



# Maritime Domain Awareness Data Sharing Community of Interest

*A new partnership explores  
net-centricity.*

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Information sharing among federal and nonfederal agencies is a cornerstone of post-9/11 mission execution. For years now, both the Department of Homeland Security (DHS) and the Department of Defense (DOD) have been working independently on ways to share data among their respective elements. The Defense Information Systems Agency is implementing a service-oriented architecture via its net-centric enterprise services (NCES) program, for net-centric DOD data to enhance data sharing for national defense. The DHS has been building the Homeland Security Information Network (HSIN) for the agencies enhancing homeland security. At the same time, the two departments have been working together to develop the concept of Maritime Domain Awareness (MDA) as required by the president's "Directive on Maritime Security Policy," the "National Strategy for Maritime Security," and the "National Plan to Achieve Maritime Domain Awareness." On February 23, 2006, all of these efforts converged when the Maritime Domain Awareness data sharing community of interest (MDA DS COI) was formed to focus on maritime information sharing among federal agencies and their partners. The purpose of the community of interest is to develop information-sharing capabilities among the cadre of MDA stakeholders by implementing a net-centric data strategy.

## **Net-Centricity**

Net-centricity is not a new concept to the DOD. It has been long understood that a net-centric approach to sharing data is more efficient than current point-to-

point solutions. Under the point-to-point methodology, if "N" systems receive their data from individual hard-wired sources (anticipated users), the cost of the changes to those systems grows exponentially as the square of N. In contrast, net-centricity establishes an environment in which each of the data providers exposes data for consumers to discover and retrieve. This approach effectively separates the data from the underlying application or system. With this loose coupling between systems and data, the cost of adding data sources to systems and applications grows linearly and is significantly more efficient than a point-to-point methodology.

A fundamental attribute of net-centricity is the ability for any consumer of information to get the information that is needed, when it is needed. Hence, data or information can be obtained by all users whether they were anticipated or unanticipated. Information moves from a private asset to a community or enterprise asset. The concept of a user-defined operational picture (UDOP) is enabled through net-centricity. The UDOP is a data-representation technology (such as a visual display on a geographic information system) that makes the data relevant for the mission. Users can build a special UDOP for the net-centric data, or they can use a common, registered representation to write a software "wrapper" for legacy systems to access the net-centric data. This is an advantage of the new approach, since it leverages the support and infrastructure of legacy systems, rather than requiring their costly replacement.

### Community of Interest

A community of interest (COI) is a collaborative group of people that is interested in exchanging information in pursuit of shared goals, interests, missions, or business processes. DOD Directive 8320.2, "Data Sharing in a Net-Centric DOD," encourages the formation of COIs to implement information sharing in a net-centric environment. Members are asked to participate in the determination of the information needed to address their common interests and how the information can be made available to those who might need it. In return, they are offered access to data held by other sources, whose managers are no longer strangers, but now trusted members of their own community. For a COI to begin sharing data in a net-centric fashion, each member must first make its data visible to members of the enterprise, accessible to all authorized members of the enterprise, and understandable across the enterprise.

### Goals for Data Sharing

To make data accessible, the DOD COI is encouraging communities of interest to design services within the NCES environment. NCES has issued standards, deployed a registry of services, and established a repository to store common vocabularies in its early capabilities baseline. The Defense Information Systems Agency is using the experience gained from working with COIs to define, improve, and demonstrate services being offered to the enterprise. At the same time, COIs are able to use the early capabilities of net-centric enterprise services to make its services discoverable, or visible, and to support data-sharing arrangements.

The DOD CIO has made experts in NCES implementation available to the MDA DS COI, and they have provided a great deal of assistance. With these services and experts, the data providers in the community of interest have the means to publish their data so their partners are able to register, discover, and subscribe to the available and newly posted information of relevance. In addition, concerns such as security, data management, and administration of a common portal are handled at the enterprise level, so that the COI can focus on mission-specific concerns.

To make data universally understandable, the members of the COI are working together to form a com-

mon, agreed-upon vocabulary and data representation (schema) from the different proprietary vocabularies and schemas already used by the various data sources. With the common vocabulary and schema, data tagging using extensible markup language can be applied so that the data that is available from the publisher is retrievable by the subscriber. The members of the COI must all agree upon the common representation that will act as the interface between their various platform-specific representations. This com-

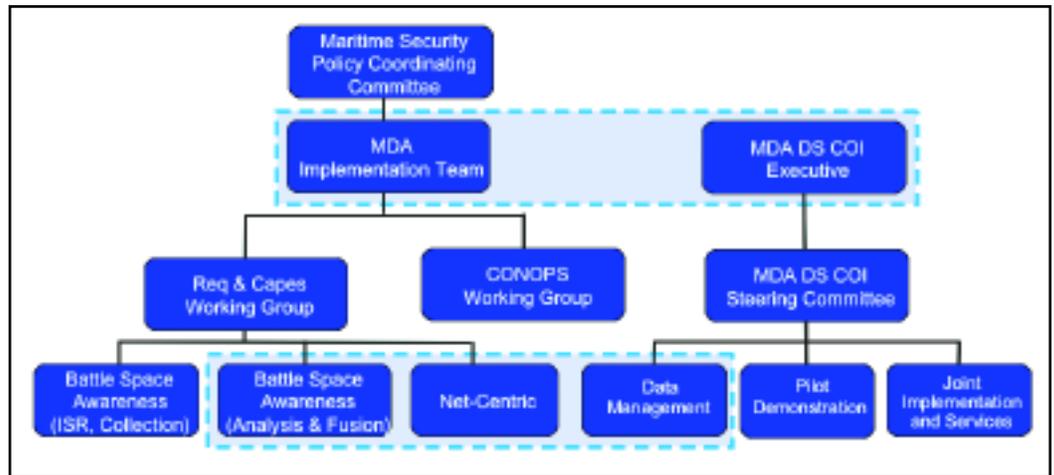


Figure 1: Maritime Domain Awareness data sharing structure.

monality, when registered, also enables the consumption of the data by unanticipated users.

### Maritime Domain Awareness

The sea has always been a hazardous environment, but 9/11 introduced a new priority to addressing maritime threats. The interagency cooperation underway for Maritime Domain Awareness is being guided by the Maritime Domain Awareness implementation team (MDA-IT), established by the "National Plan to Achieve MDA" and cochaired by U.S. Coast Guard RDML Joseph Nimmich, and U.S. Army BGEN Frederick Rudesheim. In late 2005, the Maritime Domain Awareness implementation team was introduced to the community of interest concept by members of the DOD CIO staff.

### MDA DS COI Governance

The COI proposal gained immediate acceptance from the MDA-IT, so in February 2006, the U.S. Northern Command hosted a kickoff meeting of the MDA DS COI. This kickoff meeting was very well attended from several agencies within DHS and DOD. The MDA DS COI was seen as a very exciting concept, since it is the first community of interest to be formed with members outside of DOD.

The MDA DS COI was established as a peer to the Maritime Domain Awareness implementation team (Figure 1). All of the community of interest leadership committees and working groups are cochaired by members from DOD and DHS. The COI executive committee is cochaired by U.S. Navy RDML Kendall Card, CIO of the U.S. Northern Command and RDML Ronald Hewitt, the U.S. Coast Guard's Chief Information Officer. They formalized the community of interest with a signed charter. The COI structure consists of a steering committee and three working groups: the data management working group (DMWG), the pilot demonstration working group (PDWG), and the joint implementation and services working group (JISWG).

The DMWG is charged with developing the common vocabulary and schema for the data sets selected. The PDWG is charged with developing a real-world technological demonstration that implements the common schema in a net-centric environment for shared access by the members and display on a user-defined operational picture. The JISWG is charged with identifying future spirals and establishing relationships with potential partners.

#### **The Pilot Demonstration – Spiral 1**

There are many different types of Maritime Domain Awareness data, including information on people, conveyances, and cargo. Eventually, all of this information should be shared among members of the community of interest as well as unanticipated authorized users. However, at the outset, the COI decided to focus the first spiral of the pilot demonstration on unclassified information available from the automatic identification system (AIS).

AIS is a shipboard broadcast transponder system that is capable of sending and receiving ship information, including position, course, speed, ship's name and number, dimensions, cargo type, and destination. AIS's original purpose was maritime safety and environmental protection. It was developed as an international dependent surveillance technology in response to maritime accidents and oil spills around the world. The Coast Guard relied heavily upon the automatic identification system while building a new system of vessel traffic services now deployed in several ports.

After 9/11, the automatic identification system was adapted to play a maritime security role as well. The Coast Guard expanded AIS and prototyped an extensive shore network, leading to nationwide capability. Today, the automatic identification system is recognized as a "paradigm shifter" for intelligence, and it is of great use to both DOD and DHS for homeland defense and security.

Three engineering centers in the Maritime Domain Awareness data sharing community of interest have agreed to design the infrastructure and software programs needed to publish their unclassified AIS data to the community in a net-centric environment. Shortly after the kickoff meeting, the centers began collaborating as members of the DMWG with the DOD CIO experts to develop a common vocabulary and schema for automatic identification system information. Members have been careful to design the AIS data representation so it will merge with the other types of MDA data to be added in the future. In May 2006, the DMWG delivered an initial draft version of a common vocabulary and schema to the PDWG. The pilot demonstration working group began using this information to make automatic identification system data visible, accessible, and understandable in a net-centric environment.

As a part of preparatory work, the PDWG approached the system integrators for the DHS Homeland Security Information Network to obtain permission to use the HSIN as the portal and UDOP for non-DOD members of the community of interest. The response was positive and enthusiastic. Now, the Maritime Domain Awareness data sharing community of interest has become an operational focus to enhance interoperability and synergy between NCES and the Homeland Security Information Network. This is an important development. Working across enterprises, the MDA DS COI is lighting the way for expanded operational information sharing between DOD and DHS in other shared mission areas, such as coordinating emergent threat detection, interdiction, disaster response, and post-event relief efforts.

At the beginning of the effort, the COI laid out its plan of action and milestones and its funding requirements. Since then, each of the working groups has been hard at work, and progress has been steady. Spiral 1 of the pilot is expected to be available for demonstration in late 2006. Beyond Spiral 1, we look forward to new challenges and new opportunities. Future spirals will involve different types of Maritime Domain Awareness data and new partners.

The MDA DS COI is taking a new approach to sharing information in support of mission needs across the federal government and beyond. This new relationship opens doors between DOD and DHS and facilitates new ways of thinking.

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