

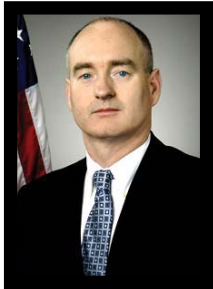
# Director of INNOVATION



Volume: 1  
March 2009

## Innovation Beyond Imagination™

### Welcome!



This is the first issue of the Innovation Newsletter, which we plan to publish on a quarterly basis. We hope to use this publication to communi-

cate current activity at the Office of Naval Research (ONR) and other organizations that increase or leverage innovation in the Science and Technology (S&T) community. This is the perfect time to begin this outreach effort – we have a new Chief of Naval Research (CNR) at ONR, and a new administration filling our most important positions throughout government. It is during times of change like this that innovation can thrive or wither. As a community it is essential that we keep innovation a part of our thinking, not just in S&T, but in our business practices, our personnel decisions, and how we approach partnering in all our endeavors.

For your background, the mission of the Office of Innovation is to promote, foster, and develop innovative science, technologies, processes and policies that support the Department of the Navy. In support of that mission, we strive to fund research that eliminates the tough technical barriers to achieving our critical warfighting capabilities of the future. As a result, it is imperative that we understand where the high value, critical challenges reside and then push the boundaries of our technical talent as a nation to deliver transformational warfighting capabilities to

the men and women of the Navy and Marine Corps.

In this first edition, I would like to introduce you to the new CNR. I believe his leadership in the coming years will help us achieve our goals in innovation. I also want to give you an overview of the programs in the innovation portfolio at ONR. This includes our Innovative Naval Prototypes, SwampWorks, Operations Analysis and TechSolutions S&T programs. You will find that ONR is also involved in a variety of activities designed to build communities of S&T activity around critical technology areas such as autonomous systems. We achieve that through initiatives such as our Innovation Summits. And finally, we try to stimulate innovative thinking by organizing events where prominent and successful people can come and interact with ONR employees. We achieve this through events such as our Distinguished Lecture Series.

There are a lot of promising things going on right now at ONR and in the S&T community. I hope that this newsletter and our website will allow you to stay current on what we are doing at ONR, how you can be involved, and where we are headed in the future. I look forward to working with you in delivering innovative capabilities to the Naval Warfighter. With your help we can make a difference.

**DR. LARRY SCHUETTE**  
Director of Innovation  
Office of Naval Research



### Distinguished Lecture Series Featuring World Class Scientists

Thursday, February 12, 2009 the DoI will host the first guest speaker for the ONR Distinguished Lecture Series featuring world-renowned scientists, engineers, policy analysts, and Nobel Laureates in the ONR MIC at 1:00 o'clock in the afternoon. We will kick off the series with Dr. George Carruthers of the Naval Research Laboratory.

Dr. Carruthers is a pioneer in the field of ultraviolet spectroscopy. He led the development team for the far ultraviolet camera used for the 1972 Apollo mission to the moon and continues to be a leader in his field and in education today.

Our next speaker is an internationally recognized al-Qaida specialist, Dr. Jarret Brachman. Dr. Brachman is the former Director of Research at the Combating Terrorism Center at West Point. His lecture will be on April 14, 2009.

Dr. William Phillips will finish the winter/spring portion of our series on May 19th with a lecture on laser cooling and trapping. Dr. Phillips is a 1997 Nobel Prize winner in the field of Physics and is currently working as a Fellow at the National Institute of Standards and Technology.

**Dr. George Carruthers**  
February 12, 2009:  
1:00-2:30pm  
ONR MIC

**Dr. Jarret Brachman**  
April 14, 2009:  
1:00-2:30  
ONR MIC

**Dr. William Phillips**  
May 19, 2009:  
1:00-2:30  
TBD

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## The CNR

### Challenge Project

The Office of Naval Research (ONR) announced the 12 winners of the 2008 CNR Challenge. Each of these cutting-edge S&T recipients will receive up to a \$100,000 grant to be used toward the continued research and development of specific technological ideas that are projected to improve U.S. Navy and Marine Corps warfighter capabilities.

As part of the competition, eligible candidates were required to submit white papers indicating research aligned with one of the six themes emphasized at the 2008 Naval S&T Partnership Conference: Fighting at Hypervelocity and Light Speed; Next Generation Hull, Propulsion and Power; Dominating the Electromagnetic Spectrum; Dominating the Battle in Littorals; Out-Thinking and Out-Adapting the Enemy; and Adaptable Autonomous Systems. Each award-winning submission described a deliverable, research approach and timeline, and outlined how the idea benefits the larger Naval S&T Strategic Plan.

ONR originally planned to award 10 grants of up to \$100,000 each, but based on the high caliber of submissions, the CNR Challenge Review board selected 12 innovative proposals from the more than 200 submissions that were received on site at the 2008 ONR Naval S&T Partnership Conference.

The 2008 participants focused their ideas on the conference theme, "Sustaining the Edge: Serving the next generation warfighter, now." The CNR Challenge Review Board selected awardees from a range of competitors representing both traditional and non-traditional sources, with field experts performing a comprehensive review of each submission.

*"The large number of great ideas received this year accentuates how ONR is perceived as a leader in the S&T world and as the place to go with good ideas and innovative concepts..."*

**SUSTAINING THE EDGE:**  
Serving the next generation warfighter now

**CNR Challenge**  
Seedling Research Funding

Bring your innovative ideas here and help us uncover the "next big thing"

Funding will be provided for innovations that fit the theme of the conference and the six featured science and technology topics

**ONR**  
OFFICE OF NAVAL RESEARCH

*...The selection of the best ideas was the real challenge and ONR is pleased to invest in those that show promise to directly support building the future Navy and Marine Corps." ~ ONR Director of Innovation, Larry Schuette, Ph.D.*

**ONR is pleased to congratulate the following 2008 CNR Challenge award recipients for their innovative research ideas:**

**Jaе Lew**, Mobility and Safety Enhancement of Military Ground Vehicles through Torque Vectoring  
**Nathan Hamilton**, Applying Advanced Statistical Methods to Complex Social Networks  
**T.F. Morse**, Efficient Underwater Communications  
**Michael Larson**, E-Field Cluster Buoys

**Michael Painter**, Advanced Spectrum Allocation, Frequency De-Confliction, and Scheduling Optimization Decision Support  
**F.J. Diez**, Novel Thrust Generation and Flow Control Method Using Micro Electrokinetic Actuator Arrays for Micro-UUVs  
**Meng H. Lean**, Compact High Throughput Membrane-Less Pretreatment for Reverse Osmosis  
**Brian Teer**, Combating Radicalization Analytic Model

**Ashok Kumar Ghosh, Ph.D., P.E.**, A Novel Material for an Adaptive and Stealth Naval Platform  
**Dr. Jacques Goeller**, Protection of Warfighter from Traumatic Brain Injury  
**Dr. Geoff Staines**, Linear Generator for Directed Energy Weapons  
**Dr. Michael Browne**, High Power Microwave Directed Energy Threat Warning System

## RDML Nevin P. Carr, Jr. takes ONR's helm: "Next Big Thing" for Navy resides in S&T discovery

Rear Admiral Nevin P. Carr, Jr. took the helm at ONR in December. His appointment as the 23rd CNR came directly from the Chief of Naval Operations (CNO) ADM Gary Roughead.

"RDML Carr is the right officer for this challenging and important job," noted Roughead. "I look forward to future successes as he builds upon the legacy left by RADM Bill Landay and the Chiefs of Naval Research that were before him."

A 29-year Navy veteran, RDML Carr previously headed the Navy International Programs Office (NIPO). His new role as the CNR is to lead ONR in its delivery of innovative, cutting edge sci-

ence and technology to the Fleet and Marine Corps. In particular, his success leading NIPO's broad spectrum of professionals and organizations throughout DoD and

surface vessels including destroyers, guided missile destroyer, cruisers and an aircraft carrier. Under his command, the USS Arleigh Burke (DDG 51) and USS

Navy and Marine Corps warfighting edge with a concept he branded as "The Next Big Thing." ADM Roughead defines this effort as delivering ground-breaking ideas and

**"We have seen many great technological advances delivered by ONR to the Fleet. The hard work, insight, intellect and commitment of the men and women of ONR will continue to bring immense value to the Navy and Marine Corps as they reach out to explore the ideas and technologies that will develop 'The Next Big Thing'".**  
**Admiral Roughead, Chief of Naval Operations**

technologies that equip the warfighter with technological advantages over adversaries, the environment and challenges faced in the range of missions in

industry in the delivery of foreign military sales, management of cooperative programs, cultivation of critical partnerships and protection of key technologies awaiting transfer have ideally poised him for the role of CNR. Carr's track record of leadership ashore and at sea includes multiple tours aboard eight

Cape St. George (CG 71) both won Battle E's and Golden Anchors. While in command of USS Cape St. George, the ship participated in combat operations in support of Operation IRAQI FREEDOM.

In remarks this spring, the CNO discussed the importance of sustaining the U.S.

which U.S. armed forces are involved today.

We welcome RADM Carr to the ONR family and look forward to working under his leadership in attaining our goals.

## SwampWorks Program

SwampWorks explores high-risk, disruptive, and innovative technologies and concepts, and provides a venue to experiment with innovative technologies to greatly advance the capabilities of our warfighters. Due to the portfolio's high-risk nature, short exploratory studies may be performed to examine the maturation of the technology proposed before making substantial investments.

The program has flexibility in planning and execution that includes a streamlined approval process to allow for the shortest possible technology development timeframe. Efforts are smaller in scope than the Innovative Naval Prototypes (INP) and are intended to produce results in less than three years. A formal transition agreement is not required, however SwampWorks programs routinely have strong advocacy outside ONR, either from the acquisition community or from the fleet.

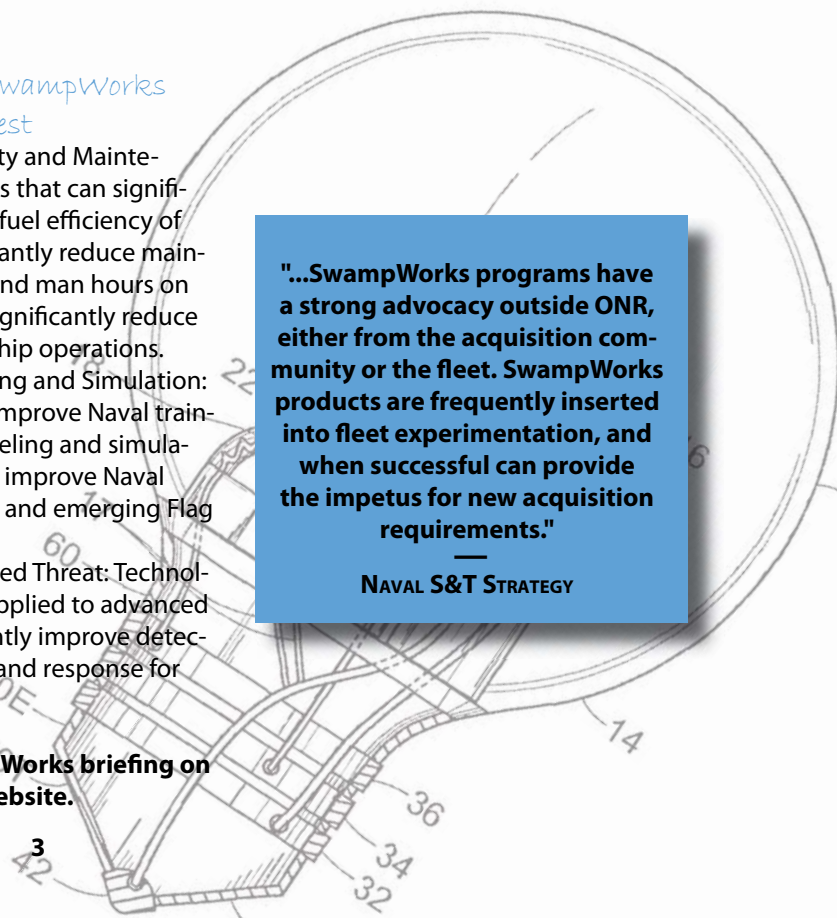
### Examples of SwampWorks Areas Of Interest

- » Fleet Affordability and Maintenance: Technologies that can significantly increase the fuel efficiency of naval ships, significantly reduce maintenance practices and man hours on Naval systems, or significantly reduce the costs of Naval ship operations.
- » Training, Modeling and Simulation: Technologies that improve Naval training or employ modeling and simulation to significantly improve Naval systems, processes, and emerging Flag challenges
- » Counter Advanced Threat: Technologies that can be applied to advanced threats to significantly improve detection, classification, and response for our Naval forces.

**"...SwampWorks programs have a strong advocacy outside ONR, either from the acquisition community or the fleet. SwampWorks products are frequently inserted into fleet experimentation, and when successful can provide the impetus for new acquisition requirements."**

**NAVAL S&T STRATEGY**

**Read the SwampWorks briefing on our website.**



# INPs Innovative Naval Prototypes

## Innovative Naval Prototypes "INPs"

Log on, you're surfing, and you see:

"Game Changing and Innovative."

"High Risk, High Payoff."

"Usable Prototypes."

Are you on Apple Computer's website, or thumbing through the Business Week homepage? Perhaps. But today, you're at ONR DoI Website ([www.onr.navy.mil/innovate/](http://www.onr.navy.mil/innovate/)), and you're checking out Innovative Naval Prototypes, or INPs. Within ONR, the INP portfolio is that, "right technology to the right point in time to give an advantage" to the Naval warfighter.

Within the ONR S&T Portfolio Balance, INPs are part of what's referred to as "Leap Ahead Innovations," and have a budget of approximately \$160 million per year. To put it into perspective, INPs are so valued by ONR that it accounts for approximately 10% of the Department of the Navy (DoN) S&T budget.

Deriving its guidance from the DoN's S&T Corporate Board and the DoN S&T Strategic Plan, the INP portfolio is managed at the strategic level by the DoI and his staff, and executed at the ONR Department level by highly experienced and insightful Program Officers (POs).

Overall, INPs are investments that are planned for transition within 4 to 8 years. A key tenet of INP portfolio leadership is the ability to leverage previously untapped investments, in such a way as to serve as a forcing function on

the basic and applied research community. For example, previous to the start of the Electromagnetic Railgun as an ONR INP, many years' worth of research and experimentation, and significant resources and funding, had been invested to bring the technology to the point of becoming an INP. Senior leadership recognized that the time had come, that the technology had sufficiently advanced, and that the need of the war fighter had been specifically articulated, so that the time was right to make the INP investment in this technology so that a usable prototype could be developed in that 4 to 8 year window.

The current INP portfolio includes: Electromagnetic Railgun (EMRG) INP (Code 35), Persistent Littoral Undersea Surveillance (PLUS) INP (Code 32), Seabasing Enablers (SBE) INP (Code 32), and Tactical Satellite (TACSAT) INP (Code 32). In fiscal year 2010 (FY10), two new INPs will start. These include the Free Electron Laser (FEL) INP (Code 35) and the Integrated Topside (InTOP) INP (Code 31). Though we've just started FY09, some funding has been provided to both the FEL and InTOP INPs so that steps can be taken now to line up contracts and performers when INP funding arrives in FY10.

In follow on issues of this newsletter, we'll provide an overview of the different INPs.

Steps are being taken right now to develop a list of potential FY12 INP new starts, to evaluate those nominations, and to package them for presentation at the Summer of 2009 meeting of DoN S&T Corporate Board. Generally, new INP ideas are championed by a PO of one of the ONR Departments, who then

discusses these ideas with the DoI. Certainly, anyone with program level ideas for innovative and game changing ways of doing business within the DoN, should not hesitate to begin a discussion of those ideas with ONR, even if you don't have access to a PO. Ideas, in the form of a white paper submission, can be submitted to [INP@onr.navy.mil](mailto:INP@onr.navy.mil).

## INP Spotlight: The Electromagnetic Railgun (EMRG)

EMRG is a revolutionary long-range naval gun that will fire precision-guided hypervelocity projectiles to ranges greater than 200 nautical miles. It will utilize electricity rather than gun powder and rocket motors to propel the projectiles. Delivering persistent, time critical precision strike without the use of propellants or explosive warheads will revolutionize warfighting capabilities from the sea.

*What will it accomplish?*

- » Value of missile ranges at bullet prices
- » Delivery of a high quantity of persistent and precise fires
- » Ability for a time critical strike, with all weather availability

**Read the EMRG Fact Sheet on our website.**



World record is set for an electromagnetic railgun fire at 10.64 mega joules with a muzzle velocity of 2,520 meters per second at the Naval Surface Warfare Center, Dahlgren, VA January 31 2008

**“NWDC is chartered to think outside the box, and chartered to make people think outside the box.”**

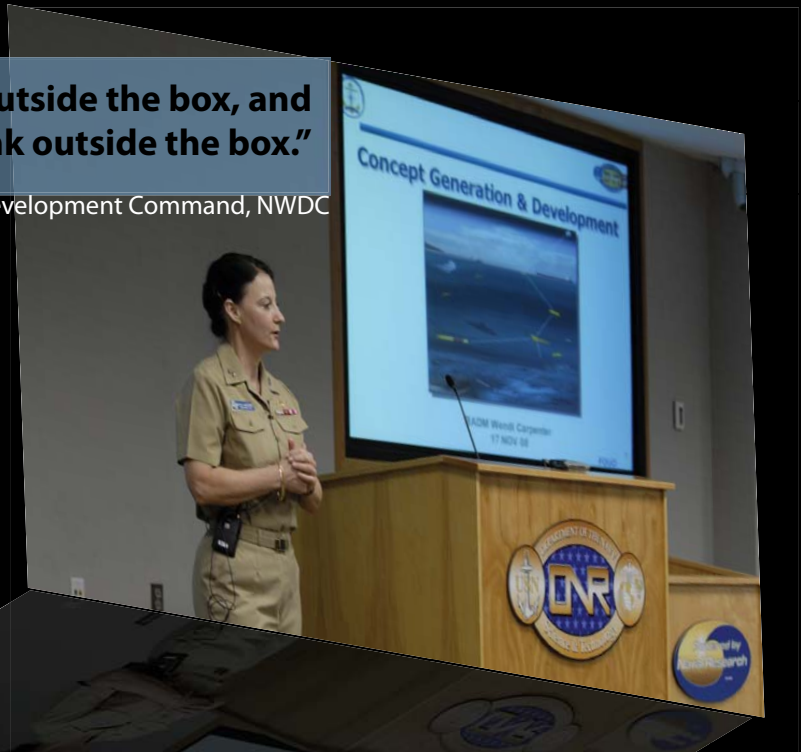
RADM Wendy Carpenter, Navy Warfare Development Command, NWDC



VADM, Joe Dyer (ret) VP IRobot



Marc Steinberg, ONR Code 31



**au·ton·o·mous** *lo-tă-nə-məs* a: existing or capable of existing independently  
b: responding, reacting, or developing independently of the whole

## Innovation Summits

Sponsored by the DoI, the Innovation Summits focus on multidisciplinary research areas that contribute to a broad range of systems, operating environments and warfighting missions. During the Summits, ONR works to find opportunities for collaboration, identify cross cutting research areas, and identify key problems that, if solved, would allow us to realize significant progress in warfighting capability.

The first Innovation Summit, held in November of 2008 focused on Autonomous Systems. Over 150 attendees from Government, Industry and Academia participated in the two day event. The subject of Autonomous Systems was approached through four technical areas:

1. Human/Unmanned Systems Collaboration
2. Intelligent Sensing Behaviors and Environmental Understanding for Robust, Sustainable Operations
3. Scalable and Robust Distributed Collaboration
4. Intelligent C3 Architectures

In these four technical areas, technical challenges were identified, future warfighting or operational capabilities were described, and scenarios were used to test the future capabilities to identify those capabilities which were used most, and were seen as critical.

Visit our website to see or download the final report. The next Innovation Summit is a natural outgrowth of the last one. It will focus on Large Sensor Data Fusion and Extraction. There will be an initial, government only workshop on this topic held at ONR in early April 2009, followed by the Innovation Summit in November 2009.

## TechSolutions Program



TechSolutions provides rapid-response S&T solutions to immediate deck-plate level issues in response to warfighter requests. The goal is to develop applications of existing and emerging

technologies to meet high-interest, near-term Fleet/Force needs by demonstrating prototype solutions within 14 months of a request. The TechSolutions team solicits operational needs from the Fleet/Force community, and then develops solutions working with the Naval Research Enterprise which consists of the Navy's warfare centers

and the Navy's University Affiliated Research Centers.

Primary areas of focus tend to be Naval Warfighter Performance and Protection; Affordability, Maintainability and Reliability; and Assure Access and Hold at Risk. In FY 2008, the TechSolutions program spent roughly \$7Million on 13 projects. At the same time, investments from 16 other programs were leveraged to solve these critical needs for our Sailors and Marines.

### Tech Solutions Program: USMC Howitzer Tools

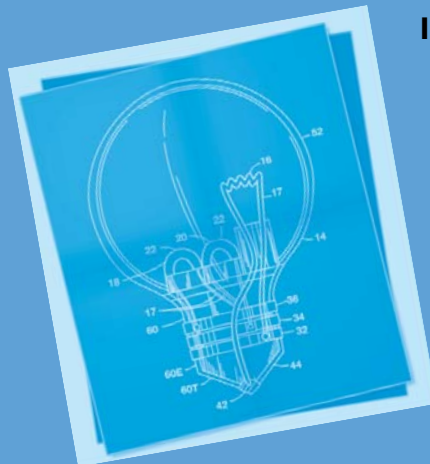


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