National Maritime Intelligence-Integration Office (NMIO)

RADM Robert D. Sharp, USN
Director

Annual Report

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Integrate the Maritime Community, Understand the Domain, Help Protect the Nation

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I. Director's Foreword

I am honored to serve as the Director of the National Maritime Intelligence-Integration Office (NMIO) and would like to thank the Global Maritime Community of Interest (GMCOI) for allowing me the tremendous opportunity to contribute to emerging capabilities in a maritime challenged environment. Cyber threats to national security interests and the global supply chain from traditional and non-traditional adversaries have placed new demands on our defenses. NMIO is in a unique position to serve maritime entities in new and different ways, specifically, unifying data in a common and digital environment. Big data analytics is a key step to ensure that our operational responses align with today's intelligence mission.

In December 2016, the Director of National Intelligence formally designated NMIO as the National Intelligence Manager for Maritime (NIM-Maritime). This designation empowered us to expand our maritime capabilities and methods by maturing NIM integration functions to mitigate intelligence challenges in the global maritime domain. We developed a Unifying Intelligence Strategy for Maritime Issues (UIS-M) to resolve vessel, cargo, people, and infrastructure priorities in the maritime domain and contributed to the development of the Intelligence Community's (IC) Integrated Mission Strategy (IMS). Additionally, we ramped-up efforts to answer the nation's key intelligence questions and strengthened our relationships with multiple IC and non-intelligence federal agencies; state, local, tribal, and territorial governments; the private sector; academia; and international partners to help them achieve their objectives. These priorities help address the 20 maritime domain awareness (MDA) challenges identified in the National MDA Plan. As the IC faces growing concerns of maritime threats to freedom of navigation, we are continuously reviewing and adjusting our analytic resources, capabilities, tradecraft, and performance to ensure proper coverage of mission goals.

The importance of MDA will continue to grow as a powerful resource to achieve national security objectives. 2017 promises to be a transformational year, in which we will seek potential intelligence solutions to achieve maritime superiority. I look forward to implementing new initiatives and building upon past successes to achieve decision advantage.

R. D. SHARP
Rear Admiral, U.S. Navy
Director, NMIO

II. Executive Summary

Throughout 2016, NMIO continued to enlarge the GMCOI in order to address gaps and vulnerabilities in maritime security. We strengthened existing partnerships and expanded new relationships with foreign and domestic, public and private entities to improve information sharing and customer intelligence needs. NMIO works with United States, Australia, Canada, Great Britain, and New Zealand (collectively referred to as Five Eyes) partners and international allies to address a broad range of areas that demand our attention and resources to drive IC collaboration with mission colleagues. We also streamlined IC processes to deliver improved mission support and capabilities to meet today's maritime requirements.

At the enterprise level, we transformed business operations and processes using innovative approaches and by implementing recognized best practices to inform senior IC leaders of the critical issues facing the GMCOI. The approved National MDA Architecture Plan by the National Security Council Maritime Security Interagency Policy Committee is one of the major milestones achieved in 2016. Additionally, through our Science and Technology effort across the Global Maritime Forum and scientific community, we helped to accelerate technology development and identified new solutions that better utilize existing maritime data to advance strategic, operational, and tactical decision making.

Finally, as NIM-Maritime, we aligned our strategic priorities that advance national interests and presented a way ahead for federal stakeholders to focus on the missions the nation requires. The development of our UIS-M focus areas will ensure appropriate execution of initiatives and plans, described in the National Intelligence Strategy. Only as a collaborative federal interagency and by leveraging the international maritime intelligence enterprise can we meet the unprecedented number of maritime challenges.

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III. Year In Review

A. Governance

In 2016, NMIO expanded and strengthened key international and national partnerships through improved information sharing and outreach activities. As the Intelligence Community's (IC) primary representative for maritime collection and analytic priorities, we worked closely with our federal and non-federal partners to identify emerging technology threats to foster unity of effort for decision advantage to protect the United States, its allies, and partners against maritime related threats. NMIO is the integrated maritime voice of the IC with a unique role of creating a national unity of effort on maritime security and intelligence-related issues. On 21 December 2016, NMIO was formally designated as the functional National Intelligence Manager for Maritime (NIM-Maritime) by the Director of National Intelligence (DNI). NIMs serve as the DNI's principal advisors for mission management, community oversight, and coordination for their respective core mission areas. As NIM-Maritime, NMIO addresses difficult and unique challenges in collection and analysis, and removes barriers to information sharing among Global Maritime Community of Interest (GMCOI) members, including data sharing related to high-interest vessels, cargo, people, and infrastructure. NMIO's core goals and objectives are captured in the DNI's strategic guidance to NMIO, Presidential Policy Directive 18: Maritime Security, the National Strategy for Maritime Security, the National Maritime Domain Awareness (MDA) Plan, and the Unifying Intelligence Strategy for Maritime Issues.

B. Strategic Goals (SG) and Priorities

The DNI provided NMIO strategic guidance to build a collaborative interagency and international maritime intelligence enterprise that supports the intelligence and information needs of the GMCOI. NMIO addresses Maritime Security and Maritime Intelligence-related issues to provide unity of effort and enhance whole-of-government synergy for more effective maritime decision advantage. This report summarizes NMIO's achievements through four strategic guidance priorities defined by the DNI:

- **SG1: Develop the GMCOI:** NMIO expands on existing domestic and foreign partnerships to better integrate maritime intelligence/information efforts at the nexus of national security and the global maritime domain.

- **SG2: Improve Information/Intelligence Sharing:** NMIO identifies and surmounts information sharing barriers through interagency and international collaboration.

- **SG3: Advocate GMCOI Collection and Analytic Priorities:** NMIO is the IC's primary representative at the national level for maritime collection and analysis-related advocacy.

- **SG4: Integrate Science and Technology (S&T):** NMIO engages academia, think tanks, the maritime industry, and foreign governments to understand the implications of emerging technologies that have the ability to produce new threats or challenges in the maritime domain.

SG1: Develop the Global Maritime Community of Interest (GMCOI)

Increased collaboration and maritime-related sharing with international, state, local, tribal, and territorial entities, industry, academia, and think tanks characterize efforts to expand the GMCOI during 2016. Multilateral and domestic relationships remain the backbone of NMIO's mission to fulfill DNI priorities. The foundations of these relationships include:

- Increasing data access and technical expertise that benefit the GMCOI;
- Identifying targets of mutual interest to counter maritime threats;
- Growing and further leveraging geographic expertise to advance global interests and enhance maritime intelligence and information sharing; and
- Supporting multilateral/bilateral and interagency operations.

In the last year, NMIO has broadened its GMCOI engagements at the federal level. NMIO also deepened its existing partnerships with Canada through the United States Maritime Executive Roundtable (CANUS MERT) and the National Maritime Interagency Advisory Group (NIAG) fora by facilitating discussions on both nations' threat response efforts to crisis events and other maritime security topics. These forums help align objectives and reinforce and/or facilitate actions taken at the federal level to counter maritime threats to our national security. Additionally, the MDA Executive Steering Committee's engagement of domestic and international maritime stakeholders has been an important venue for addressing MDA challenges. The GMCOI's goal to further MDA and intelligence integration will continue in the coming year in order to solve critical maritime issues. (This effort also supports SG2.)

SG2: Improve Information / Intelligence Sharing

NMIO's efforts to improve information and intelligence sharing included supporting special projects and events. Our seventh year as the GMCOI's maritime voice has resulted in integrating maritime intelligence needs at unprecedented rates to meet mission demands. Advances in information sharing technologies, processes, and capabilities continue to align IC missions with national objectives to counter maritime security threats. Specific activities include:

Maritime Domain Awareness Executive Steering Committee (MDA ESC)

The MDA ESC is the federal body responsible for overseeing the National MDA Plan chaired by Director, NMIO and includes executive agents from the Departments of Defense (DOD), Homeland Security (DHS), and Transportation. The MDA ESC proactively leads and coordinates maritime intelligence-integration and MDA efforts across the federal interagency. It expands existing partnerships to exchange MDA information in support of common initiatives and leverages enterprise applications and successful projects to enable broader participation of the GMCOI. The MDA ESC also developed the National MDA Architecture Plan (NMDAAP). The NMDAAP implements the DHS National Information Exchange Model as the maritime community's common vocabulary, enabling efficient information exchange across the GMCOI. In February 2016, the National Security Council Maritime Security Interagency Policy Committee (NSC MSIPC) approved the NMDAAP for sharing maritime enterprise-level data and information. Long term, the plan's single unifying standard will ensure a more holistic

approach for wider data integration efficiency and improved decision making. The MDA ESC also shepherded the National Vessel of Interest (VOI) Lexicon through final interagency approval via the NSC MSIPC in July 2016. For the first time, the U.S. federal industry has a national lexicon for sharing information on VOIs. The Five Eyes MDA Working Group and the Canada-United States MDA Working Group accepted the lexicon in August 2016.

The year ended with the NSC MSIPC approving a new U.S. Maritime Alert and Advisory System called, "Maritime Security Communications with Industry" for better interagency coordination of government maritime alerts and advisories to U.S. mariners. Additionally, NMIO presented an inaugural MDA ESC Award for Excellence to an individual from the Delaware Information and Analysis Center during the National Fusion Center Conference in Alexandria, Virginia. The ESC will maintain its impetus into 2017 by expanding the maritime vision across the GMCOI. (This effort also supports SG1.)

Canada-United States (CANUS) Puget Sound Pilot Project

In 2016, NMIO made progress with its CANUS Maritime Information Sharing Puget Sound Pilot Project. The project enables both nations to share tracking and radar data for small and dark targets in the surrounding Pacific Northwest area. This information-sharing network will enable maritime U.S. law enforcement agencies to close gaps in maritime radar coverage and will take effect in 2017. This pilot is a model for state, local, and law enforcement cooperation across international borders and generated interest from Senator Maria Cantwell (WA). (This initiative optimizes new and existing capabilities and is also linked to SG3.)

Strengthening United States, Australia, Canada, Great Britain, and New Zealand (Five Eyes) / International Networks

NMIO's foreign partnerships have been an essential part of its mission success. Concerted focus was placed on strengthening engagement efforts with Five Eyes and international partners by providing them access to multiple NMIO forums, including the International NIAG and CANUS MERT. These allies contribute to the successful execution of the maritime mission and help to advance intelligence information sharing between national and international partners.

In August 2016, NMIO and the Five Eyes countries co-hosted the annual Five Eyes MDA Working Group Conference at the North American Aerospace Defense Command/U.S. Northern Command in Colorado. As mission challenges continue to increase, all parties agreed to develop initiatives in the following areas: small and dark-target detection, information sharing standards, Automated Information System reporting regulations, and VOI case management. The partners also concurred on using the CANUS VOI Lexicon as a model for a broader Five Eyes VOI Lexicon to foster MDA information sharing. This agreement is the first of its kind and will be executed by summer 2017, ultimately increasing international information sharing amongst the GMCOI.

Global Maritime Operational Threat Response Coordination Center (GMCC) Support

In August 2016, NMIO participated in the annual GMCC-facilitated War Game at the U.S. Army War College in Carlisle, Pennsylvania. The War Game provided national-level interagency legal, policy, and operational experts with an opportunity to examine potential whole-of-government responses to maritime threats, introduced new officials to the process, and reviewed lessons learned/best practices from the previous year. NMIO crafted injects to support scenario development for the War Game and continues to serve as the primary subject matter expert to the GMCC on maritime intelligence. (This effort also supports SG1.)

In October 2016, NMIO attended a workshop at the Australian Maritime Border Command meant to enhance situation awareness of maritime security gaps, and later visited the New Zealand National Maritime Coordination Centre. The Canberra event represented the inaugural meeting of the Strategic Arrangement to exercise and exchange information on maritime threats and event response among the governments of Australia, Canada, New Zealand, the United Kingdom, and the United States. This effort reinforced NMIO's valued relationships in the region and identified gaps that require the coordination of multinational agencies to augment whole-of-government MDA. (These activities support all four SGs.)

National Network of Fusion Centers

NMIO's relationship building with the Fusion Centers furthered maritime information sharing with state and local governments and private industry. This effort centered on increasing awareness of new collaborative capabilities for future intelligence-led maritime law enforcement operations. As part of this initiative, NMIO partnered with the National Fusion Center Association (NFCA) to host a NIAG meeting in October 2016. Held in Alexandria, Virginia, NFCA's annual nationwide Training Event focused on state and local maritime law enforcement information sharing and the contributions of our domestic partners to maritime security. Participants included state and major urban fusion center directors and maritime analysts, and representatives from the U.S. federal interagency. During the event, Director NMIO presented the inaugural award of excellence to the Delaware Information and Analysis Center on behalf of the MDA ESC. Their work in developing a Maritime Surveillance System to counter illegal fishing in Delaware Bay and expand maritime security in coastal waters reinforced NMIO's strong partnership with non-federal organizations. NMIO and the fusion centers will continue aligning their missions to national security objectives. (The NFCA partnership aligns with all four SGs.)

Illegal, Unreported, and Unregulated (IUU) Fishing Support

In response to a Department of State request to support the September 2016 "Our Ocean" conference in Washington, DC, NMIO spearheaded a coordinated IC effort to help the National Intelligence Council produce its first-ever unclassified assessment on the global security implications of IUU Fishing and Seafood Fraud. The assessment provided insight into the potential impacts on critical marine ecosystems and global food security, especially for the more than four billion people who depend on fish for survival. It also documented that IUU Fishing sparks international transnational organized crime. The assessment contributed to greater

awareness of this important global issue and synergized stakeholders to support to policymakers and responders on this enduring problem. (This effort is linked to all four SGs.)

Non-Secure Internet Protocol Router Sealink Advanced Analytics (NIPR S2A) Support

NMIO collaborated with the U.S. Coast Guard Intelligence Coordination Center to launch the NIPR S2A system for the Open Mongoose (OMS) Fusion Engine. Developed by the U.S. Naval Research Laboratory, this four-year project allows land-based radar sensors to process large amounts of data and track small, dark vessels engaged in cross-border smuggling. In September 2015, the OMS was successfully tested near the Maryland Chesapeake Bay Bridge, demonstrating its ability to generate timely alerts and supporting radar data sharing with Canada and federal, state, and local agencies. Current pilot projects are underway in the Ports of Baltimore, Puget Sound, San Diego, and Great Lakes. NMIO will finish testing the latest version of the NIPR S2A before June 2017. (This initiative also supports SGs 3 and 4).

Maritime Network Mapping Workshop 2

In February 2016, NMIO teamed up with government and non-federal experts to host a successful two-day workshop at Johns Hopkins University/Applied Physics Laboratory (JHU/APL) to examine further the interactions and relationships among actors associated with global cargo networks identified in the 2015 workshop. Participants gained additional insight into the actors' information flows, communication methods, and frequency of interaction to continue mapping the network. They identified critical nodes for tracking maritime domain use patterns, potential nodes for enhanced resiliency in the maritime supply chain, and probable areas for regulation. A prototype data model for the containerized cargo maritime network supply that will leverage advanced analytics, holistic artificial life outcomes, and neural network capability is expected to roll out in 2017. (This initiative supports all four goals.)

SG3: Advocate GMCOI Collection and Analytic Priorities

Office of the Director of National Intelligence (ODNI) Advanced Analytics Study

In July 2016, NMIO continued to advocate collection and analytic priorities at the national level. NMIO's National Intelligence Collection Officer represented maritime-stakeholder interests across multiple threat vectors (i.e., counterdrug, counterproliferation, etc.) as a participant in numerous ODNI-led efforts, including advocating for priority increases and the resourcing of new capabilities. Collection priorities continued to be shaped by the GMCOI at forums, such as the Maritime Intelligence Strategy Board, the MDA ESC, and NIAG.

SG4: Integrate Science and Technology (S&T)

Emerging technologies are providing the GMCOI new opportunities for improving maritime security. NMIO-led conferences, such as the Global Maritime Forum (GMF) and the NIAG, bring together international, industry, and academic subject matter experts to discuss technology trends and promote innovative solutions to close gaps and augment the work of past pilot projects and initiatives. These partnerships give the maritime community access to important information and create an incentive to overcome technology challenges to advance common goals, make optimal use of resources, influence standards, and improve information sharing. Significant milestones in Unmanned Undersea Vehicles, the Maritime Data Challenge, the GMF, and Technical Bulletin are summarized below.

Unmanned Undersea Vehicles (UUVs)

NMIO's focus on UUVs stems from the 2014 National Intelligence Strategy, which directs the IC to be alert to advances in technology. In response, NMIO and the scientific community assessed how emerging capabilities and technologies, such as UUVs, impact U.S. national security interests. In April 2016, NMIO and the JHU/APL co-hosted the second Anticipatory Intelligence for Maritime Issues Futures Workshop in Laurel, Maryland. The workshop built on the success of a 2015 UUVs workshop and attracted more than 80 industry, academic, and U.S. government subject matter experts. The attendees identified indicators for UUV technology trends in the 2025 time frame. The articulation of this emerging technology has enhanced community insight of merging new capabilities with existing maritime data to achieve mission success.

Maritime Data Challenge

In September 2016, NMIO kicked off Phase I of a two-phase online Maritime Data Challenge. Co-sponsored with DOD DHS, NASA, Program-Manager Information Sharing Environment, and Harvard University, this competition is an outgrowth of the November 2015 GMF held at the NASA Ames Research Center in Moffett Field, California, and is focused on developing better methods to detect and monitor anomalous activity by vessels on the high seas. This contest encourages data scientists worldwide to seek development of an algorithm capable of identifying and detecting IUU Fishing activity from available data. Top competitors from Phase I will compete in Phase II of the challenge, which involves more complex datasets in 2017. Phase II is expected to produce an algorithm that will enable countries to respond more effectively to high-volume fishing movement in their exclusive economic zones. This capability development addresses U.S. National MDA Challenge #1 – "Collection for Non-Emitting and Uncooperative Vessels." (The competition also supports SG1 and SG2.)

Global Maritime Forum (GMF) and Technical Bulletin

NMIO continued to engage S&T-related working maritime issues through the GMF and NMIO Technical Bulletin. Held in November 2016 at the University of Washington/Applied Physics Laboratory, the GMF focused on the challenges and opportunities of emerging technologies, policy development, and existing maritime capabilities, such as UUVs, and unmanned

autonomous systems for countering cyber threats. This year's GMF attracted more than 135 participants, including many international attendees. Both the GMF and NMIO's Technical Bulletin provide a platform for growing and depending relationships at all levels of government, industry, international, and academic partners. The Technical Bulletin helps the global scientific community advance information sharing on emerging technology trends that offer the promise of enhancing maritime security. The GMF and NMIO Technical Bulletin set the stage for the development of a combined S&T maritime strategy to advance national and international interests.

C. Unifying Intelligence Strategy for Maritime Issues (UIS-M) Development

UIS-M Support

In November 2016, NMIO updated its 2014 Intelligence Integration Plan with the publication of the UIS-M. The UIS is the NIM's expression of the top focus areas (priorities), associated key gaps and initiatives, and the most important remaining challenges that require broader stakeholder attention. The priorities described represent the NIM's assessment of areas that would provide the highest return on investment for additional integration efforts.

The 2016 UIS-M identifies the maritime stakeholder community's highest priorities for high-interest vessels, cargo, people, and critical infrastructure threats in the maritime environment. The UIS-M is a key instrument for integrating stakeholder efforts focused on mitigating threats posed by illicit state and non-state actors from or in the maritime domain. Currently, work is underway to align these efforts to guide stakeholder activities and influence the development of future programs and capabilities. The ODNI 2016 Integrated Mission Strategy encompasses priorities from all of the NIMs, including NMIO's 2016 UIS-M focus area objectives.

IV. WAY AHEAD

Throughout 2016, NMIO led national-level policymakers, the broader interagency, industry, and academia to greater cooperation. The NIM-Maritime UIS and implementation of the approved National MDA Architecture Plan illustrate whole-of-government responses for advancing national and global maritime security. In July 2017, NMIO will launch efforts that will incorporate extensive government and industry knowledge to understand better maritime domain information and operational issues to help drive IC solutions across the maritime focus areas described in the UIS.

The National VOI Lexicon was an important milestone to improved information sharing with the U.S. maritime industry. In 2017, NMIO will expand the use of the Lexicon with Five Eyes partners, as it continues exploring the necessary solutions to maintain maritime security. By collaborating with our international partners, the maritime community will develop an initiative to bring collective expertise and resources against common cyber, counterterrorism, counterproliferation, and maritime threats.

The maritime community's success in the coming years will depend greatly on our ability to leverage emerging technologies and mature existing capabilities, such as big data analytics, to

enhance global MDA and guard against maritime threats. To this end, NMIO's top four focus areas in 2017 to address key challenges identified in the National MDA Plan are:

- Organize Stakeholders through Governance.
- Close or Mitigate Recognized National-level MDA Challenges.
- Improve Domain Awareness through Enterprise-Level Access to Data.
- Enhance Collaboration through Outreach.

As NMIO strives to address these challenges, we will develop metrics for charting our progress on existing and future initiatives.

National Maritime Intelligence-Integration Office
4251 Suitland Road
Washington, DC 20395

http://nmio.ise.gov