Acquisition Directorate

Research, Development, Test & Evaluation

FY20 RDT&E Project Portfolio

UNCLAS | FY20 RDT&E Project Portfolio
RDC | A. Arsenault | January 2020

CG R&D Center

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Airborne Use of Force (AUF)

Mission Need: Determine appropriate weapon and ammunition combination to disable non-compliant vessel engines and minimize collateral damage during AUF engagements.

Project Objectives:

- Use computational modeling, limited static and dynamic testing to parameterize secondary effects of various round types when used against representative-sized outboard motors (~75 horsepower and ~200 horsepower) while employing current U.S. Coast Guard (CG) AUF/counter drug techniques, tactics, and procedures.

Key Milestone / Deliverable Schedule:

Project Start	1 Oct 18 ✓
Kick-off/Test Design Meeting	28 Nov 18 ✓
Conduct Model Evaluation and Live Fire Test	9 Aug 19 ✓
VIP Demonstration	11 Sep 19 ✓
★ **Terminal Ballistic Effects and Threat Environment Parameterization of Outboard Motors to the 7.62 x 51 NATO Round (Report)**	**Mar 20**
Project End	Mar 20

Sponsor: CG-711

Stakeholder(s): CG-721, ATC Mobile, CG AUF Units, U.S. Army Engineer Research & Development Center

Project #: 5705

Anticipated Transition: **Knowledge Product**
Influence Tactics, Techniques, & Procedures

Notes:

- Leverage prior CG Research and Development Center work.
- Collaborate with Federally Funded Research & Development Center or other U.S. Department of Defense partner for live fire range testing.

RDC POC:	CG-926 Domain Lead:
Mr. Jay Carey	Mr. Scott Craig

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

U.S. Coast Guard Rotary Wing Covert Study

Mission Need: Improve covert Tactics, Techniques, and Procedures (TTP) for rotary wing aircraft.

Project Objectives:

- Provide the U.S. Coast Guard (CG) rotary wing aviation community with data that documents the recommended TTPs for conducting covert surveillance.
- Determine lateral and vertical distances for the H-65 and H-60 to remain covert from potential targets in the maritime environment.
- Assist Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance community with better understanding for future remote sensor acquisitions that allow for well-defined covert standoff distances.

Key Milestone / Deliverable Schedule:

Project Start	1 Oct 18	✓
Define/Limit Target Vessel Parameters	17 Dec 18	✓
Data Collection	28 Apr 19	✓
Aircraft Characteristics Modeling and Simulation	30 Aug 19	✓
Execute Operational Field Test	22 Nov 19	✓
★ **Coast Guard Rotary Wing Covert Study (Report & Brief)**	**Apr 20**	
Project End	Apr 20	

Sponsor: CG-711
Stakeholder(s): CG-SAR, FORCECOM, AREA-3, ALC Vibrations Group

Project #: 5601

Anticipated Transition: **Knowledge Product**
Influence Tactics, Techniques, & Procedures

Notes:

- Leverage prior work on CG Research and Development Center Project 8307: Coast Guard Fixed Wing Covert Study.
- KC-130J Aural Detection Information Paper and C-130H Study available as background.

RDC POC:	CG-926 Domain Lead:
Ms. Meg Tusia	Mr. Scott Craig

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Autonomous Surface-Search Sensor for Manned Aircraft

Mission Need: Greater efficiency and effectiveness of searches conducted by airborne assets.

Project Objectives:

- Update research on autonomous sensor systems.
- Determine the potential for autonomous surface-search sensor integration on U.S. Coast Guard (CG) aviation assets.
- Benchmark the use of autonomous surface-search sensors by other agencies.
- Expand the CG's existing autonomous sensor performance data set.
- Model the impact of executing search missions with an autonomous sensor package.

Key Milestone / Deliverable Schedule:

Project Start……..	1 Oct 19 ✓
Autonomous Sensor Technology Update…..……..	Jan 20
Aviation Platform Sensor Integration Analysis.....……..	Mar 20
Autonomous Surface-search Sensor Benchmarking……	May 20
Mission Performance Modeling……	Nov 20
★ **Autonomous Surface Search Sensor for CG Aviation Assets (Report)…….**	**Feb 21**
Project End…….....	Feb 21

Sponsor: CG-711
Stakeholder(s): CG-41, CG-SAR, CG-931

Project #: 7619

Anticipated Transition: **Knowledge Product**
Future Technology

Notes:

- This project builds on autonomous sensor research for unmanned aircraft executed under CG Research and Development Center Project 7810: Advanced Small Unmanned Aircraft System Sensor Investigations.

RDC POC:	CG-926 Domain Lead:
Mr. Evan Gross	Mr. Scott Craig

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Airborne Counter Unmanned Aircraft Systems (C-UAS)

Mission Need: Technology and tactics to secure airspace from small Unmanned Aircraft Systems (sUAS).

Project Objectives:

- Characterize the aviation mission for countering sUAS threats.
- Benchmark ground-based C-UAS solutions and determine the potential for transition to airborne platforms.
- Investigate robust airborne detection, tracking, classification, and identification for airborne assets.
  - Generate a prototype Technical Data Package (TDP) for an airborne C-UAS system.
  - Fabricate and integrate a minimally invasive C-UAS demonstration prototype.
- Conduct prototype test and evaluation to assess functional characteristics.

Key Milestone / Deliverable Schedule:

	Project Start	1 Oct 19 ✓
★	**Key Decision Point – System Concept (Brief)**	**Apr 20**
	Limited User Evaluation	Jan 21
★	**Airborne C-UAS Test and Evaluation (Report)**	**Jun 21**
	Project End	Jun 21

Sponsor: CG-711

Stakeholder(s): CG-41, CG-7113, CG-26, CG-6, CG-5R, ALC

Project #: 7821

Anticipated Transition: **Knowledge Product**
Future Technology

Notes:

- This effort will leverage partnerships with the U.S. Department of Homeland Security Science and Technology Directorate, Air Force Research Laboratory, Naval Air Systems Command, and other government organizations.

RDC POC:	CG-926 Domain Lead:
Mr. Evan Gross	Mr. Scott Craig

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

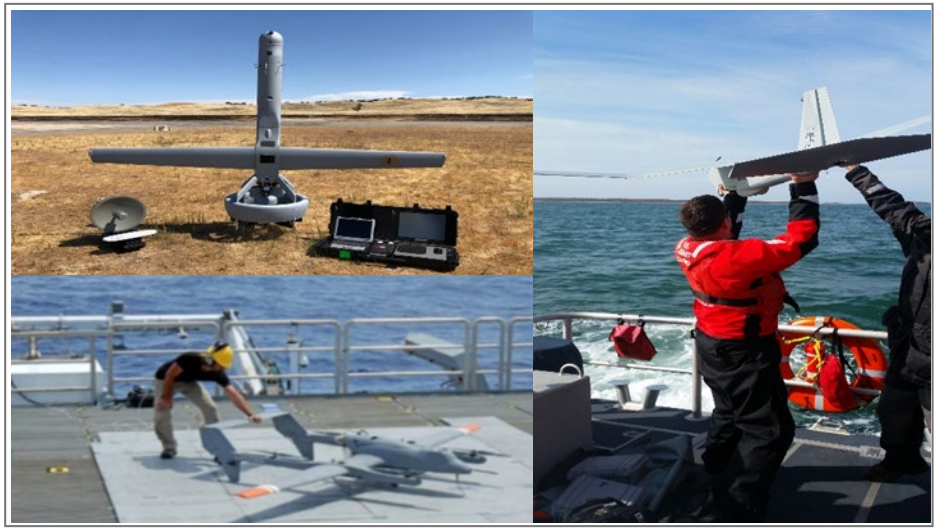
★ Indicates RDC product.

Beyond Visual Line of Sight (BVLOS) Technology for Coast Guard (CG) Unmanned Aircraft System (UAS) Operations

Mission Need: BVLOS operations for CG UAS.

Project Objectives:

- Leverage U.S. Southern Command (SOUTHCOM) efforts to explore Vertical Takeoff and Landing (VTOL) operations from a CG Cutter (CGC).
- Establish evaluation team for sense and avoid technologies.
- Submit a Request for Information (RFI) for sense and avoid technologies to assist BVLOS operations.
- Integrate sense and avoid technology for conducting BVLOS operations [sUAS 1st].
- Conduct land and vessel based evaluations using sense and avoid technology [sUAS 1st].
- Incorporate sense and avoid technology into VTOL platform.
- Conduct a VTOL BVLOS Limited User Evaluation from a CGC.
- Inform due regard parameters for CG BVLOS UAS operations.
- Establish a BVLOS Certificate of Authorization for Coast Guard operations.



Key Milestone / Deliverable Schedule:

	Project Start	13 Mar 19 ✓
	Establish Evaluation Team for Sense and Avoid Technologies	28 Oct 19 ✓
	Submit RFI for BVLOS Technologies	Jan 20
	Coordinate VTOL Demonstrations from a CGC	Jul 20
★	**VTOL Operations from a CGC (Brief)**	**Aug 20**
	Integrate BVLOS Technologies into sUAS	Oct 20
	Conduct Land Based BVLOS Tech Demonstration with sUAS	Nov 20
	Conduct Vessel Based BVLOS Tech Demonstration with sUAS	Jan 21
★	**Land and Vessel Based BVLOS Demonstrations (Brief)**	**Feb 21**
	Integrate BVLOS Tech with VTOL Platform	Aug 21
	Conduct BVLOS Limited User Evaluation with VTOL	Nov 21
★	**Beyond Visual Line of Sight UAS Operations (Report)**	**Mar 22**
	Project End	Mar 22

★ Indicates RDC product.

Sponsor: CG-711

Stakeholder(s): CG-751, CG-931, SOUTHCOM, JIATFS

Project #: 7691

Anticipated Transition: **Knowledge Product**
Acquisition Milestone Support

Notes:

- Establish Memoranda of Understanding and Cooperative Research and Development Agreements as necessary with industry partners.
- Leverage efforts of SOUTHCOM, Federal Aviation Administration, National Oceanic and Atmospheric Administration (NOAA), Joint Interagency Task Force South (JIATFS), and other government agencies.

RDC POC:	CG-926 Domain Lead:
Mr. Stephen Dunn	Mr. Scott Craig

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Maritime Unmanned System Technology (MUST)

Mission Need: Improved U.S. Coast Guard (CG) persistent maritime domain awareness using Autonomous Underwater and Surface Vehicles (AUSV).

Project Objectives:

- Provided a AUSV platform, study potential employment options for using AUSV to support CG mission areas.
- Explore space, weight, and power requirements.
- Identify possible payloads.
- Conduct single and multiple AUSV evaluations.
- Conduct multiple AUSV swarming evaluations.
- Conduct AUSV and unmanned aerial system teaming evaluations.

Key Milestone / Deliverable Schedule:

Project Start	1 Oct 19 ✓
Scoping/Baseline and Desired Payload Functional Characteristics	Apr 20
Market Research	Jun 20
★ **MUST - FY20 Progress Update (Brief)**	**Nov 20**
Modeling and Simulation Center of Expertise AUSV Sensor Network System Modeling	Dec 20
Technical Development/Integration Planning	Jan 21
Test Event 1 – Single AUSV Evaluation	May 21
Test Event 2 – Multiple AUSV Evaluation	Aug 21
★ **MUST - FY21 Progress Update (Brief)**	**Nov 21**
Test Event 3 – Swarming AUSV Evaluation	Aug 22
★ **MUST - FY22 Progress Update (Brief)**	**Nov 22**
Test Event 4 – Teaming AUSV Evaluation	Sep 23
★ **Maritime Unmanned System Technology (Report)**	**Nov 23**
Project End	Nov 23

★ Indicates RDC product.

Sponsor: DHS S&T, CG-261

Stakeholder(s): CG-26, CG-721, CG-MLE

Project #: 7820

Anticipated Transition: **Knowledge Product**
Future Technology

Notes:

- Partner with the U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) and U.S. Naval Research Laboratory.

RDC POC:	CG-926 Domain Lead:
Mr. Jay Carey	Mr. Scott Craig

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Cell Phone Location for Search and Rescue

Mission Need: Cell phone technology to support the precise geo-location of distressed mariners in mayday and Search and Rescue (SAR) scenarios.

Project Objectives:

- Conduct market research, identify, and assess state of the market Commercial/Government off the Shelf (COTS/GOTS) geo-locating system(s).
- Evaluate COTS/GOTS solutions on land and at sea to identify possible enterprise solutions.
- Inform functional requirements and Tactics, Techniques and Procedures (TTP) for cell phone geo-location methods.
- Without distracting from the necessity of carrying VHF-FM equipment, contribute to an awareness campaign educating mariners to provide cell phone numbers in float plans, place cell phones in waterproof sleeves, and carry onboard solar cell phone chargers to extend mobile battery life.

Key Milestone / Deliverable Schedule:

	Project Start	3 Oct 16 ✓
	Document Functional Requirements	30 Dec 16 ✓
	Obtain OTA Agreement with DHS S&T	24 Aug 17 ✓
	Market Research	8 Jan 18 ✓
★	**Cell Phone Location for SAR-Market Research (Brief)**	**17 Jan 18 ✓**
	Obtain COTS/GOTS Solutions for Demonstrations	14 Sep 18 ✓
	Conduct Demonstrations (Lab, Land, and Sea):	
	Commercial Solution Pilot Begin SECLI	10 Jun 19 ✓
★	**Cell Phone Location for SAR (Report)**	**25 Nov 19 ✓**
	Project End	25 Nov 19 ✓

Sponsor: CG-SAR

Stakeholder(s): CG-761, CG-BSX, CG-MLE, LANT/PAC-6, C3CEN, C4IT SC, FORCECOM, CBP, DHS S&T

Project #: 1108

Anticipated Transition: **Product**
Fielded Prototype

Notes:

- Use of Cooperative Research and Development Agreement (CRADA)/S&T Other Transaction Authority (OTA)/S&T Small Business Innovation Research (SBIR).
- Rapid deployment COTS solutions will be investigated in parallel to DHS S&T/CRADA efforts.

RDC POC:	CG-926 Domain Lead:
Mr. Sekaran Jambukesan	Ms. Holly Wendelin

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

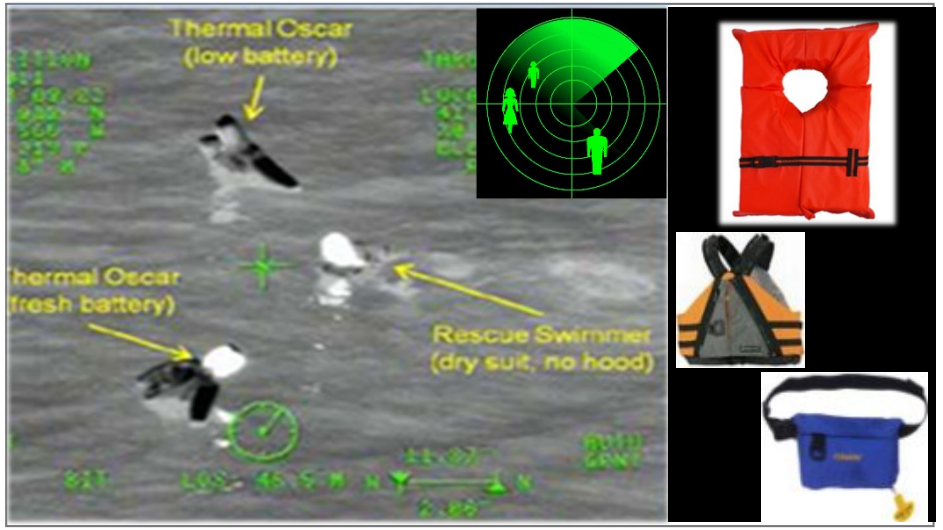
★ Indicates RDC product.

Enhanced Person in the Water (PIW) Detection

Mission Need: Maximize the effectiveness of air and surface asset searches for PIW.

Project Objectives:

- Solicit general public through prize competition for modifications/ enhancements to floatation devices that increase conspicuity and improve detection probability. Potential benefits include:
  - Increase conspicuity of PIW and small targets in an open water environment using existing U.S. Coast Guard assets.
  - Decrease the time required to search a given open water area in various sea-state and weather conditions.
  - Reduce the burden on air and surface asset sensor operators.
- Perform limited user field evaluations of selected technology.



Key Milestone / Deliverable Schedule:

	Project Start	2 Oct 17 ✓
	Prize Challenge Posting Completed	5 Sep 18 ✓
★	**Enhanced Person in the Water: Ready For Rescue Prize Challenge Competition (Report)**	**20 Dec 18 ✓**
	RDC Piranha Pool Completed	29 Mar 19 ✓
	Limited User Evaluation Completed	24 Sep 19 ✓
★	**Enhanced Person in the Water Detection (Report)**	**Jan 20**
	Project End	Jan 20

Sponsor: CG-ENG-4

Stakeholder(s): CG-731, CG-411, CG-SAR, CG-761, ATC, CG-BSX, CG-INV, CG-CVC

Project #: 1103

Anticipated Transition: **Product**
Fielded Prototype

Notes:

- Project includes use of the U.S. Department of Homeland Security Science and Technology Directorate Prize Competition process.

RDC POC:	CG-926 Domain Lead:
Ms. Judi Connelly	Ms. Holly Wendelin

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

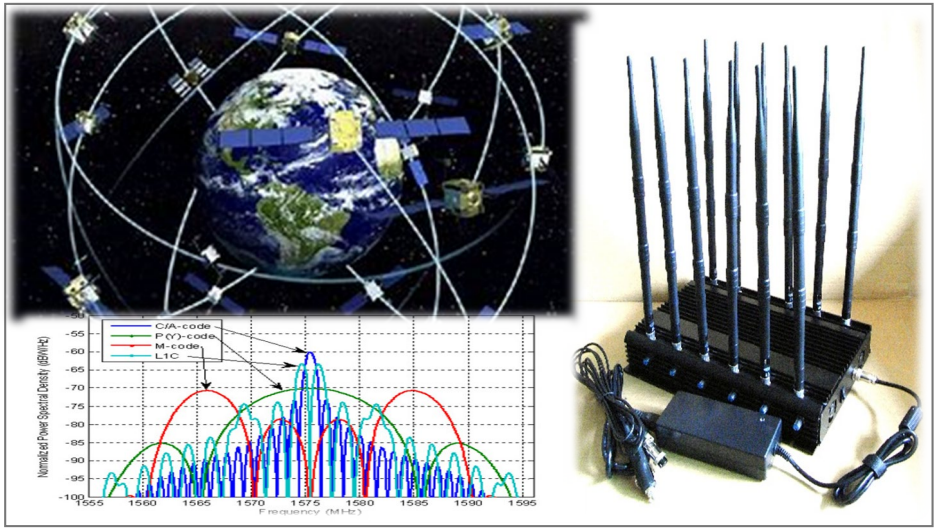
★ Indicates RDC product.

Countering GPS Interference

Mission Need: Develop a means to detect, localize, alert, and mitigate sources of Global Positioning System (GPS) interference in the maritime domain.

Project Objectives:

- Develop wide area GPS interference detection based on existing networks of GPS receivers such as Nationwide Automatic Identification System.
- Investigate GPS interference mitigation technologies to counter effects aboard U.S. Coast Guard (CG) vessels. Investigate tactical GPS interference detection capability for CG units to operate to find GPS interference sources.
- Develop notification methods for maritime users via marine safety information methods such as broadcast notice to mariners, Automatic Identification System application specific messages, and navigation data.
- Bring maritime experience to the U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) First Responders & Detection Division (FRD) Position, Navigation and Timing (PNT) efforts.



Key Milestone / Deliverable Schedule:

	Project Start	14 Jun 18 ✓
	DHS S&T 2018 GPS Equipment Tests	21 Sep 18 ✓
	Test CG GPS Units at Live Sky Test Event	15 Aug 19 ✓
	Demonstration of Wide Area GPS Interference Detection	26 Sep 19 ✓
★	**Countering GPS Interference (Brief)**	**7 Oct 19 ✓**
★	**Countering GPS Interference (Report & Brief)**	**Mar 20**
	Project End	Mar 20

Sponsor: CG-NAV

Stakeholder(s): CG-68, CG-761, CG-791, C4IT SC, C3CEN, NAVCEN, DHS S&T (FRD)

Project #: 2218

Anticipated Transition: **Knowledge Product**
Influence Tactics, Techniques & Procedures

Notes:

- Legislative requirement.
- Partner with U.S. Army Communications-Electronics Research, Development and Engineering Center and Air Force Research Laboratory.
- Continue working with DHS S&T (FRD) PNT Program.
- Leverage GPS/AIS results from RDC Project 8502: Cybersecurity Vulnerabilities, Threats, and Risk Mitigation Strategies for Coast Guard Surface and Air Assets.

RDC POC:	CG-926 Domain Lead:
Mr. Jay Spalding	Ms. Holly Wendelin

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

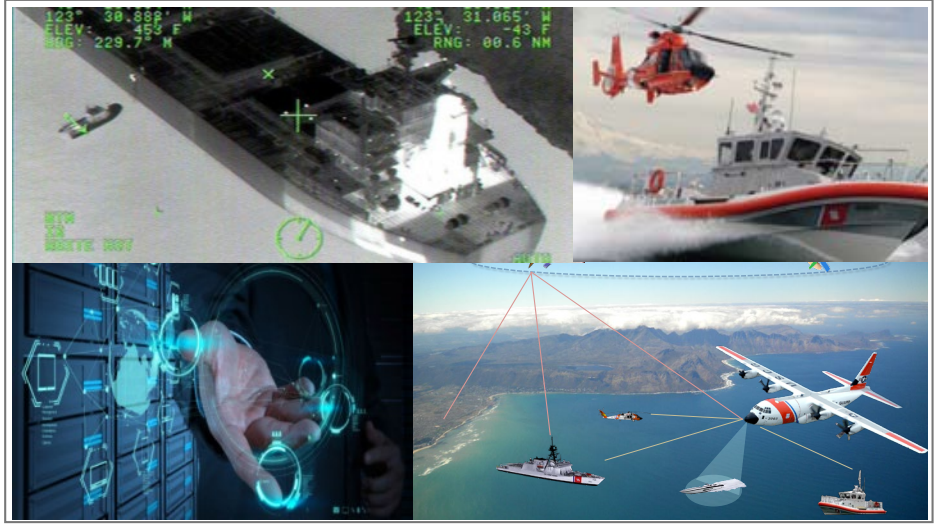
★ Indicates RDC product.

Intelligence, Surveillance and Reconnaissance (ISR) Enterprise Data Network Study and Analysis

Mission Need: Enable intelligence-driven operations and collaboration for continued decision advantage in support of all U.S. Coast Guard (CG) missions.

Project Objectives:

- Establish the necessary cross-component Joint Requirements Council (JRC) chartered team to support the development and deployment of a U.S. Department of Homeland Security (DHS) enterprise ISR data network solution.
- Support all need validation analyses and mission need objectives to successfully obtain Acquisition Decision Event (ADE) 0 and 1 approvals.
- Perform technology demonstrations (shore, surface, air) as needed to inform mission need documentation deliverables.
- Specifically focus on cyber security related requirements as solution alternatives are analyzed.
- Support development of requisite CG resource proposals.
- Ensure the smooth transition into the Analyze/Select phase of the Acquisition Lifecycle Framework.



Key Milestone / Deliverable Schedule:

	Project Start	14 Jun 17 ✓
	Standup ISR Enterprise Data Network Integrated Product Team	24 Nov 17 ✓
★	**Capability Analysis Study Plan Tactical DHS ISR Data Network**	**20 Dec 17 ✓**
	Start Technology Demonstration(s) to Inform Mission Need	6 Jun 19 ✓
★	**ISR Enterprise Data Network Capability Analysis Report (CAR)**	**Feb 20**
★	**ISR Enterprise Data Network Mission Needs Statement (MNS)**	**Mar 20**
★	**ISR Enterprise Data Network Concept of Operations (CONOP)**	**Mar 20**
★	**ISR Enterprise Data Network (Report & Brief)**	**May 20**
	Project End	May 20

★ Indicates RDC product.

Sponsor: CG-26, DHS S&T (BIM)

Stakeholder(s): CG-93, CG-711/731/741/751/761/791/771, CG-671/68, MIFC, ICC, C4IT SC, CYBERCOM, AREA-6

Project #: 8116

Anticipated Transition: **Knowledge Product**
Acquisition Milestone Support

Notes:

- Partner with DHS Science and Technology Directorate (S&T).
- Align with DHS, U.S. Department of Defense, and intelligence community information technology enterprise solutions, including the integrated maritime domain environment.
- Dates for Joint Requirements Integration and Management System documents are contractor deliverable dates and are independent of the JRC timeline for approval.

RDC POC:	CG-926 Domain Lead:
LT Anne Newton	Ms. Holly Wendelin

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Cybersecurity Vulnerabilities, Threats, and Risk Mitigation Strategies for Coast Guard Surface and Air Assets

Mission Need: U.S. Coast Guard (CG) platforms require resistance and resilience to cyber attacks.

Project Objectives:

- Conduct cyber security risk research analysis for Global Positioning System (GPS), Automatic Identification System (AIS) and specific mission oriented systems dependent on position, navigation and timing.
- Partner with the U.S. Department of Homeland Security Science and Technology Directorate to test specific equipment vulnerabilities and derive the impact and consequence of attacks to identify defense strategies.
- Perform a cyber assessment on a CG asset to identify vulnerabilities, threats and risk mitigation strategies.
- Develop and test a cyber risk mitigation strategy that could be used to recover compromised operational technology systems on CG surface and air assets.

Key Milestone / Deliverable Schedule:

	Project Start	3 Oct 16 ✓
	Inventory and Acquire GPS/AIS Units	22 Dec 16 ✓
	Conduct GPS/AIS Testing	22 Jul 17 ✓
	Inventory Surface Systems for Evaluation	26 Oct 17 ✓
★	**GPS/AIS Cyber Assessment (Report)**	**22 Feb 18** ✓
	Conduct Surface Asset Assessment	5 Apr 18 ✓
	Research Cyber Risk Mitigation Systems at Other Labs	31 Oct 18 ✓
	Select CG Surface Asset for Cyber Risk Mitigation	18 Dec 19 ✓
	Develop Cyber Risk Mitigation Strategy in Lab Environment	Jan 20
★	**Risk Mitigation Strategy (Brief)**	**Feb 20**
	Conduct Cyber Risk Mitigation Demonstration on CG Cutter	Apr 20
★	**Cybersecurity for Coast Guard Surface and Air Assets (Report & Brief)**	**Sep 20**
	Project End	Sep 20

★ Indicates RDC product.

Sponsor: CG-791

Stakeholder(s): CG-761, CG-711, CG-751, CG-933, C4ITSC, CYBERCOM

Project #: 8502

Anticipated Transition: **Knowledge Product**
Influence Tactics, Techniques & Procedures

Notes:

- Leverage research and development efforts of the Office of Naval Research's Resilient Hull, Infrastructure, Mechanical, and Electrical Security program; Federally Funded Research and Development Centers; and University Affiliated Research Centers.
- Partner with Johns Hopkins University Applied Physics Lab on U.S. Navy Sea Change initiatives and cyber risk mitigation.

RDC POC:	CG-926 Domain Lead:
Mr. Rob Taylor	Ms. Holly Wendelin

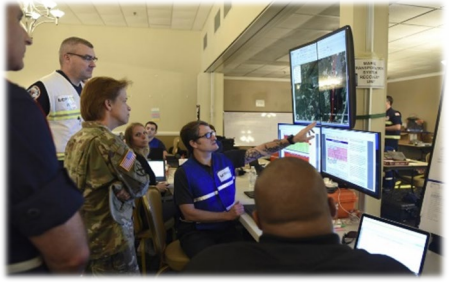
For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Redefine Field Intelligence Reporting and Analysis

Mission Need: Improved information dominance in the maritime domain.

Project Objectives:

- Research cutting edge human language tools, artificial intelligence, machine learning and other analytical tools that can help to automate analysis of field intelligence reports.
- Comprehensively assess intelligence reporting and analyze evaluation processes/constraints within tactical units and intelligence production centers.
- Research government cloud technology that will holistically enable the conditions for shorter feedback loops with relevant, timely, and predictive intelligence for CG decision makers.



Key Milestone / Deliverable Schedule:

	Project Start	1 Oct 19 ✓
	Field Collector Summit	Jan 20
	Intelligence Collection Unit Visits	Feb 20
	Research Functional Characteristics and Processes	Mar 20
	Market Research Government Cloud Analytical Tools	Apr 20
★	**Redefine Field Intelligence Reporting and Analysis (Report & Brief)**	**Sep 20**
	Project End	Sep 20

Sponsor: CG-25

Stakeholder(s): CG-68, CG-5R, CG-CYBER, CG-761
CG-CI, CG-CGIS, ICC, MIFCPAC, MIFCLANT

Project #: 8120

Anticipated Transition: **Product**
Pending Acquisition

Notes:

- Partner with the Federal Bureau of Investigation, the U.S. Department of Defense, U.S. Department of Homeland Security Office of Intelligence and Analysis, Office of the Director of National Intelligence, U.S. Immigrations and Customs Enforcement Homeland Security Investigations, as well as other external agencies that we learn about, to study the tools/process they currently use.

RDC POC:	CG-926 Domain Lead:
LT Anne Newton	Ms. Holly Wendelin

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Maritime Counter Unmanned Aircraft Systems (C-UAS)

Mission Need: Methods to detect, track, identify, and defeat illicit use of unmanned aircraft systems in the maritime environment.

Project Objectives:

- Inform requirements for C-UAS for the U.S. Coast Guard (CG) Ports, Waterways, and Coastal Security and Defense Readiness missions.
- Conduct market research to identify both government off-the-shelf and commercial off-the-shelf technologies that satisfy CG requirements.
- Evaluate system prototypes in an operational maritime environment.
- Integrate successful systems to build an end-to-end layered defensive system prototype, aimed at increasing performance and usability while reducing size, weight and power and manning requirements.
- Provide C-UAS system subject matter expertise in development of tactics, techniques, and procedures for CONUS and OCONUS applications.

Key Milestone / Deliverable Schedule:

Project Start……3 Oct 16 ✓

★ **Maritime Counter Unmanned Aircraft Systems (Brief)…… Feb 20**

Integrated Components Extend User Evaluation……..... Sep 20

★ **C-UAS Test & Evaluation Report for the PWCS Mission (Report)…… Nov 20**

Project End……..... Nov 20

Sponsor: CG-MSR

Stakeholder(s): CG-711, CG-731, CG-721, CG-751, DCMS-34, CG-2, CG-6, C3CEN, SFLC, AREA-3, DARPA, DHS S&T

Project #: 7812

Anticipated Transition: **Knowledge Product**
Future Technology

Notes:

- This effort will leverage partnerships with the U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T), Defense Advanced Research Projects Agency (DARPA), Air Force Research Laboratory, Naval Surface Warfare Centers, the Office of Naval Research, and other government organizations.

RDC POC:	CG-926 Domain Lead:
Ms. Amy Cutting	LT Steve Hager

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Performance of Daytime Distress Signals

Mission Need: Determine effectiveness of existing daytime distress signals.

Project Objectives:

- Provide the Office of Design and Engineering Standards empirically-derived information to update distress signal carriage requirements.
- Determine effectiveness of presently-approved daytime distress signals.
- Determine if an enhanced, 2-color, quick-flashing SOS electronic visual distress signal will be effective in daytime.
- Determine if project results can apply to Safety of Life at Sea (SOLAS) guidelines.

Completed

Key Milestone / Deliverable Schedule:

	Project Start	2 Apr 18 ✓
	Pilot Testing	29 Aug 18 ✓
	Field Experiment	7 Nov 18 ✓
	Key Decision Point: SOLAS Equivalence	28 Feb 19 ✓
★	**Daytime Distress Signal Effectiveness**	**5 Dec 19 ✓**
	Project End	5 Dec 19 ✓

Sponsor: CG-ENG
Stakeholder(s): CG-SAR, CG-BSX

Project #: 11011

Anticipated Transition: **Knowledge Product**
Standards/Regulations

Notes:

- Follow-on to Project 1101, Alternatives to Pyrotechnic Distress Signals Project.

RDC POC:	CG-926 Domain Lead:
LT Liz Murphy	Ms. Karin Messenger

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Develop an Environmentally Friendly Buoy Mooring System

Mission Need: A buoy mooring system for environmentally sensitive areas that would avoid directly damaging nearby delicate plants and animals in the benthic zone.

Project Objectives:

- Conduct market research to determine alternatives to traditional buoy mooring systems.
- Develop and test prototypes to determine best buoy mooring technology for environmentally sensitive areas.

Key Milestone / Deliverable Schedule:

	Project Start	10 Nov 14 ✓
	Conduct Market Research	25 Feb 15 ✓
	Key Decision Point: Broad Agency Announcement or Prize Competition	14 Oct 15 ✓
	Key Decision Point: Prototype Development	2 Jun 16 ✓
	Demonstration Start	3 Apr 18 ✓
★	**Environmentally Friendly Buoy Mooring System Deployment (Report)**	**14 Aug 18** ✓
	Demonstration End	14 Jun 19 ✓
★	**Environmentally Friendly Buoy Mooring System Deployment (Report)**	**14 Nov 19** ✓
★	**Environmentally Friendly Buoy Mooring System (Report)**	**Jan 20**
	Project End	Jan 20

★ Indicates RDC product.

Sponsor: CG-NAV

Stakeholder(s): SILC-WOPL, D7, LANT

Project #: 2702

Anticipated Transition: **Product**
Fielded Prototype

Notes:

- Supports Coral Reef Protection Executive Order 13089.
- Supports the Coast Guard Energy Renaissance Action Plan.

RDC POC:	CG-926 Domain Lead:
Ms. Irene Gonin	Ms. Karin Messenger

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Vessel of Opportunity Skimming System (VOSS) Technology Market Research

Mission Need: State-of-the-market, logistically supportable VOSS technology.

Project Objectives:

- Research state-of-the-market technologies that can potentially replace the current VOSS equipment.
- Ensure VOSS technologies will be operable in D14/D17 Areas of Responsibility (AORs).
- Compile a report for possible future actions related to VOSS equipment replacement.

Key Milestone / Deliverable Schedule:

Project Start……1 Oct 18 ✓

Capability Assessment/Mission Needs ……... 18 Mar 19 ✓

Revise Tentative Baseline and Desired Functional Characteristics..18 Sep 19 ✓

Issue Request for Information (RFI)…….. 19 Nov 19 ✓

Receive RFI Responses……30 Dec 19 ✓

Finalize Market Research……. Feb 20

★ **Vessel of Opportunity Skimming System Technologies Market Research (Report) ..... Jun 20**

Project End……..... Jun 20

Sponsor: CG-MER

Stakeholder(s): CG-751, CG-43, National Strike Force Coordination Center, PACAREA

Project #: 4212

Anticipated Transition: **Knowledge Product**
Acquisition Milestone Support

Notes:

- Oil Spill Liability Trust Fund funding.

RDC POC:	CG-926 Domain Lead:
Mr. Alexander Balsley, P.E.	Ms. Karin Messenger

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Oil Sands Products Spill Response

Mission Need: Research and develop enhanced decision-making tools and recovery/mitigation tools for responding to spilled oil sands products.

Project Objectives:

- Analyze and assess behavior, response issues and strategies in fresh and salt waters; and develop tactics and/or technologies that address gaps.
- Provide decision making/job aid tools for U.S. Coast Guard (CG) and commercial responders to aid in response planning and execution for spills of oil sand products in fresh and salt water.

Key Milestone / Deliverable Schedule:

	Project Start	31 Aug 14 ✓
★	**Response to Oil Sands Products Assessment (Report)**	**29 Sep 15 ✓**
★	**Underwater Sediment Sampling Research (Report)**	**19 Jan 17 ✓**
★	**Testing of Oil Sands Products Recovery in Fresh Water (White Paper)**	**2 Apr 18 ✓**
	Bottom Mitigation Techniques Part 2 First Inland Test	26 Apr 18 ✓
	Bottom Mitigation Techniques Part 2 Offshore Test	31 May 18 ✓
	Bottom Mitigation Techniques Part 2 Second Inland Test	4 Apr 19 ✓
★	**Mitigation of Oil Moving Along the Waterway Bottom (Report)**	**14 Nov 19 ✓**
	Consolidate Project Findings	Apr 20
★	**Oil Sands Products Spill Response (Report)**	**Jul 20**
	Project End	Jul 20

Sponsor: CG-MER

Stakeholder(s): EPA, AREA-54, NOAA

Project #: 4705

Anticipated Transition: **Knowledge Product**
Influence Tactics, Techniques, & Procedures

Notes:

- Multiple funding sources including Oil Spill Liability Trust Fund and FY17-18 Great Lakes Restoration Initiative.
- Cooperative Research and Development Agreement with Enbridge Pipeline.
- Leverage research done by academia, U.S. Department of Energy Labs, and international academic institutions.

RDC POC:	CG-926 Domain Lead:
Mr. Alexander Balsley, P.E.	Ms. Karin Messenger

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

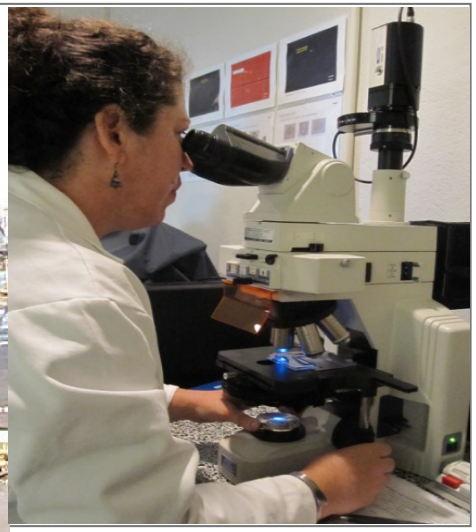
★ Indicates RDC product.

Ballast Water Management (BWM) Research and Development

Mission Need: Reduce Nonindigenous Invasive Species (NIS) transport risks by commercial vessels in U.S. waters, including the Great Lakes (GL).

Project Objectives:

- Determine the most practical BWM practices for Laker operators to reduce the risks of transporting NIS from one region of the GL to another when they are introduced from the outside by ocean-going ships.
- Research and develop robust, science-based technical Quality Assurance (QA) protocols to validate sub-Independent Lab (IL) QA/Quality Control shipboard test programs that support BWM System Type Approval (TA).
- Determine the availability and capabilities of existing technologies that field inspectors could use to verify compliance with the Ballast Water Discharge Standard (BWDS).
- Analyze the CG BWM Program impacts on GL invasion rates.



Key Milestone / Deliverable Schedule:

Project Start (*FY17-18 Scope of Work*)…….. 1 Oct 17 ✓

FY17-18/FY18-19 Great Lakes Restoration Initiative Scope (Remaining):

★ **Ballast Water Management Alternatives for Lakers (Report)…….. Jan 20**

★ **IL Auditing Protocol For Facilities Performing TA Testing of BWM Systems (Report)…… Feb 20**

FY19-20 Great Lakes Restoration Initiative Scope

★ **Current State of BWDS Compliance Technologies (Report)…… Sep 20**

★ **Functional Char. for BWDS Compliance Tools (Report)…….. Sep 20**

★ **Technical Guidance for Use, Maintenance, and Training of BWDS Compliance Tools (Report)…… Dec 20**

★ **Sampling Plan for Invasion Rates of NIS in the GL (Report)…….. Dec 20**

★ **Audit Protocols for Shipboard Tests by ILs (Report)…… Dec 20**

★ **Evaluation of Commercially Available BWDS Compliance Technologies (Report)…….. Mar 21**

Project End (*FY17-20 Scope of Work*)…….. Mar 21

★ Indicates RDC product.

Sponsor: CG-OES, Great Lakes National Program Office

Stakeholder(s): Marine Safety Center, CG-CVC

Project #: 4135

Anticipated Transition: **Knowledge Product** Standards/Regulations

Notes:

- Great Lakes Restoration Initiative funding (DW-070-20000108-0).
- Collaboration with Naval Research Laboratory.
- Collaboration with Smithsonian Environmental Research Center.
- Collaboration with the DOT Maritime Administration and Canadian Dept. of Fisheries & Oceans and Transport Canada.

RDC POC:	CG-926 Domain Lead:
Ms. Gail Roderick	Ms. Karin Messenger

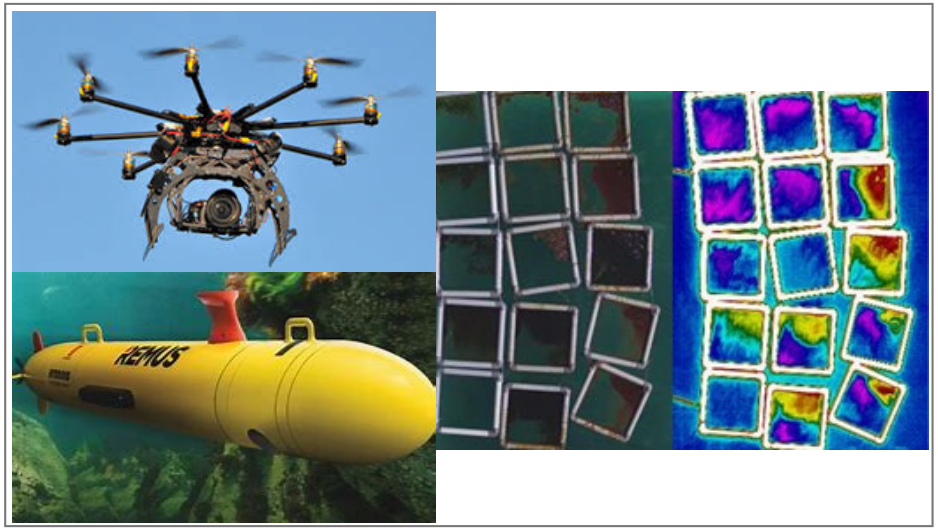
For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Advancing UAS and AUV Capabilities to Characterize Water Column and Surface Oil in Ice Environments

Mission Need: Technologies to detect and characterize oil spills in ice environments.

Project Objectives:

- Coordinate and conduct lab and field tests of Long Range Autonomous Underwater Vehicle (LRAUV), Remote Environmental Monitoring Units, Autonomous Underwater Vehicles (AUV) and Unmanned Aircraft Systems (UAS) in ice conditions to verify accuracy of sensors and unmanned systems.
- Test the transfer of sensor data in a timely manner to responders and/or Incident Command Post for actionable information.
- Partner with National Oceanic and Atmospheric Administration (NOAA) and others to build on previous tests with UAS and AUV sensors.



Key Milestone / Deliverable Schedule:

	Project Start…….. 1 Oct 19	✓
	Develop Interagency Reimbursable Work Agreement with NOAA……Jan 20	
	Phase 1: Conduct UAS/AUV Tests at Cold Regions Research and Engineering Laboratory (CRREL)……..……..……... Mar 20	
★	**UAS/AUV Lab Experiments Results (Report)……Jul 20**	
	Conduct field exercise planning…… Dec 20	
	Phase 2: UAS/AUV Systems Field Testing in Great Lakes or Arctic…….. Feb 21	
	Develop Data Schema for Data Stream Export ……..... Apr 21	
★	**UAS/AUV Systems Field Exercise Integration (Report) ……... Sep 21**	
	Project End…….. Sep 21	

★ Indicates RDC product.

Sponsor: CG-MER

Stakeholder(s): RDC, CG-5RI, D1, D9, D17, ADAC, NOAA OR&R, WHOI, MBARI, DHS S&T OUP

Project #: 4711

Anticipated Transition: **Product**
Fielded Prototype

Notes:

- Oil Spill Liability Trust Fund funding.
- Partnerships with CRREL, Woods Hole Oceanographic Institute, Arctic Domain Awareness Center, NOAA, Bureau of Safety and Environmental Enforcement, and U.S. Environmental Protection Agency.
- Possible collaboration with Norwegian Coastal Administration.

RDC POC: Mr. Alexander Balsley, P.E.

CG-926 Domain Lead: Ms. Karin Messenger

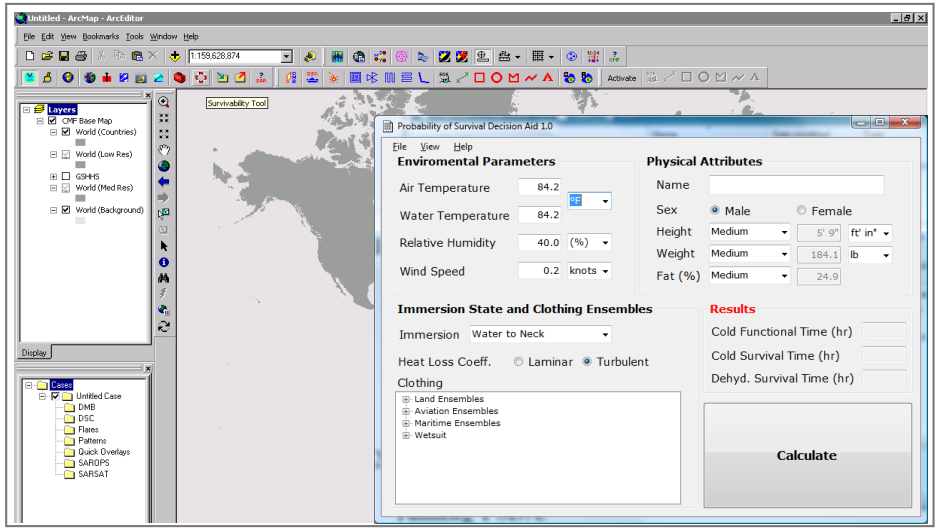
For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Survival Modeling, Reporting, and Statistics

Mission Need: Improve Search and Rescue Optimal Planning System (SAROPS) utility by ensuring appropriate incorporation of better survival modeling and statistics.

Project Objectives:

- Research the state of survival modeling, including the availability of "3rd generation" human-thermal models, and their ability to accurately predict ranges of survival time in waters warmer than 15°C (59°F).
- Determine whether the existing Probability of Survival Decision Aid or other models can account for, or incorporate, factors and parameters beyond heat production and heat loss.
- Identify and implement strategies to adapt model(s) to include additional parameters.
- Develop a survival database to validate model(s) against statistics.
- Deliver a survival-model module for plug-in application to the SAROPS.



Key Milestone / Deliverable Schedule:

Project Start	1 Nov 17 ✓
Phase I: Survival Model Investigation and Statistics	
Investigate Requirements and Applications	30 Apr 18 ✓
Investigate State of Survival Models	16 Jul 19 ✓
Conduct Facilitated Workshop	28 Aug 19 ✓
Survival Statistics Brief	16 Dec 19 ✓
Monitor Survival Information Data Collection	Jul 20
Key Decision Point to Progress to Model Implementation and Validation	Aug 20
Phase II: Survival Model Implementation	
Adapt Model with Prioritized Survival Factors	Mar 21
Validate Survival Model	Jul 21
★ **Enhanced CG Survival Model and Implementation Guidance (Report)**	**Sep 21**
Project End	Sep 21

Sponsor: CG-SAR

Stakeholder(s): CG-5R, CG-761, C3CEN, AREA-5

Project #: 1008

Anticipated Transition: **Knowledge Product**
Influence Tactics, Techniques, & Procedures

Notes:

- Carries forward U.S. Coast Guard (CG) Research and Development Center survival-related work with U.S. Department of Defense labs.
- Potential efficiencies in saving lives while reducing time on sortie.
- Explore partnerships with National Labs and University Centers.

RDC POC:	CG-926 Domain Lead:
Ms. Monica Cisternelli	Ms. Karin Messenger

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

In-Situ Burn (ISB) Research

Mission Need: Improve ISB techniques, technology and monitoring to make ISB a more effective, practical and safe option for oil spill response.

Project Objectives:

- Determine best practices for operational use of ISB.
- Conduct literature review to investigate remote air-monitoring technologies.
- Develop and test procedures to support freshwater ISB of heavy oils with and without contaminated vegetation.
- Conduct air quality monitoring of smoke plumes during ISB field tests.
- Report results for reference by U.S. Coast Guard (CG) federal on-scene coordinators, regional response teams, agency partners, academia, national labs, and international stakeholders that addresses ability of technology to improve responder safety and increase sampling accuracy.

Key Milestone / Deliverable Schedule:

	Project Start	1 Oct 18 ✓
	Mesoscale Freshwater Burns	19 Jul 19 ✓
	Large-scale Freshwater Burns	25 Oct 19 ✓
	Remote Air Monitoring Market Research	Feb 20
★	**Fresh Water ISB (Report)**	**Apr 20**
	Develop Remote Air Monitoring Process Framework	May 20
★	**Review Initial Air Monitoring Evaluation (Brief)**	**Jun 20**
	Develop Test Plan for Remote Air Monitoring	Sep 20
	Remote Air Monitoring During ISB	Feb 21
★	**Remote Air Monitoring Technology Evaluation (Report)**	**Aug 21**
	Project End	Aug 21

★ Indicates RDC product.

Sponsor: Great Lakes National Program Office, CG-MER

Stakeholder(s): CG-721, NSF, EPA, BSEE, LANT, PAC, D9

Project #: 47041

Anticipated Transition: **Knowledge Product**
Future Technology

Notes:

- Multiple funding sources including Oil Spill Liability Trust Fund and Great Lakes Restoration Initiative.
- Partner with academia and national labs to ensure result visibility and access.

RDC POC:	CG-926 Domain Lead:
LT Liz Murphy	Ms. Karin Messenger

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Mass Rescue Lifesaving Appliance (MRLSA)

Mission Need: Lightweight, easy to use, temporary, mass rescue survivor platform.

Project Objectives:

- Find, promote, or develop the technology to manufacture an extremely compact, lightweight, rescue intervention device to safely keep 100+ persons out of the water for up to 24 hours.
- Transition the developmental result to the Office of Search and Rescue and capability stakeholders for implementation as a mass rescue tool.

Key Milestone / Deliverable Schedule:

	Project Start……	1 Oct 19 ✓
	Request for Information (RFI)/Technology Assessment…….	Mar 20
★	**MRLSA Request for Information Summary (Report)…….**	**Apr 20**
	Prototype Development ……..	Oct 21
	Prototype Evaluation ……..	Nov 21
★	**Mass Rescue Lifesaving Appliance (Report)……**	**Mar 22**
	Project End…….....	Mar 22

Sponsor: CG-SAR

Stakeholder(s): CG-711, CG-731, CG-751

Project #: 1205

Anticipated Transition: **Product**
Fielded Prototype

Notes:

- Partnership with Air Force Research Laboratory.
- Investigate National Aeronautics and Space Administration or other government agency partnership.
- Potential use of a Cooperative Research and Development Agreement, or other non-traditional approaches (U.S. Department of Homeland Security Prize Competition) if the RFI does not yield results.

RDC POC:	CG-926 Domain Lead:
Ms. Monica Cisternelli	Ms. Karin Messenger

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Nearshore and Inland Evaluation of the Estimated Recovery System Potential (ERSP) Calculator

Mission Need: An ERSP calculator to include response systems for the entire nearshore and inland operating environment.

Project Objectives:

- Research the viability of the current ERSP and the calculator's initial impact in the offshore oil spill response industry.
- With industry and interagency (U.S. Environmental Protection Agency) representatives, assess ERSP as a whole to determine if it effectively rectifies the Economic and Development Review Committee's challenges experienced during Deepwater Horizon.
- Research inland and nearshore oil recovery equipment and efficiencies.
- Research if ERSP can be expanded to include the entire nearshore and inland operating environment.
- Expand ERSP to include inland and nearshore recovery modeling in calculator.

Key Milestone / Deliverable Schedule:

	Project Start	1 Oct 16 ✓
	Feasibility Workshop	21 Jun 17 ✓
★	**Feasibility of Extending the ERSP Calculator for Nearshore and Inland Waterways (Report)**	**20 Sep 17** ✓
	Complete Contract Negotiations. for Calculator Design.	18 Aug 18 ✓
	Start Development of Conceptual Model	1 Apr 19 ✓
★	**Inland ERSP Preliminary Factors, Requirements and Conceptual Model (Report)**	**14 Nov 19** ✓
★	**Inland ERSP Operational Environment Calculator (Design Document)**	**Jan 20**
	Start Development of Inland ERSP Calculator Software Tool	Sep 20
	Complete Tool and Begin National Academies Review	Apr 21
★	**National Academy of Sciences Review of Inland ERSP (Report)**	**Sep 21**
★	**Inland ERSP Calculator (Software & User Guide)**	**Feb 22**
★	**Nearshore & Inland Evaluation of the ERSP Calculator (Report)**	**Aug 22**
	Project End	Aug 22

★ Indicates RDC product.

Sponsor: CG-MER

Stakeholder(s): BSEE, AREA-54

Project #: 4710

Anticipated Transition: **Product**
Fielded Prototype

Notes:

- Oil Spill Liability Trust Fund funding.
- Partner with Bureau of Safety and Environmental Enforcement (BSEE).

RDC POC:	CG-926 Domain Lead:
Mr. Alexander Balsley, P.E.	Ms. Karin Messenger

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Next Generation Aids to Navigation Buoys

Mission Need: Reduce U.S. Coast Guard (CG) Aids to Navigation (AtoN) buoy costs and increase buoy reliability and longevity.

Project Objectives:

- Perform market study and document existing buoy types and specifications:
  - Consider hard shell plastic, fiberglass and different-shape buoys.
  - Develop a catalog for continued CG use.
- Perform a field test to determine optimal buoy replacement options:
  - Obtain the most promising buoys for exposed, semi-exposed, protected, river, and ice.
  - Deploy each type in proper environment, evaluate performance and document.
  - Provide functional characteristics for next generation buoys.

Key Milestone / Deliverable Schedule:

	Project Start	1 Oct 19 ✓
	Complete World Wide Market Study of Buoys	Mar 20
	Gather Feedback from CG Waterways Operations Product Line, District Five, District Seven, and the Office of Navigation (CG-NAV) Systems on Market Study	Jun 20
	Obtain Most Promising Buoys for Testing	Aug 20
★	**Results of Survey/Market Study (Report)**	**Sep 20**
	Test Plan	Oct 20
	Field Test	Oct 22
★	**New Buoy Field Trial Summary (Report)**	**May 23**
	Project End	May 23

★ Indicates RDC product.

Sponsor: SILC-WOPL

Stakeholder(s): CG-NAV, Districts

Project #: 2703

Anticipated Transition: **Knowledge Product**
Acquisition Milestone Support

Notes:

- Establish Cooperative Research and Development Agreements with vendors willing to work with the CG Research and Development Center for mutual benefit.
- Coordinate with CG-NAV and CG Director of International Affairs and Foreign Policy to involve International Association of Marine Aids to Navigation and Lighthouse Authorities as partners.

RDC POC:	CG-926 Domain Lead:
Ms. Irene Gonin	Ms. Karin Messenger

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

CG Nearshore Use of FirstNet

Mission Need: Interoperable voice and high speed data communications among Sector Forces and First Responders within Sea Area A1 (within 20 nautical miles of shore).

Project Objectives:

- Leverage a Cooperative Research and Development Agreement (CRADA) to investigate U.S. Coast Guard (CG) operational use of the National Public Safety Broadband Network (commonly called FirstNet).
- Assess the feasibility and effectiveness of leveraging CG infrastructure (e.g., Rescue 21 towers) to enhance FirstNet designs.
- Adapt 4G/LTE technology for the maritime environment to best support the CG, public safety, U.S. Department of Defense, and Other Government Agencies within 20 nautical miles of shore.

  Phase 1: Deploy handsets, FirstNet Enhanced Push To Talk (EPTT), blue force tracking, and Geosuite.

  Phase 2: Optimize radio access network, FirstNet integrated dispatch console, and EPPT enhanced equipment.

  Phase 3: Deploy Band 14 vessel routers.

Key Milestone / Deliverable Schedule:

	Project Start	21 Mar 18 ✓
	Limited User Evaluation Start	1 Feb 19 ✓
	CG FirstNet Maritime Test Range: Phase 1	1 Feb 19 ✓
	CG FirstNet Maritime Test Range: Phase 2	19 Aug 19 ✓
★	**Coast Guard Nearshore Use of FirstNet (Brief)**	**22 Nov 19 ✓**
	CG FirstNet Maritime Test Range: Phase 3	Jan 20
	Limited User Evaluation	Jan 20
★	**Coast Guard Nearshore Use of FirstNet: Test Results and Recommendations (Report & Brief)**	**Mar 20**
	Project End	Mar 20

Sponsor: CG-67

Stakeholder(s): CG-255, CG-721/31/41/51/61/91, C4IT SC LANT/PAC-6, C3CEN, TISCOM, D7, JIATF

Project #: 58041

Anticipated Transition: **Product**
Fielded Prototype

Notes:

- Project includes use of a CRADA.
- Partners: FirstNet Program Office, U.S. Customs and Border Protection Office of Air and Marine, and Florida Fish and Wildlife Conservation Commission.

RDC POC:	CG-926 Domain Lead:
Mr. Jon Turban, P.E.	Ms. Holly Wendelin

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Evaluation of Potential CG Use of CubeSats

Mission Need: Investigation and assessment of the operational utility of CubeSat technology for U.S. Coast Guard (CG) missions.

Project Objectives:

- Develop and deploy two ground stations for the Mobile CubeSat Command and Control (MC3) ground network, test and document the performance of the MC3 ground stations.
- Participate/partner in CubeSat technology development, test and document CubeSat performance during on-orbit test and evaluation of Polar Scout.
- Perform a CubeSat payload mission assessment that includes CubeSat concept of operations scenarios that would support CG mission needs and influence CubeSat requirements.
- Prepare a CubeSat technology roadmap to support the most pressing CG mission needs, including development, deployment and operations and maintenance planning factors.

Key Milestone / Deliverable Schedule:

	Project Start	29 Jun 16 ✓
	Partner Collaboration/Integrated Product Team Establishment	25 Oct 16 ✓
	Deploy MC3 Ground Station (Fairbanks, AK)	26 Sep 17 ✓
★	**Performance Test Results of Fairbanks Polar Scout Ground Station (Report)**	**20 Aug 18** ✓
★	**Coast Guard Use of CubeSat Technology (Brief)**	**24 Nov 18** ✓
	Polar Scout Launch	3 Dec 18 ✓
	Deploy MC3 Ground Station (New London, CT)	26 Jan 19 ✓
	Polar Scout Demonstrations Begin	1 May 19 ✓
★	**Performance Test Results of New London Polar Scout Ground Station (Report)**	**1 Jul 19** ✓
	Polar Scout Mission Concludes	Jan 20
★	**Coast Guard Use of CubeSat Technology Assessment and Roadmap (Report)**	**Aug 20**
	Project End	Aug 20

★ Indicates RDC product.

Sponsor: CG-SAR

Stakeholder(s): DHS S&T (BIM), CG-25, CG-26, CG-761, CG-771, CG-MLE, CG-MER3, IIP, D17, CGA

Project #: 7759

Anticipated Transition: **Product**
Fielded Prototype

Notes:

- Partner with U.S. Department of Homeland Security Science & Technology Directorate, U.S. Air Force Space Rapid Capabilities Office, National Oceanic and Atmospheric Administration, Naval Postgraduate School, and CG Academy to launch and evaluate CubeSat technology.
- Collaborate with Air Force Institute of Technology, U.S. Navy Program Executive Office Space Systems, and other agencies.
- Leverage Lawrence Livermore National Laboratory.

RDC POC:	CG-926 Domain Lead:
LCDR Grant Wyman	Ms. Holly Wendelin

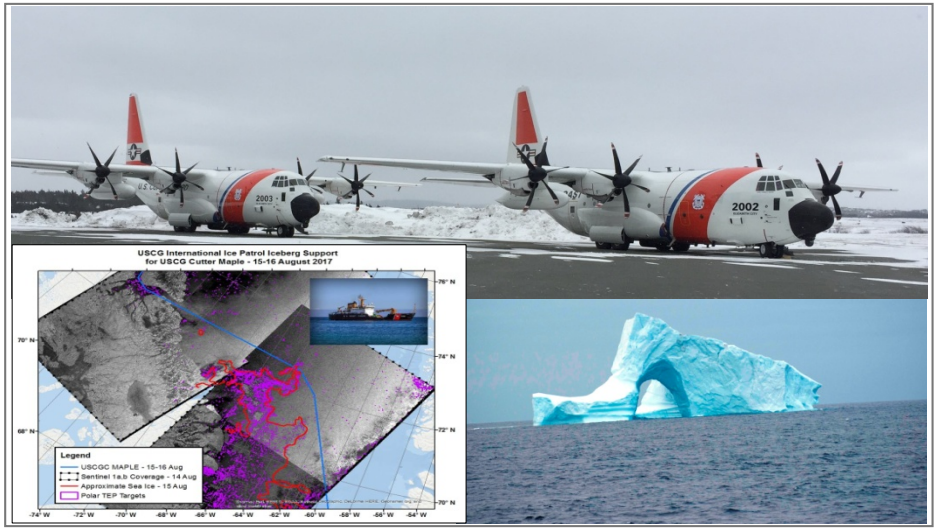
For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Iceberg Detection and Information Dissemination Methods

Mission Need: Improve quality of iceberg detection using satellite images and improve customer information dissemination.

Project Objectives:

- Research product dissemination methodologies for current International Ice Patrol (IIP) Iceberg Limit product.
- Improve current dissemination and shape requirements/limitations for future products.
- Develop additional products which provide more information to the maritime public regarding navigation risks posed by icebergs.
- Act as the U.S. Coast Guard (CG) Research and Development Center (RDC) liaison to the Department of Homeland Security (DHS) Science and Technology Directorate (S&T) Iceberg Tagging effort.
- Develop understanding of the application of machine learning to iceberg detection in Sentinel 1 satellite images.



Key Milestone / Deliverable Schedule:

Project Start	1 Apr 19 ✓
Effort I Start	1 Apr 19 ✓
Effort II Start	1 May 19 ✓
Document Current Iceberg Product Development	18 Aug 19 ✓
Evaluate output of DHS S&T Iceberg Tagging Effort	30 Sep 19 ✓
Investigate New Distribution Process	Jan 20
Tracking Data Usage	Feb 20
Investigate Machine Learning	May 20
Identify New Products	Jun 20
★ **Iceberg Product Dissemination/Development (Report)**	**Sep 20**
Project End	Sep 20

★ Indicates RDC product.

Sponsor: CG-WWM

Stakeholder(s): IIP, CG-5PW, CG-711, Air Station Elizabeth City, LANTAREA

Project #: 6509

Anticipated Transition: **Knowledge Product**
Acquisition Milestone Support

Notes:

- Supports Safety of Life at Sea.
- Leverage DHS S&T Iceberg Tagging effort.
- Supports CGA Capstone: Machine Learning for Data Dissemination.

RDC POC:	CG-926 Domain Lead:
Mr. Jack Cline	CDR James Small

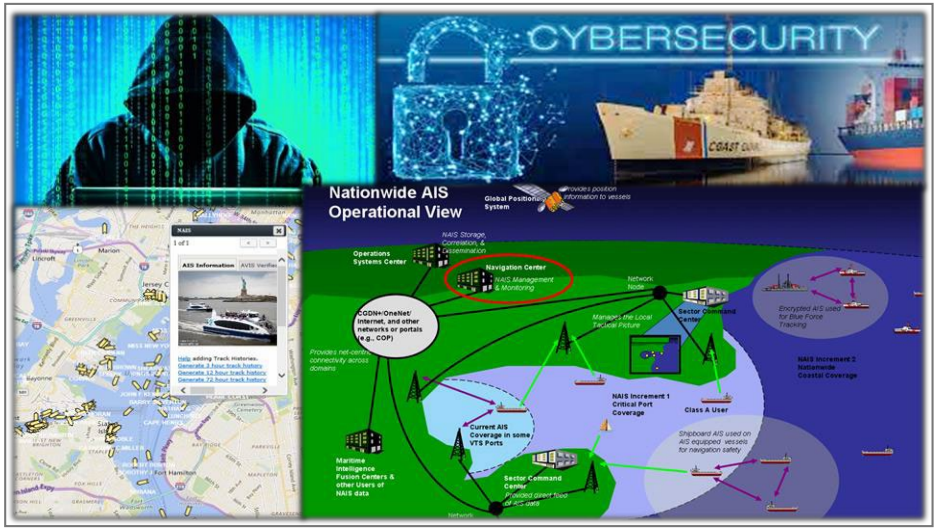
For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Automatic Identification System (AIS) Cyber Security

Mission Need: Improve mariner safety by hardening the AIS against cyber attacks.

Project Objectives:

- Investigate existing national and international cryptography research for data message authentication.
- Investigate previous signal bit-level research on extending AIS range to possibly address cybersecurity through signal verification of radio frequency information (AIS 2.0).
- Research Nationwide AIS data machine learning implementations that could augment AIS monitoring and alerting.
- Trial and demonstrate promising efforts.
- Report results and recommendations to support future implementation.



Key Milestone / Deliverable Schedule:

	Project Start	1 Oct 19 ✓
	Research Encryption Methods Proposed Internationally	May 20
	AIS 2.0 Capability Demonstration	Jun 20
	AIS Machine Learning Analysis	Aug 20
★	**AIS Data Authentication (Brief)**	**Aug 20**
	Lab Demonstration of AIS Cyber Attack Defense & Mitigation	Oct 20
★	**AIS Signal Verification (Brief)**	**Oct 20**
★	**AIS Machine Learning (Brief)**	**Dec 20**
★	**AIS Cyber Security (Report)**	**Jun 21**
	Project End	Jun 21

Sponsor: CG-761

Stakeholder(s): CG-68, CGCYBER, CG-761, CG-NAV, ICC, MIFCLANT/PAC, CGA

Project #: 8701

Anticipated Transition: **Knowledge Product**
Standards/Regulations

Notes:

- Possible partnership with Naval Postgraduate School.
- Leverage RDC Project 2218, Countering GPS Interference, and Project 6211, Next Generation Arctic Navigational Safety Information System.
- Leverage the U.S. Department of Homeland Security Homeland Security Systems Engineering and Development Institute/MITRE for machine learning analysis.

RDC POC: Mr. Jay Spalding

CG-926 Domain Lead: Ms. Holly Wendelin

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Evaluate Network Accelerator Technology to Improve Cutter Information Technology (IT) Performance

Mission Need: Hardware and software solutions to improve cutter IT performance.

Project Objectives:

- Review background issues and previous/current U.S. Coast Guard (CG) efforts to document and improve cutter IT application performance.
- Evaluate commercially available equipment that could improve network performance in a degraded, or high-latency environment.
- Perform limited user evaluation of selected equipment on an afloat unit.
- Investigate best practices, including transition to the cloud, to improve IT performance in a degraded, disconnected and high latency environment.
- Perform market research for CG database presentation tools to potentially support next generation Enterprise Service Bus (ESB).
- Make recommendations to sponsor and stakeholders about ways to most improve cutter IT application performance.

Key Milestone / Deliverable Schedule:

	Project Start	1 Oct 19 ✓
	Review of CG Previous/Current Efforts	31 Dec 19 ✓
	Evaluate Network Accelerator Technology	Feb 20
	Limited User Evaluation of Selected Equipment	Jul 20
★	**Network Accelerator Tech Evaluation (Brief)**	**Oct 20**
	Investigate Best Practices for Software	Mar 21
	Perform Market Research for Next Generation ESB	May 21
★	**Improve Cutter IT Application Performance (Report)**	**Jul 21**
	Project End	Jul 21

Sponsor: CG-68

Stakeholder(s): CG-761, C4IT SC, CG-67, CGCYBER

Project #: 8702

Anticipated Transition: **Knowledge Product**
Acquisition Milestone Support

Notes:

- Potential Cooperative Research and Development Agreement for commercial technology tested aboard U.S. Navy ships.
- Potential partnerships with Johns Hopkins Applied Physics Laboratory, Argonne National Lab, and Los Alamos National Lab (APEX Facility).

RDC POC:	CG-926 Domain Lead:
LCDR Grant Wyman	Ms. Holly Wendelin

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Extended Reality (XR) Capabilities for Coast Guard Mission Support

Mission Need: Improve the efficiency and effectiveness of maintenance and training across all U.S. Coast Guard (CG) communities.

Project Objectives:

- Identify maintenance, training, tools, processes, and procedures used by military and industry that will enhance the CG's ability to train personnel and perform maintenance on CG assets with the following goals:
  - Reduce the labor burden of technicians by providing current maintenance information via XR technologies.
  - Increase the availability of assets by improving the efficiency of maintenance and reducing costly errors.
  - Improve the effectiveness of training and reduce the time to train personnel.
- Create a roadmap that will enable sponsor to generate requirements and successfully implement extended reality capabilities throughout the CG to improve the performance of mission support services.

Key Milestone / Deliverable Schedule:

Project Start…… 30 Nov 17 ✓

★ **Market Research/Technology Assessment (Brief).....19 Dec 18** ✓

87' WPB Augmented Reality Maintenance Prototype Delivered….18 Sep 19 ✓

★ **Limited User Evaluation - Surface Community (Brief)…….May 20**

Aviation Augmented Reality Maintenance Prototype Delivered…..Aug 20

★ **Limited User Evaluation - Aviation Community (Brief)…….Apr 21**

Marine Inspection XR Training Prototype Delivered……..…. May 21

★ **Limited User Evaluation - Training Community (Brief) ……...Jan 22**

Mission Support XR Roadmap……..... Mar 22

★ **XR Capabilities for CG Mission Support (Report & Brief)…....Jul 22**

Project End……..……..……..…… Jul 22

★ Indicates RDC product.

Sponsor: FORCECOM

Stakeholder(s): CG-1B3/41/45/5PC/67/711/731/751/761/933, ALC ATC, ATTC, CGA, SFLC, TRACEN Yorktown

Project #: 8107

Anticipated Transition: **Knowledge Product**
Influence Tactics, Techniques & Procedures

Notes:

- Includes partnerships with Massachusetts Institute of Technology Lincoln Laboratory, Naval Sea Systems Command Portsmouth Naval Shipyard, Microsoft Technology Center Boston, Avatar Partners, and other U.S. Department of Defense components that have successfully adopted XR technologies in their mission support programs.
- Uses agile scrum development and rapid contracting through Defense Logistics Agency's Tailored Logistic Support Program.

RDC POC:	CG-926 Domain Lead:
Mr. Jon Turban	Ms. Holly Wendelin

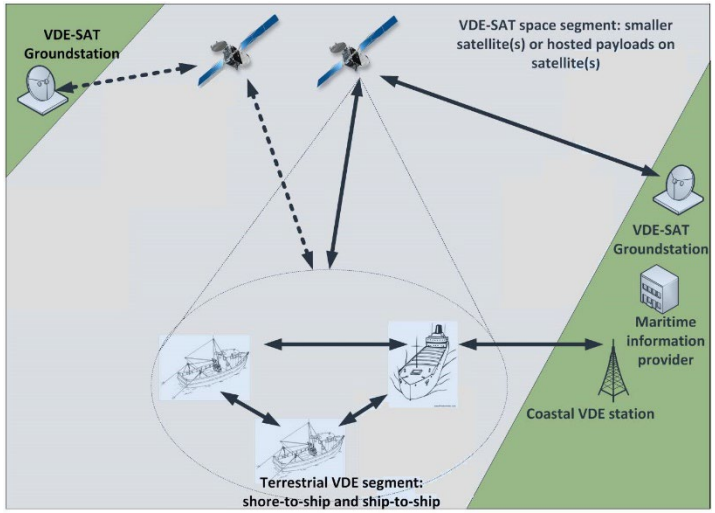
For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Evaluation and Testing of VHF Data Exchange System (VDES) Impacts on the Automatic Identification System (AIS)

Mission Need: Determine VDES benefits and path to implementation to support U.S. Coast Guard (CG) operations.

Project Objectives:

- Develop a technology roadmap for use of VDES:
  - Perform literature review, investigate the maturity of standards, market research of VDES equipment, analyze findings from worldwide VDES field trials, and identify steps for CG implementation.
- Phase 1 – VDES limited user evaluation to develop a transition plan to:
  - Shift CG tactical data transmissions from AIS channels to proposed frequencies for application specific message channels.
- Phase 2 – VDES limited user evaluation to:
  - Evaluate usage of different VDES channels to support various data types.
  - Investigate operational needs to support shore-side management of VDES.
  - Perform system level testing for frequency interference, limits to system overloads, message reception rates, out-of-bound interference, etc.



Key Milestone / Deliverable Schedule:

	Project Start……..	1 Oct 19 ✓
	Technology Roadmap Investigation……..……..	Sep 20
★	**VDES Technology Roadmap (Report)……..…….**	**Feb 21**
	Test Plan, Equipment Integration, and Bench Test……..	Mar 21
	Phase 1 Field Trials – VDES Limited User Evaluation…….	Sep 21
★	**Sensitive but Unclassified Tactical Information Exchange and Display System (STEDS) using VDES (Report)…….**	**Nov 21**
	Phase 2 Field Trials – VDES Limited User Evaluation…….	Sep 22
★	**VHF Data Exchange System Field Trial (Report & Brief)…...**	**Dec 22**
	Project End…….....	Dec 22

Sponsor: CG-761
Stakeholder(s): CG-67, CG-68, CG-9335, CG-NAV, NAVCEN, C3CEN

Project #: 8703

Anticipated Transition: **Knowledge Product**
Future Technology

Notes:

- Work closely with the Canadian Coast Guard, Electronics and Information Services, Quebec.
- Leverage prior CG Research and Development Center work completed concerning options and impacts for VDE and AIS.

RDC POC:	CG-926 Domain Lead:
Ms. Irene Gonin	Ms. Holly Wendelin

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

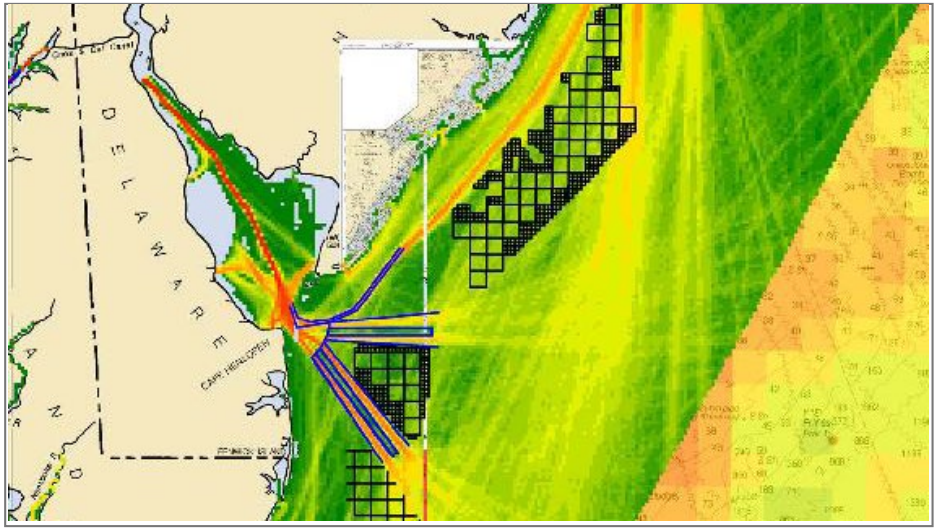
★ Indicates RDC product.

Research into Navigational Safety Risk Modeling and Analysis Tool

Mission Need: Capability to fully characterize the impact of rerouting traffic, funneling traffic, and placement of offshore structures in terms of risk.

Project Objectives:

- Analytical modeling process and analysis tools to predict changes in traffic patterns and determine the resultant changes in navigational safety risk.
- The ability to assess the proposed wind energy areas to further refine appropriate distances between shipping and structures.
- The ability to assess the need to create routing measures to mitigate risk posed by fixed structures.
- Review Pacific Northwest National Laboratory tool.



Key Milestone / Deliverable Schedule:

	Project Start	3 Oct 16 ✓
	Assessment of Risk Modeling Tools	31 Aug 18 ✓
	Automatic Identification System Risk Modeling Data Package	5 Dec 18 ✓
	Creation of an Offshore Energy Risk Assessment Tool	31 May 19 ✓
	Test Risk Modeling Package	26 Jul 19 ✓
★	**Navigational Safety Risk Modeling and Analysis Tool Summary Report (Model & Report)**	**6 Nov 19 ✓**
	Refine Assessment Tool and Methodology	May 20
	Full-Scale Process Walk-Through	Aug 20
★	**Navigational Safety Risk Modeling and Analysis After Action Report (Report)**	**Sep 20**
	Project End	Sep 20

★ Indicates RDC product.

Sponsor: CG-5PW

Stakeholder(s): LANT-54, CG-NAV

Project #: 7529

Anticipated Transition: **Knowledge Product**
Influence Tactics, Techniques, & Procedures

Notes:

- Continuation of the Atlantic Coast Port Access Route Study with requirements as documented in the Interim Report from Jul 2012 and the Final Report from Feb 2016.

RDC POC:	CG-926 Domain Lead:
Ms. Christine Hansen	CDR James Small

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Risk Based Cruise Ship Safety Score

Mission Need: Improve cruise ship risk assessments through a risk assessment score based on a vessel's exam results.

Project Objectives:

- Evaluate current practices to determine a cruise ship's risk for a safety or security incident.
- Working with subject matter experts, evaluate deficiencies (risk and/or consequence) and appropriately categorize deficiencies and assign appropriate weights.
- Develop a prototype, an automated method, to determine a cruise ship's risk assessment via its deficiency exam results and corresponding deficiency category weights.
- Receive feedback from industry on the effectiveness of the prototype's outputs.

Key Milestone / Deliverable Schedule:

Project Start……1 Oct 18 ✓

Analysis of Current Practices in Place……....27 Dec 18 ✓

Categorize and Quantify Deficiency Severity.....17 Jul 19 ✓

Develop Weighted Deficiency Scoring System….....30 Sep 19 ✓

Prototype Development and Beta Testing……..... Feb 20

Preliminary Testing and Analysis with Users...…….. Mar 20

★ **Prototype and Graphical User Interface for the Cruise Ship National Center of Expertise (Prototype & GUI)…… Apr 20**

Project End……..... Apr 20

Sponsor: CG-5P-TI

Stakeholder(s): Cruise Ship National Center of Expertise

Project #: 3502

Anticipated Transition: **Product**
Fielded Prototype

Notes:

- Leverages prior U.S. Coast Guard Research and Development Center work related to vessel inspections.

RDC POC:	CG-926 Domain Lead:
Mr. Sam Cheung	CDR James Small

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Condition-Based Maintenance (CBM) for Coast Guard Asset Product Lines

Mission Need: Targeted condition-based maintenance for higher asset availability, better use of resources, and reduced life cycle costs.

Project Objectives:

- Research significant opportunities for using leading indicators and readily available system information to implement condition-based maintenance activities. Use Maritime Security Cutter, Large (WMSL) as focus of initial demonstration.
- Research system characteristics: interfaces, data structure, data analysis, and data display.
- Conduct market research of available commercial and Governmental Off-The-Shelf (GOTS) systems that accommodate identified system characteristics.
- Provide recommendations for systems and steps required to accommodate functional characteristics.

Key Milestone / Deliverable Schedule:

Project Start…… 1 Apr 19 ✓

★ **Condition-Based Maintenance for Coast Guard Asset Product Lines System Characteristics (Brief) ……. Feb 20**

Market Research…….. Apr 20

★ **Condition-Based Maintenance for CG Asset (Report)…… Aug 20**

Project End…….. Aug 20

Sponsor: CG-45

Stakeholder(s): SFLC, ALC

Project #: 9204

Anticipated Transition: **Knowledge Product**
Acquisition Milestone Support

Notes:

- Partner with the U.S. Coast Guard Surface Forces Logistics Center (SFLC) to make recommendations.
- Potential partnership with GOTS providers.

RDC POC:	CG-926 Domain Lead:
Ms. Christine Hansen	CDR James Small

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

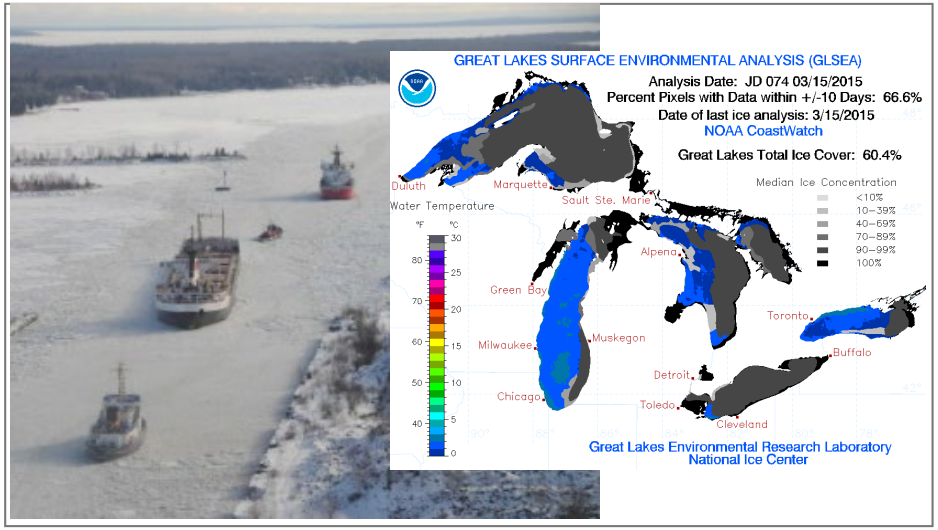
★ Indicates RDC product.

Ice Condition (ICECON) Risk Assessment Tool(s)

Mission Need: Method to forecast and share ice conditions.

Project Objectives:

- Develop ICECON classification methodology.
- Develop ship classifications for Great Lakes.
- Validate ice and ship classifications with observed conditions.
- Develop ICECON nowcast and forecast methodology.
- Adjust forecast methodology with icebreaker activity.
- Provide ICECON forecast system for decision support.
- Conduct a feasibility analysis for the development of an Arctic ICECON.



Key Milestone / Deliverable Schedule:

	Project Start	1 Oct 16 ✓
	ICECON Workshop	29 Nov 16 ✓
★	**ICECON Update (Brief)**	**22 Sep 17** ✓
★	**ICECON Update (Brief)**	**15 Oct 18** ✓
★	**ICECON Update (Brief)**	**2 Oct 19** ✓
	ICECON Model Validation	Jun 20
★	**ICECON Forecast Model (Report & Brief)**	**Sep 20**
	Project End	Sep 20

Sponsor: CG-WWM, CG-5PW

Stakeholder(s): National Ice Center, D1, D9, D17, LANT, PAC-5, DHS S&T Office of University Programs

Project #: 6512

Anticipated Transition: **Product**
Fielded Prototype

Notes:

- Collaboration with Department of Homeland Security Science and Technology Directorate Arctic Domain Awareness Center (ADAC).
- Leverage ADAC Arctic Ice Conditions Index effort.

RDC POC:	CG-926 Domain Lead:
Mr. Sam Cheung	CDR James Small

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Incorporating Sensor Performance in SAROPS

Mission Need: Time and cost effective methodology to incorporate sensor capabilities in the Search and Rescue Optimal Planning System (SAROPS).

Project Objectives:

- Research and document the SAROPS data requirements related to sensor inputs.
- Determine sensitivity of SAROPS search metrics to inputs.
- Identify a resource-effective approach to develop the sensor-specific data required for use in SAROPS.
- Create a prototype of this new approach for developing the sensor-specific data.

Key Milestone / Deliverable Schedule:

	Project Start	2 Oct 17 ✓
	Completion of Work Under Original Project Scope	13 Mar 19 ✓
	Project Re-scoped and Retitled	11 Jul 19 ✓
★	**Required SAROPS Input to Develop Sweep Width (Brief)**	**15 Dec 19** ✓
	Key Decision Point	16 Dec 19 ✓
	Conduct Sensitivity Analysis & Investigate Underlying Assumptions	Aug 20
★	**SAROPS Sensitivity Analysis (Brief)**	**Sep 20**
	Research Novel Methods to Develop Sensor-Specific Data	Apr 21
★	**Incorporating Sensor Performance in SAROPS (Interim Report)**	**Jun 21**
★	**Prototype Tool for Incorporating Sensor Performance in SAROPS (Prototype)**	**Dec 21**
★	**Incorporating Sensor Performance in SAROPS (Report)**	**Feb 22**
	Project End	Feb 22

★ Indicates RDC product.

Sponsor: CG-SAR

Stakeholder(s): LANT, PAC, FORCECOM, D1, D7, D9, D11, D13, Boat Forces

Project #: 7937

Anticipated Transition: **Knowledge Product**
Influence Tactics, Techniques, & Procedures

Notes:

- Leverages U.S. Coast Guard Research and Development Center's previous work with developing SAROPS sensor inputs.

RDC POC:	CG-926 Domain Lead:
Ms. Grace Python	CDR James Small

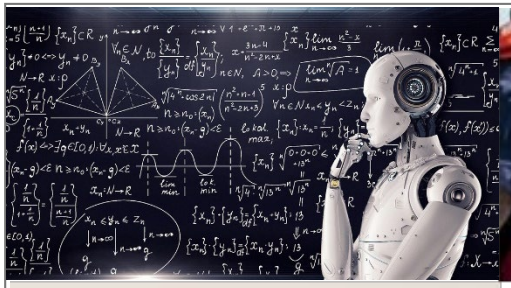
For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Machine Learning Platforms to Improve Coast Guard Tools

Mission Need: Assess the value of machine learning for improving U.S. Coast Guard (CG) tools.

Project Objectives:

- Conduct a thorough analysis and review of the field of machine learning. Determine which algorithms may be promising for future CG applications.
- Review the application of machine learning in the U.S. Department of Defense (DoD) and industry. Determine if any current applications can be usefully applied to current CG mission sets.
- Evaluate the accessibility of commercially available machine learning software for CG needs including Government cloud services offerings.
- Define applicable CG mission sets for machine learning.



Key Milestone / Deliverable Schedule:

	Project Start	1 Oct 19 ✓
	Review Machine Learning Literature	Mar 20
	Assessment of DoD And Industry Applications	Aug 20
	Complete Market Research of Available Software	Dec 20
★	**Machine Learning Platforms to Improve Coast Guard Tools (Report)**	**Feb 21**
	Project End	Feb 21

Sponsor: CG-771
Stakeholder(s): CG-761

Project #: 7401

Anticipated Transition: **Knowledge Product**
Influence Tactics, Techniques, & Procedures

Notes:

- Potential partnerships with the Air Force Institute of Technology and Naval Postgraduate School.

RDC POC:	CG-926 Domain Lead:
Ms. Grace Python	CDR James Small

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

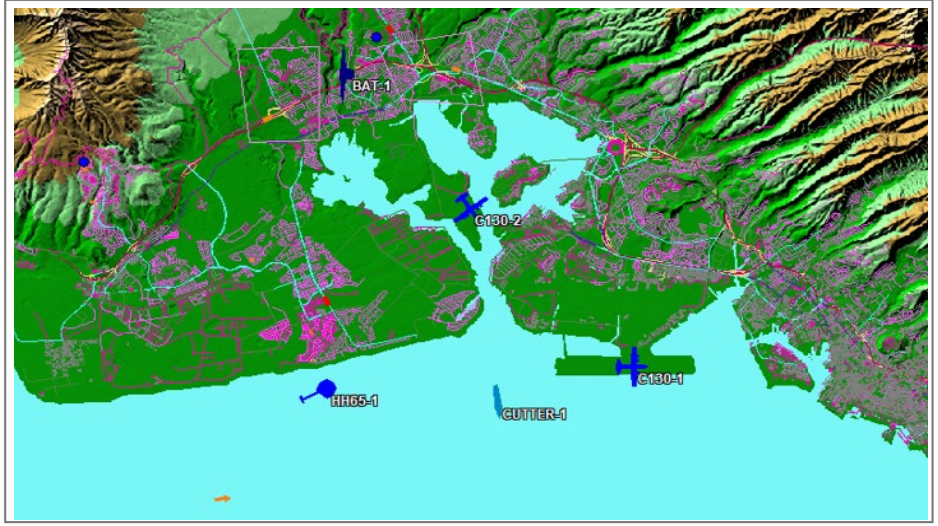
★ Indicates RDC product.

Exploring Machine Learning (ML) for Application In USCG Mission Planning & Disaster Response

Mission Need: Improve the U.S. Coast Guard's (CG) emergency preparedness and increase response effectiveness.

Project Objectives:

- Phase I:
  - Literature research and review: application of Artificial Intelligence (AI) and ML to CG Humanitarian Assistance and Disaster Response (HA/DR). Assess how the use of AI/ML could enhance the efficiency of CG planning and response process during a crisis.
- Phase II:
  - Naval Postgraduate School conducts ML digital image change detection research.
  - University of Illinois (U of I) conducts ML HA/DR network analysis and natural language processing of the 2010 Haiti earthquake response.
- Phase III:
  - Test natural language processing as a tool to harvest analysis data from MISLE SAR narratives.
  - Expand the ML HA/DR network analysis and natural language processing to include U.S. case and compare results to international case.



Key Milestone / Deliverable Schedule:

Project Start	20 Oct 17 ✓
Phase I - Conduct Literature Review and Assessment	30 Apr 18 ✓
Initiate Phase II	30 Apr 19 ✓
Change Detection of Marine Environments Using Machine Learning (Naval Postgraduate School)	
Thesis A	Jan 20
Thesis B	Apr 20
U of I Natural Language Processing	Jul 20
★ **Machine Learning Exploration: Phase II Results (Brief)**	**Aug 20**
Initiate Phase III	Aug 20
★ **Machine Learning for Application in USCG Mission Planning & Disaster Response (Report & Brief)**	**Aug 21**
Project End	Aug 21

Sponsor: CG-OEM

Stakeholder(s): CG-CVC, CG-MER, CG-2, LANT-35, PAC-53

Project #: 3309

Anticipated Transition: **Knowledge Product**
Future Technology

Notes:

- Collaboration with the DHS Center – University of Illinois (Champaign-Urbana).
- Collaboration with the U.S. Department of Defense Joint Artificial Intelligence Center.

RDC POC:	CG-926 Domain Lead:
Ms. Christine Hansen	CDR James Small

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Define and Communicate Exclusion Zones

Mission Need: Capability to physically mark and clearly communicate the boundaries of an area of exclusion, including both fixed and moving security zones.

Project Objectives:

- Review user needs, consider short-term and longer-term solutions.
- Investigate solutions on the market to determine the best possible solutions to evaluate.
- Select and test prototype solution(s) that will unambiguously mark fixed and moving security zones.

Key Milestone / Deliverable Schedule:

	Project Start	4 Feb 14 ✓
	Unit Visit/Market Research Request for Information	6 Aug 14 ✓
★	**Define and Communicate Exclusion Zones (DCEZ): Summary of Current Market Research (Report)**	**21 Oct 14 ✓**
	Sponsor Change to CG-721	6 Mar 15 ✓
	Manufacturing Delay of Test Articles	19 Feb 16 ✓
	Demonstration of Capabilities	15 Aug 16 ✓
★	**DCEZ: Short-Term Field Evaluation (Report)**	**13 Jan 17 ✓**
	Go/No-Go Decision Point	6 Jul 17 ✓
	Conduct Long-Term Solution Field Evaluation	31 Aug 19 ✓
★	**DCEZ: Long-Term Field Evaluation (Report)**	**Jan 20**
	Project End	Jan 20

★ Indicates RDC product.

Sponsor: CG-721

Stakeholder(s): CG-MSR, MSRT, AREA-3, CG-MLE

Project #: 5921

Anticipated Transition: **Product**
Fielded Prototype

Notes:

- Leverages previous work on Project Unambiguous Warning Devices.

RDC POC:	CG-926 Domain Lead:
Ms. D.J. Hastings	LT Steve Hager

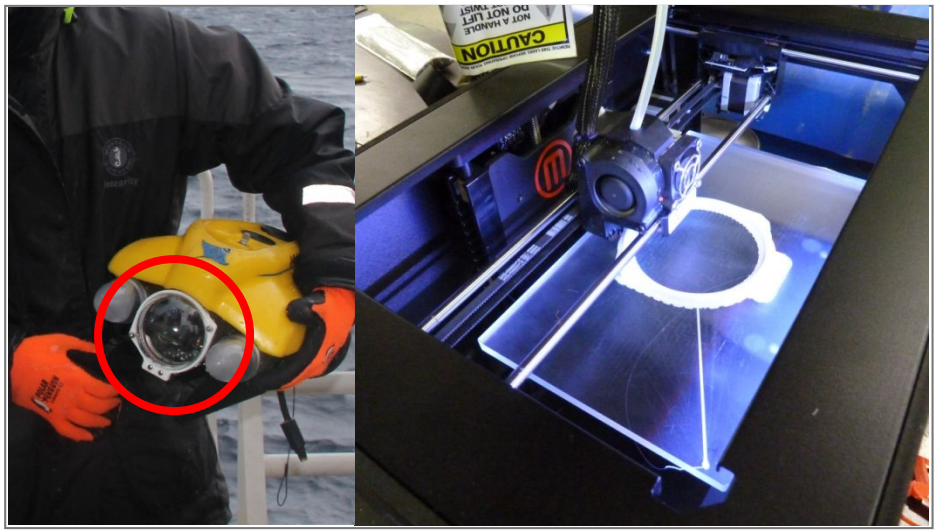
For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Evaluation of Three-Dimensional (3D) Printing Technology for Coast Guard Applications

Mission Need: Assessment of the potential for 3D printers to improve mission readiness by reducing logistical support lead times.

Project Objectives:

- Research the advancements made with the spiral development of 3D printing technology with respect to Coast Guard applications.
- Identify CG units that are best suited to implement additive manufacturing, conduct training, and trial 3D printing technologies.
- Research cost, logistical, and performance issues that could be addressed with 3D printing and additive manufacturing.
- Work with Surface Forces Logistics Center and Aviation Logistics Center to develop the required process for approving 3D printed parts for operational use.
- Document findings and provide recommendations for decision makers.



Key Milestone / Deliverable Schedule:

Project Start……..…….. 11 Jan 16 ✓

Identify Units for 3D Printing Trial……..……23 Feb 16 ✓

★ **Evaluation of 3D Printing Technology for Coast Guard Applications (Report)…….…… 26 Apr 17** ✓

Underway Additive Manufacturing Demonstration …… 29 Jun 17 ✓

★ **Roadmap for Integration of Additive Manufacturing (Report)...Jan 20**

Project End……..... Jan 20

Sponsor: CG-44

Stakeholder(s): CG-11, CG-41, CG-43, CG-45, CG-731, CG-751, CG-DOL, DIUx

Project #: 7758

Anticipated Transition: **Product**
Fielded Prototype

Notes:

- Partnering with the Chief of Naval Operations' Rapid Innovation Cell, Naval Warfare Development Command.
- Partner with Oak Ridge and Lawrence Livermore National Labs.

RDC POC:	CG-926 Domain Lead:
Mr. Jason Story	LT Steve Hager

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Diesel Outboard Development

Mission Need: Single fueled fleet.

Project Objectives:

- Research current developmental stage of diesel outboards applicable to U.S. Coast Guard (CG) usage.
- Conduct cost-benefit analysis of implementing diesel outboard engines in the CG.
- Investigate partnership options with manufacturers and other government agencies and test promising diesel outboard engine technologies to better understand performance capabilities.
- Provide recommendations for potential future acquisition initiatives, as appropriate.

Key Milestone / Deliverable Schedule:

	Project Start	27 Feb 14 ✓
	Issue Request for Information	3 Apr 14 ✓
★	**Diesel Outboard Engine Market Survey Results (Brief)**	**8 Sep 14 ✓**
★	**Diesel Outboard Engine Cost-Benefit Analysis (Report)**	**24 Jul 15 ✓**
	Key Decision Point: Determine Path Forward	24 Jul 15 ✓
	Conduct Spark-Ignited Diesel Outboard Engine Testing	31 May 17 ✓
	Conduct Compression-Ignited Diesel Outboard Engine Testing	16 Nov 18 ✓
	Key Decision Point: Cancel High Compression-Ignition Engine Testing	11 Jun 19 ✓
★	**Diesel Outboard Engine Feasibility (Report)**	**Feb 20**
	Project End	Feb 20

Sponsor: CG-731

Stakeholder(s): CG-46, CG-451

Project #: 4110

Anticipated Transition: **Knowledge Product**
Acquisition Milestone Support

Notes:

- Project includes Cooperative Research and Development Agreements.
- Establish partnerships with Joint Task Force-East, U.S. Customs and Border Protection, U.S. Immigration and Customs Enforcement, and U.S. Department of Homeland Security Science and Technology Directorate.
- Continue to leverage partnerships with the U.S. Navy Combatant Craft Division to test diesel outboard engines.

RDC POC:	CG-926 Domain Lead:
Mr. Jason Story	LT Steve Hager

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Safety Parameters for ICE Operations (SPICE Ops)

Mission Need: Technical data for personnel and equipment performance in extreme cold weather during ice operations.

Project Objectives:

- Establish exposure limits for Search and Rescue (SAR) team members wearing dry suits while exposed in open air.
- Evaluate the impact of extreme cold on the SAR vest and other electronic equipment to determine degradation values based on environmental conditions.
- Provide safe guidelines and identify risk mitigation strategies for personnel conducting operations on the ice.

Key Milestone / Deliverable Schedule:

	Project Start	1 Dec 17 ✓
	Conduct Human Physiological Data Collection at D9 Units	8 Feb 18 ✓
	Develop and Acquire Electronic Equipment Test Plan	6 Jun 18 ✓
	Complete Electronic Equipment Testing	21 Sep 18 ✓
	Develop Personal Protective Equipment (PPE) Test Plan	11 Nov 18 ✓
	Conduct PPE Testing	6 Dec 18 ✓
	Conduct Human Modeling	15 Mar 19 ✓
★	**Electronic Equipment and Dry Suit Human Modeling (Brief)**	**22 Aug 19** ✓
	D9 Ice Rescue Committee Facilitated Discussion	17 Oct 19 ✓
	Personal Locating Beacon Testing	Jan 20
★	**Safe Parameters for Ice Operations (Report)**	**Jan 20**
	Project End	Jan 20

★ Indicates RDC product.

Sponsor: CG-731

Stakeholder(s): CG-SAR, D1, D9, FORCECOM

Project #: 5301

Anticipated Transition: **Knowledge Product**
Influence Tactics, Techniques, & Procedures

Notes:

- Partnering with U.S. Army Natick Soldier Research, Development & Engineering Center and U.S. Army Corps of Engineers' Cold Regions Research and Engineering Laboratory.
- Cooperative Research and Development Agreement completed for PPE testing.

RDC POC:	CG-926 Domain Lead:
LT Ryan Huebner	LT Steve Hager

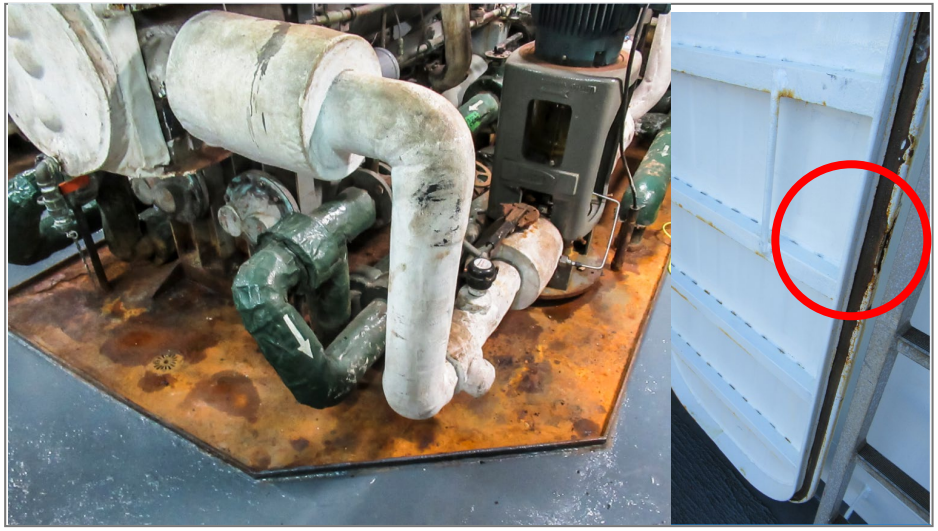
For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Corrosion Control and Monitoring

Mission Need: Research and mitigate corrosion impacts on cutters by increasing mission support efficiencies and reducing costs.

Project Objectives:

- Identify and benchmark current U.S. Coast Guard (CG) corrosion mitigation strategies.
- Research the recent advancements in commercial anti-corrosion coating technologies with respect to CG surface fleet applications.
- Coordinate with U.S. Navy and other government/military services to gather their corrosion mitigation strategies.
- Stand up a CG Corrosion Integrated Product Team (IPT) to down-select promising corrosion technologies.
- Based on the research, compile a report and provide recommendations in a Corrosion Roadmap.
- Conduct Limited User Evaluations (LUE) of selected technologies.
- Research CG cutter hull blasting and recoating intervals.
- Research remote buoy corrosion monitoring systems.



Key Milestone / Deliverable Schedule:

	Project Start	3 Oct 16 ✓
	Benchmark CG Corrosion Strategies	15 May 17 ✓
	Conduct Market Research	1 Jul 17 ✓
	Review Request for Information Results	15 Oct 17 ✓
	Review Research Results and IPT Efforts	8 Nov 17 ✓
★	**Corrosion Control Roadmap (Report)**	**24 Apr 18** ✓
	CGC MOHAWK Fluidized Bed Coated Watertight Doors Installed	15 Oct 18 ✓
	One Component (1K) Polysiloxane Tests Begin	Feb 20
	Limited User Evaluations	Jul 20
★	**Corrosion LUE (Report)**	**Sep 20**
	Project End	Sep 20

★ Indicates RDC product.

Sponsor: CG-45

Stakeholder(s): SFLC, CG-41, CG-43, CG-44, CG-751, AREA-3

Project #: 7760

Anticipated Transition: **Knowledge Product**
Influence Tactics, Techniques, & Procedures

Notes:

- Partnerships with the Office of Naval Research and CG Surface Forces Logistics Center (SFLC).
- Test articles scheduled for incorporation onboard 210' and 270' Medium Endurance Cutters.
- Includes Fluidized Bed Coating and One Component (1K) Polysiloxane treatments.

RDC POC:	CG-926 Domain Lead:
Mr. Mike Coleman	LT Steve Hager

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

Arctic Technology Evaluation 2019-2020

Mission Need: Provide support to relevant research efforts in the Arctic.

Project Objectives:

- Support projects which develop capability improvements in the execution of U.S. Coast Guard (CG) missions in the Arctic.
- Nurture joint efforts and interagency cooperation between government sectors and civilian entities on the North Slope and abroad.
- Facilitate and support other Arctic projects, including Department of Homeland Security Science and Technology Directorate initiatives.
- Monitor technology progression.

Key Milestone / Deliverable Schedule:

	Project Start	3 Dec 18 ✓
	Identify Partners/Technologies/Test Plans (FY19)	14 Jun 19 ✓
	Solicit FY20 Research Efforts/Partners	30 Aug 19 ✓
	Conduct Tests/Demonstrations on USCGC HEALY (FY19)	28 Oct 19 ✓
★	**Communications Technology in the Arctic (Application Note)**	**Jan 20**
	Identify Partners/Technologies/Test Plans (FY20)	Jun 20
	Solicit FY21 Research Efforts/Partners	Jul 20
	Conduct Tests/Demonstrations on USCGC HEALY (FY20)	Aug 20
★	**Arctic Technology Evaluation FY20 (Application Note)**	**Oct 20**
	Project End	Oct 20

Sponsor: CG-751

Stakeholder(s): D17, PAC-5, LANT-5

Project #: 62102

Anticipated Transition: **Knowledge Product**
Future Technology

Notes:

- Outreach partners include the Bureau of Safety and Environmental Enforcement, the Arctic Domain Awareness Center, Department of Defense Labs, U.S. Northern Command, and National Labs.

RDC POC:	CG-926 Domain Lead:
Mr. Scot Tripp	Ms. Holly Wendelin

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Bromine-Free Water Purification System

Mission Need: Evaluate newer, less hazardous water purification systems.

Project Objectives:

- Install and operate a Bromine-Free Water Purification System (BF-WPS) onboard a U.S. Coast Guard (CG) National Security Cutter based on system advances made by the U.S. Navy.
- Explore potential issues/aspects of transitioning use of BF-WPS to new CG cutters:
  - Identify feasibility of incorporating BF-WPS on various cutter classes.
  - Estimate ownership costs to include procurement, installation/retrofit, operation, and maintenance.
  - Identify potential benefits of utilizing BF-WPS on CG cutters.

Key Milestone / Deliverable Schedule:

	Project Start	27 Jul 19 ✓
	BF-WPS Purchase and Begin 3-Month Pilot Study	Mar 20
★	**Bromine-Free Water Purification System (Brief)**	**Apr 20**
	Conclude Pilot Study and Remove BF-WPS	Sep 20
★	**Bromine-Free Water Purification System Pilot Study (Report)**	**Dec 20**
	Project End	Dec 20

Sponsor: Surface Force Logistics Center (SFLC)

Stakeholder(s): CG-45, SFLC-LRE

Project #: 5507

Anticipated Transition: **Product**
Pending Acquisition

Notes:

- Legislative requirement.

RDC POC:	CG-926 Domain Lead:
Ms. D. J. Hastings	LT Steve Hager

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Counter Unmanned Underwater Vehicle (c-UUV)/Anti-Swimmer Technology

Mission Need: Improved detection, tracking, classification, and deterrence of underwater threats to U.S. Coast Guard (CG) assets.

Project Objectives:

- Phase I – Summarize currently available high technology readiness level c-UUV and anti-swimmer technologies that can be demonstrated for CG use cases.
- Phase II – Conduct a limited user evaluation to identify baseline and desired functional characteristics.

Key Milestone / Deliverable Schedule:

	Project Start……..	1 Oct 18 ✓
★	**c-UUV/Anti-Swimmer Technology (Brief)…….**	**Mar 20**
	Limited User Evaluation……..……..	Sep 20
★	**c-UUV/Anti-Swimmer Limited User Evaluation (Report)…….**	**Feb 21**
	Project End…….....	Feb 21

Sponsor: CG-721

Stakeholder(s): CG-45, CG-731, CG-761, AREA-3

Project #: 5922

Anticipated Transition: **Knowledge Product**
Future Technology

Notes:

- Build on past RDC anti-swimmer work.
- Coordinate with other government agencies.
- Possible Cooperative Research & Development Agreements for limited user evaluation.

RDC POC:	CG-926 Domain Lead:
Mr. Mike Coleman	LT Steve Hager

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

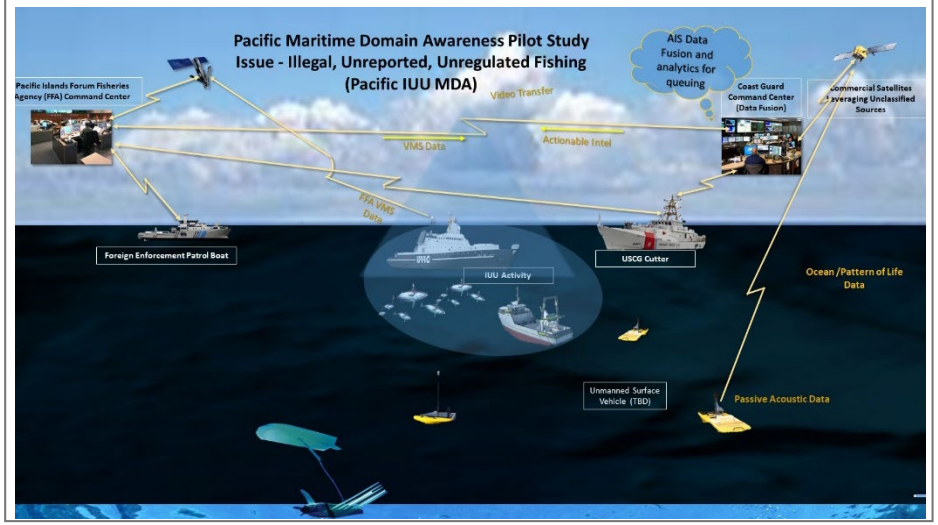
★ Indicates RDC product.

Low-Cost MDA Pilot

Mission Need: Improve Maritime Domain Awareness (MDA) in remote areas.

Project Objectives:

- Conduct a pilot study/assessment to determine the efficacy of using low-cost commercially available unmanned surface systems, in combination with or on existing fleet platforms, to enhance maritime domain awareness.
- Test technology solutions used by small, remote Pacific Island states and other technologies with little or no logistics funding.
- Utilize industry engagement and technology demonstrations, focus on contractor owned and operated technology.



Key Milestone / Deliverable Schedule:

	Project Start	6 Jun 18 ✓
	Issue Request for Information for Industry Engagement	30 Sep 18 ✓
	Issue Request for Proposal for Industry Owned and Operated Solutions	7 Nov 19 ✓
	Award Contract(s)	Feb 20
★	**Low-Cost Maritime Domain Awareness Demonstration Plan (Brief)**	**Apr 20**
	Field Demonstration Complete	Aug 20
★	**Low-Cost Maritime Domain Awareness Pilot Study (Report)**	**Apr 21**
	Project End	Apr 21

Sponsor: CG-26

Stakeholder(s): CG-711, CG-721, CG-761, CG-MLE, LANTAREA, D14, PACAREA, D17

Project #: 7210

Anticipated Transition: **Knowledge Product**
Future Technology

Notes:

- Legislative requirement.
- Include the U.S. Coast Guard (CG) Auxiliary if applicable.

RDC POC:	CG-926 Domain Lead:
Mr. Scot Tripp	Mr. Scott Craig

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Drug and Explosives Detection Technologies

Mission Need: Improved efficiency in multiple agent detection with accuracy and reliability required to support legal prosecution.

Project Objectives:

- Provide more effective and efficient drug and explosive detection capability options for use by U.S. Coast Guard (CG) members during maritime and shore-based missions.
- Provide support to plan, execute, and report results from Handheld Illicit Drug – Explosive Trace Detector (HID-ETD) Limited User Evaluation (LUE) as part of the U.S. Department of Homeland Security's (DHS) Science and Technology Directorate (S&T) Strategic Sourcing Initiative.

Key Milestone / Deliverable Schedule:

	Project Start	1 Oct 19 ✓
	Begin DHS System Assessment and Validation for Emergency Responders (SAVER) Program	Jan 20
★	**Drug and Explosives Detection SAVER (Report)**	**May 20**
	HID-ETD LUE Plan Developed and Devices Obtained	Jan 21
	Distribute Devices and Begin HID-ETD LUE	Feb 21
	Complete HIT-ETD LUE and Retrieve Devices	Jul 21
★	**Handheld Illicit Drug – Explosives Trace Detector (Report)**	**Sep 21**
	Project End	Sep 21

Sponsor: CG-721

Stakeholder(s): DSF, NSF, CG-MLE, DHS S&T, CG-1B3, FORCECOM

Project #: 5807

Anticipated Transition: **Knowledge Product**
Influence Tactics, Techniques, & Procedures

Notes:

- Partnerships: Countering Weapons of Mass Destruction Office, U.S. Secret Service, Federal Protective Services, National Urban Security Technology Laboratory, Transportation Security Laboratory, Federal Emergency Management Agency, Transportation Security Administration, and U.S. Customs and Border Protection.
- Leverages past RDC Project 5802, Maritime Trace Narcotic Identification/Verification.

RDC POC:	CG-926 Domain Lead:
Ms. D.J. Hastings	LT Steve Hager

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Support of Alternatives Analysis for the Waterways Commerce Cutter

Mission Need: Support replacing the outdated fleet of inland cutters.

Project Objectives:

- Support Sponsor's Integrated Project Team tasked to:
  - Identify replacement options for the inland fleet.
  - Review new design options for replacement hulls.
  - Review the cost and consequences of buying, leasing, or contracting other boats to perform similar missions.
- Support drafting the Alternatives Analysis Study Plan (AASP) for the Waterways Commerce Cutter.
- Support execution of the AASP by the Naval Sea Systems Command (NAVSEA).

Key Milestone / Deliverable Schedule:

Project Start…….. 1 Jun 17 ✓

★ **Waterways Commerce Cutter Alternatives Analysis Study Plan (AASP)…….. 2 Oct 18 ✓**

AASP Liaison Support to NAVSEA…… Feb 20

★ **Support of Alternatives Analysis for the Waterways Commerce Cutter (Closeout Memo)…… Mar 20**

Project End……..... Mar 20

Sponsor: CG-932
Stakeholder(s): CG-751, LANT-5, D8

Project #: 6812

Anticipated Transition: **Knowledge Product**
Acquisition Milestone Support

Notes:

- Direct support to Procurement, Construction, and Improvement.
- Leverage all previous approved and signed Acquisition documents.

RDC POC:	CG-926 Domain Lead:
LTJG Ryan Major	LT Steve Hager

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

Operational Test Agent (OTA) for the sUAS for NSC Program

Mission Need: Independent and objective evaluation of Small Unmanned Aerial Systems (sUAS) operational suitability and effectiveness.

Project Objectives:

- Generate sUAS test plan for the National Security Cutter (NSC) Program.
- Perform Operational Testing & Evaluation (OT&E) of sUAS.
- Provide OT&E report to the sponsor program office.

Key Milestone / Deliverable Schedule:

	Project Start	27 Jun 18 ✓
	Develop Test Plan	2 Apr 19 ✓
	Conduct OT&E	19 Nov 19 ✓
	Summary Report of OT&E	16 Dec 19 ✓
★	**NSC Program sUAS OT&E (Report)**	**Mar 20**
	Project End	Mar 20

Sponsor: CG-931
Stakeholder(s): CG-711

Project #: 7702

Anticipated Transition: **Knowledge Product**
Acquisition Milestone Support

Notes:

- Direct support to Procurement, Construction, and Improvement.

RDC POC:	CG-926 Domain Lead:
LTJG Ryan Major	Mr. Scott Craig

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil

★ Indicates RDC product.

FY20 Science & Technology Innovation Center (CG-STIC) Tasks

Purpose: To establish a collaborative relationship between the U.S. Coast Guard Innovation Center and the Department of Homeland Security Science and Technology Directorate to share and advance technologies that will be mutually beneficial to both parties.

Title	Objective	Office Supported	Funding Type	RDC POC	CG-926 Domain Lead	Due/ Delivery Date
Human Language Technology (HLT)	*Examine HLT and investigate previously unknown or untried techniques for operational use.*	CG-2 CG-721 CG-731	DHS S&T	LCDR Anderson Ogg	CDR James Small	31 Dec 19 ✓
Handheld X-ray Backscatter Technology	*Examine handheld X-ray backscatter technology and investigate previously unknown or untried techniques for operational use.*	CG-2 CG-721 CG-731	DHS S&T	LTJG Ryan Major	CDR James Small	Jan 20
Shipboard Transducer Tool	*Examine a Transducer Removal Tool to aid in the removal of hull-mounted transducers in a way that makes the process more efficient, reduces risk to the personnel removing the transducer, and reduces risk of damaging the hull seal making for safer and more efficient replacement.*	CG-45 SFLC	DHS S&T	LTJG Ryan Major	CDR James Small	Jan 20
K9 Equipment Limited User Evaluation	*Examine life-saving solutions for K9 companions to include K9 helmets with integrated hearing and eye protection and multi-purpose ballistic and hoist vests.*	CG-5R	DHS S&T	LTJG Ryan Major	CDR James Small	Feb 20
Laser Detection System for Small Boats	*Examine a laser detection system for small boats and investigate previously unknown or untried techniques for its operational use.*	CG-2 CG-5R CG-7	DHS S&T	LTJG Ryan Major	CDR James Small	Mar 20
Maritime Object Tracking Technology (MOTT) 1.75	*Finalize design as needed from drop testing, obtain ACCB clearance, and test/evaluate for operational use.*	CG-711 CG-721 CG-731	DHS S&T	LTJG Ryan Major	CDR James Small	Apr 20
Improved Aerial Deployment Methods for SVP	*Improve aerial deployment methods for SVP buoys and investigate previously unknown or untried techniques for operational use.*	IIP	DHS S&T	LTJG Ryan Major	CDR James Small	Apr 20
Mobile Tethered Video Systems	*Examine mobile tethered video systems and investigate previously unknown or untried techniques for operational use.*	CG-7 DCMS CG-5R	DHS S&T	LTJG Ryan Major	CDR James Small	May 20
Teleoperated RBS Proof Of Concept	*Summary of background information, test results, and conclusions relating to the teleoperated RBS proof of concept demonstration.*	CG-731	DHS S&T	LTJG Ryan Major	CDR James Small	May 20
Hydronalix Remotely Piloted Vessel	*Test the capabilities of lifesaving rescue robots technology and investigate previously unknown or untried techniques for operational use.*	CG-SAR DOL-3	DHS S&T	LTJG Ryan Major	CDR James Small	Jun 20

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil.

FY20 Short Term Analytical Support Efforts

Purpose: Provide short term analytical support to CG decision makers with a means to access quick, inexpensive analyses to investigate a wide range of technology issues relating to current or planned CG operations or procurements. Larger analytical support projects will typically require funding to cover the cost of RDC labor & overhead and other direct costs.

Branch	Title	Objective	Office Supported	RDC POC	CG-926 Domain Lead	Due/ Delivery Date
Aviation	**REACT Report: ESS Geo-Position Accuracy**	*The report will present conclusions concerning ESS geo-positioning accuracy as a function of calibration and maintenance actions performed and recommended re-calibration requirements.*	ALC ESD RW Air Stations CG-41 CG-711	Mr. Sean Lester	Mr. Scott Craig	Feb 20
Surface	**REACT Report: Rough Bar Illumination**	*Identify low weight and low power lighting and how this lighting can be installed onto the MLB platform to increase situational awareness during surf operations and rough bar escorts. The lights will enable crews to see the incoming waves and allow escorted vessels to better see the MLB to safely follow it through the rough bar conditions. Also investigate land based lighting and improved flares to illuminate rough bars.*	CG-731 to support Coast Guard 47' MLB fleet	Mr. Brian Dolph	LT Steve Hager	Jul 20

For more information, call (860) 271-2600 or e-mail RDC-Info@uscg.mil.