



**TESTIMONY OF  
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ASSISTANT COMMANDANT FOR PREVENTION POLICY**

**ON  
“FEDERAL MARITIME NAVIGATION PROGRAMS”**

**BEFORE THE  
HOUSE COAST GUARD & MARINE TRANSPORTATION (CG&MT) SUBCOMMITTEE  
AND HOUSE WATER RESOURCES & ENVIRONMENT (WR&E) SUBCOMMITTEE**

**SEPTEMBER 7, 2016**

Good morning Chairman Hunter, Ranking Member Garamendi and distinguished Members of the Subcommittee. It is a pleasure to be here today to update you on the Coast Guard’s efforts to modernize the marine navigation system and enhance mariner situational awareness.

Maintaining Aids to Navigation (ATON) is the U.S. Coast Guard’s oldest mission, tracing its roots to the ninth law passed by Congress in 1789. As the multi-mission, maritime service responsible for the safety, security, and stewardship of U.S. waterways, the Coast Guard maintains the aids that guide mariners through the U.S. Marine Transportation System (MTS), one of the largest systems of ports and waterways in the world. The MTS is a complex, inter-woven, and intermodal series of coastal, intracoastal, and inland waterways that travel across state and national borders, linking our highways, railroads, and pipelines to ports around the world. The U.S. MTS consists of 25,000 miles of waterways that connect approximately 1,000 harbor channels, over 300 ports, and 3,700 terminals. This vast and vital system enables passenger and cargo movements for more than 68,000 vessel calls and facilitates the movement of maritime cargo that accounted for over \$4.5 trillion of our nation’s economic activity in 2015. The U.S. MTS also includes more than 1,500 miles of maritime border with Canada that link major population centers to the Atlantic Ocean through the Great Lakes and the St. Lawrence Seaway System. More than 73 million Americans are involved in recreational boating, maritime trade, and marine fisheries.

The Coast Guard is making efforts to adapt our service to support the increasing complexities of the MTS. Modernizing navigation safety services the Coast Guard provides to the mariner has been a hallmark of the ATON program since we switched from whale oil lamps to tungsten bulbs.

The use of and increasing dependency on electronics and technology by the shipping industry continues to evolve. The Coast Guard will adapt to these changes by maintaining the appropriate mix of physical and electronic ATON that best serves the mariner. Sustainment and recapitalization of our servicing assets is a key element of our modernization effort.

### **Modernize Physical ATON System:**

A key component to modernizing the marine navigation system lies with the modernization of our physical ATON constellation. The cost of the physical ATON constellation is driven by the maintenance associated with large steel buoys and the assets required to service them. The Coast Guard is seeking to modernize large physical ATON by leveraging technological advances in buoy construction and mooring solutions, while streamlining our logistics supply chain.

For example, the Coast Guard Research and Development Center is currently evaluating over fifty submissions for a new mooring solution aimed at determining a more effective, less costly, and more environmentally friendly way to anchor our buoys in position. On the Great Lakes, we are evaluating the effectiveness of composite (plastic), ice resistant buoys. These buoys are designed to withstand the harsh winter environment and remain on station year round. If successful, these aids could cut the number of visits by the servicing assets in half. We are also evaluating the effectiveness and visual signal and long term service life costs of these buoys.

In an effort to reduce logistics costs associated with maintaining our physical ATON system, we are standing up a new Waterways Operations Product Line, which will provide for a centrally managed and funded standardized approach to aid construction and refurbishment. The new product line will provide for more efficiencies in logistics, maintenance, and support of our physical system by reducing service costs and increasing aid life cycle.

### **Incorporate Automatic Identification System (AIS) ATON into System Design:**

The current design of the U.S. ATON System is based on the use of physical ATON, visual bearings, and radar ranges to determine a ship's position. As part of its modernization effort, the Coast Guard has augmented the physical ATON constellation with 417 electronic ATON via our Nationwide Automatic Identification System (NAIS). The Coast Guard has taken a very judicious approach to incorporating this new technology into our ATON system to ensure the mariner is comfortable with using this technology, and we have properly evaluated its effectiveness and reliability in mitigating transit risk through the MTS. In some cases, the use of electronic ATON has significantly reduced the Coast Guard's response time to missing or discrepant aids from days to minutes. A mix of physical and electronic ATON in ice prone waters has improved the resiliency of the system in winter months when physical aids have been pushed under the ice and concealed from the mariner.

On March 1, 2016, the AIS carriage requirement expanded to include nearly 6,000 additional vessels to the over 4,500 vessels previously required to carry AIS. This expanded rule, along with our recent efforts to allow electronic charts in lieu of paper charts, is helping bring the technology to use electronic ATON and enhanced Marine Safety Information (eMSI) to the wheelhouse.

While the Coast Guard does not believe electronic aids will completely replace the need for physical ATON, a proper balance among the two will improve efficiency, effectiveness, and resiliency throughout the system. Through our analyses, the Coast Guard will optimize the appropriate mix. Lessons learned from the operation and maintenance of the ATON system and feedback provided by waterway users will inform the Coast Guard's waterway design criteria and policy.

## **Sustainment and Recapitalization of Assets:**

Notwithstanding the advent of electronic ATON, the Coast Guard expects that the requirement for physical aids and their on-going maintenance will continue to be a vital component to safe navigation. Given this, the Coast Guard is planning to recapitalize our aging Inland and Construction tender fleets. At an average age of 52 years old, the entire fleet is well past the end of their designed service lives, in some cases, well over 60 years old; yet they are responsible for the establishment or maintenance of over 27,000 ATON, which accounts for more than 56 percent of the overall constellation. To address immediate obsolescence issues, the Coast Guard is completing the Inland River Tender Emergency Subsystem Sustainment (IRESS) project to serve as a bridging strategy to maintain the operational capabilities of river and construction tenders until a viable, long-term replacement is identified. To date, work has been completed on 22 of the 23 cutters under this project.

In addition to our inland fleet, the Coast Guard's 225 foot seagoing buoy tenders, and 175 foot coastal buoy tenders are at or past their midlife, requiring depot-level maintenance to ensure they can continue to safely sail and effectively execute their mission sets. A multi-year Mid-life Maintenance Availability is currently underway at the Coast Guard Yard for our seagoing buoy tenders. The Coast Guard also has begun preliminary Survey and Design actions to identify a similar overhaul package for the coastal buoy tenders. The Service is grateful for this Subcommittee's strong ongoing support of the sustainment and recapitalization of these critical fleets.

## **Review Current System:**

To successfully modernize the marine navigation system, the Coast Guard continues to explore ways to optimize the mix of both physical and electronic ATON. The benefits to the Coast Guard of such optimization could include increased workforce productivity, more effective service delivery and improved port resiliency. This long-term effort is evaluating revised waterway marking design standards and transmission of eMSI through immediately accessible electronic methods. Working with Federal partners and maritime stakeholders to better understand the current navigational needs, we will ensure the end product meets navigational safety requirements.

To determine navigational safety requirements, we are taking a systematic and holistic approach that considers channel framework, user capabilities, training and carriage, available technology, and environmental considerations in addition to stakeholder input. The Coast Guard uses the Waterway Analysis and Management System (WAMS) to plan and implement our ATON program to enhance the safe navigation upon a waterway. During the WAMS process, the Coast Guard solicits waterway user input, assesses current ATON configurations, and reviews nautical literature, such as charts. Using the current WAMS process, we are conducting a series analyses to inform a national level of service policy, updated to be regionally consistent and predictable. The levels of service will continue to define where and how the Coast Guard will provide ATON to meet today's requirements throughout the U.S. MTS.

We have recently completed an analysis on the Atlantic and Gulf Seacoast System, which is an unrestricted waterway without specific boundaries or controlling depth. The analysis covers the eastern seaboard from the U.S. Canadian Border south along the Gulf of Mexico to the U.S. Mexican border.

Portions of the Seacoast ATONs were established based on mariner requirements that predate modern navigation technologies and methods, including Global Positioning System (GPS), electronic chart systems, and AIS. We intend to conduct a similar study on the Pacific Seacoast System this upcoming fiscal year, and consolidate the results for Seacoast systems as a whole.

This will allow us to adjust our current framework and give our District Commanders the tools they need to appropriately and consistently mitigate the risk throughout these systems. Additional WAMS analysis will be conducted on the Deep Draft and Shallow Draft Systems, the Intracoastal Waterway, and the Inland Waterways/Western Rivers. Taken together, this will provide a consistent approach to service throughout the entire U.S. MTS that accounts for the increased complexity, while minimizing our environmental footprint.

### **Improve public notification of ATON changes and proposals:**

The Coast Guard submitted a report to Congress in August entitled *Discontinuance of an Aid to Navigation*, specifically addressing ways to improve our public notifications on ATON changes and proposal. In it we recognized the importance of improving public awareness and engagement when changes are considered for any maritime aid to navigation.

In this spirit, we worked with our Navigation Safety Advisory Council to identify best practices and update our policies. The most significant changes include lengthening the time the Proposed Change is published, and developing an official Coast Guard checklist form to ensure standardization of outreach efforts throughout all Districts. The Coast Guard is pursuing additional process improvements that leverage available technology to complement current outreach efforts. Specifically, the Coast Guard is exploring new technologies that allow mariners to view proposed ATON changes via mobile applications, web based applications and electronic navigation systems. These improvements could both expand the distribution of marine information products and allow for marine information data to be integrated into route planning software.

The effective and timely notification of ATON changes is essential to ensuring the safety of waterways users and the reliability of our MTS. These policy changes and future enhancements will further modernize the distribution of marine information products.

### **Modernize Delivery of Marine Safety Information:**

Marine Safety Information (MSI) provides critical information to the mariner during voyage planning and while transiting the MTS. The Coast Guard has made strides to update and augment the delivery of this service for the modern waterway user. Currently, MSI is provided to the public via two methods: Local Notice to Mariners posted online via the U.S. Navigation Center's website, and by broadcasting more time sensitive information via VHF-FM marine band radio. While this meets our requirement to provide the information to the mariner, it is not the most practical, efficient, or effective method given the common, modern means of information sharing. The current methods require the mariner to read lengthy documents for specific pieces of information and to monitor the appropriate radio frequency at all times. In order to modernize the delivery of this information, the Coast Guard is seeking ways to provide these notices to mariners in a real-time, electronic, user-friendly format that can be viewed on an integrated charting system. In pursuit of this vision, we are currently providing ATON discrepancy, temporary ATON changes, and iceberg locations, in machine readable, electronic formats online. We have connected our IT systems with the National Oceanic and Atmospheric Administration's Physical Oceanographic Real Time System, and we are broadcasting real time meteorological and hydrographic information through

our NAIS network in Tampa and on the Columbia River. Working closely with the Army Corps of Engineers (ACOE), we are broadcasting similar data, as well as lock queue information along portions of the Ohio River.

We have worked closely with bridge owners and Pilot's associations, and have developed policies to allow lift bridges to broadcast open or closed information via private, self-contained, AIS transmitting units. These advancements in MSI delivery will streamline the voyage planning process, and allow for an improved and more effective flow of information and marine traffic.

### **Nationwide Differential GPS:**

As technologies emerge, the Coast Guard is considering new methods for ensuring safe navigation. At the same time, we must continue to examine legacy systems to ensure that the benefit from their continued operation is greater than the cost to maintain them. Services such as Differential GPS (DGPS), while useful to a narrow but important, may not be the best system for meeting mariner needs in the 21<sup>st</sup> century. DGPS was developed by the Coast Guard to improve accuracy in positioning ATON when the original GPS signal was transmitted for civil users with an imbedded intentional error. This induced error was known as Selective Availability. It decreased the position accuracy of GPS from five meters to approximately 100 meters. By using static reference stations to calculate corrections to the GPS signal received from the satellites, DGPS is able to retransmit a corrected GPS signal to users with DGPS receivers, providing accurate positioning information to within approximately three meters. In May of 2000, the U.S. Government turned off Selective Availability, providing all users of GPS receivers with the maximum accuracy available from the GPS satellites.

Over time, a number of factors have contributed to the declining public use of NDGPS, including lack of a carriage requirement, technological advances in GPS, and limited availability of consumer-grade DGPS receivers. Working with the Department of Transportation and ACOE, which both have responsibility for terrestrial uses of DGPS, the Coast Guard and the Department of Homeland Security published a Federal Register Notice in August 2015 and sought public comments on a proposal to shutdown and decommission 62 of the then-existing 84 NDGPS sites. Based on input from the public and waterway users along with our subsequent review, we shut down nine Coast Guard maritime and 28 inland Department of Transportation DGPS sites on August 4, 2016. This streamlined system will still provide DGPS services for precision navigation where needed. We will continue to assess DGPS's value to the mariner as the navigation system evolves.

### **Conclusion**

The modernization of our marine navigation systems is challenging and complex, and requires continuous collaboration among all maritime stakeholders. The interest and support of Congress in this ongoing endeavor is of great benefit to the Coast Guard and our waterway partners. Working closely with NOAA and USACE, and in full consultation with our waterway users and stakeholders, we will adapt our portfolio of navigation services in order to meet these new requirements, and provide for a safe, efficient, and more resilient MTS.

Thank you for the opportunity to testify today, and for your continued support of the United States Coast Guard. I look forward to answering any questions you may have.