



Acquisition Directorate  
Research, Development, Test & Evaluation

# U.S. Coast Guard FY21 RDT&E Project Portfolio



UNCLAS | FY21 RDT&E Project Portfolio  
CG-926 RDC | A. Arsenault | October 2021

# Table of Contents | FY21 RDT&E Project Portfolio

Branch Area	Project #	Project	Status	Slide #
<b>Aviation</b>	7821	Airborne Counter Unmanned Aircraft Systems (C-UAS)	Completed	5
	7619	Autonomous Surface-Search Sensor for Manned Aircraft	Completed	6
	7815 (2021-02)	Advanced Maritime Counter-Unmanned Aircraft System (C-UAS) Technologies		7
	7820	Maritime Unmanned System Technology (MUST)		8
	7691	Beyond Visual Line of Sight (BVLOS) Technology for Coast Guard (CG) Unmanned Aircraft System (UAS) Operations <i>(Legislative Requirement)</i>		9
	99922122	FY21-22 Aviation Branch Support		10
<b>C5I</b> (Command, Control, Communications, Computers, Cyber, & Intelligence)	8120	Redefine Field Intelligence Reporting and Analysis	Completed	11
	8502	Cybersecurity Vulnerabilities, Threats, and Risk Mitigation Strategies for Coast Guard Surface and Air Assets	Completed	12
	7812	Maritime Counter Unmanned Aircraft Systems (C-UAS)	Completed	13
	8119 (2020-20)	High Frequency (HF) Radar		14
	8504 (2021-04)	Mission-Specific Long-Range Communication Analysis		15
	5602 (2021-01)	Modernizing Law Enforcement Encounter Background Checks at Sea		16
	99912122	FY21-22 Command, Control, Communications, Computers, Cyber, & Intelligence (C5I) Branch Support		17
<b>E&amp;W</b> (Environment & Waterways)	47041	Freshwater In-Situ Oil Burn Research <i>(Oil Spill Liability Trust Fund &amp; Great Lakes Restoration Initiative funding)</i>		18
	4711	Advancing UAS and AUV Capabilities to Characterize Water Column and Surface Oil in Ice Environments <i>(Oil Spill Liability Trust Fund funding)</i>		19
	1008	Survival Modeling, Reporting, and Statistics		20
	1205	Mass Rescue Life Saving Appliance (MRLSA)		21
	4204 (2021-20)	Behavior of Diluted Bitumen (Dilbit) in Fresh Water <i>(Great Lakes Restoration Initiative funding)</i>		22
	4135	Ballast Water Management (BWM) Research and Development <i>(Great Lakes Restoration Initiative funding)</i>		23



# Table of Contents | FY21 RDT&E Project Portfolio

Branch Area	Project #	Project	Status	Slide #
<b>E&amp;W</b> (Environment & Waterways) <i>Continued</i>	2703	Next Generation Aids to Navigation Buoys & Alternative Moorings		24
	4710	Nearshore and Inland Evaluation of the Estimated Recovery System Potential (ERSP) Calculator <i>(Oil Spill Liability Trust Fund funding)</i>		25
	99932122	FY21-22 Environment & Waterways (E&W) Branch Support		26
<b>ITNET</b> (IT & Networks)	58041	CG Nearshore Use of FirstNet <i>(Continuation from FY20)</i>	Completed	27
	8702	Evaluate Network Accelerator Technology to Improve Cutter Information Technology (IT) Performance		28
	8701	Automatic Identification System (AIS) Cyber Security		29
	8503	Radio Frequency (RF) Communications in a Cloud Environment		30
	8704 (2021-08)	Operational Mobile Technology Architecture		31
	8705 (2021-03)	High Latitude Underway Connectivity		32
	8703	Evaluation and Testing of VHF Data Exchange System (VDES) Impacts on the Automatic Identification System (AIS)		33
	8107	Extended Reality (XR) Capabilities for Coast Guard Mission Support		34
	99982122	FY21-22 IT & Networks (ITNET) Branch Support		35
<b>MSA</b> (Modeling, Simulation, & Analysis)	7529	Research into Navigational Safety Risk Modeling and Analysis Tool	Completed	36
	7401	Machine Learning Platforms to Improve Coast Guard Tools	Completed	37
	9204	Condition-Based Maintenance (CBM) for Coast Guard Asset Product Lines		38
	7937	Incorporating Sensor Performance in SAROPS		39
	7402 (2021-15)	Applications of Robotic Process Automation		40
	8206 (2021-22)	Cognitive Training for High Risk Operators <i>(New)</i>		41
	99972122	FY21-22 Modeling, Simulation, & Analysis (MSA) Branch Support		42



# Table of Contents | FY21 RDT&E Project Portfolio

Branch Area	Project #	Project	Status	Slide #
Surface	62102	Arctic Technology Evaluation 2019 - 2020	Completed	43
	7210	Low-Cost MDA Pilot <i>(Legislative Requirement)</i>	Completed	44
	5807	Drug and Explosives Detection Technologies		45
	9205 (2021-11)	Cold Spray Restoration of Vessel and Aircraft Components		46
	1202 (2021-16)	Enhanced Rotary Wing Night Vision Goggle (NVG) Searches		47
	5922	Counter Unmanned Underwater Vehicle (C-UUV)/Anti-Swimmer Technology		48
	62103	Polar Regions Technology Evaluation 2021 - 2022		49
	5507	Bromine-Free Water Purification System <i>(Legislative Requirement)</i>		50
	99942122	FY21-22 Surface Branch Support		51
STIC (Science & Technology Innovation Center)	99953	Science & Technology Innovation Center (CG-STIC) Tasks <i>(U.S. Department of Homeland Security Science and Technology Directorate funding)</i>		52
	99952122	FY21-22 Science & Technology Innovation Center (STIC) Branch Support		54





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

- 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 technologies 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.



**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.

**Project Start:**

**Project Timeline / Key Milestones**

Please e-mail [RDC-Info@uscg.mil](mailto:RDC-Info@uscg.mil) for information concerning the Milestones and Deliverable Schedule.

**Project Completion:**

<b>Sponsor:</b> CG-711	<b>Stakeholder(s):</b> CG-41, CG-711, CG-26, CG-68, CG-5R, ALC
<b>RDC Research Lead:</b> C-UAS Research Team	<b>CG-926 Domain Lead:</b> C-UAS Research Team
<b>Anticipated Transition:</b> Knowledge Product <i>Future Technology</i>	



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

- Objectives**
- Update market research on autonomous sensor systems for maritime search.
  - Determine the potential for autonomous surface-search sensor integration on U.S. Coast Guard (CG) rotary wing assets.
  - Expand the CG’s existing autonomous sensor performance data set.
  - Model the impact of executing search missions with an autonomous sensor package.



**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.

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

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

**Anticipated Transition:** Knowledge Product  
Future Technology

**Project Start:** 1 Oct 19

Autonomous Sensor Technology Update	18 May 20 ✓
Autonomous Surface-search Sensor Performance Data Update	16 Jun 20 ✓
Integration Hardware/Software Engineering Complete	19 Aug 20 ✓
Mission Performance Modeling Complete	19 Aug 20 ✓
<b>Autonomous Surface Search Sensor for CG Rotary Wing Assets (Brief)</b>	<b>12 Jan 21 ✓ ★</b>

**Project Completion:** 12 Jan 21

**Project Timeline / Key Milestones**

Completed

# Advanced Maritime Counter-Unmanned Aircraft System (C-UAS) Technologies

7815

**Mission Need:** Operationally effective C-UAS force protection capability.

- Objectives**
- Assess new developments in kinetic C-UAS solutions in the open market and with other government agencies as technologies mature.
  - Automate object detection and classification based on Electro-Optical/Infrared camera data by collaborating with optics companies to incorporate additional sensor modalities to aid UAS detection and target discrimination.
  - Explore applicability of data fusion algorithms and machine learning to combine multiple data types into single threat track to reduce operator workload, uncertainty, and response time.
  - Provide technical guidance on system employment for various mission sets based on legal authority and tactics, techniques, and procedures.



**Notes**

- Follow-on for U.S. Coast Guard (CG) Research and Development Center Project 7812: Maritime Counter Unmanned Aircraft Systems.

**Sponsor:** CG-MSR      **Stakeholder(s):** CG-711, CG-721, CG-751, LANT-3, PAC, D1, NSWC Dahlgren, AFRL, ONR, CGCYBER

**RDC Research Lead:** C-UAS Research Team      **CG-926 Domain Lead:** C-UAS Research Team

**Anticipated Transition:** Product  
*Fielded Prototype*

**Project Start:**

**Project Timeline / Key Milestones**

Please e-mail [RDC-Info@uscg.mil](mailto:RDC-Info@uscg.mil) for information concerning the Milestones and Deliverable Schedule.

**Project Completion:**



## Mission Need: Persistent maritime domain awareness using AUSVs.

### Objectives

- Assess potential employment options using Autonomous Underwater and Surface Vehicles (AUSV) to support U.S. Coast Guard (CG) mission areas. Using modeling and simulation techniques, assess AUSV Concept of Operations, including:
  - Effectiveness of single and multiple AUSVs; and
  - Effectiveness of AUSV and unmanned aerial system teaming.
- Inform field testing using modeling analysis results.



### Notes

- Partner with the U.S. Department of Homeland Security (DHS) Science, Technology Directorate (S&T) Borders, Immigration and Maritime (BIM), U.S. Naval Research Laboratory, Naval Undersea Warfare Center, Naval Surface Warfare Center – Dahlgren Division.

### Project Timeline / Key Milestones

<b>Project Start:</b> 1 Oct 19	
In House or Contracted Modeling KDP	23 Sep 20 ✓
Vehicle Operations and Control Training	20 Jun 21 ✓
Contract for Modeling Effort Established	14 Sep 21 ✓
Model Scope and Application Software Established	Oct 21
<b>MUST – Modeling Progress Status (Brief)</b>	<b>Dec 21 ★</b>
MUST – Modeling Effort Contract Completed	Nov 22
<b>MUST – Model Simulation Results (Brief)</b>	<b>Dec 22 ★</b>
<b>MUST – FY23 Test &amp; Evaluation Progress Update (Brief)</b>	<b>Jun 23 ★</b>
Support for DHS MUST Operational Testing Completed	Sep 23
<b>Maritime Unmanned System Technology (Report)</b>	<b>Nov 23 ★</b>
<b>Project Completion:</b> Nov 23	

**Sponsor:** DHS S&T BIM, CG-26      **Stakeholder(s):** CG-721, CG-MLE, CGCYBER

**RDC Research Lead:** Mr. Ross Vassallo      **CG-926 Domain Lead:** Mr. Scott Craig

**Anticipated Transition:** Knowledge Product, Future Technology





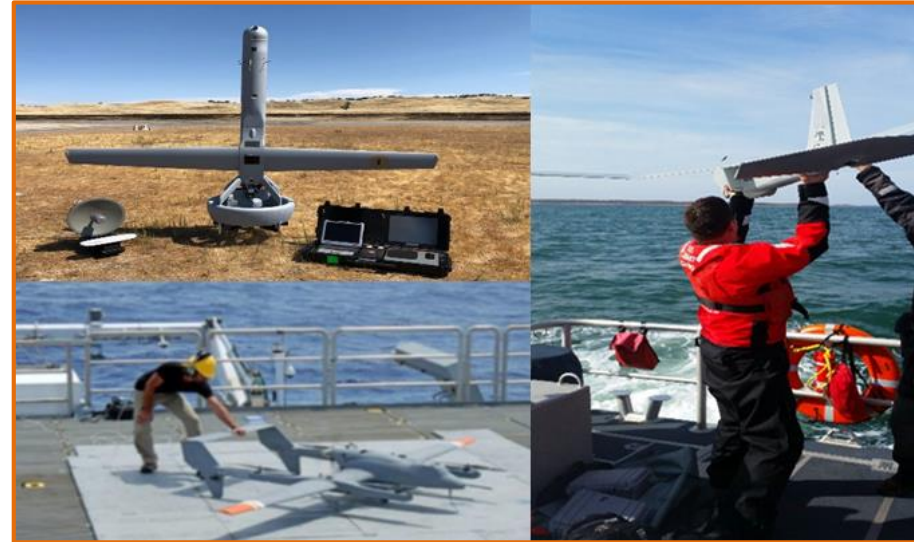
# Beyond Visual Line of Sight (BVLOS) Technology for Coast Guard (CG) Unmanned Aircraft System (UAS) Operations

7691

## Mission Need: BVLOS operations for CG UAS.

### Objectives

- Leverage U.S. Southern Command (SOUTHCOM), Joint Inter Agency Task Force-South (JIATF-S), and Navy Research Laboratory (NRL) efforts to explore Medium Range UAS (MR-UAS) Vertical Takeoff and Landing (VTOL) operations from a CG Cutter (CGC).
- Integrate Detect and Avoid (DAA) technologies for conducting BVLOS operations [sUAS 1st].
- Conduct land and vessel based evaluations using DAA technology [sUAS 1st].
- 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.
- Conduct a land based Medium Range-UAS Search and Rescue (SAR) demonstration, followed by a Limited User Evaluation (LUE) onboard a CGC.



### Notes

- Legislative requirement.
- Establish Memoranda of Understanding and Cooperative Research and Development Agreements as necessary with industry partners.
- Leverage efforts of the U.S. Southern Command (SOUTHCOM), Federal Aviation Administration, National Oceanic and Atmospheric Administration, Joint Interagency Task Force South (JIATF-S), U.S. Navy 4th Fleet and other government agencies.

**Sponsor:** CG-711

**Stakeholder(s):** CG-751, CG-931, SOUTHCOM, JIATF-S, U.S. Naval Research Laboratory, CGCYBER

**RDC Research Lead:**  
Mr. Stephen Dunn

**CG-926 Domain Lead:**  
Mr. Scott Craig

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

### Project Timeline / Key Milestones

**Project Start:** 13 Mar 19

<b>MR-UAS VTOL Operations from a CGC (Brief)</b>	<b>9 Nov 20</b> ✓ ★
BVLOS Technologies Integrated into Small UAS (sUAS) Complete	Apr 22
<b>Detect and Avoid Technologies Integration (Brief)</b>	<b>May 22</b> ★
Land Based BVLOS Tech Demo with sUAS Complete	Jul 22
Vessel Based BVLOS Tech Demo with sUAS Complete	Jan 23
<b>Land / Vessel sUAS BVLOS Demonstrations (Brief)</b>	<b>Mar 23</b> ★
BVLOS Technology MR-UAS VTOL Integration Complete	Aug 23
BVLOS MR-UAS VTOL SAR Demonstration Complete	Nov 23
Vessel Based BVLOS MR-UAS VTOL Limited User Evaluation Complete	Dec 23
<b>Beyond Visual Line of Sight UAS Operations (Report)</b>	<b>Mar 24</b> ★
<b>Project Completion:</b> Mar 24	



**Acquisition Directorate**  
Research & Development Center



CG Research & Development Center  
UNCLAS//Internet Release is Authorized

Indicates RDC Product ★

October 2021 9

**Mission Need:** Maintain competency/knowledge; provide rapid response; and external liaison.

**Objectives**

- Maintain U.S. Coast Guard (CG) Research and Development Center (RDC) competency and technical knowledge in understanding present and future aviation and test and evaluation technology/systems including: manned and Unmanned Aircraft Systems (UAS), mission analysis, wide area surveillance, search and rescue, and persistent/strategic Maritime Domain Awareness (MDA).
- Maintain Branch infrastructure to support CG RDC portfolio objectives.
- Support Aviation Strategic Project Portfolio Alignment and CG DCO/DCMS Research Priorities.
- Provide expert input to CG stakeholders regarding aviation technologies.
- Foster continued relationships with CG sponsors/stakeholders and external U.S. Department of Defense labs, U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T), and other government agency/academic partners.
- Provide service academy, Historically Black College or University, and Minority serving Institution students internship opportunities.



**Notes**

- Virtual Industry Day coordination for the Primus 700 Radar Replacement.
- Lead for Bear Trap enhanced MDA effort with District 11.
- Nexus for research and development unmanned efforts.
- Participating in CG Unmanned Systems Integrated Product Team (IPT).
- Participating in Medium Range UAS IPT and Small UAS Work Group.
- Partnered with Air Force Research Laboratory Agility Prime Electric Vertical Takeoff And Landing aircraft work.

<b>Sponsor:</b> CG-926	<b>Stakeholder(s):</b> CG-41, CG-711, CG-721, CG-931, CG-SAR, ALC, DHS S&T
<b>RDC Research Lead:</b> Mr. Sean Lester	<b>CG-926 Domain Lead:</b> Mr. Scott Craig

**Anticipated Transition:** Various

<b>Project Timeline / Key Milestones</b>	<b>Project Start:</b> Ongoing	
	CG District 11 MDA "Bear Trap" Support	1 Apr 21 ✓
	Primus 700 Radar Replacement Industry Day Coordination Complete	1 Jul 21 ✓
	Assist with Group-1 UAS Prototype Program Initiative (GUPPI) Refresh Evaluation	Dec 21
<b>Project Completion:</b> Ongoing		



# Redefine Field Intelligence Reporting and Analysis

8120

**Mission Need:** Improved information dominance in the maritime domain.

**Objectives**

- Automate analysis of field intelligence reports by leveraging cutting edge human language tools, artificial intelligence, machine learning and other analytical tools.
- Enable shorter feedback loops with relevant, timely, and predictive intelligence for CG decision makers by utilizing government cloud technology.



**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, and U.S. Immigrations and Customs Enforcement Homeland Security Investigations.

Completed

**Sponsor:** CG-25

**Stakeholder(s):** CG-26, CG-68, CG-5R, CG-CYBER, CG-761, CG-CI, CG-CGIS, ICC, MIFCPAC, MIFCLANT

**RDC Research Lead:**  
LT Anne Newton

**CG-926 Domain Lead:**  
Ms. Holly Wendelin

**Anticipated Transition:** Product  
*Pending Acquisition*

**Project Timeline / Key Milestones**

<b>Project Start:</b> 1 Oct 19	
Field Collector Summit Complete	22 Jan 20 ✓
Intelligence Collection Unit Visits Complete	5 Mar 20 ✓
Research Functional Characteristics and Processes	27 Mar 20 ✓
Complete Prototype	31 May 20 ✓
Limited User Evaluation Complete	30 Sep 20 ✓
<b>Redefine Field Intelligence Reporting and Analysis (Report)</b>	<b>25 Feb 21 ✓ ★</b>
<b>Project Completion:</b> 25 Feb 21	



**Acquisition Directorate**  
Research & Development Center



CG Research & Development Center  
UNCLAS//Internet Release is Authorized

Indicates RDC Product ★  
October 2021 11



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

8502

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

- 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.
  - Perform a cyber assessment on a CG asset to identify vulnerabilities, threats and risk mitigation strategies.
  - Develop and test a cyber risk mitigation solution that could be used to recover compromised operational technology systems on CG surface and air assets.



- 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.

**Sponsor:** CG-791      **Stakeholder(s):** CG-761, CG-711, CG-751, CG-933, C5ISC, CYBERCOM

**RDC Research Lead:** Mr. Robert Taylor      **CG-926 Domain Lead:** Ms. Holly Wendelin

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

**Project Timeline / Key Milestones**

<b>Project Start:</b> 3 Oct 16	
Inventory and Acquire GPS/AIS Units Complete	22 Dec 16 ✓
GPS/AIS Testing Complete	22 Jul 17 ✓
Inventory of Surface Systems for Evaluation Complete	26 Oct 17 ✓
<b>GPS/AIS Cyber Assessment (Report)</b>	<b>22 Feb 18 ✓ ★</b>
Surface Asset Assessment Complete	5 Apr 18 ✓
Cyber Risk Mitigation Systems Research Complete	31 Oct 18 ✓
CG Surface Asset for Cyber Risk Mitigation Selected	18 Dec 19 ✓
Cyber Risk Mitigation Strategy in Lab Environment Complete	29 Jun 20 ✓
Cyber Risk Mitigation Demonstration on CGC Complete	2 Sep 20 ✓
<b>Cybersecurity for Coast Guard Surface and Air Assets (Report &amp; Brief)</b>	<b>9 Jul 21 ✓ ★</b>
<b>Project Completion:</b> 9 Jul 21	



**Mission Need:** Detect, track, identify, and defeat illicit use of UAS in the maritime environment.

- Objectives**
- Inform requirements for C-UAS for the U.S. Coast Guard (CG) Ports, Waterways, and Coastal Security (PWCS) and Defense Readiness missions.
  - Establish functional characteristics by evaluating 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.



- Notes**
- This effort leverages 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.

**Project Start:**

**Project Timeline / Key Milestones**

Please e-mail [RDC-Info@uscg.mil](mailto:RDC-Info@uscg.mil) for information concerning the Milestones and Deliverable Schedule.

**Project Completion:**

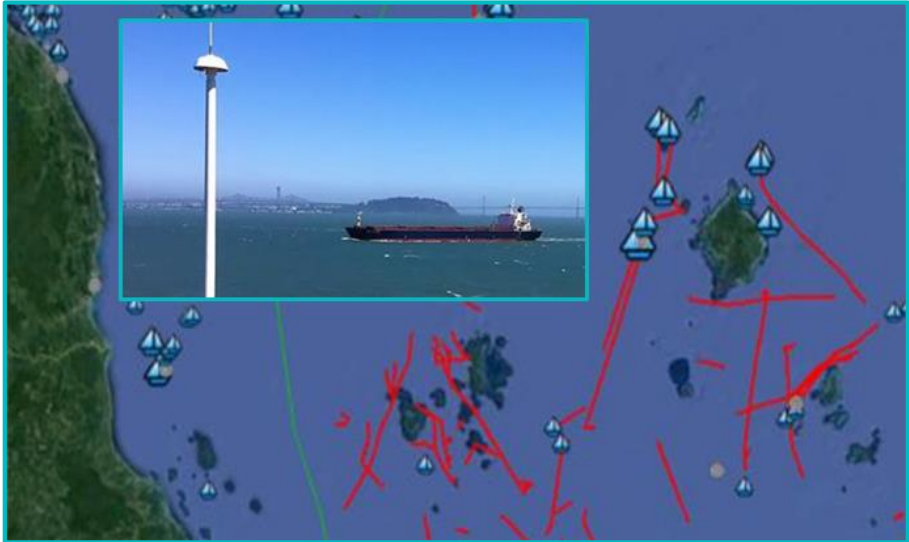
<b>Sponsor:</b> CG-MSR	<b>Stakeholder(s):</b> CG-711/731/721/751/2/6, DCMS-34, C5ISC, SFLC, AREA-3, DARPA, DHS S&T
<b>RDC Research Lead:</b> C-UAS Research Team	<b>CG-926 Domain Lead:</b> C-UAS Research Team
<b>Anticipated Transition:</b> Product <i>Fielded Prototype</i>	

# High Frequency (HF) Radar

8119

**Mission Need:** Enhance Maritime Domain Awareness (MDA) in the U.S. Exclusive Economic Zone (EEZ).

- Objectives**
- Assess High Frequency Surface Wave Radar (HFSWR) tracking and communications capabilities of existing systems with government and commercial partners.
  - Evaluate HFSWR applicability to U.S. Coast Guard (CG) missions through a technology demonstration with partner organizations at an established site.
  - Investigate the data fusion analysis framework for possible CG integration and transition with the Maritime Intelligence Fusion Centers (MIFC).
  - Identify the locations with greatest utility and return on investment for potential fielding of HFSWR to enhance MDA within the EEZ.



- Notes**
- Partnership opportunities include the National Oceanic and Atmospheric Administration, Naval Postgraduate School, the U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) - Borders, Immigration and Maritime (BIM), Naval Research Laboratory (NRL), U.S. Southern Command (SOUTHCOM), Joint Interagency Task Force-South (JIATF-S), and the Commander, USN 4th Fleet Science Advisor.

**Sponsor:** CG-761      **Stakeholder(s):** MIFC, CG-26/68/741/933, C5ISC, LANT/PAC-6, DHS S&T BIM, SOUTHCOM, JIATF-S

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

**Anticipated Transition:** Knowledge Product  
Future Technology

**Project Timeline / Key Milestones**

<b>Project Start:</b> 1 Oct 20	
Completed HFSWR Capabilities Research	17 Mar 21 ✓
NRL Completed HF Data Collection, Analysis, and Report	3 Aug 21 ✓
<b>High Frequency Radar Capabilities for MDA (Brief)</b>	<b>Oct 21</b> ★
Technology Demonstration	May 22
Applicability to CG Missions Identified	Aug 22
<b>High Frequency Surface Wave Radar for CG Operations (Report &amp; Brief)</b>	<b>Jan 23</b> ★
<b>Project Completion:</b> Jan 23	



**Acquisition Directorate**  
Research & Development Center



CG Research & Development Center  
UNCLAS//Internet Release is Authorized

Indicates RDC Product ★  
October 2021 14

**Mission Need:** Long-range communication options ranked for each mission set and environment.

**Objectives**

- Determine an optimized list of long range communications (LRC) options for each U.S. Coast Guard (CG) mission in each area of operation, met with available or near term available equipment. This will be accomplished by:
  - Identifying baseline, new, and emerging long-range communications options to include technologies such as:
    - Low, medium, and High Frequency (HF).
    - Satellite communications.
    - 3G/4G/5G automatic link establishment.
  - Developing a comprehensive matrix assessing those technologies for applicability by mission or geographic area including technical performance and resource burden.
  - Conducting testing or demonstration of the most relevant technologies and assess value added compared to baseline capability.



**Notes**

- Leverage CG-761-developed Capabilities Based Assessment on current state of U.S. Coast Guard long-range communications.
- Partner with Naval Postgraduate School on a proposed thesis analyzing (1) Digital Radio Mondiale as an HF communications capability with encryption requirements, and (2) a new HF Internet Protocol under development.
- Collaborate with U.S. Naval Forces Southern Command (SOUTHCOM), U.S. Navy 4th Fleet, Joint Interagency Task Force-South (JIATF-S), and leverage experimentation work by U.S. Department of Defense research laboratories.

**Sponsor:** CG-761      **Stakeholder(s):** CG-68/751/791, C5ISC, CGCYBER, JIATF-S, AREA-6, SOUTH/FORCE/COMM COM, ALC

**RDC Research Lead:** Mr. Mark Wiggins      **CG-926 Domain Lead:** Ms. Holly Wendelin

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

**Project Timeline / Key Milestones**

<b>Project Start:</b> 1 Oct 20	
Complete Long Range Communications Requirements Analysis	1 Jun 21 ✓
Complete and Brief Sponsor on USCG Baseline Long Range Communications Capabilities Analysis and Verification Study	Jan 22
Complete Long-Range Communications Matrix	Feb 22
<b>Mission-Specific Long-Range Communications Analysis (Brief)</b>	<b>Mar 22 ★</b>
Complete Technology Demonstration	Nov 22
<b>Mission-Specific Long-Range Communications Analysis (Report)</b>	<b>Jan 23 ★</b>
<b>Project Completion:</b> Jan 23	





# Modernizing Law Enforcement Encounter Background Checks at Sea

**Mission Need:** Real-time, relevant information to the boarding team.

**Objectives**

- Improve the current process for Law Enforcement personnel to enable faster and more accurate results delivered on-scene directly to the Boarding Officer by building and deploying a prototype in the field to be evaluated by Boarding Officers and Intelligence Coordination Center (ICC) Coastwatch experts.
- Ensure alignment of efforts for modernization and compatibility with the new mobile MISLE application called ENFORCE.
- Enable a modernized, “plug-in” process for the background check functionality within the new ENFORCE mobile application.

**Notes**

- Partner with the National Urban Security Technology Laboratory, U.S. Department of Homeland Security Criminal Investigation and Network Analysis Center of Excellence, Transportation Security Administration, and U.S. Customs and Border Protection to explore technologies being used.

**Sponsor:** CG-MLE      **Stakeholder(s):** CG-26, CG-25, ICC, CG-MSR, CG-721, CG-761, C5ISC, LANT/PAC-6, CGIS, CGCYBER

**RDC Research Lead:** Ms. Lauren Eberly      **CG-926 Domain Lead:** Ms. Holly Wendelin

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



<b>Project Timeline / Key Milestones</b>	<b>Project Start:</b> 1 Oct 20	
	Market Research Complete	28 May 21 ✓
	<b>Modernizing Law Enforcement Background Checks at Sea (Brief)</b>	<b>8 Jul 21 ✓ ★</b>
	Selected COA	7 Oct 21 ✓
	Develop Prototype Background Check Plug-in	Feb 23
	Prototype Testing Completed	Apr 23
	<b>Modernizing Law Enforcement Encounter Background Checks at Sea (Report)</b>	<b>Aug 23 ★</b>
<b>Project Completion:</b> Aug 23		



# FY21-22 Command, Control, Communications, Computers, Cyber, & Intelligence (C5I) Branch Support

99912122

**Mission Need:** Maintain competency/knowledge; provide rapid response; and external liaison.

## Objectives

- Maintain U.S. Coast Guard (CG) Research and Development Center (RDC) competency and technical knowledge in understanding present and future C5I systems, including: radio frequency communications, electronic navigation systems, software defined radios, cyber security systems, spectrum management, and sensors.
- Maintain Branch infrastructure to support RDC portfolio objectives.
- Support C5I Strategic Project Portfolio Alignment and CG DCO/DCMS Research Priorities.
- Provide expert input to CG stakeholders regarding C5I technologies.
- Foster continued relationships with CG sponsors/stakeholders and external U.S. Department of Defense labs, U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T), and other government agency/academic partners.
- Provide service academy, Historically Black College or University, and Minority Serving Institution students internship opportunities.



## Notes

- Continue to provide Extended Reality subject matter expertise and technical support for HoloLens2 devices in support of RDC ITNET Branch.
- Bear Trap enhanced Maritime Domain Awareness (MDA) effort with District 11.
- Conduct Light Emitting Diode (LED) Electromagnetic Interference Rapid Evaluation & Analysis of Critical Technologies (REACT) effort to determine effects of LED lights on other electronic equipment.
- Complete a large-scale FirstNet evaluation at Sector San Francisco, including deployment at the sector, stations, air station, cutters & boats.

**Sponsor:** CG-926

**Stakeholder(s):** CG-2, CG-6, CG-7, CG-933, C5ISC, CGCYBER, DHS S&T

**RDC Research Lead:**  
Ms. Amy Cutting

**CG-926 Domain Lead:**  
Ms. Holly Wendelin

**Anticipated Transition:** Various

## Project Timeline / Key Milestones

**Project Start:** Ongoing

Low Cost MDA Fusion Center	15 Dec 20 ✓
CG District 11 MDA "Bear Trap" Support	1 Apr 21 ✓
LED REACT Testing	30 Apr 21 ✓
<b>Testing for EMC/RFI Emissions of LED Navigation Lights and Susceptibility Levels for Marine Radionavigation Receivers (REACT Report)</b>	<b>30 Aug 21 ✓ ★</b>
FirstNet Deployment – Sector San Francisco Units	30 Sep 21 ✓
FirstNet Sector Evaluation	Mar 22

**Project Completion:** Ongoing



**Acquisition Directorate**  
Research & Development Center



CG Research & Development Center  
UNCLAS//Internet Release is Authorized

Indicates RDC Product ★  
October 2021 17

**Mission Need:** Improve In-Situ Burn (ISB) knowledge base to supplement oil spill response options.

**Objectives**

- Evaluate best practices for operational use of ISB in multiple environments, including fresh water and areas with vegetation.
- Develop methods to conduct ISB smoke-plume monitoring that improve sampling accuracy and responder safety.
- Provide reference guidance for Federal On-Scene Coordinator and Regional Response Team (RRT) use.



**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.

**Sponsor:** EPA Great Lakes Nat'l Program Office, CG-MER

**Stakeholder(s):** CG-721, NSF, EPA, BSEE, D9, RRT5

**RDC Research Lead:**  
Benedette Adewale, PhD

**CG-926 Domain Lead:**  
Ms. Karin Messenger

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

**Project Timeline / Key Milestones**

<b>Project Start:</b> 1 Oct 18	
Mesoscale Freshwater Burns Complete	19 Jul 19 ✓
Large-scale Freshwater Burns Complete	25 Oct 19 ✓
<b>Freshwater In-Situ Oil Burning (Report)</b>	<b>16 Feb 21 ✓ ★</b>
Remote Air Monitoring Market Research Complete	17 Feb 21 ✓
Remote Air Monitoring Process Framework Complete	11 Mar 21 ✓
Test Plan for Remote Air Monitoring Complete	22 Apr 21 ✓
Air Monitoring During Freshwater ISB	Oct 21
<b>Freshwater In-Situ Burning Air Monitoring (Report)</b>	<b>May 22 ★</b>
<b>Project Completion:</b> May 22	

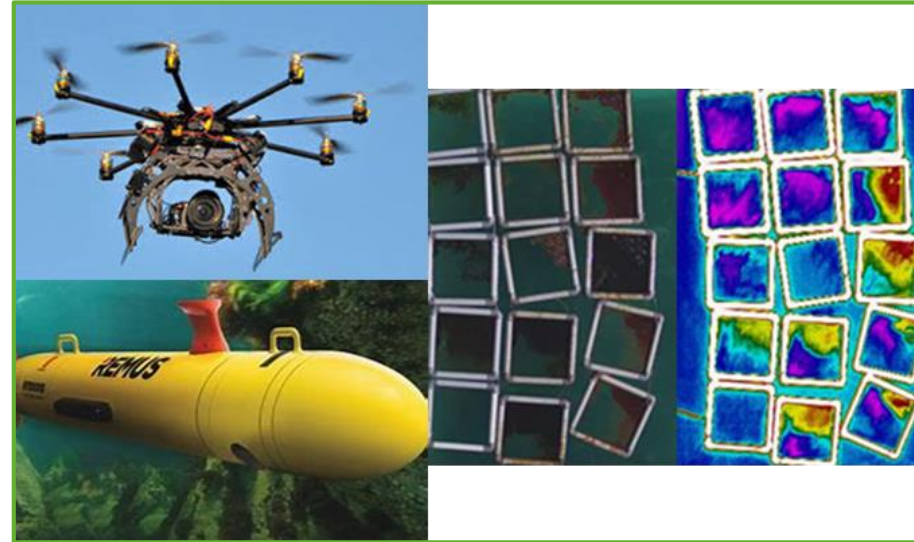


# Advancing UAS and AUV Capabilities to Characterize Water Column and Surface Oil in Ice Environments

4711

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

- Objectives**
- Coordinate and conduct multi-agency lab and field tests to gain better understanding of aerial and underwater sensor capability in characterizing oil on the surface or in the water column in ice conditions.
  - Determine remote vehicle telemetry capability to transfer sensor data to on-scene responders or Incident Command as actionable information.



- Notes**
- Oil Spill Liability Trust Fund funding.
  - Partnerships with the Cold Regions Research and Engineering Laboratory (CRREL), Woods Hole Oceanographic Institute (WHOI), U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) Office of University Programs (OUP), National Oceanic and Atmospheric Administration's (NOAA) Office of Response and Restoration (OR&R), Bureau of Safety and Environmental Enforcement, and U.S. Environmental Protection Agency.

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

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

**Anticipated Transition:** Product  
*Fielded Prototype*

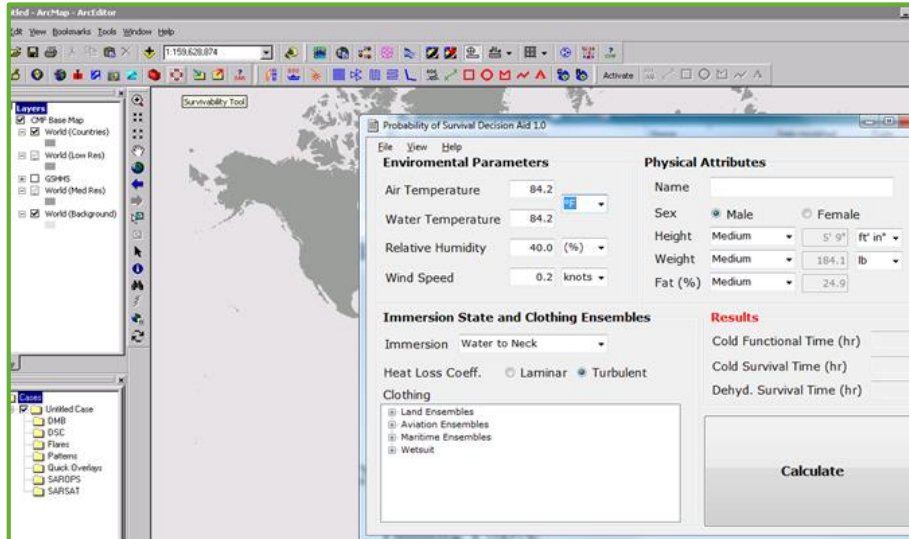
**Project Timeline / Key Milestones**

<b>Project Start:</b> 23 Jan 20		
Interagency Reimbursable Work Agreement with NOAA Complete	3 Jun 20	✓
Phase 1: Unmanned Aircraft System (UAS)/Autonomous Underwater Vehicle (AUV) Tests at CRREL Complete	23 Apr 21	✓
<b>UAS and AUV Characterization of Oil in Ice; Laboratory Results And Way Ahead (Brief)</b>	<b>6 Jul 21</b>	✓ ★
Field Exercise Planning Complete	Nov 21	
<b>UAS/AUV Lab Experiments Results (Report)</b>	<b>Dec 21</b>	★
Phase 2: UAS/AUV Systems Field Testing in Great Lakes or Arctic Complete	Dec 21	
Data Schema for Data Export Complete	Mar 22	
<b>UAS/AUV Systems Field Exercise Integration (Report)</b>	<b>May 22</b>	★
<b>Project Completion:</b> May 22		



**Mission Need:** Improve SAROPS utility by incorporating better survival modeling and statistics.

- Objectives**
- Improve Search and Rescue survival decision tools by incorporating methods that better account for survival time in warmer water (15°C (59°F)) and incorporating survival factors beyond heat production and heat loss.
  - Develop a dynamic database to validate model(s) against statistics, and permit model fine-tuning as the database grows.
  - Provide the Search and Rescue program an easily-integrated survival module that allows two-way compatibility with existing Search and Rescue Optimal Planning System (SAROPS) processes.



- Notes**
- Carries forward U.S. Coast Guard (CG) Research and Development Center survival-related work with U.S. Department of Defense labs (John Hopkins University/Applied Physics Lab).
  - Explore partnerships with National Labs and University Centers including the U.S. Naval Experimental Diving Unit (NEDU), U.S. Army Research Institute of Environmental Medicine (USARIEM), and U.S. Navy Clothing and Textile Research Facility.

<b>Sponsor:</b> CG-SAR	<b>Stakeholder(s):</b> CG-5R, CG-761, C5ISC
<b>RDC Research Lead:</b> Ms. Monica Cisternelli	<b>CG-926 Domain Lead:</b> Ms. Karin Messenger
<b>Anticipated Transition:</b> Knowledge Product <i>Influence Tactics, Techniques, &amp; Procedures</i>	

**Project Start:** 1 Nov 17

<b>Project Timeline / Key Milestones</b>	Investigated Requirements and Applications	30 Apr 18 ✓
	Investigated State of Survival Models	6 Jul 19 ✓
	Conducted Facilitated Workshop	28 Aug 19 ✓
	Completed Survival Statistics Brief	16 Dec 19 ✓
	Completed Key Decision Point to Progress to Model Implementation	2 Sep 20 ✓
	<b>Enhanced USCG Survival Model and Implementation (Brief)</b>	<b>30 Nov 20 ✓ ★</b>
	Complete USARIEM Clothing Studies	Oct 21
	Complete NEDU Immersion Tests	Jun 22
	<b>Enhanced USCG Survival Model and Implementation Guidance (Report)</b>	<b>Jul 22 ★</b>
	<b>Project Completion:</b> Jul 22	





# Mass Rescue Lifesaving Appliance (MRLSA)

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

**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.



**Notes**

- Partnership with Air Force Research Laboratory.
- U.S. Department of Homeland Security (DHS) Science & Technology (S&T) funded Broad Agency Announcement for prototype development.
- Investigate National Aeronautics and Space Administration or other government agency partnership.

**Project Start:** 1 Oct 19

Request for Information/Technology Assessment Complete	1 Mar 20 ✓
<b>MRLSA: Market Research Summary (Report)</b>	<b>13 May 20 ✓ ★</b>
Industry Day Webinar Complete	25 May 21 ✓
DHS Issues BAA	21 June 21 ✓
Interim Brief Complete	28 Sep 21 ✓
Prototype Development Complete	Jul 22
<b>Mass Rescue Lifesaving Appliance (Report)</b>	<b>Sep 22 ★</b>
<b>Project Completion:</b> Sep 22	

**Sponsor:** CG-SAR      **Stakeholder(s):** DHS S&T, CG-711, CG-731, CG-751

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

**Anticipated Transition:** Product  
*Fielded Prototype*

**Mission Need:** Enhanced decision-making for response to dilbit spills in the fresh water environment.

**Objectives**

- Provide the U.S. Coast Guard (CG) Federal On-Scene Coordinators with decision-making guidance as they relate to the fate and transport of dilbit in the freshwater environment.
- Study the behavior (density and weathering) and response tools of dilbit spills in the freshwater environment.



**Notes**

- Supported by Great Lakes Restoration Initiative funding.
- Leverage CG Research and Development Center Project 4705: Oil Sands Products Spill Response.
- Collaborate with the International Institute for Sustainable Development's Experimental Lakes Area and U.S. Department of Energy labs.

**Sponsor:** CG-MER, D9      **Stakeholder(s):** EPA Great Lakes Nat'l Program Office/Pollution Response Office, LANT-54, NOAA

**RDC Research Lead:** Benedette Adewale, PhD      **CG-926 Domain Lead:** Ms. Karin Messenger

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

**Project Start:** 1 Oct 20

Literature Review Complete	12 Feb 21 ✓
<b>Literature Review – Diluted Bitumen in the Fresh Water Environment (Report)</b>	<b>23 Jun 21 ✓ ★</b>
Dilbit Test Plan Complete	30 Sep 21 ✓
CRREL Dilbit Weathering Cold Weather Test Complete	Nov 21
CRREL Dilbit Weathering Warm Weather Test Complete	Jul 22
Dilbit Oil Analysis Complete	Sep 22
<b>Guidance Document - Behavior of Diluted Bitumen in the Fresh Water Environment (Report)</b>	<b>Dec 22 ★</b>
<b>Project Completion:</b> Dec 22	

**Mission Need:** Reduce Nonindigenous Invasive Species (NIS) transport risks in U.S. waters by vessel.

**Objectives**

- Determine the most practical BWM practices for Laker operators to reduce the risks of transporting NIS from one region of the Great Lakes (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 (BWMS) Type Approval (TA).
- Provide a tested Ballast Water Discharge Standard (BWDS) compliance tool to the field.
- Provide robust, science-based, shipboard-test technical protocols to validate IL test programs.
- Assess CG’s Ballast Water Management Regulatory Program.

**Notes**

- FY18-FY20 Great Lakes Restoration Initiative funding (DW-070-95926401-0), (DW-070-20000108-0), (DW-70-95953301-0).
- Collaboration with Naval Research Laboratory.
- Collaboration with Smithsonian Environmental Research Center.
- Collaboration with the U.S. Department of Transportation Maritime Administration, Canadian Department of Fisheries & Oceans, and Transport Canada.



**Project Timeline / Key Milestones**

<b>Project Start:</b> 1 Oct 17	
BWM Alternatives for Lakers (Report)	31 Mar 20 ✓ ★
IL Auditing Protocol; For Facilities Performing TA Testing of BWMS (Report)	17 Jun 20 ✓ ★
Current State of BWDS Compliance Technologies (Report)	29 Jul 21 ✓ ★
Recommendation on Selection of Great Lakes Nonindigenous Species & Ballast Water Sampling Sentinel Sites	Nov 21 ★
Proposed Protocol for Nonindigenous Species Survey Methods & Ballast Water Sampling at Great Lakes Sentinel Sites	Dec 21 ★
Tech Guidance for Use, Maint. & Trng. of BWDS Compliance Tools (Report)	Feb 22 ★
Functional Char. for BWDS Compliance Tools (Report)	Apr 22 ★
Audit Protocols for Shipboard Tests by IL (Report)	Sep 22 ★
Validation of Audit Protocols for Shipboard Tests by IL (Report)	Jan 23 ★
Eval. of Commercially Available BWDS Compliance Technologies (Report)	Feb 23 ★
Results of Year 1 BW Sampling and Sentinel Site Survey in the GL (Report)	Sep 23 ★
<b>Project Completion:</b> Sep 23	

**Sponsor:** CG-OES, EPA Great Lakes Nat’l Program Office

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

**RDC Research Lead:**  
Ms. Gail Roderick

**CG-926 Domain Lead:**  
Ms. Karin Messenger

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





# Next Generation Aids to Navigation Buoys & Alternative Moorings

2703

**Mission Need:** Modernize U.S. Coast Guard (CG) Aids to Navigation (AtoN) buoys and moorings.

## Objectives

- Determine the world-wide state of non-ferrous, Next Generation (Next Gen) aids to navigation (AtoN) buoys.
- In conjunction with CG managers, field trial the most-promising prospects for replacing steel buoys.
- Provide CG managers technical, cost, and operational benefits (if any) to modernize buoy inventory.
- Conduct follow-up investigation of an alternative buoy-mooring system to determine CG applicability.
- Analyze buoy inventory to identify logistical and operational inefficiencies.
- Determine functional characteristics for legacy and next generation buoys.
- Develop science-based, analytical tool to aid CG managers with future inventory decisions.



## Notes

- Coordinate with CG-NAV and the Data Center Optimization Initiative to involve International Association of Marine Aids to Navigation and Lighthouse Authorities as partners.
- Collaborate with Naval Sea Systems Command on buoy radar cross section and detection ranges analysis.

**Sponsor:** SILC-WOPL

**Stakeholder(s):** CG-NAV, Districts (dpw)

**RDC Research Lead:**  
Mr. James Spilsbury

**CG-926 Domain Lead:**  
Ms. Karin Messenger

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

## Project Timeline / Key Milestones

<b>Project Start:</b> 1 Oct 19	
Complete World Wide Market Study of Buoys	31 Mar 20 ✓
Gather Feedback from Sponsor and Stakeholders	30 Jun 20 ✓
Selection Most Promising Buoys for Testing Complete	31 Aug 20 ✓
<b>Next Gen AtoN Buoys: Market Study Report (Report)</b>	<b>17 Sep 20 ✓ ★</b>
Draft Test Plan for Buoys and Moorings Complete	20 Oct 20 ✓
<b>Next Gen Buoy and Alternative Mooring Field Test Update (Brief)</b>	<b>12 Aug 21 ✓ ★</b>
<b>AtoN Buoy Inventory Analysis Results (Brief)</b>	<b>Jul 22 ★</b>
Key Decision Point	Jul 22
Field Test for Buoys and Moorings Complete	Oct 22
<b>New Buoy and Moorings Field Trial Summary (Report)</b>	<b>Jul 23 ★</b>
<b>AtoN Buoy Optimization Tool (Tool &amp; User Guide)</b>	<b>Dec 23 ★</b>
<b>Project Completion:</b> Dec 23	



**Acquisition Directorate**  
Research & Development Center



CG Research & Development Center  
UNCLAS//Internet Release is Authorized

Indicates RDC Product ★  
October 2021 24

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

4710

**Mission Need:** ERSP calculator to include response systems for nearshore/inland operating environment.

**Objectives**

- Determine if an enhanced version of the existing offshore ERSP calculator provides improved efficiency for planning and response to oil spills.
- Develop an inland ERSP calculator prototype tool.
- Validate ERSP calculator functionality and usefulness through an independent evaluation by a group of National Academies of Sciences, Engineering, and Medicine reviewers.



**Notes**

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

**Sponsor:** CG-MER      **Stakeholder(s):** BSEE, AREA-54

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

**Anticipated Transition:** Product  
Fielded Prototype

**Project Timeline / Key Milestones**

<b>Project Start:</b> 1 Oct 16	
Feasibility Workshop Completed	21 Jun 17 ✓
<b>Feasibility of Extending the ERSP Calculator for Nearshore and Inland Waterways (Report)</b>	<b>20 Sep 17 ✓ ★</b>
<b>Inland ERSP Preliminary Factors, Requirements and Conceptual Model (Report)</b>	<b>14 Nov 19 ✓ ★</b>
<b>Inland ERSP Operational Environment Calculator (Design Document)</b>	<b>29 Jun 20 ✓ ★</b>
Initial Development of Inland ERSP Calculator Complete	4 Jun 21 ✓
National Academy of Sciences (NAS) Review Complete	May 22
<b>NAS Response Review of Inland ERSP (White Paper)</b>	<b>Sep 22 ★</b>
NAS Recommended ERSP Calculator Updates Complete	Sep 23
<b>Inland Evaluation of the ERSP Calculator (Prototype &amp; User Guide)</b>	<b>Jan 24 ★</b>
<b>Project Completion:</b> Jan 24	

**Mission Need:** Maintain competency/knowledge; provide rapid response; and external liaison.

**Objectives**

- Maintain U.S. Coast Guard (CG) Research and Development Center (RDC) competency and technical knowledge in understanding present and future E&W technology, systems, and regulatory directives/policies, including: environmental protection, pollution detection/response, ballast water standards, marine and navigation safety Improvements, and search and rescue improvements.
- Maintain Branch infrastructure to support RDC portfolio objectives.
- Support E&W Strategic Project Portfolio Alignment and CG DCO/DCMS Research Priorities.
- Provide expert input to CG stakeholders regarding E&W technologies.
- Foster continued relationships with CG sponsors/stakeholders and external U.S. Department of Defense labs, U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T), and other government agency/academic partners.
- Provide service academy, Historically Black College & University, and Minority Serving institution students internship opportunities.



**Notes**

- Distress Signals Policy Council & Radio Technical Commission for Maritime Services meetings and special committees.
- Univ. of Texas San Antonio machine learning for leeway (DHS/DoD funds).
- Michigan Technological University mass-rescue capstone effort.
- Ice accretion Rapid Evaluation & Analysis of Critical Technologies (REACT) Report for F/V Scandies Rose Marine Board of Investigation.
- Interagency Coordinating Committee on Oil Pollution Research.
- Great Lakes Oil Spill Center of Expertise membership.
- Introductory liaison for ballast water research on CGC HEALY.
- National Oceanic & Atmospheric Administration Response Oil Assay Work Group.

**Sponsor:** CG-926      **Stakeholder(s):** CG-5, CG-SAR, CG-MER, CG-ENG, CG-OES, D9, D11, DHS S&T

**RDC Research Lead:** Mr. M. J. Lewandowski      **CG-926 Domain Lead:** Ms. Karin Messenger

**Anticipated Transition:** Various

Project Start: Ongoing		
<b>Project Timeline / Key Milestones</b>	International Search Planning Focus Meeting: Search Plans From a Common Data Set	24 Jan 21 ✓
	Chicago Sanitary & Ship Canal Electric Dispersal Barrier System Operations Review Memo	28 Jan 21 ✓
	CA Office of Spill Prevention & Response Tech Meeting	22 Feb 21 ✓
	Bureau of Safety and Environmental Enforcement/CG R&D Review and Planning Meeting	2 Mar 21 ✓
	Quarterly Distress Signal Policy Council Meeting	18 Mar 21 ✓
	Quarterly Interagency Coordinating Committee on Oil Pollution Research Meeting	23 Mar 21 ✓
	International Oil Spill Conference	14 May 21 ✓
	Ice Accretion Testing at Cold Regions Research and Engineering Lab	30 Sep 21 ✓
	Machine Learning for Leeway Effort Complete	Oct 21
	<b>Ice Accretion on Crab Traps (REACT Report)</b>	<b>Nov 21 ★</b>
	<b>Project Completion:</b> Ongoing	



## Mission Need: Interoperable voice and high speed data communications within Sea Area A1.

### 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 EPTT enhanced equipment.
  - Phase 3: Deploy Band 14 vessel routers.



### Notes

- Project includes use of a CRADA.
- Partners: FirstNet Program Office.

Completed

**Sponsor:** CG-67

**Stakeholder(s):** CG-255, CG-721/31/41/51/61/91, C4ITSC, LANT/PAC-6, C3CEN, TISCOM, D7, JIATF

**RDC Research Lead:**  
Mr. Jon Turban, P.E.

**CG-926 Domain Lead:**  
Ms. Holly Wendelin

**Anticipated Transition:** Product  
*Fielded Prototype*

### Project Timeline / Key Milestones

<b>Project Start:</b> 1 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 ✓
<b>Coast Guard Nearshore Use of FirstNet (Brief)</b>	<b>22 Nov 19 ✓ ★</b>
CG FirstNet Maritime Test Range: Phase 3	31 Jan 20 ✓
Conclude Sector Key West Full Scale Exercise	11 Mar 20 ✓
Limited User Evaluation End	31 Mar 20 ✓
<b>Coast Guard Nearshore Use of FirstNet: Test Results and Recommendations (Report)</b>	<b>8 Dec 20 ✓ ★</b>
<b>Project Completion:</b> 8 Dec 20	



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

8702

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

**Objectives**

- Improve IT performance in a degraded, disconnected, and high latency environment by performing a limited user evaluation of selected equipment on an afloat unit.
- Make recommendations to sponsor and stakeholders about best means of improving cutter IT application performance to include IP Video Compression on CG Communications Networks.



**Notes**

- Establish Cooperative Research and Development Agreement with Industry for commercial technology testing onboard USCG Cutters.

**Sponsor:** CG-68      **Stakeholder(s):** CG-761, C5ISC, CG-67, CGCYBER

**RDC Research Lead:** Mr. David Cote      **CG-926 Domain Lead:** Ms. Holly Wendelin

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

<b>Project Timeline / Key Milestones</b>	<b>Project Start:</b> 1 Oct 19	
	Review of CG Previous/Current Efforts Complete	31 Dec 19 ✓
	Evaluation of Network Accelerator Technology Complete	28 Feb 20 ✓
	Limited User Evaluation of Selected Equipment Complete	18 Nov 20 ✓
	<b>Network Accelerator Tech Evaluation (Brief)</b>	<b>29 Dec 20 ✓ ★</b>
	Investigation of Best Practices for Application Software Complete	14 May 21 ✓
	<b>Improve Cutter IT Application Performance (Report)</b>	<b>Oct 21 ★</b>
	<b>Project Completion:</b> Oct 21	

# Automatic Identification System (AIS) Cyber Security

8701

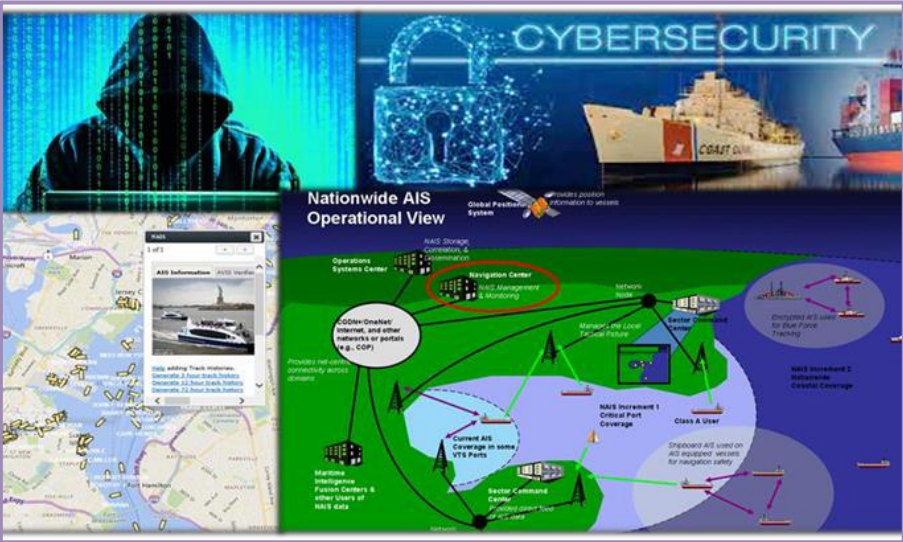
**Mission Need:** Improve mariner safety by hardening the AIS against cyber attacks.

**Objectives**

- Recommend AIS data message authentication methods based on existing national and international cryptography research.
- Apply previous AIS signal bit-level range extension research to address cybersecurity through signal verification of radio frequency information (AIS 2.0).
- Demonstrate machine learning methods using Nationwide AIS data for cyber monitoring and alerting.

**Notes**

- Leveraging U.S. Coast Guard (CG) Research and Development Center Project 2218: Countering GPS Interference, Project 6211: Next Generation Arctic Navigational Safety Information System, and Project 7401: Machine Learning Platforms to Improve Coast Guard Tools.
- Leverage the U.S. Department of Homeland Security Homeland Security Systems Engineering and Development Institute/MITRE for machine learning analysis.



<b>Project Timeline / Key Milestones</b>	<b>Project Start:</b> 1 Oct 19	
	Complete International Encryption Methods Research	30 Jun 20 ✓
	<b>AIS Data Authentication (Brief)</b>	<b>10 Nov 20 ✓ ★</b>
	High-level Operational Requirements to be Used to Drive Development Complete	22 Jan 21 ✓
	Machine Learning and Other Algorithms Briefing	22 Feb 21 ✓
	<b>AIS Machine Learning (Brief &amp; Demonstration)</b>	<b>Nov 21 ★</b>
	<b>AIS Cyber Security (Report)</b>	<b>Jan 22 ★</b>
	<b>Project Completion:</b> Jan 22	

<b>Sponsor:</b> CG-761	<b>Stakeholder(s):</b> CG-68, CGCYBER, C5ISC, CG-NAV, ICC, MIFC LANT/PAC, CGA
<b>RDC Research Lead:</b> Ms. Anita Trombino	<b>CG-926 Domain Lead:</b> Ms. Holly Wendelin
<b>Anticipated Transition:</b> Knowledge Product Standards/Regulations	



# Radio Frequency (RF) Communications in a Cloud Environment

8503

**Mission Need:** RF communications capabilities as virtualized services in a cloud environment.

**Objectives**

- Satisfy existing RF communications requirements by leveraging U.S. Coast Guard (CG) network infrastructure along with CG One View (CG1V) and approved cloud access points.
- Investigate the cloud service, architecture, and implementation that provides the best solution for replacing existing RF communications components in the Rescue 21 (R21) system.
- Replace existing backend server components currently deployed at R21 Remote Fixed Facilities and Sector Command Centers with cloud-based capabilities and perform system demonstration (Phase 1).
- Replace existing R21 user console with cloud-based web accessible interface and perform system demonstration (Phase 2).
- Assess operational improvements and make NextGen R21 recommendations.



**Notes**

- Technical design and execution with the CG Command, Control, Communications, Computers, Cyber and Intelligence Service Center (C5ISC) Communications Systems Product Line.
- Leverage Cooperative Research and Development Agreement (CRADA) with industry.
- Leverages prior CG Research and Development Center cloud environment research.
- Coordinate with CG-68 for CG cloud pilot.

**Sponsor:** CG-761      **Stakeholder(s):** CG-68, CG-67, CG-741, CG-SAR, C5ISC, CGCYBER

**RDC Research Lead:** Ms. Anita Trombino      **CG-926 Domain Lead:** Ms. Holly Wendelin

**Anticipated Transition:** Product  
Fielded Prototype

**Project Timeline / Key Milestones**

<b>Project Start:</b> 12 Feb 20	
CRADA Established	21 Jan 20 ✓
System Architecture Design Complete	27 Mar 20 ✓
Cloud Environment Established	22 Jun 20 ✓
Phase 1 R21 Cloud Prototype Deployed & Connected	16 Jan 21 ✓
Phase 1 Testing Complete	2 Apr 21 ✓
<b>RF Comms Cloud Suitability Phase 1 (Brief)</b>	<b>17 May 21 ✓ ★</b>
Phase 2 User Interface to CG1V Developed & Deployed	30 Sep 21 ✓
Phase 2 Testing Complete	Nov 21
<b>RF Comms Cloud Suitability (Report)</b>	<b>Feb 22 ★</b>
<b>Project Completion:</b> Feb 22	



**Acquisition Directorate**  
Research & Development Center

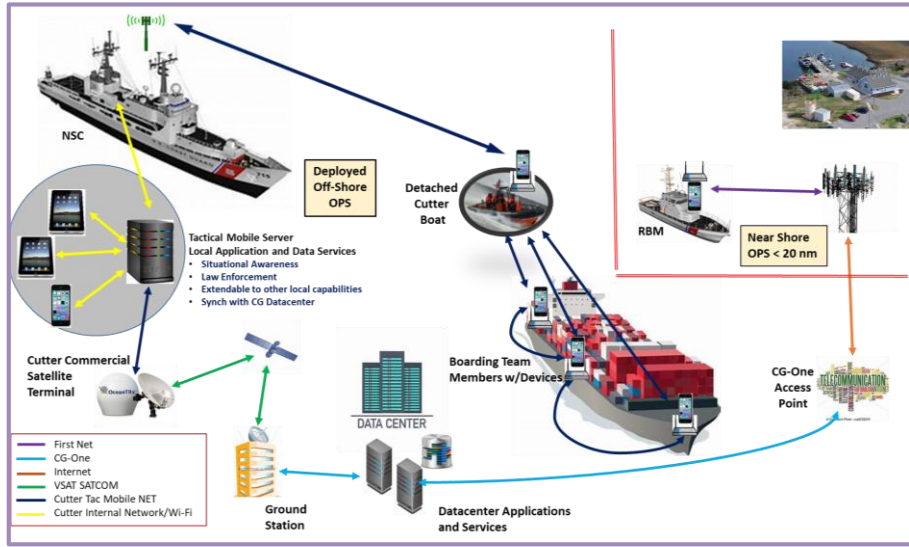


CG Research & Development Center  
UNCLAS//Internet Release is Authorized

Indicates RDC Product ★  
October 2021 30

## Mission Need: Improve boarding team safety, security, and mission efficiency.

- Objectives**
- Define protected, standards based mobile architectures to interface with U.S. Coast Guard (CG) Maritime and Avionic Systems.
  - Phase 1:
    - Distill Boarding Team (BT) requirements with sponsors/stakeholders.
    - Apply market research of COTS and GOTS Tactical Mobile Network technology architectures to identify best in class ranking of technology for fast CG integration and provide decision brief to key players.
  - Phase 2:
    - Conduct Limited User Evaluation of best technology architectures and follow-up with Tactical Mobile Technology Evaluation to sponsor/stakeholders.
    - Deliver best in class solution architecture roadmap options to sponsor/stakeholders.
    - Deliver Improved Cutter BT Efficiency Report to key decision makers to drive CG wide change.
    - Examine use of LiDAR Technology by BT members and how the technology could be integrated into Tactical Mobile Networks.



- Notes**
- Partner with the Air Force Institute of Technology (AFIT) to leverage systems engineering modeling capability.
  - Research U.S. Navy, Special Forces and U.S. Department of Homeland Security (DHS) components tactical mobile communications architectures.
  - Interview CG BT/Law Enforcement Detachment, U.S. Department of Defense, U.S. Department of Justice, DHS, and BT policy makers to identify functional characteristics in an ideal and an acceptable scenario.
  - Potential collaboration with the Naval Post Graduate School (NPS) Initial Research Estimate Form (IREF) compressed video request.

**Sponsor:** CG-761      **Stakeholder(s):** CG-67/68/721/751/932, CG-MLE, LANT, PAC, C5ISC, CGCYBER, TACLETs, NPS, AFIT

**RDC Research Lead:** Mr. David Cote      **CG-926 Domain Lead:** Ms. Holly Wendelin

**Anticipated Transition:** Product  
Fielded Prototype

**Project Start:** 1 Oct 20

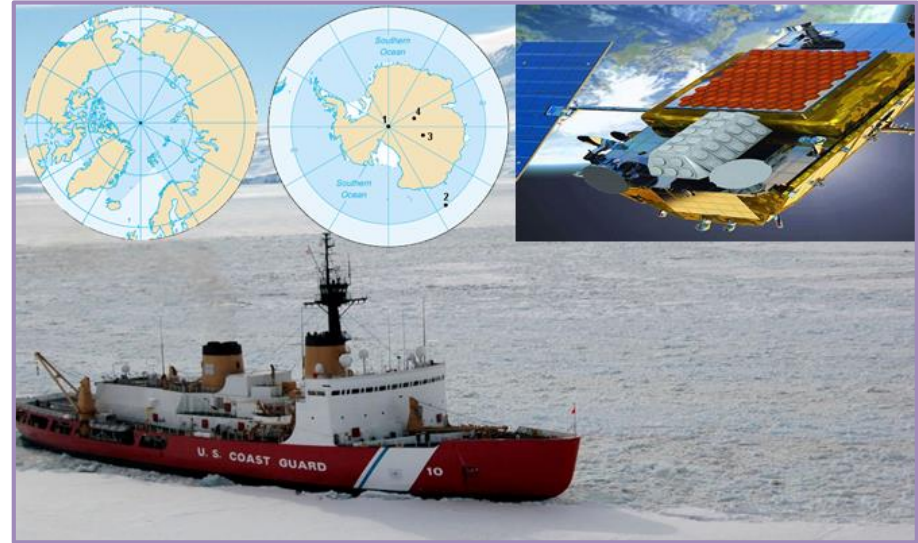
<b>Project Timeline / Key Milestones</b>	Interviews w/CG Cutter BTs and Policy Makers Completed	23 Dec 20 ✓
	Review of CG Previous/Current Efforts Completed	23 Dec 20 ✓
	Tactical Mobile COTS/GOTS Tech Evaluation Completed	31 Mar 21 ✓
	<b>Tactical Mobile Technology Market Research (Brief)</b>	<b>18 Aug 21 ✓ ★</b>
	Selected Technology Limited User Evaluation Completed	Dec 21
	<b>Tactical Mobile Technology Evaluation (Brief)</b>	<b>Jan 22 ★</b>
	Deployment Solution Architecture Evaluation Completed	Mar 22
	Selected Solution Architecture Evaluation Completed	May 22
	<b>Improve Cutter Boarding Team Efficiency (Report)</b>	<b>Jul 22 ★</b>
	<b>Project Completion:</b> Jul 22	



## Mission Need: Provide network connectivity to Cutters operating at high latitudes.

### Objectives

- Influence the desired minimum connectivity functional characteristics by analyzing previous U.S. Coast Guard (CG) Research and Development Center (RDC) arctic communications and cutter connectivity projects within last 10 years.
- Influence the desired minimum connectivity functional characteristics by analyzing prior U.S. Department of Defense (DoD) High Latitude (Hi-Lat) research projects within last 10 years, including U.S. Navy (USN) and North Atlantic Treaty Organization Combined Joint Operations from the Sea.
- Build and test a Hi-Lat cutter connectivity test bed.
- Deploy a prototype solution and perform a limited user evaluation and report on system capabilities for best in class determination.



### Notes

- Leverage CG RDC Projects 6208: Arctic Communications Technology Assessments, 8702: Evaluate Network Accelerator Technology to Improve Cutter Information Technology Performance, and 7759: Evaluation of Potential CG Use of CubeSats.
- Partner with the U.S. Department of Homeland Security Science and Technology Directorate Office of University Programs; USN Stratospheric Community of Interest; and Command, Control, Communications, Computers, Cyber, and Intelligence Service Center (C5ISC) Deployed Connectivity Section.
- Align with C5ISC SATCOM procurement.
- Link with DoD Lab Sync Arctic Comms effort.

**Sponsor:** CG-761      **Stakeholder(s):** CG-67, CG-68, CG-751, CG-762, LANT/PAC-6, C5ISC, ALC, CGCYBER

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

**Anticipated Transition:** Product  
Fielded Prototype

### Project Timeline / Key Milestones

<b>Project Start:</b> 1 Oct 20	
Review of Previous Projects and Research Complete	18 Mar 21 ✓
High Latitude Satellite Systems Market Research Complete	18 Mar 21 ✓
<b>High Latitude Underway Connectivity – Status Update (Brief)</b>	<b>12 Aug 21 ✓ ★</b>
Limited User Evaluation Complete	Apr 22
<b>High Latitude Underway Connectivity (Report)</b>	<b>Sep 22 ★</b>
<b>Project Completion:</b> Sep 22	





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

8703

**Mission Need:** Determine VDES benefits and path to implementation to support CG operations.

## Objectives

- Understand the capabilities and limitations of VDES.
- Identify steps for U.S. Coast Guard (CG) Implementation of VDES.
- Identify steps to shift CG tactical data transmissions from AIS channels to VDES application specific message channels.
- Evaluate VDES capabilities to disseminate various types of Maritime Safety Information (MSI).
- Understand the requirements for CG shore-side management of VDES.



## Notes

- Work closely with the Canadian Coast Guard; Electronics and Information Services, Quebec; U.S. Army Corps of Engineers, Engineer Research & Development Center.
- Leverage prior CG Research and Development Center work completed concerning options and impacts for VDES and AIS.

**Sponsor:** CG-761

**Stakeholder(s):** CG-67, CG-68, CG-933, CG-NAV, NAVCEN, C5ISC, CGCYBER

**RDC Research Lead:**  
LCDR John Forster

**CG-926 Domain Lead:**  
Ms. Holly Wendelin

**Anticipated Transition:** Knowledge Product  
Future Technology

## Project Timeline / Key Milestones

**Project Start:** 1 Oct 19

Technology Roadmap Investigation Complete	30 Sep 20 ✓
<b>Very High Frequency Data Exchange System (VDES) Technology Roadmap (Report)</b>	<b>27 Jan 20 ✓ ★</b>
Test Plan-Equipment Integration- Lab Test Complete	5 Mar 21 ✓
Phase 1 Field Trials – VDES Evaluation of CG Tactical Data Transmission	Oct 21
<b>Sensitive but Unclassified Tactical Information Exchange and Display System Using VHF Data Exchange System (Report)</b>	<b>Dec 21 ★</b>
Phase 2 Field Trials – VDES Evaluation of the Dissemination of MSI	Nov 22
<b>VHF Data Exchange System Field Trial (Report &amp; Brief)</b>	<b>Mar 23 ★</b>
<b>Project Completion:</b> Mar 23	



**Acquisition Directorate**  
Research & Development Center



CG Research & Development Center  
UNCLAS//Internet Release is Authorized

Indicates RDC Product ★  
October 2021 33

# Extended Reality (XR) Capabilities for Coast Guard Mission Support

8107

**Mission Need:** Improve efficiency and effectiveness of maintenance and training across the CG.

- Objectives**
- Enhance the U.S. Coast Guard's (CG) ability to train personnel and perform maintenance on CG assets by identifying maintenance, training, tools, processes, and procedures used by military and industry that will:
    - 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 the sponsor to generate requirements and successfully implement extended reality capabilities throughout the CG to improve the performance of mission support services.



- Notes**
- Includes partnerships with Naval Sea Systems Command Portsmouth Naval Shipyard, Microsoft Technology Center Boston, 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.

<b>Sponsor:</b> FORCECOM	<b>Stakeholder(s):</b> CG-1B3/41/45/5PC/67/751/761/933, ALC, ATTC, CGA, SFLC, TRACEN Yorktown
<b>RDC Research Lead:</b> Mr. Jack Cline	<b>CG-926 Domain Lead:</b> Ms. Holly Wendelin
<b>Anticipated Transition:</b> Knowledge Product Future Technology	

**Project Start:** 30 Nov 17

<b>Project Timeline / Key Milestones</b>	<b>Market Research/Technology Assessment (Brief)</b>	19 Dec 18 ✓ ★
	HoloLens 2 Upgrade Completed	3 Sep 20 ✓
	87' WPB Augmented Reality Maintenance Prototype	18 Sep 19 ✓
	Aviation Augmented Reality Maintenance Prototype	2 Feb 21 ✓
	<b>Limited User Evaluation - Surface Community (Brief)</b>	20 Apr 21 ✓ ★
	Marine Inspection XR Training Prototype Delivered	Jan 22
	<b>Limited User Evaluation - Aviation Community (Brief)</b>	Apr 22 ★
	<b>Limited User Evaluation - Training Community (Brief)</b>	Jun 22 ★
	<b>Limited User Evaluation - Operational Training (Brief)</b>	Oct 23
	Mission Support XR Roadmap Complete	Nov 23
	<b>XR Capabilities for CG Mission Support (Report &amp; Brief)</b>	May 24 ★
	<b>Project Completion:</b> May 24	



**Mission Need:** Maintain competency/knowledge; provide rapid response; and external liaison.

**Objectives**

- Build U.S. Coast Guard (CG) Research and Development Center (RDC) competency and technical knowledge/understanding of innovative Information Technology, Networked Systems & Cyber Tools, including: CG mobility, software prototyping, cloud computing, software defined networks, mixed reality, telecommunications, space based systems, and cyber security systems.
- Evaluate efficient information storage, management and knowledge tech.
- Support ITNET Strategic Project Portfolio Alignment and CG DCO/DCMS Research Priorities.
- Provide expert input to CG stakeholders regarding ITNET technologies.
- Establish robust relationships with CG sponsors/stakeholders and external U.S. DoD labs, U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T), and other government agency/academic partners.
- Provide service academy, Historically Black College or University, and Minority Serving Institution students internship opportunities.
- Build lean application evaluation platform to provide effective recommendations to Program Managers and Product Line Managers.



**Notes**

- Continue to plan and execute RDC infrastructure improvements that will benefit CG: P-LAN, audio/visual updates, Hi-Latitude communications lab, Light-Fidelity test lab, Team Awareness Kit hosting, U.S. Coast Guard Command, Control, Communications, Computers, Cyber, Intelligence Service Center (C5ISC) Cutter Lab mockup, computer forensics/cyber test bed.
- Continue FirstNet Mission-Critical Push to Talk (MCPTT) evaluation.
- Member of Maritime Security Regimes Working Group (WG), TRIDENT Warrior WG, Arctic Communications WG, and Information Warfare Science & Engineering WG.

<b>Sponsor:</b> CG-926	<b>Stakeholder(s):</b> CG-2, CG-6, CG-7, C5ISC, CGCYBER, DHS S&T
<b>RDC Research Lead:</b> Mr. Rob Riley	<b>CG-926 Domain Lead:</b> Ms. Holly Wendelin

**Anticipated Transition:** Various

<b>Project Timeline / Key Milestones</b>	<b>Project Start:</b> Ongoing	
	FirstNet MCPTT Hardware Test Bed	30 Apr 21 ✓
	Hi-Latitude Communications Equipment Testing	Nov 21
	FirstNet Deployment Effort (w/ C5I Branch)	Jan 22
<b>Project Completion:</b> Ongoing		

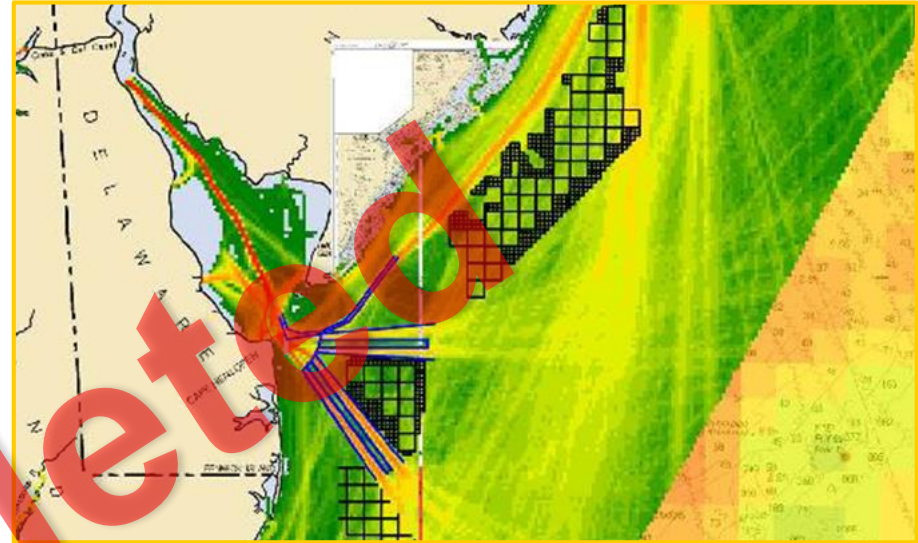


# Research into Navigational Safety Risk Modeling and Analysis Tool

7529

**Mission Need:** Capability to fully characterize the navigational risk of offshore structures.

- Objectives**
- Create an analytical modeling process and analysis tools to predict changes in traffic patterns and determine the resultant changes in navigational safety risk.
  - Create the ability to assess the proposed wind energy areas to further refine appropriate distances between shipping and structures.
  - Create the ability to test routing measures to mitigate risk posed by fixed structures.



**Notes**

- This project is a result of the requirements specified in the Atlantic Coast Port Access Route Study as documented in the Interim Report from Jul 2012 and the Final Report from Feb 2016.

**Sponsor:** CG-5PW      **Stakeholder(s):** LANT-54, CG-NAV

**RDC Research Lead:** Ms. Christine Hansen      **CG-926 Domain Lead:** Dr. David Wiesenbahn

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

**Project Start:** 3 Oct 16

Risk Modeling Tools Assessed	31 Aug 18 ✓
Automatic Identification System Risk Modeling Data Package Created	5 Dec 18 ✓
Offshore Energy Risk Assessment Tool Envisioned	31 May 19 ✓
Test Risk Modeling Package Created	26 Jul 19 ✓
<b>Navigational Safety Risk Modeling and Analysis Tool Summary Report (Model &amp; Report)</b>	<b>6 Nov 19 ✓ ★</b>
Assessment Tool and Methodology Refined	1 Sep 20 ✓
<b>Navigational Safety Risk Modeling and Analysis After Action Report (Report)</b>	<b>31 Dec 20 ✓ ★</b>

**Project Completion:** 31 Dec 20

**Project Timeline / Key Milestones**

**Mission Need:** Demonstrate the value and application of machine learning for improving USCG tools.

<b>Objectives</b>	<ul style="list-style-type: none"> <li>Initial review will provide an understanding of current AI/ML uses in the CG, U.S. Department of Defense (DoD) , and U.S. Department of Homeland Security (DHS).</li> <li>Project will result in a clear understanding of AI/ML uses to support CG missions.</li> <li>Project will identify promising AI/ML technologies for incorporation into CG applications, as well as any infeasible technologies or those that are not yet mature enough to support CG applications.</li> <li>Proof of Concept will demonstrate selected use case from CG Ideas at Work campaign and positive impact to CG mission outcomes.</li> </ul>
-------------------	---



<b>Notes</b>	<ul style="list-style-type: none"> <li>Potential partnerships with other service organizations in R&amp;D.</li> <li>Leverage AI/ ML efforts by DoD and DoE labs, MIT Lincoln Laboratory, and Argonne National Laboratory.</li> <li>Conduct a literature review of current DoD applications.</li> </ul>
--------------	--

<b>Sponsor:</b> CG-771	<b>Stakeholder(s):</b> CG-761
------------------------	-------------------------------

<b>RDC Research Lead:</b> Mr. Sam Cheung	<b>CG-926 Domain Lead:</b> Dr. David Wiesenbahn
---	--

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

<b>Project Timeline / Key Milestones</b>	<b>Project Start:</b> 1 Oct 19	
	Identification of High-level Application Areas for AI/ML Solutions Completed	30 Jun 20 ✓
	Review Current DoD, DHS, and USCG Applications for AI/ML and Identify Application Area for Solution Development Completed	28 Sep 20 ✓
	Develop and Document Proof of Concept for Rescue 21 (Selected Application Area)	25 Feb 21 ✓
	<b>Proof of Concept IBM Watson (Proof of Concept)</b>	<b>27 Apr 21 ✓ ★</b>
	<b>Machine Learning Platforms to Improve Coast Guard Tools (Report)</b>	<b>3 Aug 21 ✓ ★</b>
	<b>Project Completion:</b> 3 Aug 21	



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

9204

**Mission Need:** Targeted CBM for higher asset availability and reduced life cycle costs.

**Objectives**

- Implement condition-based and predictive maintenance activities within the surface and aviation communities by researching and documenting significant opportunities for using leading indicators and readily available system information, including the following system characteristics: interfaces, data structure, data analysis, and data display that support a data driven system.
- Develop demonstration case studies using predictive maintenance with U.S. Coast Guard (CG) data to provide recommendations for systems and steps required to accommodate desired functional characteristics of a data driven system.



**Notes**

- Partner with the CG Surface Forces Logistics Center (SFLC) and Aviation Logistics Center (ALC) to make recommendations.
- Partner with U.S. Naval Academy (USNA), U.S. Department of Defense Joint Artificial Intelligence Center (JAIC), U.S. Navy's Naval Air System Command and Naval Sea Systems Command, and U.S. Army Combat Capabilities Development Command Aviation & Missile Center.
- Potential collaboration with the CT National Guard.

**Sponsor:** CG-45, CG-41      **Stakeholder(s):** SFLC, ALC

**RDC Research Lead:** Ms. Christine Hansen      **CG-926 Domain Lead:** Dr. David Wiesenbahn

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

**Project Start:** 1 Apr 19

Surface Asset Maintenance Characteristics Reviewed	1 Apr 19 ✓
Surface CBM Market Research Initiated	29 Oct 19 ✓
Academic Partnership Engagement Initiated	1 Dec 19 ✓
<b>CBM for CG Asset Product Lines (Brief)</b>	<b>14 Feb 20 ✓ ★</b>
Aviation Asset Maintenance Characteristics Reviewed	15 Feb 20 ✓
Aviation CBM Market Research Initiated	1 Oct 20 ✓
<b>CBM for CG Asset Product Lines: Update Brief (Brief)</b>	<b>7 Oct 21 ✓ ★</b>
DoD H-60 CBM and PMx Benchmarking	Jun 22
USNA NSC Data Analysis	Jun 22
JAIC PMx Representation	Jun 22
<b>CBM for CG Asset Product Lines Summary Report (Report)</b>	<b>Sep 22 ★</b>

**Project Completion:** Sep 22



**Mission Need:** Time and cost effective methodology to incorporate sensor capabilities in SAROPS.

**Objectives**

- Determine sensitivity of the Search and Rescue Optimal Planning System (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.



**Notes**

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

**Sponsor:** CG-SAR

**Stakeholder(s):** CG LANTAREA (LANT-3), CG PACAREA (PAC-3), CG FORCECOM (FC-T)

**RDC Research Lead:**  
Ms. Grace Python

**CG-926 Domain Lead:**  
Dr. David Wiesenbahn

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

**Project Timeline / Key Milestones**

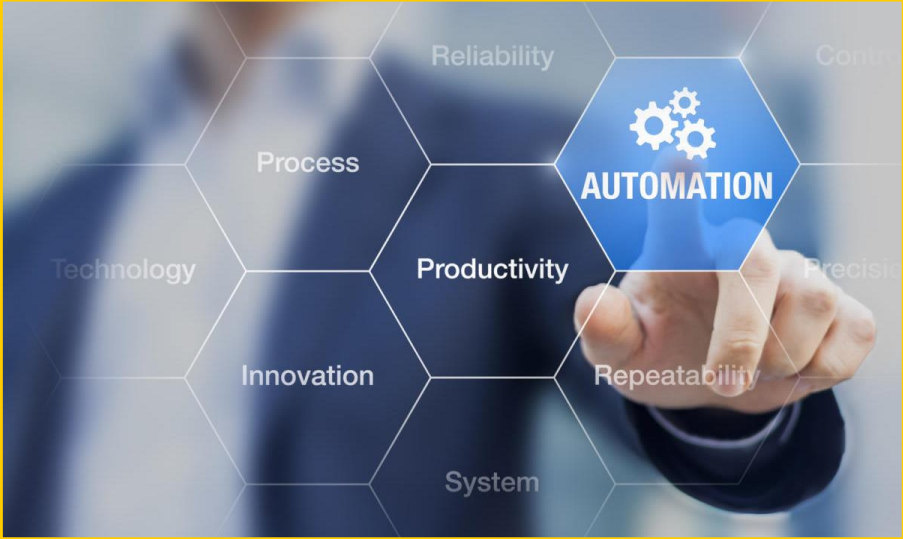
<b>Project Start:</b> 2 Oct 17	
Completion of Work Under Original Project Scope	13 Mar 19 ✓
Project Re-scoped and Retitled	11 Jul 19 ✓
<b>Required SAROPS Input to Develop Sweep Width (Brief)</b>	<b>15 Dec 19 ✓ ★</b>
Key Decision Point	16 Dec 19 ✓
Sensitivity Analysis & Underlying Assumption Investigation Complete	30 Jun 21 ✓
Methods to Develop Sensor-Specific Data Research Complete	Feb 22
<b>Incorporating Sensor Performance in SAROPS (Brief)</b>	<b>Feb 22 ★</b>
<b>Prototype Tool for Incorporating Sensor Performance in SAROPS (Prototype)</b>	<b>Aug 22 ★</b>
<b>Incorporating Sensor Performance in SAROPS (Report)</b>	<b>Nov 22 ★</b>
<b>Project Completion:</b> Nov 22	



**Mission Need:** Repeatable process automation to enable operational and mission support efficiencies.

**Objectives**

- Provide an understanding of the current state of Robotic Process Automation (RPA).
- Identify challenges to acquiring and implementing RPA solutions.
- Investigate specific use-cases of RPA.
- Identify requirements for sustainment of RPA after development.



**Notes**

- Leverage existing U.S. Coast Guard (CG) Research and Development Center Project 7401: Machine Learning Platforms to Improve Coast Guard Tools.
- Coordinate with the Joint Artificial Intelligence Center, CG Finance Center (FINCEN), and the Department of Homeland Security RPA Working Group.
- Potential partnership with Naval Postgraduate School.

**Sponsor:** CG-67

**Stakeholder(s):** CG-62, CG-86, CG-68, CG-761, CG-1B3, CG-82, CG-4, FORCECOM, FINCEN

**RDC Research Lead:**  
Dr. Devon Gunter

**CG-926 Domain Lead:**  
Dr. David Wiesenbahn

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

<b>Project Timeline / Key Milestones</b>	<b>Project Start:</b> 1 Oct 20	
	Identification of RPA Candidate Criteria/Method Completed	20 Jan 21 ✓
	FINCEN Effort/Progress Research, Literature Review Completed	29 Jan 21 ✓
	Identification of RPA Prototype Use-case Completed	30 Apr 21 ✓
	<b>Applications of Robotic Process Automation: Use-case Selection (Brief)</b>	<b>17 May 21 ✓ ★</b>
	Prototype Development and Evaluation Completed	Dec 22
	<b>Applications of Robotic Process Automation (Report)</b>	<b>Feb 23 ★</b>
	<b>Project Completion:</b> Feb 23	



**Mission Need:** Improve cognitive skills and decision-making in high-risk operations.

- Objectives**
- Research objective measurements that demonstrate the influence of selected cognitive training program(s) on training environment evaluations.
  - Research framework for collecting empirical evidence of performance improvement in the training environment.
  - Develop understanding of impact cognitive training programs have on trainees' performance.
  - Develop recommendations for one or more cognitive training programs for evaluation in an operational setting.



- Notes**
- Potential collaboration with Blue Technology Center of Expertise, Naval Health Research Center in San Diego, CG Auxiliary, DoD Special Operations, U.S. Air Force 711<sup>th</sup> Human Performance Wing, U.S. Army Combat Capabilities Development Command, and Army Research Laboratory – Adelphi.

**Sponsor:** CG-721      **Stakeholder(s):** FORCECOM, MLEA, SMTC, CG-1, MSRT/MSSTs, DoD Spe. Ops, NUSTL, LE/DSF Cmty's

**RDC Research Lead:** Dr. Jared Peterson      **CG-926 Domain Lead:** Dr. David Wiesenbahn

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

**Project Start:** 30 Nov 20

<b>Project Timeline / Key Milestones</b>	Researched Objective Measures	31 Mar 21 ✓
	<b>Experimental Design and Cognitive Training Market Research Selection (Brief)</b>	<b>Jan 22 ★</b>
	Awarded Contract Training Program	Aug 22
	Pre-Training Assessment Completed	Oct 22
	Cognitive Training Programs Completed	Jan 23
	Post-Training Assessment Completed	Jan 23
	<b>Cognitive Training Influence on Cognitive Skills and Decision-Making (Report)</b>	<b>Aug 23 ★</b>
	<b>Project Completion:</b> Aug 23	



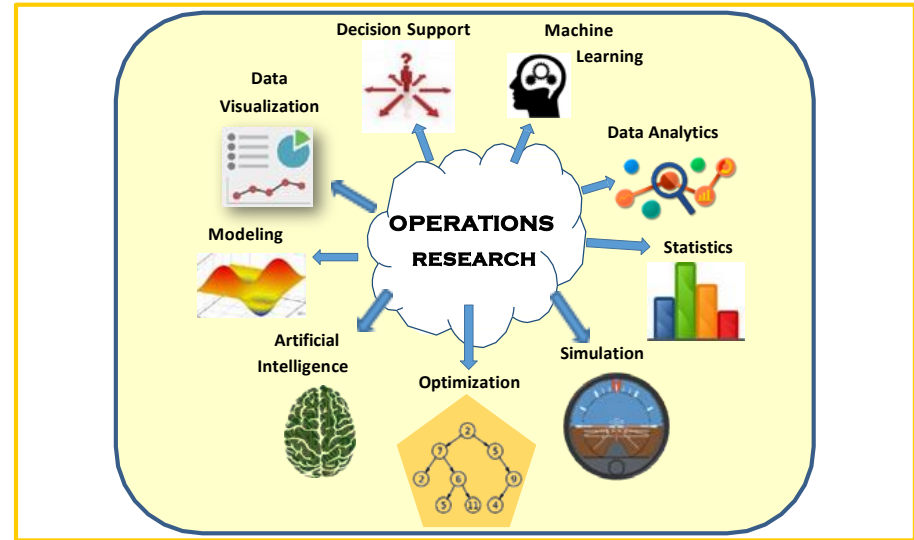
# FY21-22 Modeling, Simulation, & Analysis (MSA) Branch Support

99972122

**Mission Need:** Maintain competency/knowledge; provide rapid response; and external liaison.

## Objectives

- Maintain competency and technical knowledge in understanding present and future Operations Research (OR)/Data Analytics (DA) tools and techniques including: modeling & simulation, data analytics, Artificial Intelligence (AI) & Machine Learning (ML), process automation, risk analysis, and human factors.
- Maintain Branch infrastructure to support RDC portfolio objectives.
- Support MSA Strategic Project Portfolio Alignment and CG DCO/DCMS Research Priorities.
- Provide expert input to CG stakeholders regarding use and application of AI/ML and OR/DA technologies and techniques.
- Foster continued relationships with CG sponsors/stakeholders and external Department of Defense labs, Department of Homeland Security (DHS) Science and Technology Directorate (S&T), and other government agency/academic partners.
- Provide service academy, Historically Black Colleges and Universities, and Minority Serving Institutions students internship opportunities.



## Notes

- Represent CG on Joint Artificial Intelligence Center (JAIC) Service Lab AI Research and Development Subcommittee; JAIC Predictive Maintenance Subcommittee; and Tri-Service Lab Commander’s Sync Data Analytics Working Group.
- Member of CG-7 Unmanned Systems Integrated Product Team (AI Subcommittee); CG OR/DA Working Group, CG Data Readiness Task Force Advisory Group, CG Modeling & Simulation Advisory Council, and RDC Institutional Review Board.

**Sponsor:** CG-926

**Stakeholder(s):** CG-2/6/7/9, CG-MLE, CG-SAR, CG-OEM, CG-5PW, CG-INV, CG-NAV, DCO-X, DHS S&T

**RDC Research Lead:**  
CDR Daniel Sweigart

**CG-926 Domain Lead:**  
Dr. David Wiesenbahn

**Anticipated Transition:** Various

## Project Timeline / Key Milestones

**Project Start:** Ongoing

Project Evergreen (2030) Participation	26 Feb 21 ✓
Low Cost Maritime Domain Awareness – Ongoing Support	18 Mar 21 ✓
Quarterly DISPOCO Meeting (Quant Subcommittee)	15 Mar 21 ✓
CG District 11 MDA “Bear Trap” Support	1 Apr 21 ✓
Navigation Safety Risk Assessment Follow Up/Alpha Test	28 May 21 ✓
Host U.S. Naval Academy Cadet Summer Intern	17 Aug 21 ✓
Blockchain Use-Case Exploration	10 Sep 21 ✓
Post-Completion Report Analytics	Dec 21
Natural Language Processing Analysis of Unstructured Search and Rescue Narratives	TBD

**Project Completion:** Ongoing



**Acquisition Directorate**  
Research & Development Center



CG Research & Development Center  
UNCLAS//Internet Release is Authorized

Indicates RDC Product ★

October 2021 42

# Arctic Technology Evaluation 2019-2020

62102

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

**Objectives**

- Provide support to projects which develop capability improvements in the execution of U.S. Coast Guard (CG) missions in the Arctic.
- Cultivate joint efforts and interagency cooperation between government sectors and civilian entities.



**Notes**

- Outreach partners included the Bureau of Safety and Environmental Enforcement, the U.S. Department of Homeland Security Office of University Programs, U.S. Department of Defense Labs, U.S. Northern Command, and National Labs.

Completed

**Sponsor:** CG-7

**Stakeholder(s):** CG-5PW, CG-751, CG-761, PAC-5, LANT-5, D17

**RDC Research Lead:**  
Mr. Scot Tripp

**CG-926 Domain Lead:**  
Ms. Holly Wendelin

**Anticipated Transition:** Knowledge Product  
*Future Technology*

**Project Timeline / Key Milestones**

<b>Project Start:</b> 3 Dec 18	
Partners/Technologies/Test Plans Identified (FY19)	14 Jun 19 ✓
FY20 Research Efforts/Partners Solicited	30 Aug 19 ✓
CGC HEALY Tests/Demonstrations Complete (FY19)	28 Oct 19 ✓
<b>Arctic Technology Evaluation 2019 – Communications Technology Focus (Application Note)</b>	<b>30 Apr 20 ✓ ★</b>
Partners/Technologies Scheduled (FY20)	14 Jul 20 ✓
CGC CAMPBELL Tests/Demonstrations Complete (FY20)	2 Oct 20 ✓
FY21 Research Efforts/Partners Solicited	28 Oct 20 ✓
<b>Arctic Technology Evaluation FY20 (Application Note)</b>	<b>29 Dec 20 ✓ ★</b>
<b>Project Completion:</b> 29 Dec 20	



**Acquisition Directorate**  
Research & Development Center



CG Research & Development Center  
UNCLAS//Internet Release is Authorized

Indicates RDC Product ★  
October 2021 43

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

**Objectives**

- Deliver decision support information regarding potential improvements in MDA through use of low-cost USV technologies by performing and documenting results of 30 day on-water technology demonstration of commercially available Unmanned Surface Vehicle (USV) and sensor systems to improve actionable MDA in remote Pacific regions.



**Notes**

- Legislative requirement.
- Collaborating with U.S. Coast Guard Auxiliary, U.S. Customs and Border Protection, multiple U.S. Navy Science Advisors (USN 4th Fleet, USN Commander Fleet Forces Command, USN Commander Submarine Forces, and USN Commander Pacific Fleet), and National Oceanic and Atmospheric Administration as well as local port authorities and governments.

**Sponsor:** CG-26      **Stakeholder(s):** CG-711, CG-721, CG-761, CG-MLE, LANTAREA, D14, PACAREA, D17

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

**Anticipated Transition:** Knowledge Product  
Future Technology

**Project Timeline / Key Milestones**

<b>Project Start:</b> 6 Jun 18	
Request for Information for Industry Engagement Issued	30 Sep 18 ✓
Request for Proposal for Field Demonstrations Issued	7 Nov 19 ✓
Technology Demonstration Contracts Awarded	7 Feb 20 ✓
Low-Cost Maritime Domain Awareness Pilot Study Status Brief Complete	27 Aug 20 ✓
Field Demonstration Complete	7 Nov 20 ✓
<b>Low-Cost Maritime Domain Awareness Pilot Study (Report)</b>	<b>6 Apr 21 ✓ ★</b>
<b>Project Completion:</b> 6 Apr 21	



**Mission Need:** Improved accuracy and reliability in multifunction chemical detection.

**Objectives**

- Deliver decision support information regarding state-of-the-market multifunction chemical detectors for U.S. Coast Guard (CG) operation in maritime environments.
- Deliver decision support information regarding Tactics, Techniques, and Procedure (TTP) opportunities to improve accuracy, reliability, and usability of drug and explosives detection technologies.



**Notes**

- Collaborating with Countering Weapons of Mass Destruction Office, U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) Strategic Sourcing Initiative, National Urban Security Technology Laboratory, Transportation Security Laboratory, Transportation Security Administration, and U.S. Customs and Border Protection.
- Leverages past CG Research and Development Project 5802: Maritime Trace Narcotic Identification/Verification.

**Sponsor:** CG-721      **Stakeholder(s):** DSF, NSF, CG-MLE, DHS S&T, CG-1B3, FORCECOM

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

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

<b>Project Timeline / Key Milestones</b>	<b>Project Start:</b> 1 Oct 19	
	Handheld Illicit Drug – Explosive Trace Detector (HID-ETD) Technical Evaluation CG Feedback Submitted	21 Apr 20 ✓
	DHS System Assessment and Validation for Emergency Responders (SAVER) Detector Analysis Started	30 Jun 20 ✓
	Compile current HID-ETD progress with SAVER Information to Complete Summary Deliverable	Oct 21
	<b>Drug and Explosives Detection Technologies Summary (Brief)</b>	<b>Dec 21 ★</b>
	<b>Project Completion:</b> Dec 21	

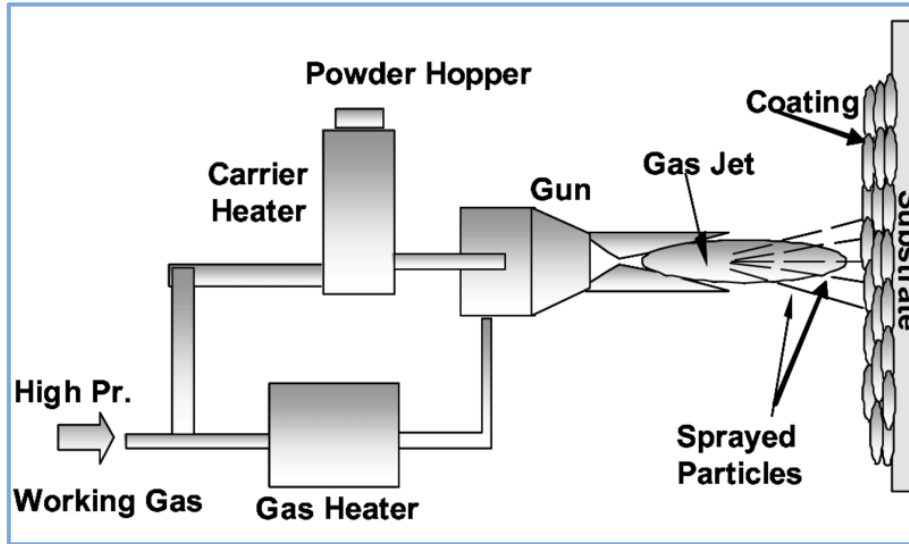


# Cold Spray Restoration of Vessel and Aircraft Components

9205

**Mission Need:** Cold spray restoration of vessel and aircraft components to support mission readiness.

- Objectives**
- Document process/criteria to identify U.S. Coast Guard (CG) vessel and aircraft components which are good candidates for restoration using cold spray.
  - Document process to work with Original Equipment Manufacturers, or any capable entity, on cold spray restoration.
  - Deliver decision support information regarding effective utilization of cold spray to improve CG surface and aviation mission readiness.



- Notes**
- Partner with CG's Additive Manufacturing Working Group.
  - Leverage research from the Army Research Laboratory, Ellsworth Air Force Base, Army Combat Capabilities Development Command Aviation & Missile Center, Adelphi Laboratory Center, Cold Spray Action Team Workshop, Connecticut National Guard, Naval Postgraduate School Sea Land Air Military Research Initiative, Oak Ridge National Laboratory, and Department of Energy National Laboratories.
  - Partner with Naval Research Lab and other Lab-Sync partners.
  - Explore Cooperative Research and Development Agreement with Industry.

<b>Sponsor:</b> CG-41	<b>Stakeholder(s):</b> CG-45, CG-711, SFLC, ALC
<b>RDC Research Lead:</b> LT Kristopher Thornburg	<b>CG-926 Domain Lead:</b> LT Steve Hager
<b>Anticipated Transition:</b> Knowledge Product Future Technology	

**Project Timeline / Key Milestones**

<b>Project Start:</b> 1 Oct 20	
Visit to Department of Defense (DoD) and Commercial Cold Spray Facilities	21 Apr 21 ✓
Parts Identified, Restored, and Tested for Repair Quality	Oct 21
<b>Cold Spray Restoration of Vessel and Aircraft Components (Brief)</b>	<b>Dec 21</b> ★
Cost Benefit Analysis: DoD vs. Commercial vs. CG Facility	Jan 22
<b>Cold Spray Restoration of Vessel and Aircraft Components (Report)</b>	<b>Jun 22</b> ★
<b>Project Completion:</b> Jun 22	



# Enhanced Rotary Wing Night Vision Goggle (NVG) Searches

1202

**Mission Need:** Improved NVG/augmented lighting to support SAR and LE missions.

## Objectives

- Deliver decision support information regarding Tactics, Techniques, and Procedures (TTP) opportunities to enhance rotary wing NVG searches for both Search and Rescue (SAR) and Law Enforcement (LE) missions by performing and documenting results of a Limited User Evaluation (LUE) for enhanced rotary wing NVG searches. Research focus will primarily be on augmented lighting sources and their ability to improve existing NVG technologies.
- Investigate mitigation strategies for backlight and ambient light effects for coxswains using NVGs.



## Notes

- Explore collaboration opportunities with Air Force Research Laboratory, Naval Research Laboratory, Army Research Laboratory (Adelphi Laboratory Center) and Army Combat Capabilities Development Command C5ISR Center Night Vision and Electronic Sensors Directorate.

**Sponsor:** CG-SAR

**Stakeholder(s):** CG-1B3, CG-711, CG-761, CG-41, ALC, ATC, LANT, PAC, FORCECOM, CG-731

**RDC Research Lead:**  
Mr. Mike Coleman

**CG-926 Domain Lead:**  
LT Steve Hager

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

## Project Timeline / Key Milestones

<b>Project Start:</b> 1 Oct 20	
Commercial/Military Lab NVG & Lighting Advancements Investigated	14 May 21 ✓
Technologies Investigated	23 Jul 21 ✓
<b>Enhanced Rotary Wing (RW) Night Vision Goggle (NVG) Searches (Brief)</b>	<b>9 Sep 21 ✓</b>
Decision Point on Proceeding to RW LUE	Oct 21
RW LUE Test Plan Developed and Technologies Acquired	Mar 22
RW LUE Completed	Apr 22
Evaluate Coxswain NVG Lighting Mitigation Strategies	May 22
<b>Augmented Lighting for NVG Searches Limited User Evaluation (Report)</b>	<b>Sep 22 ★</b>
<b>Project Completion:</b> Sep 22	



**Acquisition Directorate**  
Research & Development Center



CG Research & Development Center  
UNCLAS//Internet Release is Authorized

Indicates RDC Product ★  
October 2021 47



**Mission Need:** Improved detection, tracking, classification, and deterrence of underwater threats.

**Objectives**

- Deliver decision support information regarding improved C-UUV capabilities for detection, tracking, classification, and deterring underwater threats by performing and documenting results of Limited User Evaluation for C-UUV capabilities.



**Notes**

- Building on past U.S. Coast Guard Research and Development Center anti-swimmer work.
- Coordinating with U.S. Naval Undersea Warfare Center - Newport, U.S. Naval Information Warfare Center, and U.S. Indo-Pacific Command.

**Project Timeline / Key Milestones**

**Project Start:**

Please e-mail [RDC-Info@uscg.mil](mailto:RDC-Info@uscg.mil) for information concerning the Milestones and Deliverable Schedule.

**Project Completion:**

**Sponsor:** CG-721

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

**RDC Research Lead:**  
C-UUV Research Team

**CG-926 Domain Lead:**  
C-UUV Research Team

**Anticipated Transition:** Knowledge Product  
*Future Technology*



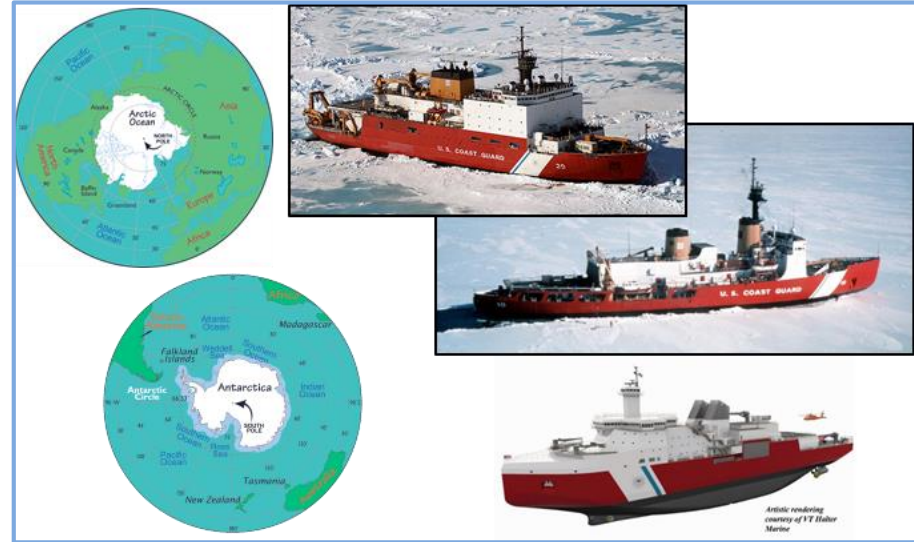
# Polar Regions Technology Evaluation 2021 - 2022

62103

**Mission Need:** Provide support to relevant research efforts in the Polar Regions.

## Objectives

- Provide support to projects which develop capability improvements in the execution of U.S. Coast Guard (CG) missions in Polar Regions.
- Cultivate joint efforts and interagency cooperation between government sectors and civilian entities.
- Evaluate emerging technologies to enhance CG operations in Polar Regions.



## Notes

- Anticipate partnerships with the Bureau of Safety and Environmental Enforcement, U.S. Department of Homeland Security Office of University Programs, U.S. Department of Defense Labs, U.S. Northern Command, National Labs, Office of Naval Research Science Advisor in Prague for communications capabilities, Naval Research Laboratory, and the National Science Foundation U.S. Antarctic Program (McMurdo Station).

**Sponsor:** CG-751

**Stakeholder(s):** CG-5PW, CG-761, PAC-3, LANT-5, D17

**RDC Research Lead:**  
Ms. Shalane Regan

**CG-926 Domain Lead:**  
Ms. Karin Messenger

**Anticipated Transition:** Knowledge Product  
Future Technology

## Project Timeline / Key Milestones

**Project Start:** 1 Oct 20

Partners/Technologies/Test Plans Identified (FY21)	30 Jul 21 ✓
FY21 Research Efforts/Partners Solicited	30 Jul 21 ✓
Tests/Demonstrations Complete (FY21)	Nov 21
<b>Polar Technology Evaluation FY21 (Application Note)</b>	<b>Mar 22 ★</b>
Partners/Technologies/Test Plans Identified (FY22)	Apr 22
FY22 Research Efforts/Partners Solicited	May 22
Tests/Demonstrations Complete (FY22)	Oct 22
<b>Polar Technology Evaluation FY22 (Application Note)</b>	<b>Mar 23 ★</b>
<b>Project Completion:</b> Mar 23	



**Acquisition Directorate**  
Research & Development Center



CG Research & Development Center  
UNCLAS//Internet Release is Authorized

Indicates RDC Product ★  
October 2021 49

# Bromine-Free Water Purification System

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

**Objectives**

- Deliver decision support information regarding effective utilization of bromine-free water purification systems for National Security Cutters, Fast Response Cutters (FRC), and Operational Patrol Cutters (OPC).

**Notes**

- Legislative requirement.
- Collaborating with the U.S. Army Engineer Research and Development Center Construction Engineering Research Laboratory; Naval Surface Warfare Center – Carderock Division, Corona Division, Crane Division, Philadelphia Division; and U.S. Naval Research Laboratory.



<b>Sponsor:</b> Surface Force Logistics Center (SFLC)	<b>Stakeholder(s):</b> CG-45, SFLC-LRE
<b>RDC Research Lead:</b> Ms. D. J. Hastings	<b>CG-926 Domain Lead:</b> LT Steve Hager
<b>Anticipated Transition:</b> Product <i>Pending Acquisition</i>	

**Project Start:** 27 Jul 19

<b>Project Timeline / Key Milestones</b>	Bromine-Free Water Purification Partners Identified and Pilot Study Started (Phase 1)	19 Jun 20 ✓
	<b>Bromine-Free Water Purification System Pilot Study (Brief)</b> (Phase 1)	<b>9 Jul 20 ✓ ★</b>
	Begin CG Compatibility Review of Bromine-Free Systems on FRC and OPC with NSWC Carderock (Phase 2)	8 Sep 21 ✓
	Bromine-Free Water Purification Systems Feasibility Analysis Complete (Phase 1)	Nov 21
	Bromine-Free Systems Integration Feasibility Study (Phase 2)	Mar 22
	<b>Bromine-Free Water Purification System Summary (Report)</b> (Phase 2)	<b>Dec 23 ★</b>
	<b>Project Completion:</b> Dec 23	





# FY21-22 Surface Branch Support

99942122

**Mission Need:** Maintain competency/knowledge; provide rapid response; and external liaison.

## Objectives

- Maintain U.S. Coast Guard (CG) Research and Development Center (RDC) competency and technical knowledge in understanding present and future surface asset technology and systems including: unmanned surface & sub-surface systems; boarding team tools; compel compliance; law enforcement; Chemical, Biological, Radiological, Nuclear, and Explosives countermeasures; alternative energy; and polar region capabilities.
- Maintain Branch infrastructure to support RDC portfolio objectives.
- Support Surface Strategic Project Portfolio Alignment and CG DCO/DCMS Research Priorities.
- Provide expert input to CG stakeholders regarding surface technologies.
- Foster continued relationships with CG sponsors/stakeholders and external U.S. Department of Defense labs, U.S. Department of Homeland Security (DHS) Science & Technology Directorate (S&T) and other government agency/academic partners.
- Provide service academy, Historically Black College or University, and Minority Serving Institution students internship opportunities.

## Notes

- Complete corrosion control and monitoring evaluation.
- Explore unmanned surface vessel collision avoidance autonomy.
- RDC Arctic/Polar Coordinator and Representative to U.S. Arctic Research Commission.



## Project Timeline / Key Milestones

<b>Project Start:</b> Ongoing	
<b>Rough Bar Illumination (REACT Report)</b>	24 May 21 ✓ ★
CG-HALLTS Field Support	25 Jun 21 ✓
<b>Corrosion Control and Monitoring (Technical Note)</b>	Apr 22 ★
<b>Project Completion:</b> Ongoing	

**Sponsor:** CG-926

**Stakeholder(s):** CG-43, CG-45, CG-5PW, CG-721, CG-731, CG-751, CG-932, SFLC, CGD17, DHS S&T

**RDC Research Lead:**  
Mr. Evan Gross

**CG-926 Domain Lead:**  
LT Steve Hager

**Anticipated Transition:** Various



**Acquisition Directorate**  
Research & Development Center



CG Research & Development Center  
UNCLAS//Internet Release is Authorized

Indicates RDC Product ★  
October 2021 51

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

**Purpose:** Establish a collaborative relationship between the U.S. Coast Guard Science & Technology Innovation Center and the Department of Homeland Security (DHS) Science and Technology Directorate (S&T) to share and advance technologies that will be mutually beneficial to both parties.

CG-STIC Funding Type: DHS S&T      RDC Research Lead: LCDR Anderson Ogg      CG-926 Domain Lead: Ms. Minh-Thu Phan

STIC Note Title	Objective	Office Supported	Due/ Delivery Date
<b>MH-65 Maintenance Kit</b>	<i>Determine if off-the-shelf MH-65 Deck Plate bolt storage system improved the maintenance task sufficiently to justify cost.</i>	CG-41, ALC	30 Nov 20 ✓
<b>Enhanced Hearing Personal Protective Equipment</b>	<i>Improve communication among marine inspectors in noisy environments while reducing energy of frequencies that can damage human hearing.</i>	Boarding and Inspection Teams	30 Nov 20 ✓
<b>Imaging Sonar Evaluations</b>	<i>Improve underwater situational awareness for various missions including Ports, Waterways, and Coastal Security; disaster recovery (Captain of the Port support); and SAR.</i>	CG-721	13 Jan 21 ✓
<b>Handheld Forward-looking Infrared Technology</b>	<i>Support small boat Ports, Waterways, and Coastal Security mission execution improvement by providing night time imaging.</i>	CG-721	22 Feb 21 ✓
<b>Small Boat Wash System</b>	<i>Prevent environmental contamination by filtering wash water for spoils and releasing filtered water.</i>	Alameda Naval Engineering	24 Feb 21 ✓
<b>Remotely Operated Lifesaving Devices</b>	<i>Support Search and Rescue mission execution from shore-side and nearshore.</i>	CG-SAR	23 Mar 21 ✓
<b>Counter Narcotics Enforcement Go-Kits</b>	<i>Support counter drug mission Presidential Order to increase operations in SOUTHCOM area of operations.</i>	CG-721	18 May 21 ✓
<b>Light-emitting Diode Lighting for Safety – Rotary Wing</b>	<i>Improve safety in operations including hoist operations using lighted collars around hoisting hooks.</i>	CG-1131, ALC	3 Jun 21 ✓
<b>Light-emitting Diode Lighting for Safety – Headgear</b>	<i>Improve safety in operations for firefighting and hard hat areas for deck operations.</i>	CG-731,741,751	20 Jul 21 ✓

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



**Acquisition Directorate**  
Research & Development Center



CG Research & Development Center  
UNCLAS//Internet Release is Authorized

# Science & Technology Innovation Center (CG-STIC) Tasks (Cont'd)

CG-STIC Funding Type: DHS S&T

RDC Research Lead: LCDR Anderson Ogg

CG-926 Domain Lead: Ms. Minh-Thu Phan

STIC Note Title	Objective	Office Supported	Due/ Delivery Date
<b>Unmanned Surface Vessel</b> (Title change from: Teleoperated RBS Proof Of Concept)	<i>Support Ports, Waterways, and Coastal Security mission in accordance with Commandant strategy to use unmanned and autonomous systems to conduct missions.</i>	CG-731	27 Jul 21 ✓
<b>Stabilized Binoculars</b>	<i>Determine if hand-held stabilized binoculars are worth their added cost and complication, and for which types of units they work best.</i>	CG-731,741,751	30 Aug 21 ✓
<b>Mobile Tethered Video Systems</b>	<i>Improve maritime domain awareness from land-based surveillance balloon.</i>	CG-721	13 Sep 21 ✓
<b>Diesel Outboard Engines</b>	<i>Long term user evaluation to support single-fuel concept which will reduce cost due to efficient infrastructure by eliminating duplicate framework.</i>	CG-731	5 Oct 21 ✓
<b>3D Metal Printing</b>	<i>Work towards overcoming obsolescence and supply chain shortages for various metal parts; work is for all CG communities, but focused on surface and aviation.</i>	ALC, CGA, CG-4	Nov 21
<b>Window Clarity System</b>	<i>Identify COTS solutions to address pilot house window obstructions due to fogging and icing under adverse environmental conditions.</i>	CG-731,741,751	Jan 22
<b>Laser Corrosion Removal</b>	<i>Improve maintenance on boats and aircraft by using proven laser technology for corrosion removal.</i>	SFLC ESD	Jan 22
<b>Inland Brush Cutter</b>	<i>Improve Aids to Navigation mission execution and reduce injuries and crew downtime from poison ivy and snake bites.</i>	D-8	Mar 22
<b>Drone Mapping</b>	<i>Provide Maritime Domain Awareness for disaster recovery/aerial inspections.</i>	CG-711, CEU	Jun 22
<b>Trillium Ball</b>	<i>Evaluate sensors to support data generation and imaging for Law Enforcement and Search and Rescue missions.</i>	CG-711	Jun 22

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



**Acquisition Directorate**  
Research & Development Center



CG Research & Development Center  
UNCLAS//Internet Release is Authorized



## Branch Support

**Mission Need:** Increase unity, share knowledge, build innovation culture, and transition technology.

### Objectives

- Maintain U.S. Coast Guard (CG) Research and Development Center (RDC) competency and technical knowledge in understanding present and future technology to support CG mission execution.
- Maintain a collaborative relationship between the CG's Research, Development, Test and Evaluation Program Office and the U.S. Department of Homeland Security (DHS) Science & Technology Directorate (S&T) to share and advance technologies that will be mutually beneficial to both parties.
- Provide Tactics, Techniques and Procedures for use in development of requirements for new technology evaluations and transitions.
- Maintain Branch infrastructure to support RDC portfolio objectives.
- Support Strategic Project Portfolio Alignment and CG DCO/DCMS Research Priorities.
- Provide expert input to CG stakeholders regarding advanced technologies.
- Provide service academy, Historically Black College or University, and Minority Serving Institution students internship opportunities.

### Notes

- Align with DHS S&T Integrated Project Team gaps and CG Idea Submission Review input.
- Support Bear Trap enhanced Maritime Domain Awareness (MDA) effort with District 11.
- Support RDC tasks as requested.
- Collaborate with the CG RDC Environment & Waterways branch to prototype Intelligence, Surveillance, and Reconnaissance Buoy with sensors for MDA.

**Sponsor:** CG-926

**Stakeholder(s):** DHS S&T, Various

**RDC Research Lead:**  
Mr. Timothy Hughes

**CG-926 Domain Lead:**  
Ms. Minh-Thu Phan

**Anticipated Transition:** Various



### Project Timeline / Key Milestones

<b>Project Start:</b> Ongoing	
<b>Low Profile Drone Vessel Analysis (REACT Report)</b>	19 Mar 21 ✓ ★
CG District 11 MDA "Bear Trap" Support	1 Apr 21 ✓
FY21 Support	30 Sep 21 ✓
FY22 Support	Sep 22
<b>Project Completion:</b> Ongoing	

