



FY16 EC New Starts

Funded FY16 New Starts
Flexible Sea-based Force Projection (FSFP)
Operational Planning Tool
Densified Propellant Fire From Enclosure - Confined Space (FFE/CS) Propulsion Technologies
Advanced Topcoat System (ATS)
Incapacitation Prediction for Readiness in Expeditionary Domains - an Integrated Computational Tool (I-PREDICT)
Combined EO/IR Surveillance and Response System (CESARS)
Ship-launched EW Extended Endurance Decoy (SEWEED)
Surface Ship Periscope Detection and Discrimination (SSPDD)
Softkill Performance and Real-Time Assessment (SPARTA)
Reactive Electronic Attack Measures (REAM)
Proposed FY16 New Starts
Combat Power Control
Autonomous Unmanned Surface Vehicles for MiW Operations
Multi-Threat Passive Ship Armor
Mine Drift Prediction Tactical Decision Aid (MDP TDA)
Operate to Know (OtK)
Persistent Renewable Energy for Undersea Systems
Surface X-Band Radar (Surf-X)
Autonomous Reacquisition Manipulator System (ARMS)



Flexible Sea-based Force Projection (FSFP)

Technical Description

Develop inflatable structure technologies to facilitate cargo transfer operations, surface connector interfaces, and amphibious vehicle launch and recovery in the sea base by mitigating the local sea state through SS4 and increasing the functionality of existing platforms.

S&T Focus

- Inflatable/fillable rigid structures deploy as wave mitigation barriers to reduce the local sea state near the Sea Base
 - Reduce sea state from SS-4 to SS-3 or SS-3 to SS-1
 - Enable assembly and employment of interface components (MLP/LMSR) to support surface vessel (JHSV) and connector (LCAC/LCAC-100/LCU/Army watercraft) transfer operations
- Systems utilize this new technology with existing sea base components to form interface platforms
 - Support surface connector and amphibious craft operations with ships of the Seabase (JHSV, T-AK, LMSR, T-AKE)



Warfighter Payoff

- Access to entire Prepositioned Force in Sea Base
- At-sea transfer operations enabled through SS3
- Provides a launch & recovery interface for amphibious vehicles and reduced sea states for other connector operations

Pillar: Sea Basing

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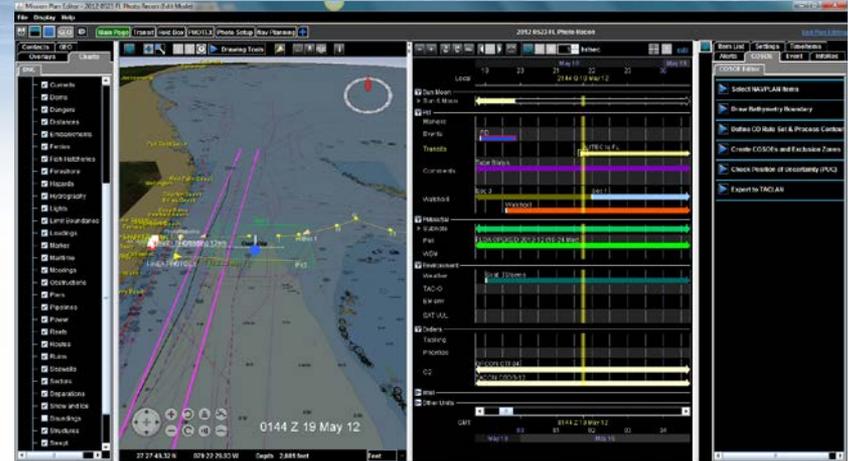
Operational Planning Tool

Technical Description

A task-centered, intuitive and easy to operate mission planning software that will assist unit and CSG/ESG Planning teams in planning and assessing alternatives for an operational timeline and include alternative transit routes, recommended changes in the ships posture and cues to conduct specific activities in the execution of operational objectives.

S&T Focus

- Intuitive and efficient Carrier Strike Group “Plan-Brief-Execute-Assess” set of decision support services that aid rapid changes in battle rhythm and sequence, allowing rapid shifts to changing mission requirements.
- Integrated training capability that seamlessly allows operators to train on actual systems as needed during operations.
- Automated navigation planning decision aids that provide the warfighter timely, relevant, and accurate information.
- Extract relevant C2, navigation, and tactical data to allow the commander to rapidly and confidently move from data-to-options-to-informed decisions.



Warfighter Payoff

- Make informed decisions, solve complex problems, and ultimately accomplish assigned missions.
- Seamless process for "Plan-Brief-Execute-Assess" directed by the Commander's intent
- Reduce time and lower risk to generate safe and effective navigation and operational plans.

Pillar: Capable Manpower

EC Manager: Dr. William "Kip" Krebs
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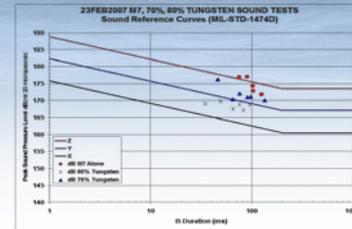
Densified Propellant Fire From Enclosure/Confined Space (FFE/CS) Propulsion Technologies

Technical Description

Provide a Fire From Enclosure (FFE)/Confined Space (CS) capable propulsion system that meets length, weight, and sound pressure level requirements for the next generation Shoulder-launched Multipurpose Assault Weapon (SMAW) system.

S&T Focus

- Densified Propellant (DP)-based propulsion system (rocket) for the SMAW system:
 - Objective: FFE launch capable
 - Threshold: CS launch capable
- Build and demonstrate a propulsion system that meets sound pressure and blast overpressure requirements applicable to FFE/CS requirements from -25°F to +140°F, as stated in Marine Corps Systems Command Capabilities Development Document (CDD) for Follow-On-To-SMAW (FOTS)
- Meet rocket launch velocity requirements and weight requirements



Warfighter Payoff

The Marine Corps has requirements for capabilities to conduct Military Operations in Urban Terrain (MOUT). This EC will provide:

- FFE launch capability
- CS launch capability
- Improved urban warhead penetration capability
- Minimal weight increase, no increase in SMAW system length

Pillar: Expeditionary Maneuver Warfare

EC Manager: Mr. Dan Simons

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Advanced Topcoat System (ATS)

Technical Description

Develop, demonstrate and implement high performance non-isocyanate topcoat systems and advanced protection primers to significantly reduce total ownership cost, increase Naval aircraft and USMC ground vehicle readiness and improve long-term survivability.

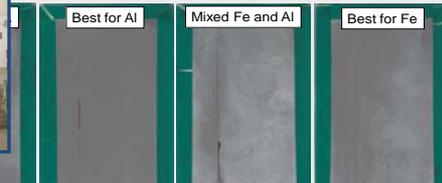
S&T Focus

- Leverage commonality in current state-of-the-art topcoat systems for air and ground vehicle (topcoats ~80% common)
 - Aviation: Type IV Polyurethane – Lower film thickness, focus on flexibility, erosion, color/gloss retention IH restrictions.
 - Reduce Environmental Safety and Health Footprint
 - Improve color and gloss retention, improved corrosion resistance properties, and reduced toxicity for naval aircraft and support equipment
 - Ground: Type IV/II Polyurea – Higher film thickness
 - Enhance corrosion resistance, improved color stability (camouflage), improved retention of chemical agent resistance properties, and reduced toxicity for USMC ground vehicles



AI- Rich Primer on Steel

Primer on zinc phosphated steel (Bonderite 952 P60), 1.5 mil thick, after 168 hours in ASTM B117 salt fog



Warfighter Payoff

- Reduced maintenance costs:
 - Aviation: \$22M/Year
 - Ground: \$38M/Year
- Operational maintenance capability
- Improved readiness / Improved survivability

Pillar: Enterprise & Platform Enablers

EC Manager: Mr. Bill Nickerson

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Incapacitation Prediction for Readiness in Expeditionary Domains – an Integrated Computation Tool (I-PREDICT)

Technical Description

Develop an integrated insilico physiologically-relevant human body model and associated software tool to predict injury outcomes in response to specific stressors (ballistic, blast/acceleration, vibration and blunt traumas), enabling risk assessment for improved injury prediction, casualty flow modeling and design criteria for personnel protective equipment and platform design.

S&T Focus

- Integrated insilico Model of the human body and internal organs that includes physiologically-based injury prediction capabilities
- Quantitative validation method to ensure biofidelity



Warfighter Payoff

- Better mitigation/preventative measures to protect against ballistic, blast/acceleration, vibration and blunt trauma
- Cost avoidance, Injury and Incapacitation Prediction, Medical Planning, Equipment Design (PPE and Platforms)

Pillar: Force Health Protection

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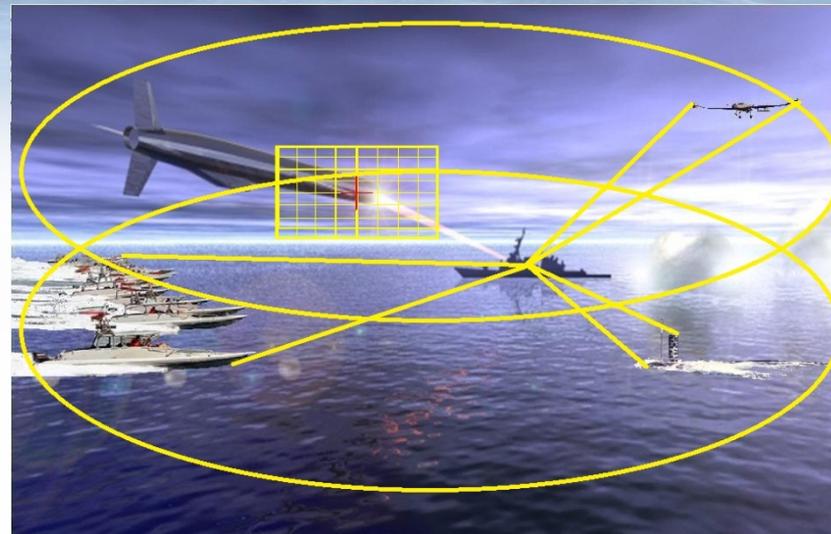
Combined EO/IR Surveillance and Response System (CESARS)

Technical Description

Develop a combined Electro-Optical/Infrared (EO/IR) surveillance and response solution for shipboard use that encompasses the entire kill chain of threat detection, identification, tracking, engagement, and assessment of engagement effectiveness.

S&T Focus

- Shipboard panoramic EO/IR cueing and surveillance system.
- Multispectral EO/IR countermeasures against advanced threats.



Warfighter Payoff

- Enhanced detection of small boats, anti-ship weapons, periscopes, and UAVs
- Upgraded defense against EO/IR guided weapons and sensors

Pillar: FORCEnet

EC Manager: Dr. Peter Craig
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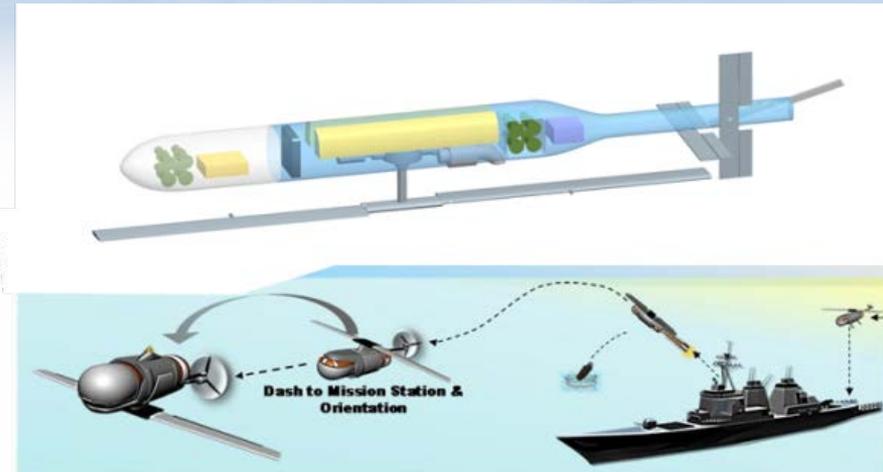
Ship-launched EW Extended Endurance Decoy (SEWEED)

Technical Description

Provide a ship-launched, rapid reaction, long endurance, expendable flight vehicle designed to carry electronic warfare payloads.

S&T Focus

- Cavity & Surface Treatments + Airframe Materials/Geometry for EW-Compatible Antenna Isolation
- Swashplateless Rotor
- Payload Thermal Management
- Rotary Wing Rapid Deployment Configuration
- Advanced Control Algorithms
- “Black Ghost” High Efficiency Turbine Engine (Tech Data Pkg for Possible Future Upgrade)



Warfighter Payoff

- Defense against pop-up and sustained missile attacks
- Suitable for installation on most naval ships

Pillar: Sea Shield

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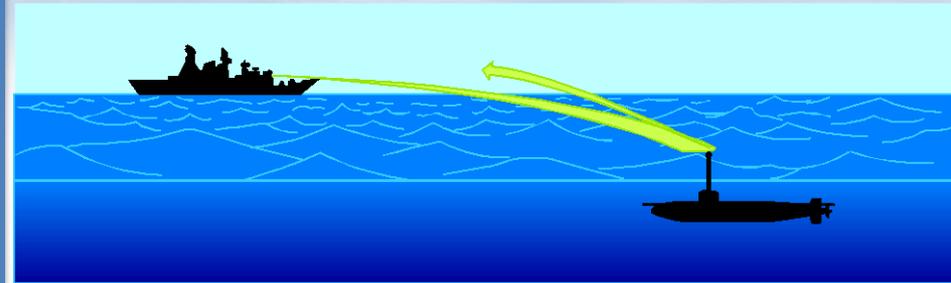
Surface Ship Periscope Detection and Discrimination (SSPDD)

Technical Description

Demonstrate a surface ship based optical periscope detection and discrimination capability that compliments radar techniques, results in a high probability of overall detection with near zero false alarms, and is resistant to countermeasures.

S&T Focus

- High performance Avalanche Photodiode (APD) technology
- Non-conventional aperture and optical designs
- High Performance Read-Out Integrated Circuits (ROIC's)
- Agile beam and line-of-sight steering
- Information theoretic data fusion



Warfighter Payoff

- Complimentary to radar detection
- Eliminate false alarms
- Resistant to Countermeasures

Pillar: Sea Shield

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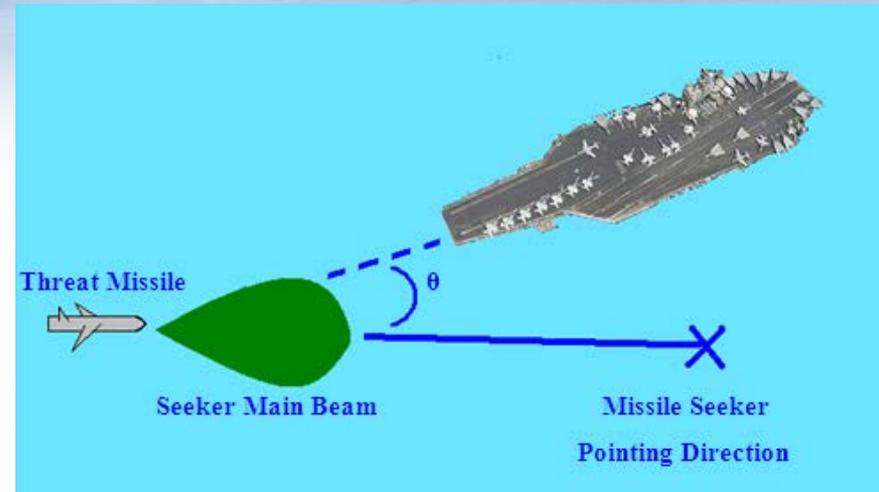
Softkill Performance and Real-Time Assessment (SPARTA)

Technical Description

Provides a means to detect and measure the response of threats, allowing real-time adjustments to defensive countermeasures.

S&T Focus

- Environmental performance
- Sensor technology assessment
- Algorithm development
- Performance assessment



Warfighter Payoff

- Raise overall survivability by contributing to coordinated hardkill/softkill
- Provide informed estimates of threat

Pillar: Sea Shield

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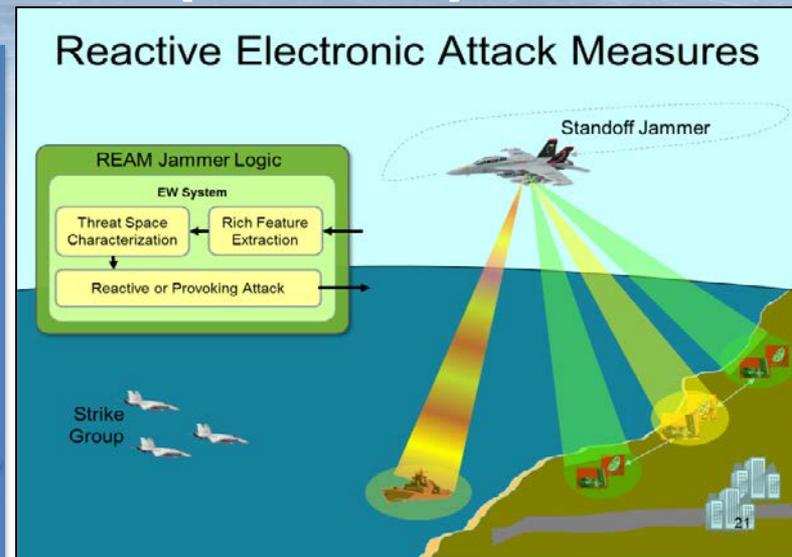
Reactive Electronic Attack Measures (REAM)

Technical Description

Deliver detection and classification techniques to identify new or waveform agile radar threats and automatically respond with an effective electronic attack.

S&T Focus

- Prioritize threats and dynamically allocate EW resources
- Adaptive countermeasures
- Trust in adaptive EW capabilities by designing comprehensive testing methodologies



Warfighter Payoff

- Provide EW protection against new and unknown threats
- Ability to characterize unknown radar threats
- Scalable and modular capability to support additional platforms

Pillar: Sea Strike

EC Manager: Dr. Peter Craig
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Combat Power Control

Technical Description

Enable high power weapons and sensors in combat by automating optimal and timely alignment of resources to loads from distributed, shared energy generation and storage. Manages associated cooling and auxiliary system demands.

S&T Focus

- A control system to automate optimal and timely alignment of resources to loads for high powered weapons and sensors
- Software application programming interface (API) to provide the ability to interface components to shipboard machinery systems,
- Automatically generate algorithms and communications interfaces for HM&E and combat systems - enabling automated control system software generation



Warfighter Payoff

- Enables sustainment of high power weapons & sensors in combat
- Enables persistent, rapid rate of fire warfighter response
- Required for energy magazine

Pillar: Power & Energy

EC Manager: Mr. Tony Seman
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Autonomous Unmanned Surface Vehicles For MiW Operations

Technical Description

Autonomous Situational Awareness and Hazard Avoidance System for USVs reduces minefield clearance timeline via night operations, operations during communications dropouts and in sea state 3, and reduces human operator workload. Underway Refueling and Data Transfer for USVs & RMMVs provides greater clearance rates via time savings in the refueling/data transfer process and greater standoff of the host ship from the minefield.

S&T Focus

- Autonomous situational awareness and hazard avoidance for USVs with emphasis on fast reaction times (driven by detection of hazards when close aboard and high closure speeds)
- Underway refueling and data transfer system for USVs and Remote Multi-mission Vehicles (RMMVs)



Warfighter Payoff

- Improvement in clearance rate via continuation of operations at night, during communications dropouts and in sea state 3
- Enables use of low bandwidth RF comms, reduced human operator workload
- Metrics: autonomous avoidance of fixed/moving hazards with fast response time; underway refueling in sea state 3

Pillar: Sea Shield

EC Manager: Dr. Robert Brizzolara
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Multi-Threat Passive Ship Armor

Technical Description

Significantly improve ship survivability by defeating a wide range of threats using a composite system at lower life-cycle cost, than current systems.

S&T Focus

- Based on threat assessment, experiments, M&S optimization strategy.
- Scalable unit capable of being configured into armor solutions
- Development application, analytical processes and integration methods and confirmation tests. Integrated analytical and system functionality including compartment configuration test and shock effects. Design for specific application configuration.



Warfighter Payoff

- Protection from highly proliferated multi-threats.
- Lightweight small volume expandable modules
- Low cost of the shelf materials, low cost implementation in construction, retrofit and maintenance
- Retro-fittable
- Transferable Design Process (M&S Capability)
- Fully Defined Cost Saving Level and weight /space Benefits

Pillar: Enterprise & Platform Enablers

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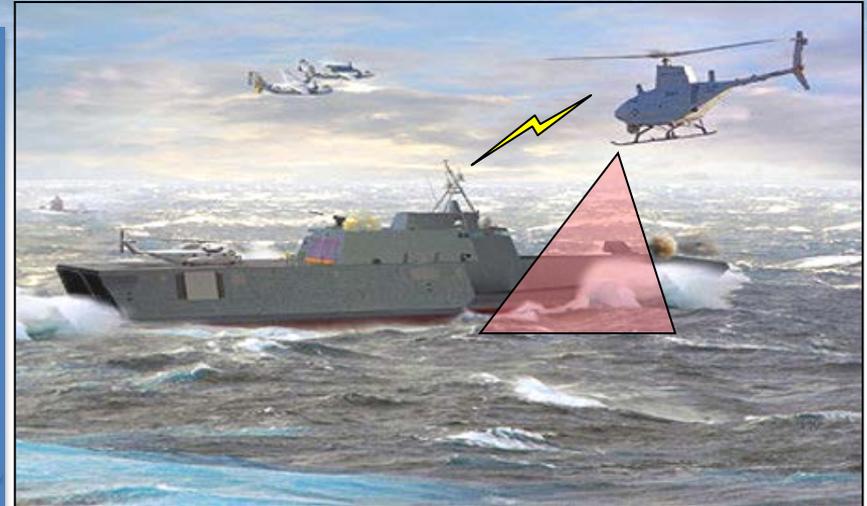
Mine Drift Prediction Tactical Decision Aid (MDP TDA)

Technical Description

Tactical Decision Aid (TDA) to enable real-time adaptive operations in areas threatened by drifting mines by using all available sources of environmental data and real-time detection information to predict mine drift, dispersion and probability of detection to enable effective MCM ops and improved ship maneuver plans.

S&T Focus

- Tools to enable optimal deployment of MCM assets for search and/or environmental information gathering, includes other sources and all available ISR platforms,
- Generate a ship maneuver plan which minimizes risk of engaging drifting threats.



Warfighter Payoff

Enables on-board prediction of mine drift, dispersion and probability of detection and provides tools for tactical maneuver, route planning and optimal sensor deployment and search mission adaptation

Pillar: Sea Shield

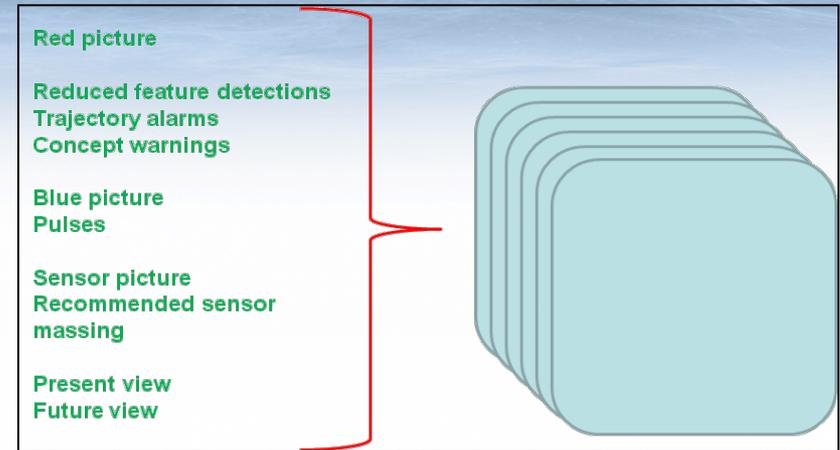
EC Manager: Mr. Brian Almquist
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Operate to Know (OtK)

Technical Description

Develop analytics to enable the use of actions or events to cause specific responses, the interpretation of which can help address information requirements.



S&T Focus

- Knowledge models and software to collect and process a broad spectrum of data.
- Data Science and deep modeling will be used to understand POL and identify threat signals from a broad spectrum of data.

Warfighter Payoff

Increased speed of decision making through the effective and efficient fulfillment of information requirements enabled by advanced analytics and data indexing and the integration of all warfighting functions.

Pillar: FORCEnet

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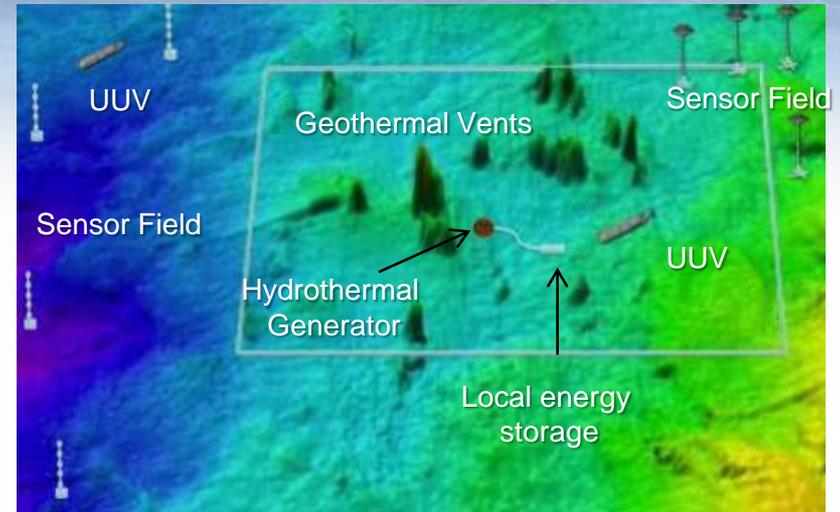
Persistent Renewable Energy for Undersea Systems (PREUS)

Technical Description

Extends the mission life of ASW distributed systems by resupplying energy in-situ by exploiting geothermal energy sources in the ocean.

S&T Focus

- Effectively recharge undersea surveillance sensor nodes and UUVs by energy harvesting from hydrothermal vents on the ocean bottom
 - A hydrothermal generator to convert thermal energy to electrical energy and store it for distribution
 - A UUV to demonstrate the transport of portable recharge to distant sensor nodes.



Warfighter Payoff

- Extends the mission life of deep water unmanned ASW sensors
- Permits more power for sensors & communications packages

Pillar: Power & Energy

EC Manager: Dr. Dave Johnson

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Surface X-Band Radar (Surf-X)

Technical Description

Develop and demonstrate an affordable, open architecture surface X-band radar by integrating X-band radar apertures with a digital array radar open architecture back-end.

S&T Focus

A modular, affordable, scalable, interoperable, open architecture surface x-band radar.



Warfighter Payoff

- Scalable capability
- Reusable open architecture back end

Pillar: Sea Shield

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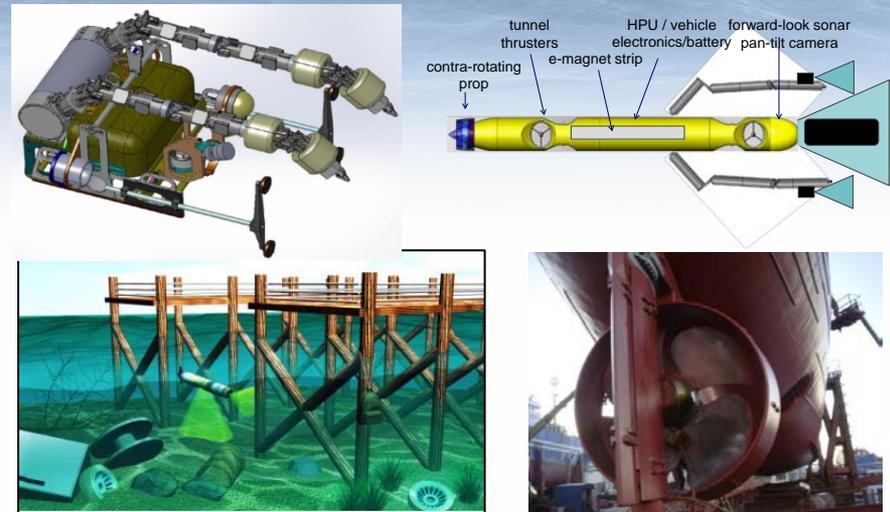
Autonomous Reacquisition Manipulator System (ARMS)

Technical Description

Underwater robotic system consisting of a compact, highly maneuverable, stable UUV with a dual-manipulator system that enables reacquisition and mitigation of underwater explosive hazards by providing EOD forces the capability to remotely access, diagnose, render safe, neutralize or move/remove underwater IEDs, mines and UXO from a safe distance.

S&T Focus

- Dexterous manipulators and end effectors
- Compact highly maneuverable unmanned underwater vehicles (UUV)
- Autonomous operations
- Imitative controller software
- Algorithms for motion planning and control



Warfighter Payoff

- Reduces risk to EOD divers
- Enables remote access, diagnose, render-safe, neutralization
- Two-man portable, small boat deployable for EOD missions

Pillar: Sea Shield

EC Manager: Mr. Brian Almquist

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