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U.S. Coast Guard Deterrence Evergreen

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N O T I C E

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EXECUTIVE SUMMARY

The United States Coast Guard Research and Development Center (RDC) joined with the Commandant's Emerging Policy staff (DCO-X) to conduct a research-based Evergreen event at Naval Support Activity Annapolis focused on deterrence. This was the fourth RDC/DCO-X Evergreen collaboration. The 71-player, five-team event examined the current role of deterrence in USCG missions and its future potential. Participants came from 14 federal government agencies, two state agencies, five academic institutions and six industry groups. Mr. Jeff Radgowski (USCG Intelligence Deputy) provided the Keynote, framing the issue of deterrence and its intersection with intelligence. Retired USCG RADM Pat DeQuattro and Army Development Command (DEVCOM) Deputy, Dr. Eric Moore served as senior mentors. Five teams discussed assigned questions and developed recommendations for consideration by Coast Guard Leadership.

A two-page **Quick Look Report** was delivered on 23 September 2024. This report provided key take-aways and developed an alternative USCG future. The conceptual future was based on a synthesis of the workshop take-aways and created in a way that depicts a USCG that fully embraces and integrates deterrence concepts and analytics. This **Final Report** provides discussion of the facilitation process and recommendations and challenges to achieve the alternative future presented in the two-page **Quick Look Report**.

Deterrence is currently being applied across the USCG. There is ample anecdotal evidence of its use and impact, but no means or method of directly measuring deterrence. Historical examples include the use of deterrence threshold models for drug interdiction and USCG research experiments into the uses of game theory in USCG operations. Today there are risk models that implicitly include deterrence in maritime security operational planning and Marine Transportation System (MTS) security. Participants agreed that the modeling alone is insufficient; the current data capture and analysis techniques are not tailored to measure an association between USCG activities and deterrence effect. Despite the lack of meaningful measurement, there are near- and long-term opportunities that can be explored, primarily those created by big data analytics and AI. Participants also discussed the importance of advanced technologies, especially uncrewed systems (UxS), and strongly concurred they would have a significant force-multiplying effect on future deterrence strategies.

Participants indicated the service should start leaning forward now with integrating deterrence in both strategy and operational planning processes to make deterrence effectiveness a key factor. To this point, the **Final Report** offers many recommendations to consider. Many of the current USCG initiatives to grow data analytics, provide for integrated data environments, and adoption of AI competencies will serve as enablers and help fully integrate deterrence measurement in the future. To initiate, we recommend designing and conducting a pilot on deterrence measurement for purposes of furthering a specific mission set or placing emphasis on a specific global region (illegal fishing, boating safety, and Arctic are all opportunities). This approach would allow the USCG to test out concepts and use real world environments to assess the USCG readiness spectrum for quantifying deterrence. Key to the pilot success would be partnerships with industry and academic expertise.

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1 INTRODUCTION

For the purposes of this Evergreen workshop, "deterrence" was defined as "displacing or delaying unwanted behavior through proactive measures." In practice, deterrence aims to discourage an individual or individuals from such behavior. An effective deterrence strategy rewards "good behavior" and punishes "bad behavior." While the USCG has implemented the concepts of deterrence in particular communities to deter unwanted behavior, it has not adopted an explicit data-informed strategy for effecting deterrence.

The Deterrence Evergreen Workshop Approach: Before the event began participants were divided into five teams, each with specific objectives, focus areas, and guiding questions. The teams met virtually before the event started and began to examine where deterrence is currently being incorporated and if it could be quantified; where it should be employed; the current state of deterrence research; how data analytics including Artificial Intelligence/Machine Learning (AI/ML) could advance its use; and the complimentary aspects of Intelligence and Deterrence in support of USCG operations.

Day 1: Before the start of the workshop each of the five team leaders and facilitators were provided a facilitation guide developed by DCO-X. The guide provided a step-by-step "playbook" for each team to employ as they addressed their assigned research questions. A framing narrative was developed and presented to each team. Each team conducted a series of exercises where team members were asked to consider challenges that the Service would face, which were later organized into themes. The foresight exercise then moved to a "What's on Your Radar?" activity. A radar diagram was created on white boards with three circles: primary, secondary, and tertiary. The figure below shows a team example of the primary circle. Facilitators worked with their teams on the relative importance of the challenges developed regarding the use of deterrence and then asked to identify solutions for the priority challenges. This was followed by an exercise to develop solutions.

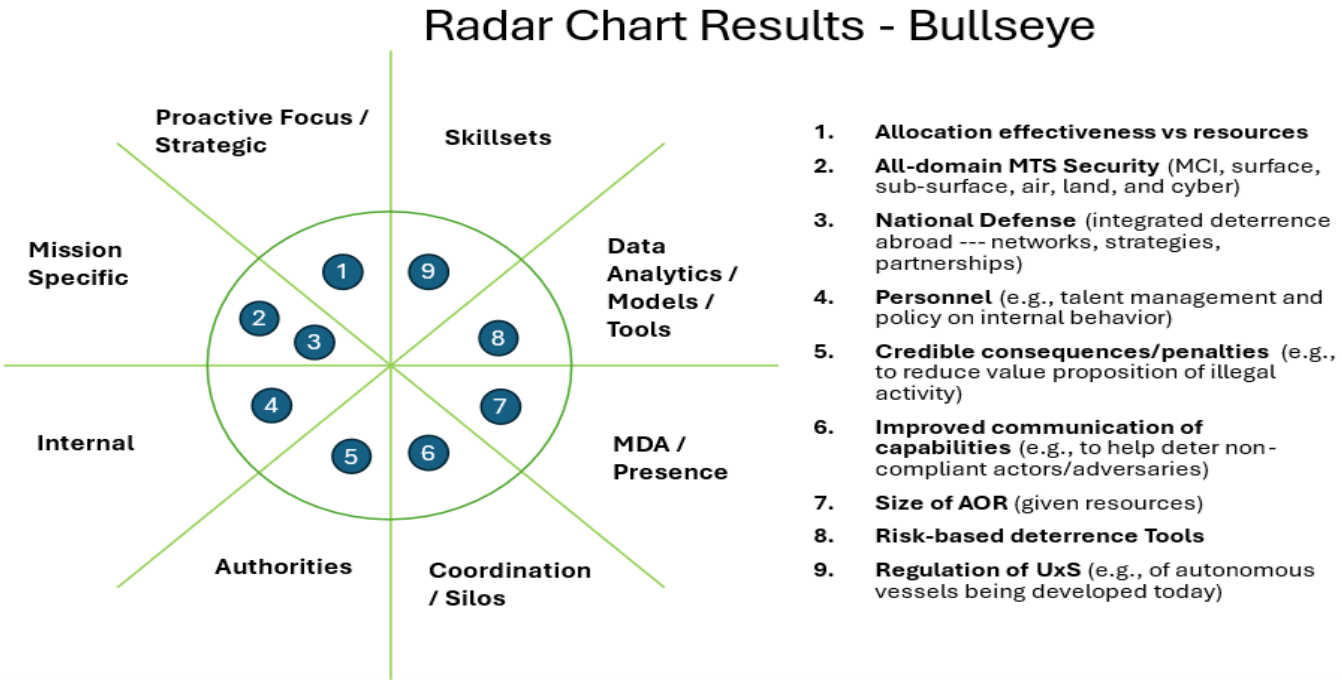

Figure 1. Radar Chart Results – Bullseye.

Day 2: On the second day the teams developed a Difficulty Matrix, that presented Difficulty and Importance on an X and Y axis, with four labeled quadrants: Low Hanging Fruit, High ROI, Strategic, and Low ROI. The objective of this exercise was to create a quad chart to plot relative importance (impact) and difficulty (cost) of the solutions to the most "wicked problems" identified in the previous exercise regarding deterrence. The below figure and table provide an example of a Difficulty Matrix for a set of solutions.

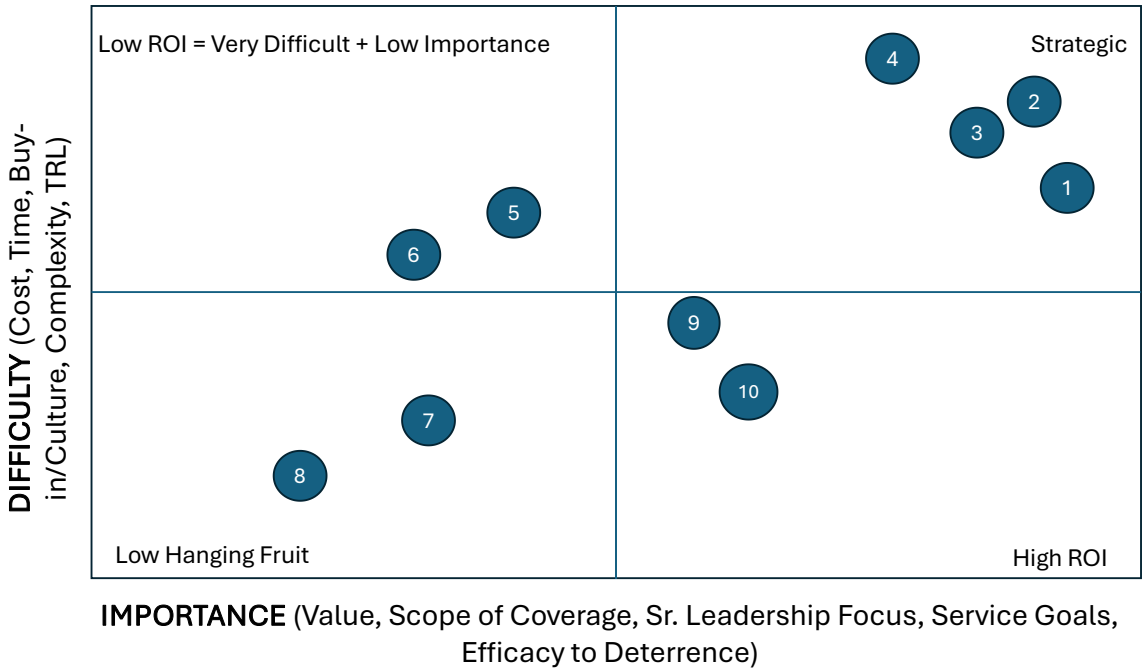

Figure 2. Difficulty matrix.

Table 1. Solution set to difficulty matrix.

Hi ROI/Hi Diff	1.	**Proactive Focus / Strategic –** Specifically integrate deterrence in USCG strategy and operational planning processes to make deterrence effectiveness a key factor. ▪ Top to bottom line of sight on deterrence strategy/activities. ▪ Conduct a pilot on deterrence measurement for a specific mission set (illegal fishing represents an opportunity for a USCG pilot). ▪ Leverage partner resources.
	2.	**Mission-specific Deterrence – All Domain MTS Security –** Strategically deploy enhanced capabilities and vessel targeting to discourage threats with use of advanced technology. ▪ Maritime sensors and robotics for persistent coverage. ▪ AI/ML for vessel targeting and identifying physical and cyber threats. ▪ Leverage NTC correlations of targeting/screening. ▪ Leverage Navy underwater threat technology.
	3.	**Authorities** – Address key authority gaps that are degrading the deterrence effect of USCG enforcement activities and making inefficient use of enforcement resources – because prosecution outcomes are being discarded/minimized. ▪ Build liaisons with other agencies and judicial jurisdictions for outcomes.
	4.	**MDA / Presence – Situational Awareness / Response** - Make deterrence planning a key focus in MDA technology initiatives. ▪ Task Force Medusa / DoD Minerva. ▪ Leverage space-based solutions to enhance MDA. ▪ Advanced analytics to synthesize/integrate data. ▪ Learn from existing and technical/intelligence data. ▪ Long-range and persistent surveillance.
Lo ROI / Lo Diff	5.	**Internal – Personnel** – Enact ways to retaining specialized positions and deterring erosion of key skills and capability gaps. ▪ Better use of civilian billets for key operational areas. ▪ Greater flexibility on PCS choice/flexible paths. ▪ Follow next generation needs.
	6.	**Coordinate strategic Communications for Deterrence** – Examine how external communication strategies might be adjusted, enhanced, and even exaggerated to provide deterrence signals. ▪ Leverage social media. ▪ Publicize capabilities and interdictions. ▪ Create adversary uncertainty. ▪ Empower COs for local communications. ▪ Leverage CG-AUX skills.
Lo ROI/Lo Diff	7.	**Mission-specific Deterrence – National Defense** – Employ Enterprise Risk Management methods to estimate deterrence buy-down of integrated deterrence on national defense priorities. ▪ Wargaming. ▪ Risk assessments.
	8.	**Skillsets** – Strengthen deterrence against multi-mission threats from autonomous systems employed in/against the MTS by leveraging key external partnerships to augment USCG capabilities and experience. ▪ Industry partners. ▪ Navy/OGAs. ▪ Associations (AUVSI, JAIC).
Hi ROI/Lo Diff	9.	**Mission-specific Deterrence – National Defense** – Make the USCG a more integrated partner on deterrence priorities for national defense. ▪ Better define "Asks" from other agencies. ▪ Make USCG "Asks" of other agencies. ▪ Realistic integrated operational plans. ▪ Full engagement in exercises.
	10.	**Data Analytics / Models / Tools –** Incorporate deterrence effectiveness enhancement strategies in operational planning. ▪ Use of Cooperative Game Theoretical methods with external partners. ▪ Condition-based patrols (situation driven, not time/schedule-based).

The results were briefed out to all the teams, with each individual teams' deterrence challenges, radar graphic, solutions, and importance/difficulty matrix. Each team developed specific examples for each quadrant.

2 RESULTS

2.1 Summary of Team Key Issues

Team #1 looked at where deterrence is currently being used in the USCG and if there is a way to quantify it. Key issues included the recognition that deterrence is important and serves as a factor to most USCG missions, but the absence of its deliberate integration into strategy and operational planning processes along with authority gaps make it difficult to measure and have meaningful persistent deterrence.

Team #2 looked at select USCG missions and activities where deterrence should be infused, including joint efforts with Navy and interagency partners. Key issues identified included the need to understand human behavior to have effective deterrence, controlling the narrative, and importance of remaining credible with actions being consistent with messaging.

Team #3 looked at the state of research on deterrence within academia, DoD, NATO allies, and law enforcement. They evaluated who the RDC should team with for collaboration and the best ways to integrate deterrence in future policy issues. With aggressive nation-state behaviors increasing at the northern latitudes due to opening of new sea lanes, deterrence in the Arctic region was viewed as an area of high focus. Current operations in the Arctic are suboptimal and require initiating and sustaining a permanent presence to strengthen deterrence activities against multi-mission threats, to include autonomous systems employed in/against the MTS. This can be accomplished with greatest effect by leveraging key external partnerships to augment USCG capabilities and authorities. Key Challenges of implementation include a harsh operating environment, establishing logistics infrastructure, and adapting current policies, including UUV use and c-UUV TTPs.

Team #4 explored how new data analysis techniques can be used to advance deterrence. Key issues included adoption in the form of organizational buy-in, including the application of AI/ML as a tool that can assess the sentiment of parties we want to deter and analyze social media to quickly spot conflicts. Change management involved in advancing analytical techniques to support deterrence would be a challenge along with creating the trust in the data sourcing and future large language models that will be needed.

Team #5 examined the intersection of intelligence and deterrence. Key challenges include an upward flattening of the information environment/loss of intelligence as an advantage with future ubiquitous technical capabilities, adversary intel capabilities, and the technical advantage to sift through and validate data.

Discussion: Over the last decade various written products produced within the Coast Guard, both internally and externally, have highlighted "deterrence" activity within the service's eleven missions. Is presence a successful deterrence measure? For example, if smugglers see a Coast Guard cutter on the horizon or spot a Coast Guard aircraft, will they "dump" their illegal load and head south? Should we expect smugglers will do the same in 2035? Or will more specific deterrence activity be required to thwart unwanted, future patterns of behavior?

The heart of the issue is that in the past, quantifying deterrence has been difficult. (Taquechel & Lewis, 2012) In the article "How to Quantify Deterrence and Reduce Critical Infrastructure Risk" (Taquechel & Lewis, 2012) the Naval Postgraduate School's Center for Homeland Defense and Security's publication noted that "various elements within DHS have begun efforts to analyze deterrence, or influence adversary decision-making before a CI attack is executed. This necessarily involves considering human factors; specifically, thinking about the adversary's approach to terrorism planning. For example, the U.S. Coast Guard, in conjunction with the University of Southern California's Center for Risk and Economic Analysis of Terrorism Events (CREATE), has begun the development of PROTECT, a model intended to help Coast Guard units deter adversary planning by patrolling CI in a random fashion." The Port Resilience Operational / Tactical Enforcement to Combat Terrorism (PROTECT) work helped inform one facet of the service's Risk-Based Maritime Security & Response Operations (RB MSRO).

Continued the researchers, "Deterrence thus inherently includes our adversary's assessment of their risk, or perceived reduction in utility, as well as our assessment of our own risk. Ultimately, when deliberating deterrence strategies, we want to know answers to three questions: (1) what is the extent to which the attacker is deterred, (2) what the risk reduction is, or change in expected defender loss resulting from that deterrence strategy; and (3) what the cost implications are, or defender deterrence investment efficiency, of that deterrence strategy." These issues play into the issue of deterrence including definition, application, and

quantification. The Deterrence Evergreen workshop further delved into these questions, pursuing both short- and long-term service recommendations for strategic, operational, and tactical levels to aid in mission decision making and future policy.

An initial finding of the Evergreen event was that all missions have a nexus with deterrence. Based on the team's knowledge/understanding of USCG missions, the teams felt that the impacts of deterrence on USCG missions in priority order can be characterized as follows:

Ports, Waterways, and Coastal Security: Emphasis on both passive and active deterrence activities to protect infrastructure through continuous monitoring, patrols, and security measures to prevent and/or thwart terrorist attacks and unlawful activities in U.S. waters. This includes visible security measures, intelligence gathering, and readiness to respond to terrorist threats.

Drug Interdiction: High emphasis on deterrence through visible patrols, surveillance, and interception efforts to disrupt drug trafficking operations.

Migrant Interdiction: Significant resources are allocated to deterring illegal immigration by maintaining a strong maritime presence along maritime boundary lines and conducting interdictions.

Defense Readiness: Deterrence is involved in the support of the National Defense Strategy by maintaining a state of readiness to support DoD operations. This is especially important in gray zone engagements.

Living Marine Resources: Resources are allocated to deterrence through monitoring and enforcing regulations to protect marine life.

Marine Environmental Protection: Deterrence is involved in enforcement of pollution laws, penalties to responsible parties, and/or inherent USCG capabilities like effective pollution forensics.

Other Law Enforcement: Includes various deterrence efforts to uphold maritime laws and regulations, such as smuggling and vessel safety.

Search and Rescue: Deterrence is involved in promoting safety and preventing accidents through education and outreach such as opting into programs that help take the search out of search and rescue.

Marine Safety: Deterrence is involved in the enforcement of safety regulations including vessel and facility inspections along with strong USCG community and stakeholder relations.

Aids to Navigation: Deterrence is involved in mariner communication of safe navigation routes and good behavior in our waterways.

Ice Operations: Deterrence is involved in communicating ice conditions to deter or reroute vessels that might otherwise operate in hazardous ice conditions.

The above connections illustrate how the concepts of deterrence are woven into the fabric of USCG mission areas. A challenge is how each mission set's deterrence component can be quantified and measured. There are also many powerful anecdotal instances of its use and impact. Recent USCG and CBP activities that include the use of aerostats, deployment of multiple Saildrones, and RDC field research on human machine teaming of uncrewed vessels with UAS and other capabilities appear to offer temporary deterrent effects. At

least until adversaries determine sensor range(s), schedules of operation, and workarounds. Participants believed that a future organizational deterrence strategy, along with an ability to directly measure deterrence, would facilitate its transition from anecdotal use cases to a more persistent and integrated one.

3 RECOMMENDATIONS

Each of the five teams developed recommendations for consideration by leadership at the strategic, operational and tactical levels. Recommendations were grouped as Policy Recommendations, Operational Planning Recommendations, Research and Development, and Human Factors Recommendations.

3.1 Policy Recommendations

- The USCG should formally define deterrence for mission areas, as appropriate, while examining how deterrence and its impact can affect mission success by establishing a working group of Strategic/Operational/Tactical stakeholders. The USCG should also propose a formal definition, identify missions where deterrence is a component, and where measurement methods are needed. This Lexicon would be used in a manner like the DHS Risk Lexicon.
- The USCG should focus on how Intelligence policy prepares for changes to the socio-political landscape (contested environments like the Arctic, contested logistics, contested resources, etc.) and its relationship to deterrence activities. This could entail leveraging an outside organization such as a DHS S&T Center of Excellence, RAND, MITRE, Johns Hopkins Applied Physics Laboratory (JHU APL) or the DoD Ted Stevens Center for Arctic Security Studies, Anchorage Alaska. USCG Headquarters Programs engaged in strategic foresight/planning would be key HQ stakeholders along with both Areas.
- The USCG should update policy on its activities in the information environment/strategic messaging. An example proposed multi-faceted information campaign could include deterrence of boating while intoxicated (BWI) and reckless boating, focusing on recreational boaters, young adults, and frequent boaters. The campaign could emphasize clear and consistent messaging, highlighting the dangers and legal consequences through memorable taglines, collaboration with organizations such as Mothers Against Drunk Driving (MADD) and the National Association of State Boating Law Administrators (NASBLA). Messaging could be amplified through engaging local communities and utilizing multiple channels, including social media, traditional media, and on-site messaging. Educational programs, including boating safety courses and workshops, could incorporate modules on the dangers of BWI and reckless boating. Increased patrols by the USCG and local law enforcement could further heighten visibility.
- Deterrence, especially in geo-political strategic areas such as the Arctic, is more than periodic patrols. The USCG supported by a whole-of-government approach needs to focus on a permanent presence in the region**.** This would offer opportunities for more persistent deterrence of Russian and Chinese incursions. By maintaining a visible and active presence, the service signals to potential aggressors that incursion will trigger a response. This will require educating the public as to why the Arctic, and specifically deterrence in that region, is important to the national security and economic viability of the US.

- Considering the projected upward flattening of the information environment and the potential diminishment of intelligence as an asset by the 2035-2045 timeframe, the USCG should develop a strategic plan to harness AI to gain a technical advantage in data validation and analysis. The AI-curated data could significantly aid USCG operational planners in developing targeted deterrence activities, ranging from preventing violations of laws and regulations to combating human trafficking. For example, by proactively anticipating living marine resource incursions with the convergence of AI-driven intelligence and patterns-of-life, the USCG can optimize its resources and amplify its deterrence efforts. To be best prepared for this progress the Coast Guard needs to prioritize data collection, processing, and archiving. Historical data associated with Coast Guard assets and mission response will be the capital that fuels the high-powered analytics driving AI.

3.2 Operational Planning Recommendations

- The USCG should integrate deterrence in its strategy and operational planning processes to make deterrence effectiveness a key factor. A quantitative experimental test plan could be designed to conduct a pilot on deterrence measurement for purposes of furthering a specific mission set or emphasis on a specific global region. This approach would allow the USCG the flexibility to specialize a pilot on a mission or region that can address strategic urgency and optimize partnerships and academic resources on either operations or locations of highest organizational priority.
- The USCG should rely on tried-and-true operational models, such as Joint Interagency Task Force or Patrol Forces Southwest Asia, when developing plans for major deterrence campaigns, such as the Arctic, rather than starting from scratch. The Joint Task Force-like model is well known and could be replicated for a specific need or to force a specific behavior.
- In the post 9-11 world, the USCG is challenged to clearly define and execute Maritime Domain Awareness (MDA). To ensure that deterrence will be effective across current and future mission areas, MDA must be enhanced and standardized to effectively address the increasing demands on:
    - International waterway security (Perhaps the greatest example of this is the Indo-Pacific Gray Zone, that space between politics and operations and war and peace. The ongoing PRC interference, incursions and imposition would be the starting point for this analysis).
    - Arctic operations & security
    - Securing Arctic /Ant-Arctic fisheries and minerals
    - Environmental changes, competition, conflict
    - Urban density of the US ports
    - Public events / Large gatherings
    - Economic development

3.3 Research and Development

- The USCG should leverage Research, Development, and Innovation activities of DoD, other agencies (e.g., IUUF mission and Navy presence) as well as its own RDC while simultaneously employing the ingenuity of academia and private industry through partnerships.

- Industry and higher-level educational institutions have already made in-roads with technologies that make sustained asset and human presence in the Arctic more achievable. The federal government, including the DHS S&T Office of University Programs, needs to ensure funding and grants are provided to expand R&D efforts to solve the challenges of a permanent operational presence in the Arctic. The USCG needs to be a part of this R&D and ensure its own internal technical authority requirements are flexible enough to adopt these emerging cold-weather technologies. This effort can build on the RDC relationship with the DoD Laboratory Commanders' Sync.
- The USCG needs to increase its investments in R&D activities. The USCG has success in leveraging DoD, academia and other agencies; however, the rate of change on the global scale, especially in the AI/Information/Technology space, has outpaced USCG organizational capabilities and capacities to address "speed to market and speed to scale" solutioning and implementation.

3.4 Human Factors Recommendations

- The USCG can enhance their deterrence operations by leveraging workforce adaptations such as ManTrainEquip (MTE) and Human-in-the-loop (HITL) or Human-out-of-the-loop (HOTL) systems. MTE involves integrating training, equipment, and personnel to improve operational readiness and effectiveness. This could include enhanced training programs, advanced equipment, and integrated operations. HITL systems involve human operators actively participating in decision-making processes, which can be crucial for real-time decision making, adaptive responses, and ethical considerations. HOTL systems operate autonomously without direct human intervention, which can be beneficial for surveillance operations, rapid response, and data analysis. By integrating these workforce adaptations, the USCG can enhance their deterrence operations, making them more efficient, responsive, and adaptable to evolving maritime threats.
  - By 2035-2045, on the global scale, we (the collective business world) will all be competing for the same set of talent to help gain/maintain the competitive advantage to meet organizational success. The USCG will need to rethink and redevelop accession and transition points for the work force and clearly define how that workforce must interact to achieve mission success. This is exponentially complex in the interface of deterrence that currently does not have a simple measure to record the means of success.
  - The USCG should examine applying deterrence precepts to internal activities to prevent and deter misconduct, unethical behavior, and other violations by developing clear policies and procedures, providing training and education, conducting regular inspections and audits, implementing a robust reporting system, and enforcing consequences for violations in a consistent and fair manner. The USCG is currently undertaking many of these activities, but their value needs to be reinforced and further strengthened. Applying new ways of thinking about deterrence to internal activities may help the USCG address human resource management issues that are deterring recruitment and staff retention and further prevent unacceptable behaviors affecting personnel satisfaction with USCG service.
  - The USCG should consider growing competencies in behavioral and decision-making sciences with the necessary skills to craft deterrence-focused activities. With this organic skills tune-up, the USCG can better develop effective approaches to deterrence activities that consider the complex motivations and behaviors of individuals and groups operating on the water.

Figure 3. Group picture of Evergreen Deterrence participants. USCG Picture.

Evergreen Overview

Project Evergreen is the Coast Guard's strategic foresight program designed to identify long-term risks and opportunities across many plausible futures over the next 25 years. Evergreen Pinecones are shorter, focused sessions that bring together key operational, academic, and industry thought leaders for a deep dive on a particular topic,

Each Evergreen Pinecone frames future USCG strategies, operational approaches, and research areas to address impact concerns specific to the topic through 2050.

The event output helps the Service formulate adaptation, mitigation, resilience strategies and focus R&D initiatives for the coming decades.

RDC supports Evergreen Pinecone workshops as Science Advisors to the Service.

Figure 4. Evergreen overview.

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