sensors and guidance methods.**
- c. **Sources of directed energy with sufficient power and spectral diversity to effectively jam multi-mode tracking and guidance systems operating across the EMS.**
- d. **Airborne obscurants that block the full electromagnetic signature of naval platforms for sufficient duration to negate effective targeting and/or tracking of multi-mode sensors and guidance methods.**



# ONR Discovery & Invention

## ONR BAA 09-014 Award Info



- **ONR anticipates a budget of \$2,000,000.00 per annum for the period FY10-FY12 for this program. ONR plans to fund individual awards of \$100,000.00 to \$750,000.00 per year, using Discovery and Invention (D&I) (Budget Category 6.2) funds. However, lower and higher cost proposals will be considered.**
- **The period of performance for projects may be from one to three years. Projects will have an estimated start date of 30 October 2009, subject to date of final award and availability of new fiscal year funds.**
- **Some portion of this budget may fund research requests in this program area received from Government entities outside of this BAA.**



# ONR Discovery & Invention

## ONR BAA 09-014 Eligibility



- **All responsible sources from academia and industry may submit proposals under this BAA.**
- **There will be no set asides for Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs).**
- **Some topics cover export controlled technologies. Research in these areas is limited to “U.S. persons” as defined in the International Traffic in Arms Regulations (ITAR) - 22 CFR § 1201.1 et seq.**



# ONR Discovery & Invention

## ONR BAA 09-014 Eligibility



- Navy laboratories and warfare centers, as well as other Department of Defense and civilian agency laboratories, and Federally Funded Research & Development Centers (FFRDCs), including Department of Energy National Laboratories, are **not eligible to receive awards under this BAA** and should not directly submit either white papers or full proposals in response to this BAA.
- **NOTE: Responses from these organizations are being solicited separately, though with the same guidance regarding research areas of interest, white paper format and deadlines.**



# ONR Discovery & Invention

## ONR BAA 09-014 Eligibility



- **Bottom line**: All civilian, industry, government, and military organizations are encouraged to submit white paper responses to the two ONR EW research areas as solicited.
- Once a proposed effort has been chosen for funding, ONR will determine the best method to proceed.
- If a contract or grant is required, then the guidance, clauses, and limitations of this BAA are applicable.
- If other means are more appropriate (direct funds transfer to DoD laboratory or warfare center, use of existing contract vehicle, etc.) then separate guidance and limitations may apply.





# ONR Discovery & Invention

## ONR BAA 09-014 White Papers



- The due date for white papers is no later than 4:00 PM (EST) on Tuesday, 3 February 2009. **White papers received after the published due date will not be considered for funding in FY10.** Each white paper should state that it is submitted in response to this BAA.
- The only acceptable methods for submission of white papers sent in response to the BAA is via the United States Postal Service (USPS) with delivery confirmation, via a commercial carrier (e.g. FedEx, UPS) or hand delivered to the attention of the cognizant Technical Point of Contact, Dr. Peter Craig. **NOTE: White Papers sent by fax or e-mail will not be considered.**



# ONR Discovery & Invention

## ONR BAA 09-014 White Papers



### White Paper Format

- **Paper Size – 8.5 x 11 inch paper**
- **Margins – 1” inch**
- **Spacing – single or double-spaced**
- **Font – Times New Roman, 12 point**
- **Number of Pages – No more than two (2) single-sided pages (excluding cover page and resumes). White Papers exceeding the page limit may not be evaluated.**
- **Copies – one (1) original, five (5) copies, and one (1) electronic copy on CD-ROM (in Microsoft® Word or .PDF format).**



# ONR Discovery & Invention

## ONR BAA 09-014 White Papers



### White Paper Content

White papers must address the following without exceeding the two (2) page limit:

1. Project Manager and/or Principal Investigator
2. Relevance to BAA Research Opportunity Description
3. Technical Objective
4. Technical Approach
5. Deliverables
6. Recent technical breakthroughs that will reduce risk
7. Funding plan showing requested funding per fiscal year



# ONR Discovery & Invention

## ONR BAA 09-014 Schedule



**The annual ONR EW S&T Review will be held on 17-19 March, 2009 at the Executive Conference Center (ECC), Suite 600, 3601 Wilson Boulevard, Arlington, Virginia 22201. The following schedule has been established to facilitate the submission of white papers and their follow-on review and possible selection for FY 2010 funding.**

<b>03 Feb 2009</b>	<b>White paper responses to EW research areas due to ONR</b>
<b>18 Feb 2009</b>	<b>ONR notify selected parties to prepare briefing for EW Review</b>
<b>09 Mar 2009</b>	<b>Quad Chart due to ONR</b>
<b>12 Mar 2009</b>	<b>Briefings due to ONR</b>
<b>19 Mar 2009</b>	<b>Oral presentations at the ONR EW S&amp;T Review</b>
<b>27 Mar 2009</b>	<b>ONR notify selected parties to prepare/submit full proposal</b>
<b>12 May 2009</b>	<b>Full technical/cost proposal due to ONR</b>
<b>22 May 2009</b>	<b>ONR notify selected parties of intent to fund efforts</b>
<b>30 Oct 2009</b>	<b>ONR issues awards</b>



# ONR Discovery & Invention

## ONR BAA 09-014 Evaluation Criteria



- A. Overall scientific and technical merits of the proposal**
  - 1. The degree of innovation**
  - 2. The soundness of technical concept**
  - 3. The Offeror's awareness of the state of the art and understanding of the scope of the problem and the technical effort needed to address it**
  
- B. Naval relevance, transition potential and anticipated contributions of the proposed technology to Electronic Warfare operations.**
  
- C. Offeror's capabilities, related experience, facilities, techniques or unique combinations of these which are integral factors for achieving the proposal objectives**
  - 1. The Offeror's experience in relevant efforts with similar resources**
  - 2. The ability to manage the proposed effort**
  
- D. The qualifications, capabilities and experience of the proposed Principal Investigator (PI), team leader and key personnel who are critical in achieving the proposal objectives**
  
- E. The realism of the proposed cost**
  - 1. Total cost relative to benefit**
  - 2. Realism of the proposed costs and availability of funds**



# ONR Discovery & Invention

## ONR BAA 09-014 Deliverables



**The following is a sample of reporting deliverables that could be required under a research effort. The following deliverables, primarily in contractor format, are anticipated as necessary. However, specific deliverables should be proposed by each Offeror and finalized with the contracting agent:**

- **Detailed Technical Data**
- **Technical and Financial Progress Reports**
- **Presentation Material(s)**
- **Other Documentation or Reports, as required**
- **Final Report**

**Research performed under contracts may also include the delivery of software, prototypes, and other hardware deliverables.**



# ONR Discovery & Invention

## ONR BAA 09-014 Facilities / GFE



- **Offerors are expected to provide all facilities (equipment and/or real property) necessary for the performance of the proposed effort. Any direct charge of facilities, not including deliverable items, must be specifically identified in the Offeror's proposal and approved by the Government prior to purchase.**
- **Any request to use Government owned facilities or Government Furnished Equipment (GFE) must be included in the Offeror's proposal and approved in advance by the cognizant Government official. After contract award, requests to use Government integration, test, and experiment facilities will be considered on a case by case basis based on availability and justification of need.**



# ONR Discovery & Invention

## ONR BAA 09-014 Classification



- All white papers and proposals are expected to be unclassified. However, confidential/classified white papers and proposals are permitted.
- In order to facilitate intra-program collaboration and technology transfer, the Government will attempt to enable awardees to work at the unclassified level to the maximum extent possible.
- If awardees use unclassified data in their deliveries and demonstrations regarding a potentially classified project, they should use methods and conventions consistent with those used in classified environments. Such conventions will permit the various subsystems and the final system to be more adaptable in accommodating classified data in the transition system.





# ONR Discovery & Invention

## ONR BAA 09-014 Summary



### Things ONR will look for in white paper submissions

- An understanding of Electronic Warfare principles and needs
- Innovative applications of cutting edge science and technology to address Electronic Warfare priorities
- Efforts that focus on Detecting and Defeating Imaging Infrared and Multi-mode Threats
- Clear statements of the effort's objectives, applicability to Electronic Warfare, anticipated end state, and deliverables.
- Clear and concise schedule including intermediate milestones to objectively measure progress toward goals
- Funding request broken out by performing organization and Government fiscal year.



# ONR Discovery & Invention

## ONR BAA 09-014 Summary



### Things that will cause ONR to reject white papers

- **Proposed effort is not Electronic Warfare**
  - Electronics or components (outside an EW system/sub-system)
  - Communications or navigation systems (counter comms/nav is okay)
  - Intel, reconn, surveillance (ISR) systems (counter ISR is okay)
- **Proposed effort is not Discovery & Invention (6.2)**
  - Off-the-shelf solutions without any clear innovation
  - Demonstrations and field testing of existing systems or components to show military application
- **Reliance on GFE/GFI without prior arrangement/agreement**
- **Poor program planning**
  - No explanation or understanding of underlying S&T
  - Scattershot approaches with little methodology
  - Lack of intermediate milestones to gauge progress
  - No substantiation for requested budget



# ONR Discovery & Invention

## ONR BAA 09-014 Final Comments



- **ONR 312 EW will not entertain requests for individual meetings with industry representatives to discuss potential white paper submissions**
  - **No pre-selection of ideas or concepts**
  - **If in doubt, write the white paper and submit it**
- **This is your opportunity to ask questions**
  - **Written questions are permitted, but all questions and answers will be posted to the ONR BAA website**
- **White paper questions of a business nature can be submitted by e-mail through Friday, 23 January 2009**
  - **All questions and answers will be posted to the ONR BAA website**



# ONR Discovery & Invention Questions From Last Year (1)



**Question:** Can a University Affiliated Research Center (UARC) submit white papers?

**Answer:** The BAA excludes submissions from Federally Funded Research & Development Centers (FFRDCs), which could include UARCs. However, a UARC can still submit a white paper in response to the internal (Government laboratory and warfare centers) solicitation. The same white paper guidance and deadlines apply to both, so it really makes no difference to the white paper selection process.

**Question:** Is it feasible for industry to work in conjunction with a Navy Lab?

**Answer:** Yes, but ONR will not act as a facilitator in establishing a teaming relationship.

**Question:** If industry teamed with a Navy lab what would be the process for funding the team members?

**Answer:** It could vary. If there is an existing contract between the Navy lab and the industry partner then funds could be sent to the Navy lab to be applied to that contract. If there was no existing contract then ONR could split the funding between a direct contract to the industry partner and a separate funding transfer to the lab. The program plan in the proposal should clearly indicate which method would be advised or preferred.



# ONR Discovery & Invention Questions From Last Year (2)



**Question:** Does industry compete with the Navy labs for the same resources?

**Answer:** Yes. There is no set-aside for either industry or Navy labs; all submissions are considered solely on their own merits in accordance with the evaluation criteria.

**Question:** Will ONR request more full proposals to be submitted than there are resources to fund?

**Answer:** No, ONR will request full proposals from only those entities whose efforts they intend to fund starting in fiscal year 2010. However, if the final approved DoD budget for fiscal year 2010 includes less funding for ONR EW D&I efforts than is currently anticipated, it may be necessary to limit the awards to match the funding available.

**Question:** Will the briefing slides shown today be posted on the ONR website?

**Answer:** Yes.

**Question:** What happens to white papers that are not selected for further consideration? Is the information destroyed?

**Answer:** Yes.



# ONR Discovery & Invention Questions From Last Year (3)



**Question:** Regarding program funding, is there a profile that is considered more desirable than others?

**Answer:** Not necessarily, but the profile should make sense with respect to the effort being proposed. One would normally not expect the funding to be front-loaded but rather spread out over the life of the program, possibly with a slightly higher profile in the final year as testing and other more costly events occur. But whatever profile is proposed it must be justified by the program plan.

**Question:** Would you have any interest in receiving white papers that are outside the area of Electronic Warfare but still of great interest to the U.S. Navy?

**Answer:** No, the focus of this BAA is on Electronic Warfare so other responses would be inappropriate. For other topics of interest to the U.S. Navy, BAA ONR 09-001 may be more appropriate. However, you are encouraged to seek out the appropriate Program Officer within ONR that handles the technology area of interest and discuss the matter with him or her before submitting any white paper or proposal in response to BAA ONR 09-001. Consult the ONR website to determine the best point of contact.



# ONR Discovery & Invention

## ONR BAA 09-014 Points of Contact



### Technical

**Dr. Peter Craig**  
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# Questions?



# ONR

*Revolutionary Research . . . Relevant Results*





# ONR Discovery & Invention

## This year: ONR BAA 09-014



### Detect and Defeat Imaging Infrared Threats

Increase capabilities to detect and/or counter tracking, targeting or guidance systems employing Imaging Infrared (IIR) sensors.

- Passive or active detection methods that cover all potential infrared spectral bands
- Infrared emitting decoys that will spectrally, temporally, and spatially mimic the infrared signatures of naval platforms with sufficient fidelity and intensity to deny the targeting and/or tracking of IIR sensors
- Highly efficient, compact, and multi-band infrared emitting laser sources with sufficient power to effectively jam IIR sensors
- Airborne obscurants that can block the infrared signature of naval platforms for a sufficient duration to negate the effective targeting and/or tracking of IIR guidance

### Detect and Defeat Multi-Mode Threats

Increase capabilities to detect and/or counter threats employing multiple modes of tracking and guidance

- Passive or active detection methods that are not reliant upon particular mode or spectral band
- Decoys that mimic multiple signatures of naval platforms across the EMS with sufficient fidelity and intensity to deny the targeting and/or tracking of multi-mode sensors and guidance methods
- Sources of directed energy with sufficient power and spectral diversity to effectively jam multi-mode tracking and guidance systems operating across the EMS
- Airborne obscurants that block the full electromagnetic signature of naval platforms for sufficient duration to negate the effective targeting / tracking of multi-mode sensors and guidance methods