

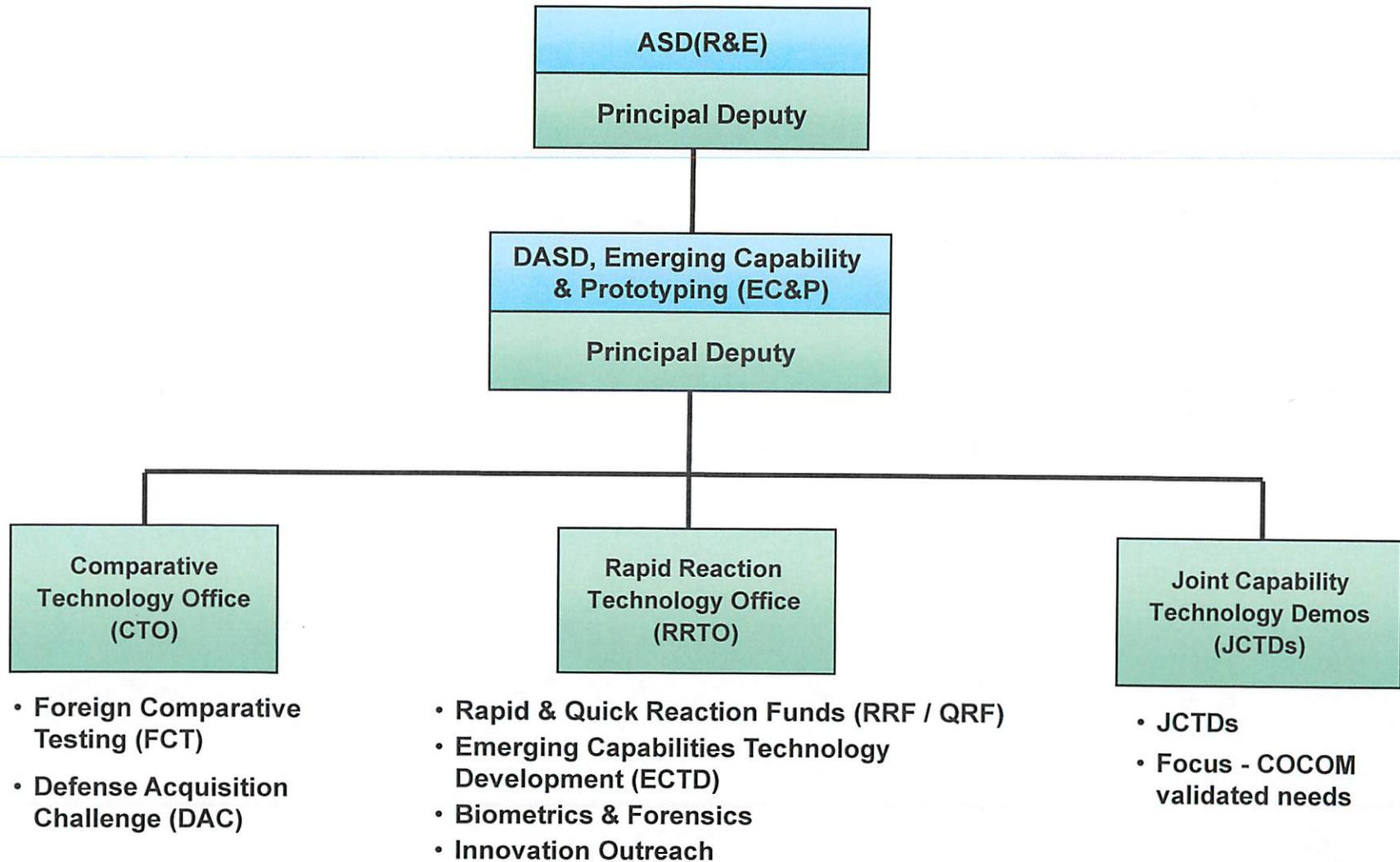


Rapid Reaction Technology Office

Overview

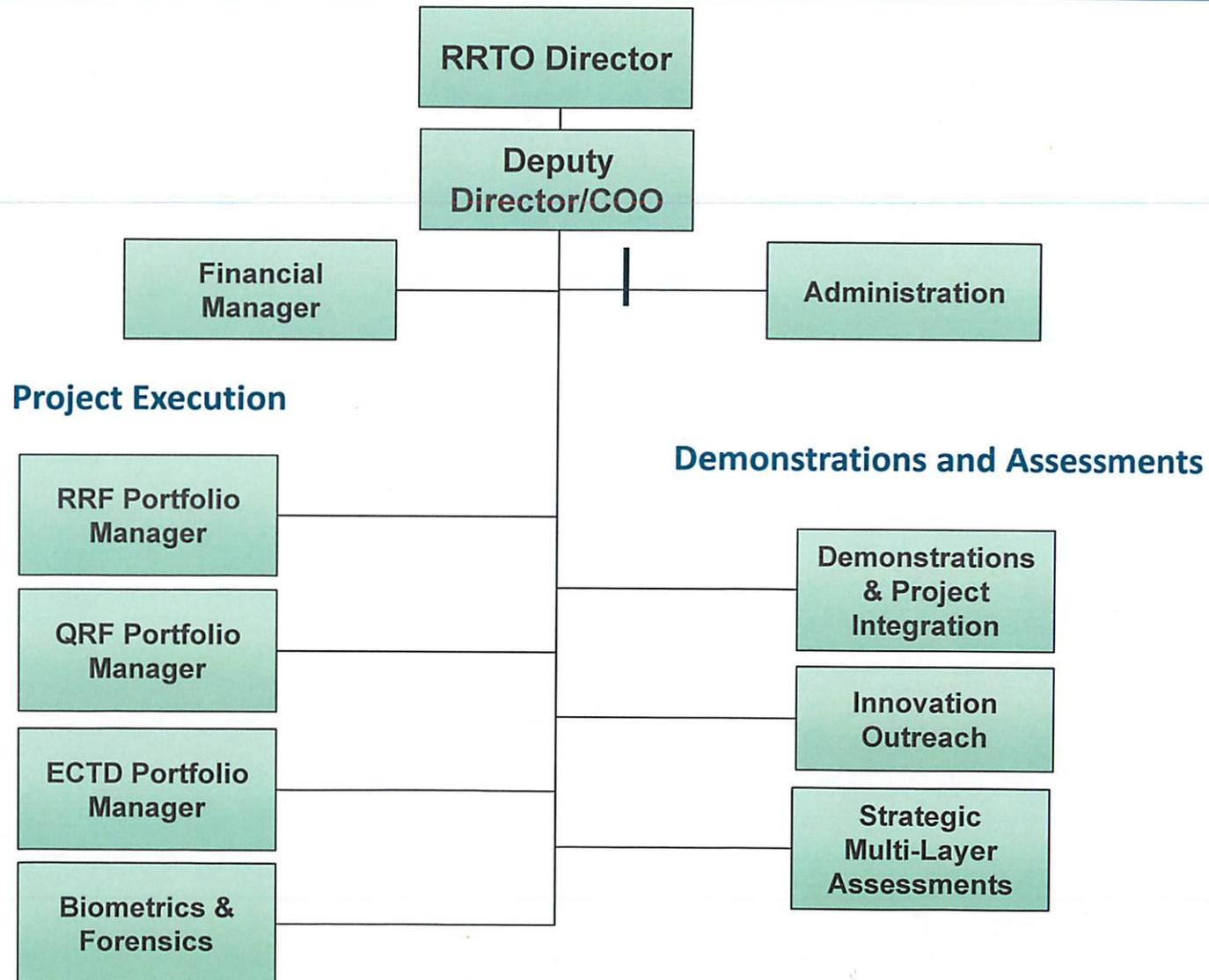


Emerging Capability & Prototyping Directorate





RRTO Organizational Structure





Strategic Guidance

Quest for agility, innovation, and affordability

“As we end today’s wars and reshape our Armed Forces, we will ensure that our military is agile, flexible, and ready for the full range of contingencies.”

“This country is at a strategic turning point after a decade of war and, therefore, we are shaping a Joint Force for the future that will be smaller and leaner, but will be agile, flexible, ready, and technologically advanced.”

– Sustaining US Global Leadership: Priorities for the 21st Century Defense

“We are continuing our efforts in the following seven areas to achieve greater efficiency and productivity in defense spending:

1. Achieve affordable programs;
2. Control costs throughout the product lifecycle;
3. Incentivize productivity and innovation in industry and Government;
4. Eliminate unproductive processes and bureaucracy;
5. Promote effective competition;
6. Improve tradecraft in acquisition of services; and
7. Improve the professionalism of the total acquisition workforce.”

– Better Buying Power 2.0

“The goal of Reliance 21 is to ensure that the DoD S&T community provides solutions and advice to the Department’s senior-level decision makers, warfighters, Congress, and other stakeholders in the most effective and efficient manner possible. This is achieved through an ecosystem and infrastructure that enables information sharing, alignment of effort, coordination of priorities, and support for scientists and engineers across the Department.”

– Reliance 21, January 2014

“When there is a strong threat-based or operationally driven need to field a capability solution in the shortest time, MDAs are authorized to implement streamlined procedures designed to accelerate acquisition system responsiveness. Statutory requirements will be complied with, unless waived in accordance with relevant provisions.”

– Interim DoDI 5000.02, November 26, 2013

“Staying ahead of security challenges requires that we continue to innovate, not only in the technologies we develop, but in the way the U.S. forces operate. Innovation – within the Department and working with other U.S. departments and agencies and with international partners – will be center stage as we adapt to meet future challenges.”

– Quadrennial Defense Review 2014





Top Level Guidance



- **ASD(R&E) Imperatives**
 - Mitigate emerging threats
 - Enable new capabilities
 - Affordably extend life of existing systems
- **ASD (R&E) Focus Areas**
 - Autonomy
 - Electronic Warfare
 - Space Resiliency
 - Counter-WMD
- **DASD Emerging Capability and Prototyping**
 - Developmental Prototypes
 - Demonstrate Feasibility of an integrated capability
 - Overcome technical risk
 - Develop data to enable cost-capability trade
 - Operational Prototypes
 - Demonstrate military utility of integrated solution
 - Demonstrate robust manufacturing processes
 - Define forum, fit and function



RRTO Mission and Vision



“...we must now adapt, innovate, and make difficult decisions to ensure that our military remains ready and capable – maintaining its technological edge over all potential adversaries.”

Secretary of Defense Hagel, Pentagon Press Briefing Room, February 24, 2014

- **RRTO Mission**

- RRTO will develop prototypes and host technology demonstrations to counter emerging and anticipated threats in order to accelerate the delivery of resilient solutions leading to affordable Warfighter capabilities.

- **RRTO Vision**

- RRTO is the model for developing and demonstrating high-risk, high-reward technologies that produce game-changing capabilities by leveraging non-traditional sources of innovation, interagency partnerships, and rapid prototyping.



RRTO Overarching Objectives



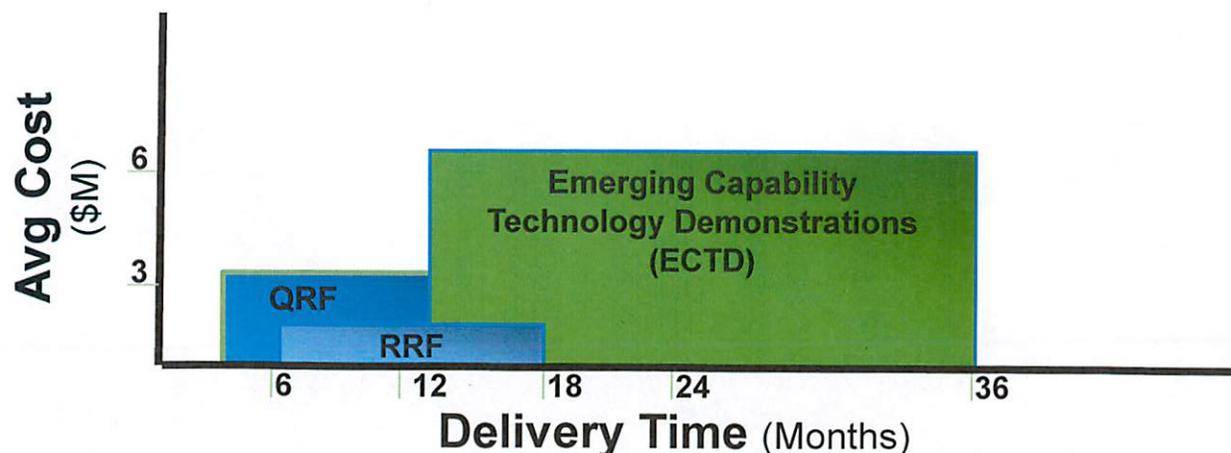
- Identify and examine technological impacts of emerging and potential future military issues
- Anticipate adversaries' (Red Team) future exploitation of technology
- Leverage the DoD science and technology base and those of other Federal Departments
- Identify and leverage technology developed outside of DoD in the commercial sector, in academia, and internationally
- Regularly engage with innovators and communities of interest to keep abreast of emerging technologies, threats, and Warfighter needs
- Support ASD(R&E) and DASD(EC&P) overarching objectives
- Stimulate interagency coordination and cooperation
- Demonstrate feasibility of integrated or cross-domain capabilities that guide long-term science and technology investment decisions
- Provide evidence based metrics & measures in overcoming specific technical risk barriers
- Accelerate maturation of affordable, resilient capabilities and concepts to counter emerging threats
- Execute projects to support irregular and conventional warfare needs



RRTO Funding Lines



- **Rapid Reaction Fund (RRF):** Provide hedge against technology risk
 - Identify and develop near term capabilities to support irregular warfare needs
 - Completion of efforts within 6-18 months
 - Actively seeks partnership opportunities with DoD and non-DoD partners
- **Quick Reaction Fund (QRF):** Accelerate conventional warfare capabilities
 - Identify and develop near term capabilities to support conventional warfare needs
 - Requirement for completion of efforts within 12 months of funding
 - Deliver a hardware prototype to demonstrate capability
- **Emerging Capabilities Technology Development (ECTD):** Counter emerging threats
 - Identify and develop prototypes to counter emerging threats
 - Longer-term (12-36 months), mission-focused capability development that crosses functional domains and enhances the Warfighter's adaptability and resilience





RRTO Execution Approach



- **RRTO develops joint projects and activities with DoD organizations and interagency partners**
 - Interagency partnerships are informal and are built on established working relationships
 - Partners include:

Department of Homeland Security	Department of State
Department of Justice	Department of Commerce
Director of National Intelligence	Central Intelligence Agency
National Security Agency	National Reconnaissance Office
National Geospatial-Intelligence Agency	Director, National Intelligence
Technical Support Working Group	Academic institutions and industry partners
- **RRTO projects support a wide range of operational users:**

– EUCOM	CENTCOM	AIR FORCE
– PACOM	SOCOM	ARMY
– NORTHCOM	SOUTHCOM	NAVY/MARINE CORPS
- **RRTO also creates venues for informing interagency programs of interest and partners of its activities**
 - Bi-annual Cross-Pollination Meetings
 - Strategic Multi-layered Assessment Conferences
 - Demonstration Venues and Spiral Exercises



Biometrics and Forensics Science & Technology



Biometric Technology Development

Purpose: Development of emerging technology that improves our ability to collect, store, match, and analyze biometric data

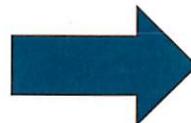
Forensic Technology Development

Purpose: Development of emerging technology for forensic recognition, collection, analyzing, preserving, storing, and sharing in expeditionary environments

Approach:

• Biometric and Forensic RDT&E Challenges

- More confidence, shorter response time
- Increase standoff
- Reduce time on target
- Push analysis forward
- Research into the underlying science



Biometric and Forensic Focus Areas

- Collection Capability
- Data Sharing
- Database Capability
- Underlying Science

Solicitation Mechanisms:

• Broad Agency Announcement (BAA) is open from 1 July 2013 through 30 June 2015

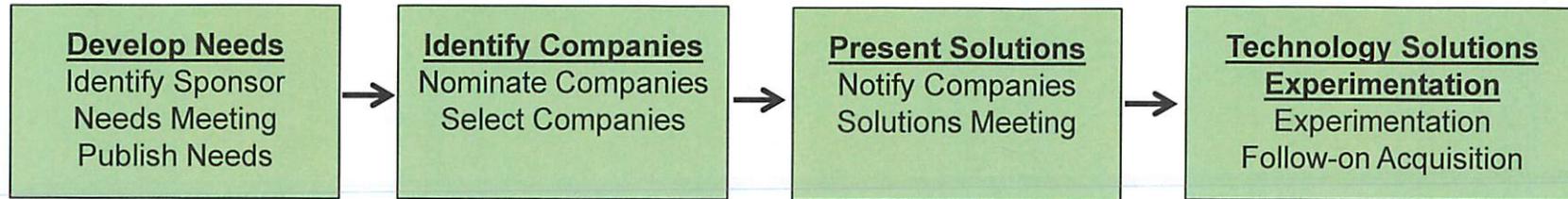
- 96 proposals submitted to date; 8 selected for follow-up or funding
- 53 were forensic related (DNA, chemistry) and 30 were biometric related (face, iris)
- Others include crossover (fingerprint scanning and AFIS/ABIS), digital imaging and odontology

Measure of Success:

- **Demonstrated capability improvements, fielded or transitioned to acquisition efforts**



Innovation Outreach



- **Technology leaps are being made outside the purview of the DoD**
- **Innovation Outreach Workshops:**
 - Provide access to critical innovations occurring outside DoD's view
 - Have resulted in:
 - 319 of 1519 Nominated companies have made presentation to government agencies
 - 45 companies were funded for experimentation
 - 16 capabilities operationally fielded
- **Support DoD's focus on engaging small business**
- **Support DoD's Better Buying Power objectives and initiatives**



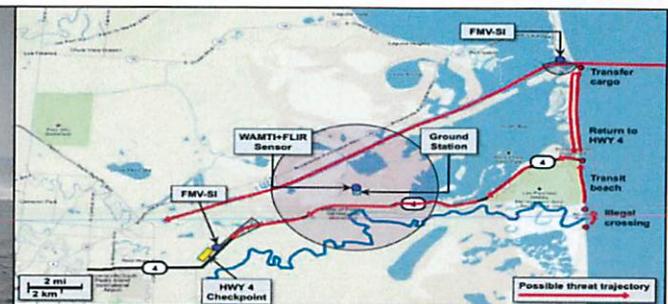
RRTO Demonstration Venues



Joint Experimental Range Complex



High Speed, Electronic Keel Marine Testbed



Multi-Intelligence & ISR Technology Demonstration Venue

The Joint Experimental Range Complex (JERC) is a remote test site located at the Yuma Proving Grounds that is designed to rapidly test prototype technologies. These limited proof-of-concept tests allow for integration and development of ISR, training, and CONOPS development. Since its establishment in late 2003, RRTO has sponsored testing of more than 300 systems at the JERC.

Stiletto is a high speed vessel with an “electronic keel” that will support a wide range of equipment. The 88-foot long boat is an experimental, all carbon fiber craft that was designed to rapidly acquire, integrate, and employ new capabilities to explore the military utility of emerging technologies and concepts for special and expeditionary forces. Stiletto participates in coordinated exercises and technology assessments with the direct involvement of military commands, Services and interagency partners. In FY2013, Stiletto demonstrated 56 technologies, providing a total cost savings of \$7.1M and transitioning 8 technologies to operational PORs.

Thunderstorm provides OSD, interagency partners, Combatant Commanders, Services, academia, government laboratories and commercial vendors with an enduring multi-Intelligence technology demonstration venue. New and existing ISR technologies can be integrated, evaluated and assessed under real world conditions with scripted and unscripted scenarios. Thunderstorm spirals are conducted twice a year. In FY 2013, 24 technologies were demonstrated, and six of those systems were referred to operational partners for follow-up or potential acquisition.



Backup

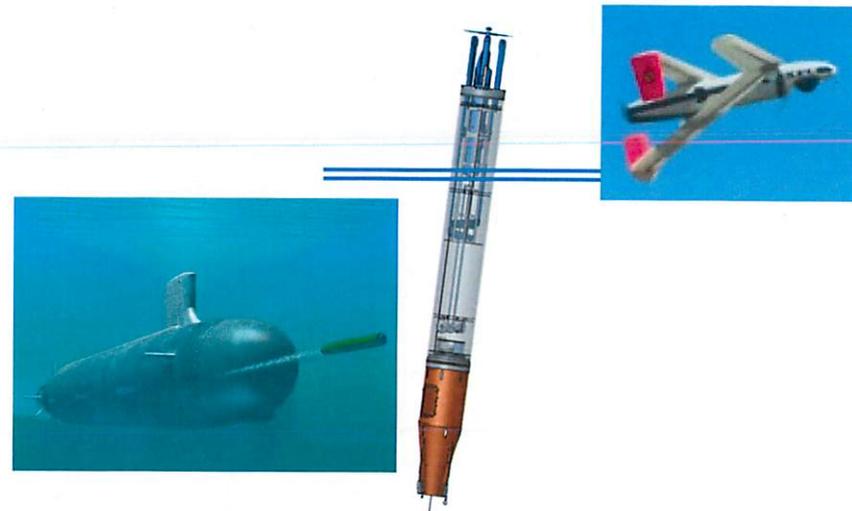


RRTO Project Examples



XFC/Sea Robin:

This effort developed and demonstrated a long endurance, stealthy Unmanned Aerial System equipped with high quality, real-time or stored video, capable of being launched from a submerged submarine. XFC provides submarines with an extended reach collection device.



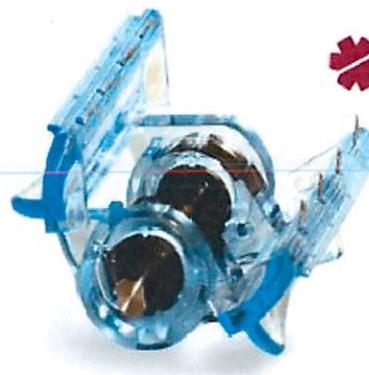
I-CAT: A conceptual design for an inflatable catamaran with three mutually supporting components: inflatable hulls, a collapsible frame, and an integrated topside. The study demonstrated the concept by fabricating both inflatable and rigid hulls to demonstrate performance, and a basic rigid aluminum frame to form a catamaran craft with the hulls.



RRTO Project Examples



iClamp: Provides combat medics, first responders and emergency room triage personnel with a novel hemorrhage control technology that stabilizes wounded persons until emergency room care is available. iTClamp closes open wounds, stops critical bleeding in seconds, and one-handed operation allows for self-placement.



iTClamp
by INNOVATIVE
TRAUMA CARE



Standoff AUV collection in shallow or denied areas with host submarine

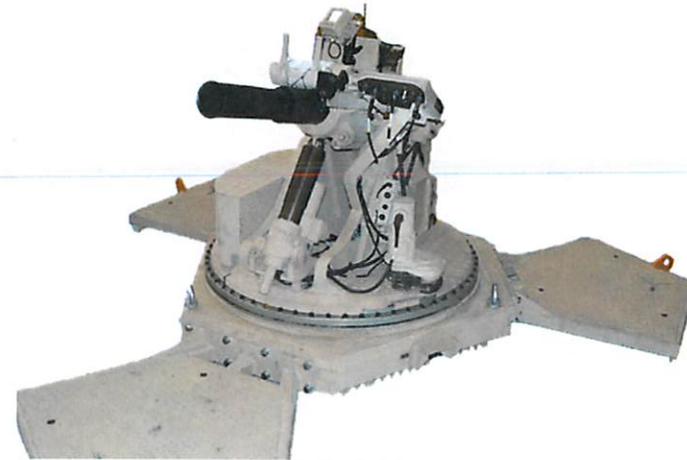
Project 1319: Provides covert extended Warfighter reach into littoral, shallow water or denied areas. It supports safe and efficient homing and docking between an Autonomous Underwater Vehicle (AUV) and submarine. Demonstrates high data rate digital acoustic communications and ultra-short baseline acoustic tracking. A prototype will operationally deploy in FY 2015.



RRTO Project Examples



Advanced Mortar Protection System (AMPS): AMPS is an accurate system for providing precise 120mm indirect fire capability in 360 degree direction. AMPS is being fielded with U.S. Forces-Afghanistan in support of Operation Enduring Freedom in FY 2014.



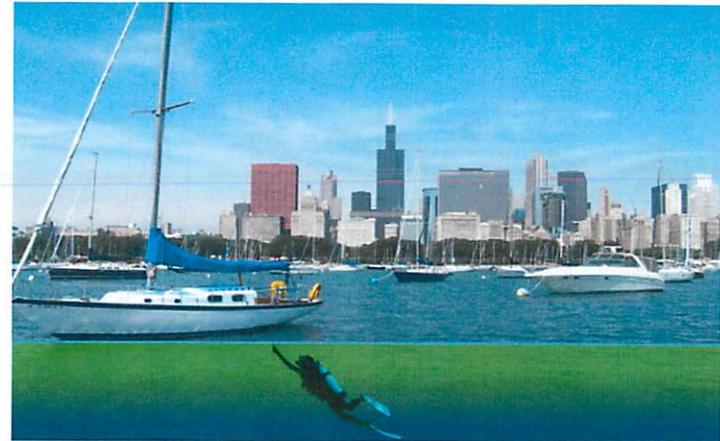
Accelerated Nuclear DNA Equipment (ANDE): Enables automated rapid DNA profiling, while minimizing analytical complexity and user manipulations, for field applications. System prototypes allow users without technical training to generate DNA profiles directly from buccal swab reference samples in approximately 90 minutes.



RRTO Project Examples



NAUSICAS is a short-range stand-off system which allows the contents of a submerged object to be examined without touching or opening the object. The technique allow threat materials, contained inside of the object to be easily and readily identified even if they are surrounded by intentional shielding, layers of “benign” materials.



UUV Short Course: The course establishes a basic understanding of the technological “art of the possible” of undersea technology through a combination of lectures, technology demonstrations of prototype hardware and visualization of the key technology trade-offs. By educating promising junior officers today, we ensure that future decision-makers will possess the technology background necessary to understand the technology trade-offs and make good investments to maximally exploit the unique features of the undersea domain.



Preparing our future leaders for a rapidly evolving technology landscape

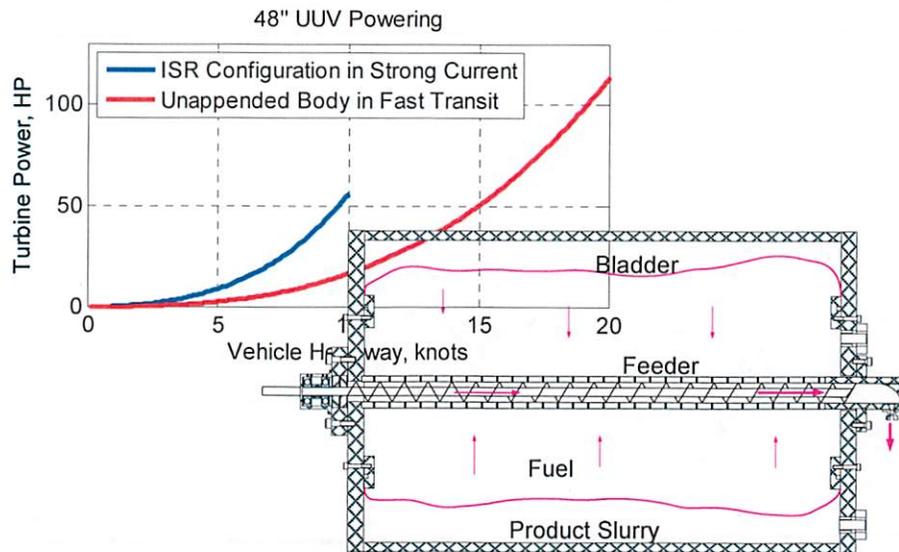


RRTO Project Examples



Perseus: A DoD effort supporting Science, Technology, Engineering, and Mathematics (STEM) education by enabling undergraduate students to apply multidisciplinary engineering skills to accomplish a realistic mission. Missions have included disrupting underwater cables and identifying and characterizing underwater unexploded ordnance.

Conventional Effects Via Unconventional Means



Aluminum Combustor: Develops a fuel-feed system for an aluminum-combustion powered high-performance Unmanned Underwater Vehicle. ISR, SOF support and track-and-trail are typically regarded as the mission types that will benefit most from the enhanced capability provided by aluminum combustion power.

LUUV Ops are Energy Intensive -- Al-H₂O is a Game Changer



ASD(R&E) FY 2014-15 Themes



- ***Electromagnetic spectrum agility***
 - Cognitive Agility – Near real-time movement across the spectrum
- ***Autonomous systems***
 - What should DoD be doing?
 - Open systems architectures
- **Space capability resilience**
- **Countering weapons of mass destruction**
- **Novel counters for force applications**



Prototype Categories

