



# 13<sup>th</sup> Annual Science & Engineering Technology Conference/Defense Tech Exposition



*Revolutionary Research . . . Relevant Results*

**Dr. Walter F. Jones**  
Executive Director  
April 2012

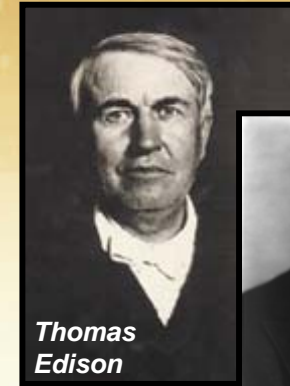
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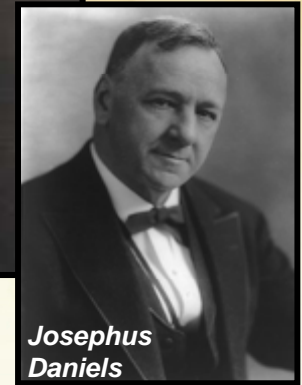
# The Office of Naval Research

## Naval Research Laboratory (*Appropriations Act, 1916*)

*"[Conduct] exploratory and research work...necessary ...for the benefit of Government service, including the construction, equipment, and operation of a laboratory...."*



Thomas Edison



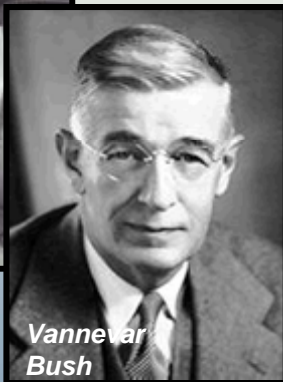
Josephus Daniels

## Office of Naval Research (*Public Law 588, 1946*)

*"...plan, foster, and encourage scientific research in recognition of its paramount importance as related to the maintenance of future of naval power, and the preservation of national security..."*



Harry S. Truman



Vannevar Bush

## Office of Naval Research - London Office (*1946*)

*"...reporting on the latest developments and to assist visiting American scientists to make contact with their colleagues in Europe..."*

## Transitioning S&T (*Defense Authorization Act, 2001*)

*"...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 Milestones

ACCOMPLISHMENTS ACROSS ALL DOMAINS



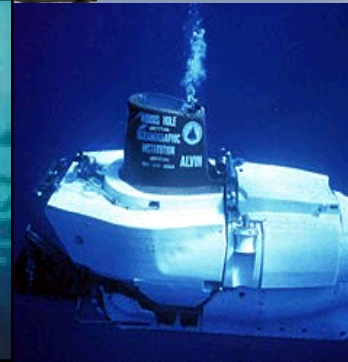
								<p>VIRTUAL AT-SEA TRAINING (LIVE-FIRE COMBAT SKILLS)</p>		<p>NOBEL PRIZE TO ONR RESEARCHERS FOR GRAPHENE</p>	
								<p>NOBEL PRIZE TO DR. JEROME KARLE, NRL</p>		<p>FREE ELECTRON LASER</p>	
				<p>NTS-2 SATELLITE IN NAVSTAR GPS</p>				<p>NAVY AEROSOL ANALYSIS AND PREDICTION SYSTEM</p>		<p>HIGH TEMPERATURE SUPERCONDUCTIVE DEGAUSSING</p>	
				<p>TIMING AND NAVSTAR GPS</p>				<p>CLEMENTINE SPACECRAFT</p>		<p>HYPERSPECTRAL IMAGER FOR COASTAL OCEANS</p>	
				<p>CORONAL MASS EJECTION</p>				<p>INTERACTIVE MULTISENSOR ANALYSIS TRAINING (IMAT)</p>		<p>SHARP RECONNAISSANCE</p>	
				<p>MOBILE ROBOTS</p>				<p>LARGE DISPLACEMENT UNMANNED UNDERWATER VEHICLE</p>		<p>TACTICAL MICROSATellite</p>	
		<p>FIRST DETECTION OF X RAYS FROM THE SUN</p>		<p>FIRST UNMANNED HELICOPTER</p>		<p>OWENS VALLEY 40M RADIO TELESCOPE</p>		<p>ONR-FUNDED TECH FINDS RMS TITANIC</p>		<p>DRAGON EYE UAV</p>	
<p>MULTISTATIC RADAR TESTED AT NRL</p>		<p>PLAN-POSITION INDICATOR</p>		<p>AQUEOUS FILM FORMING FOAMS (AFF)</p>		<p>EXCIMER LASER TECHNOLOGY</p>		<p>GLOBAL ATMOSPHERIC PREDICTION SYSTEM</p>		<p>HIGH-STRENGTH LOW-ALLOY STEELS</p>	
<p>SOUND NAVIGATION AND RANGING (SONAR)</p>		<p>FIRST FAR-ULTRAVIOLET SPECTRUM OF THE SUN</p>		<p>VANGUARD I LAUNCHED</p>		<p>FIRST U.S. INTELLIGENCE SATELLITE</p>		<p>SIDEWINDER AIR-TO-AIR MISSILE</p>		<p>NEURAL NETWORKING COMPUTER CHIPS</p>	
<p>URANIUM 235 PRODUCTION</p>		<p>PRINCIPLES OF MODERN FRACTURE MECHANICS</p>		<p>PROJECT WHIRLWIND DIGITAL COMPUTER</p>		<p>FAR ULTRAVIOLET LUNAR CAMERA</p>		<p>CONTRIBUTED TO AEGIS COMBAT SYSTEM</p>		<p>FIRST OPERATIONAL GLOBAL OCEAN MODEL</p>	
<p>GAMMA-RAY RADIOGRAPHY</p>		<p>FIRST CONCEPT FOR A NUCLEAR SUBMARINE</p>		<p>PARTICLE ACCELERATORS</p>		<p>SEALAB I AND II</p>		<p>ULTRA-HIGH STRENGTH STEEL</p>		<p>QUIKCLOT® COMBAT GAUZE</p>	
<p>NRL COMMISSIONED</p>		<p>SYNTHETIC LUBRICANTS</p>		<p>VERTICAL TAKE-OFF AND LANDING</p>		<p>BATHYSCAPHE TRIESTE REACHES 35,800 FT.</p>		<p>ACOUSTIC MICROSCOPY</p>		<p>HULL ANTI-FOULING COATINGS</p>	
<p>FIRST U.S. RADAR PATENTS</p>		<p>ONR FOUNDED 1946</p>		<p>SOUND SURVEILLANCE SYSTEM (SOSUS)</p>		<p>REMOTE ENVIRONMENT MONITORING UNITS</p>		<p>ANTI-TORPEDO TORPEDO</p>			
<p>1920s</p>		<p>1930s</p>		<p>1940s</p>		<p>1950s</p>		<p>1960s</p>		<p>1970s</p>	
<p>1980s</p>		<p>1990s</p>		<p>2000s</p>		<p>2010 &amp; BEYOND</p>					



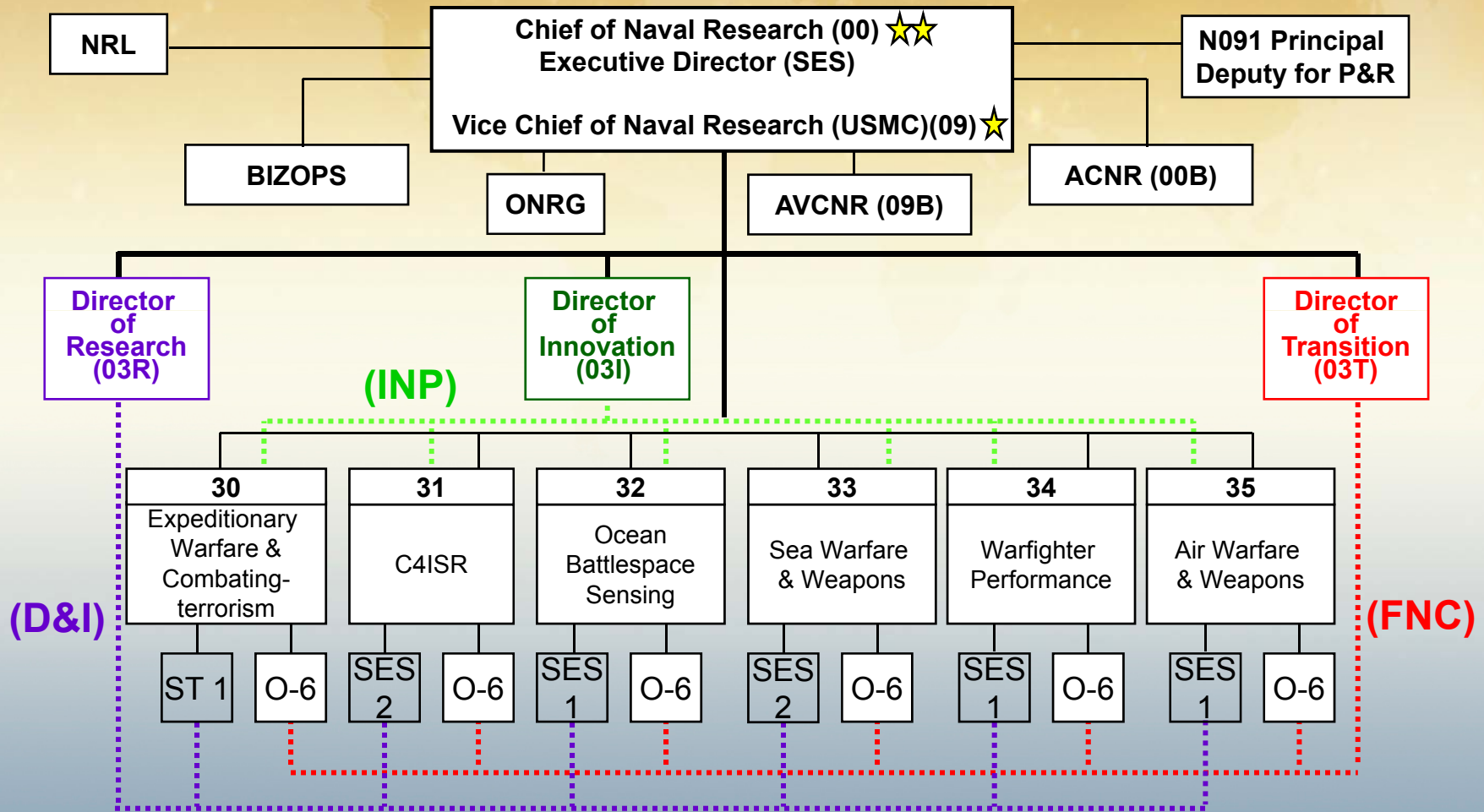
# Who We Are

## ONR/NRL

**People:** 3,900  
**Govn't:** 3,360  
**Contractor:** 540  
**PhDs:** 842  
**SES:** 45  
**USNR:** 212

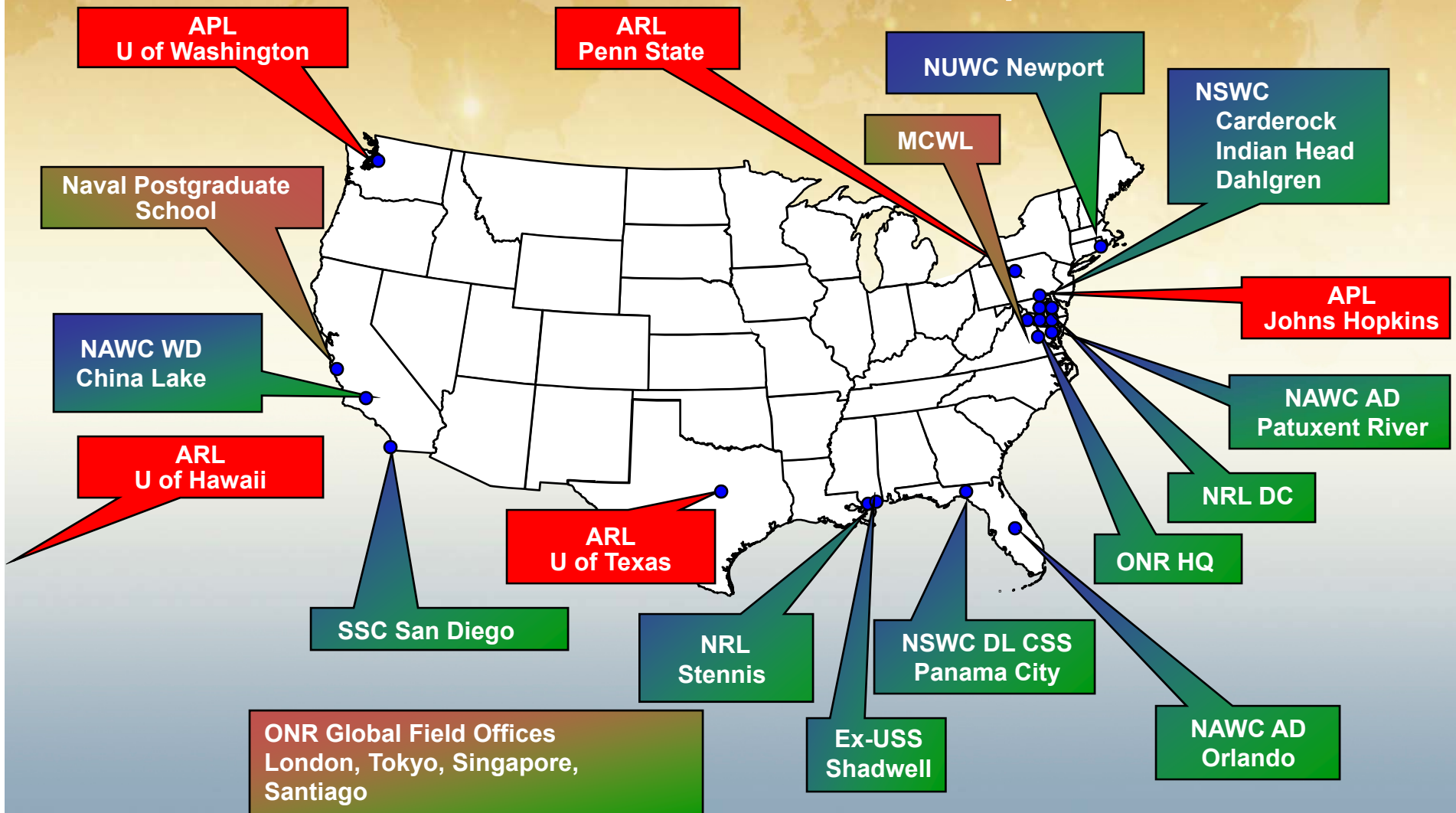


# ONR Organization





# Department of the Navy Research Enterprise

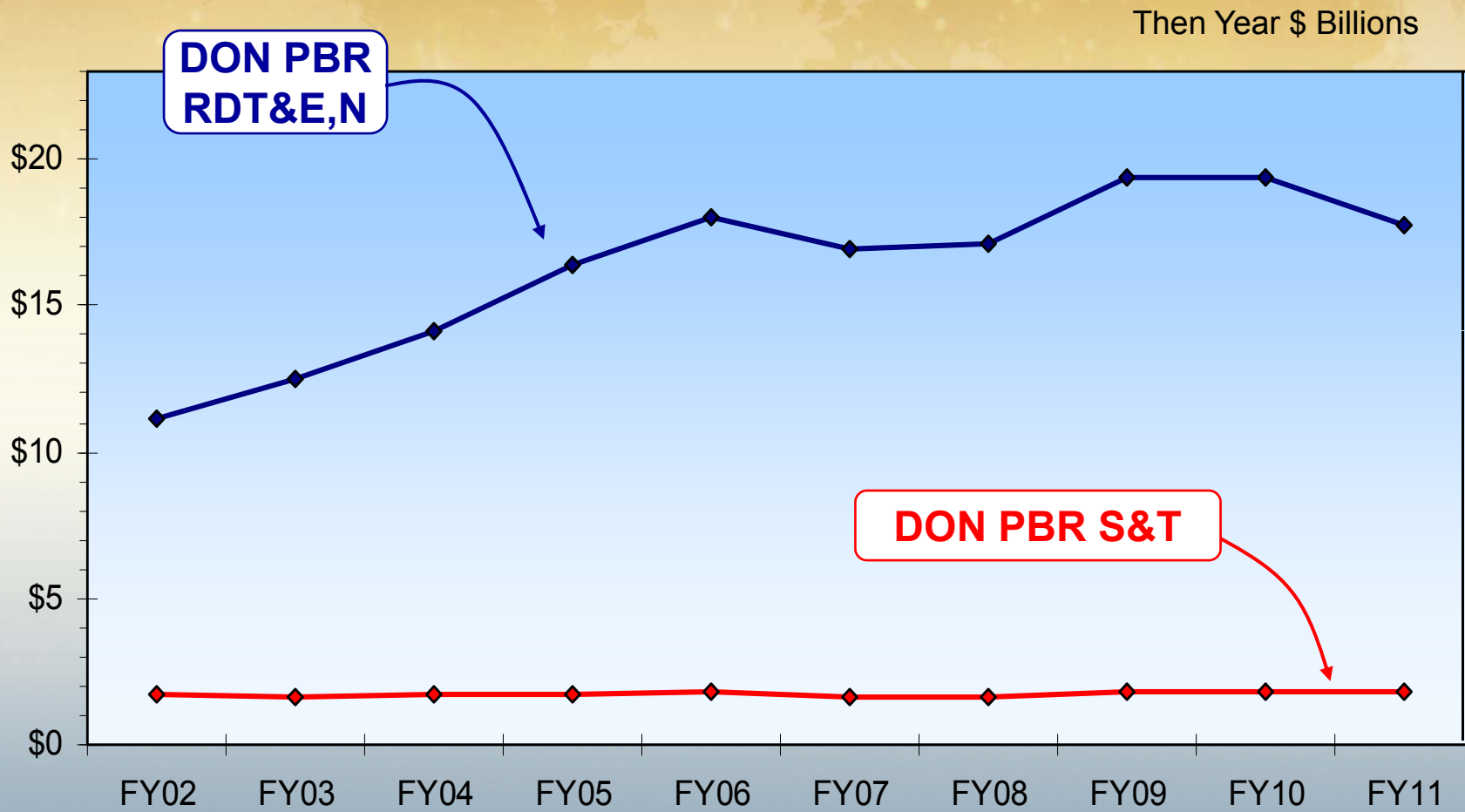


# ONR-Global



- Develop Partnerships
- Leverage Global S&T Advances
- Avoid Technology Surprise

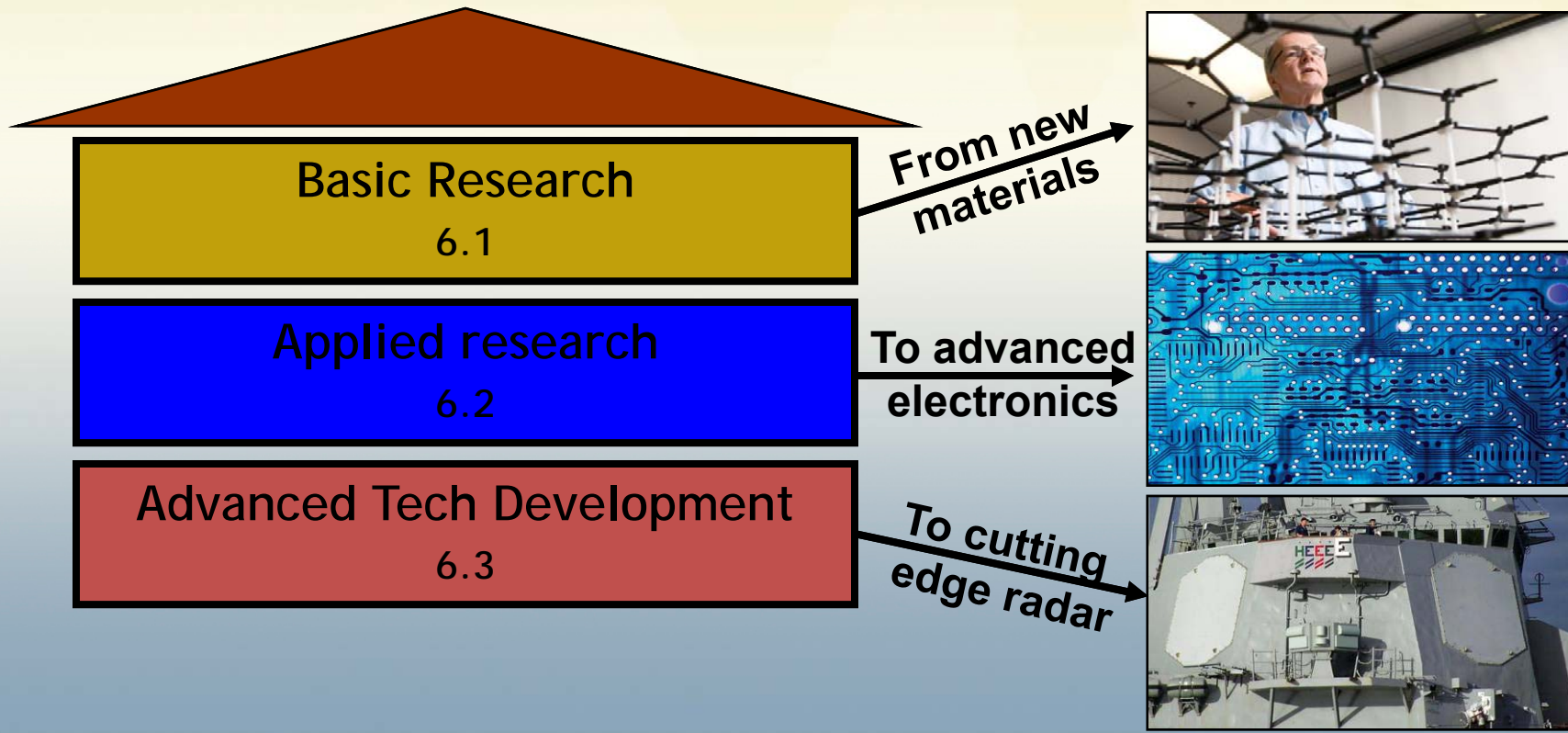
# RDT&E 6.1 - 6.7





# Unique Structure

- All three S&T funding lines under one roof
- Program Officer can see a program through D&I → Applied Science → Transition



# Leadership for S&T



**RADM Matthew Klunder**  
Chief of Naval Research



**Dr. Walter Jones**  
Executive Director



**BGen Mark R. Wise**  
Vice CNR

## *Guidance Comes From...*



**Assistant Secretary of Defense  
for Research & Engineering**



**Assistant Secretary of the Navy  
(Research, Development  
and Acquisition)**

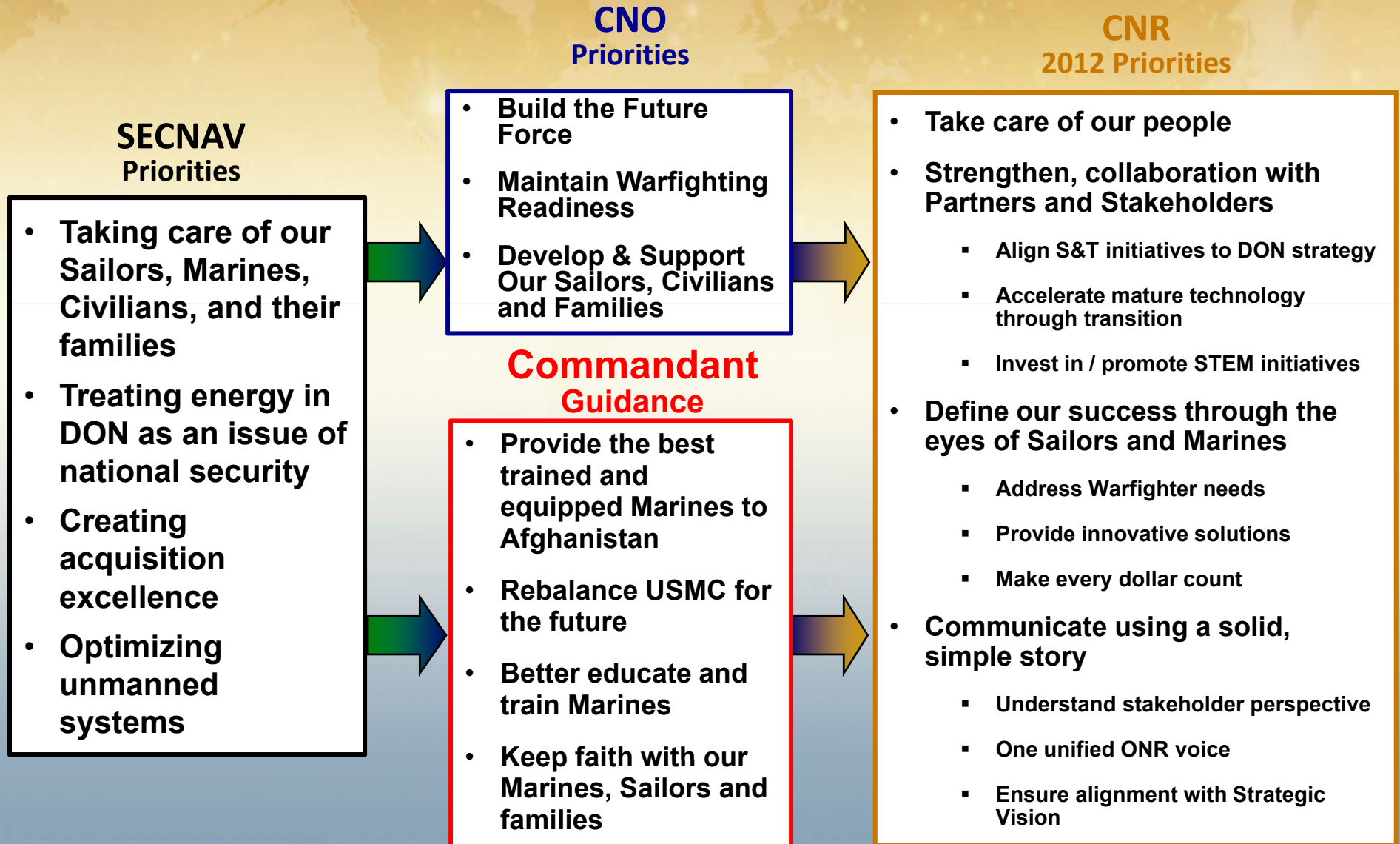


**Vice Chief of  
Naval Operations**



**Assistant Commandant  
for the Marine Corps**

# Aligning to Strategic Guidance



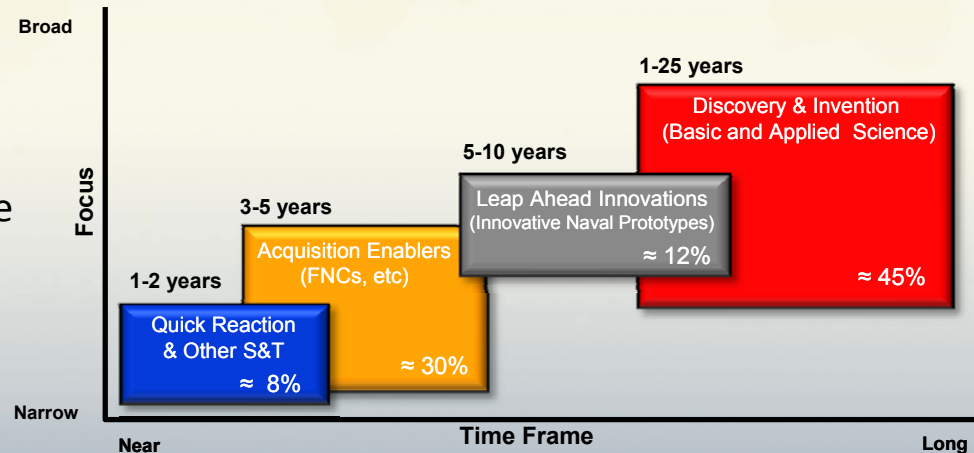
# Strategic Plan



- Cascades from National, DoD and Service Guidance
- Vetted by Fleet/Force Stakeholders
- Approved by VCNO, ACMC and ASN (RDA)

## S&T Plan Focus Areas:

- A2/AD**
- Assure Access to Maritime Battlespace
  - Autonomy & Unmanned Systems
  - Expeditionary & Irregular Warfare
  - Power Projection/Integrated Defense
  - Information Dominance
  - Power & Energy
  - Platform Design & Survivability
  - Total Ownership Cost
  - Warfighter Performance



Tech Solutions



FNCs



INPs

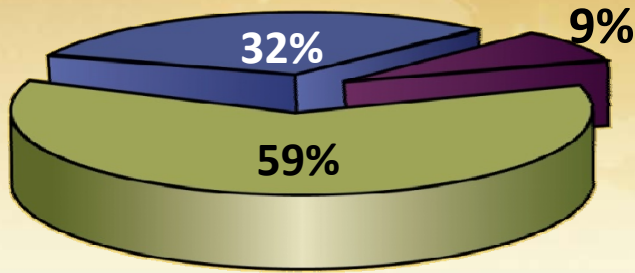


D&I

Revised Sep 2011 - aligned with 2012 Defense Strategy

# Investment Balance

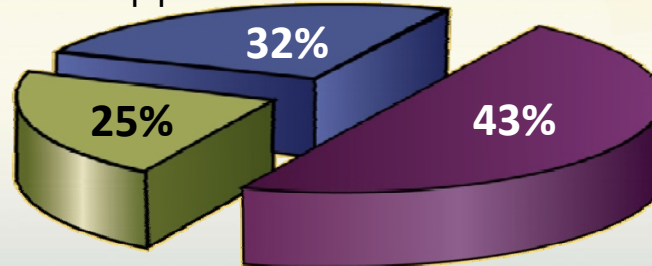
## 6.1: Basic Research



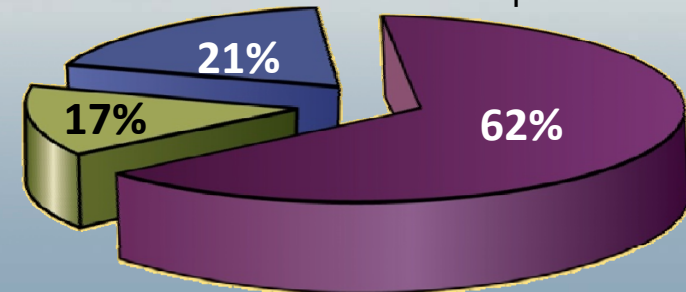
	FY-11	FY-12	FY-13
BA 6.1	\$ 538,716.00	\$ 605,319.00	\$ 605,021.00
BA 6.2	\$ 704,164.00	\$ 822,951.00	\$ 790,302.00
BA 6.3	\$ 769,394.00	\$ 692,105.00	\$ 584,402.00
<b>Total</b>	<b>\$ 2,012,274.00</b>	<b>\$ 2,120,375.00</b>	<b>\$ 1,979,725.00</b>

Source: Exhibit R-1 of the FY 2013 Presidential Budget Request (Feb 2012)

## 6.2: Applied Research



## 6.3: Advanced Tech Development



Typical Obligations Profile During an FY

# Naval S&T Strategic Plan



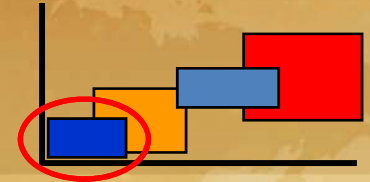
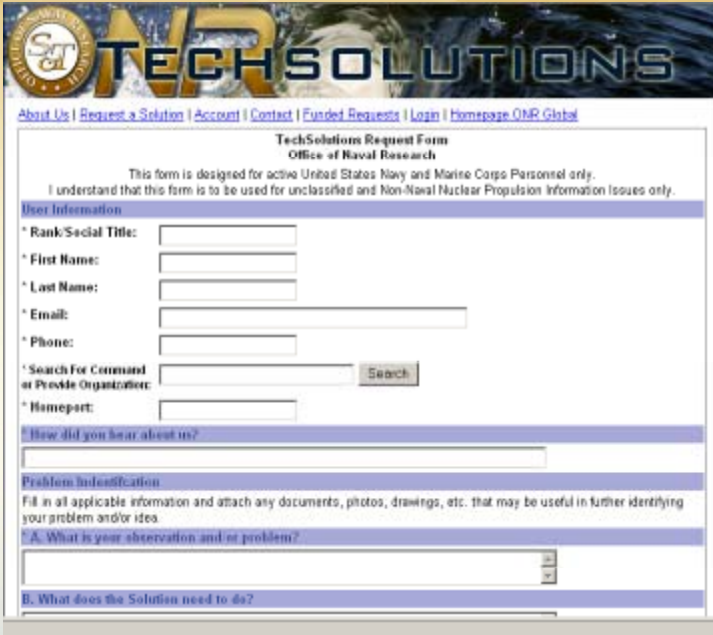
- Second update of the original Naval S&T Strategic Plan
- Focused on top-down guidance, informed by fiscal realities of POM13
- Strategic Context – development guided by CS-21, SECNAV Guidance, NSP, and Vision and Strategy 2025
- Focus Areas consolidated from 13 to 9; includes addition of one new area on Autonomy and Unmanned Systems

# Naval S&T Focus Areas

## Tomorrow's Technologies for Our Warfighters Across All Domains



***STEM is a critical enabler across all Focus Areas***

- Ship Identification
- Solid State Lighting
- HCO Trainer
- Food Service Software
- Automated Weather Prediction system

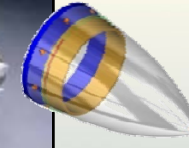
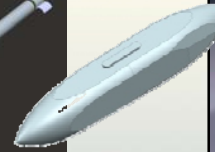
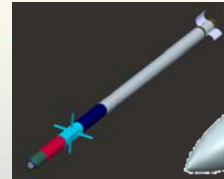
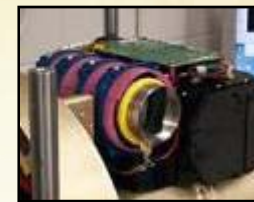
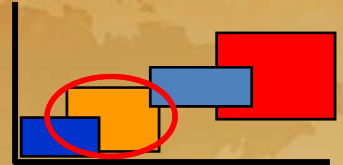


- Rapid solutions to problems identified by deckplate Sailors and Marines
- 1 year turnaround time
- Video: [www.youtube.com/usnavyresearch](http://www.youtube.com/usnavyresearch)
- Requests submitted online [www.onr.navy.mil/techsolutions](http://www.onr.navy.mil/techsolutions)



# Future Naval Capabilities

## (3-5 Year) Component Technologies

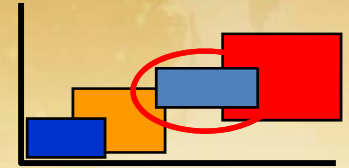


**Secure Networks**

# Innovative Naval Prototypes

(5-10 Year) Disruptive Technologies

- High Risk / High Payoff
- Innovative and game-changing
- Approved by Corporate Board
- Delivers prototype



**Tactical Satellite**



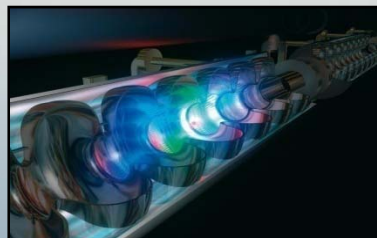
**EM Railgun**



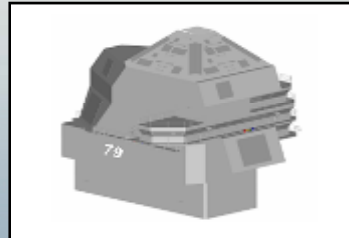
**Persistent Littoral Undersea Surveillance**



**Sea Base Enablers**



**Free Electron Laser**



**Integrated Topside**



**Large Displacement UUV**



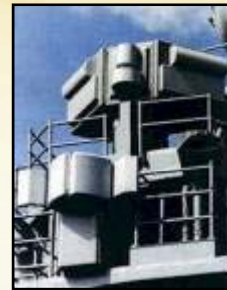
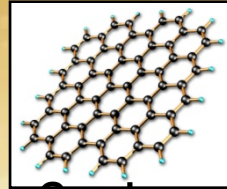
**AACUS**

# Basic Research

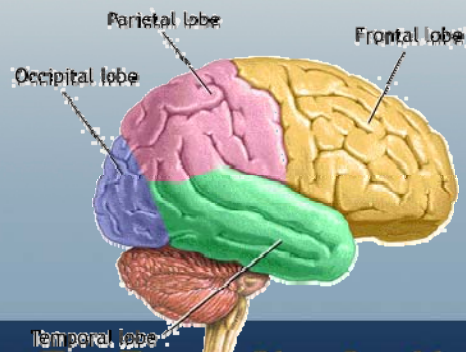
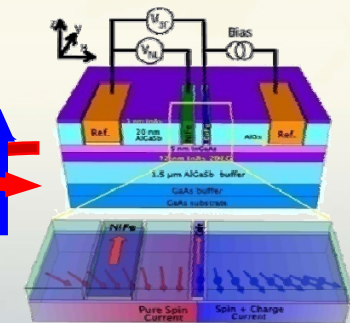
Seed corn for disruptive technologies



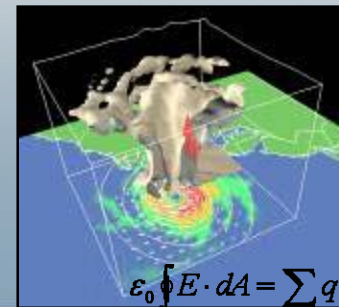
- Diverse portfolio
- Fosters innovation
- Long-term
- Investment in people
- \*60+ Nobel laureates



**Spintronics**



**Weather Modeling**



**Laser Cooling**



# How We Execute



ONR Global

FFRDs

UARCs/Academia

Industry

NRL/Warfare Centers

- 70 Countries
- 50 States
- 1,078 Companies
  - 859 small businesses
- 1,035 Universities & Nonprofit Entities
  - 3,340 principal investigators
  - 3,000 grad students

# Requirements Driven Process

I have a  
Need!

**REQUIREMENT**

I have an  
Idea!



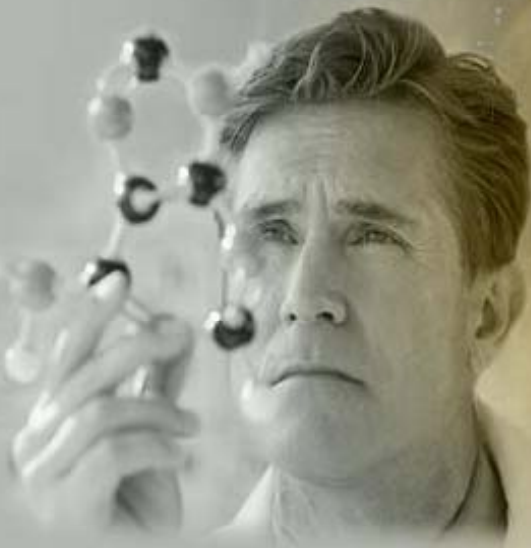
**CAPABILITY**

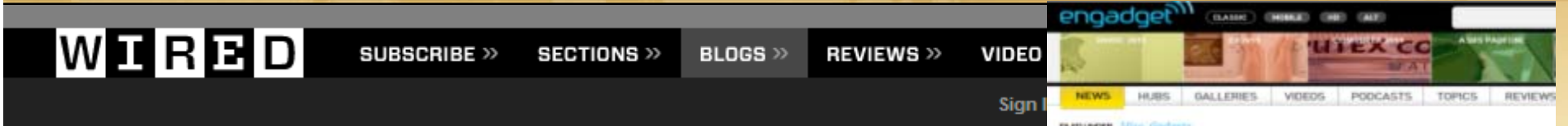
# Innovation Driven Process

I have an  
Idea!

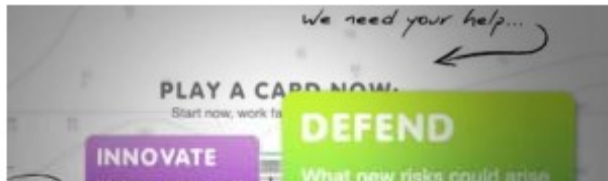
**CAPABILITY**

That's a  
Good Idea!





## Navy Crowdsources Pirate Fight To Online Gamers » MMOWGLI Gameplay



## Navy Sets World Record With Incredible, Sci-Fi Weapon

## Marines Going Green to Save Lives on Battlefield



## The Navy's Free Electron Laser System Will be More Than Just a Death Ray

## Navy's Patent Portfolio #1 in World Among Government Organizations



# Where to Find Us Online

# You Tube

Broadcast Yourself™

The screenshot shows the ONR website homepage. At the top left is the ONR logo. To its right are navigation links: Technology Locator, Glossary, Careers, and Events, followed by a search bar. Below this is a secondary navigation bar with links to ONR Global, Marine Corps Warfighting Lab, Naval Research Laboratory, and Naval Research Advisory Committee. A main navigation bar contains links for About ONR, Science & Technology Organization, Contracts & Grants, Education & Outreach, and News & Media. The main content area features a large image of a sailor on a ship. Below the image is a text block: "The Office of Naval Research (ONR) coordinates, executes, and promotes the science and technology programs of the United States Navy and Marine Corps." To the left of this text are two circular logos. Below the text is a horizontal menu with six items: 30 Expeditionary Maneuver Warfare and Combating Terrorism, 31 Command, Control Communications, Intelligence, Surveillance and Reconnaissance (C4ISR), 32 Ocean Battlespace Sensing, 33 Sea Warfare & Weapons, 34 Warfighter Performance, and 35 Naval Air Warfare and Weapons.

[www.onr.navy.mil](http://www.onr.navy.mil)







# www.onr.navy.mil

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The Office of Naval Research (ONR) coordinates, executes, and promotes the science and technology programs of the United States Navy and Marine Corps.

- 30 Expeditionary Maneuver Warfare and Combating Terrorism
- 31 Command, Control Communications, Intelligence, Surveillance and Reconnaissance (C4ISR)
- 32 Ocean Battlespace Sensing
- 33 Sea Warfare & Weapons
- 34 Warfighter Performance
- 35 Naval Air Warfare and Weapons

### Directorates

ONR's directorates balance a robust science and technology (S&T) portfolio, allocating funds to meet the warfighter's requirements.

- 03I Innovation >
- 03R Research (Discovery & Invention) >
- 03T Transition >

### Chief of Naval Research Spotlight



Challenge Winners Named  
On Feb. 28, the Office of Naval Research announced 10 finalists for its [Chief of Naval Research \(CNR\) Challenge](#). Winners, like Professor Moeness Amin of Villanova

University (left), will receive a \$100,000 research grant for basic research which could significantly contribute to building future naval forces.

"ONR program officers reviewed the entries and selected 10 very promising ideas from nearly 100 white papers," said [Rear Adm. Nevin Carr](#), chief of naval research. "As always, final selection was tough, but the winners were ultimately chosen based on potential and how well the idea supports the needs of the Nav."

### Quick Links

Get shortcuts to commonly requested topics below:

- ONR Wins Website of the Year >
- Explore research funding opportunities >
- Learn how to submit a proposal >
- Follow ONR on Facebook >

Done

Local intranet

100%

OFFICE OF NAVAL RESEARCH