



Global Maritime Domain Awareness Conference 2nd Western Hemisphere Maritime Domain Awareness Workshop

SUMMARY REPORT FEBRUARY 2009



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Executive Summary

Workshop Overview

Delegates from thirty nationsⁱ converged in Valparaíso, Chileⁱⁱ to participate in the 6th International Maritime and Naval Exhibition and Conference for Latin America, EXPONAVAL 2008 (www.exponaval.cl) from 2 to 5 December 2008.

The Office of Naval Research Global Americas (ONRG Americas) and the U.S. Southern Command (USSOUTHCOM) with the support of the U.S. Northern Command, in conjunction with the Director General of the Chilean Maritime Territory and Merchant Marine, and the Director of the U.S. Office of Global Maritime Situational Awareness co-sponsored the Global Maritime Domain Awareness (GMDA) Conference. This conference took place within the framework of EXPONAVAL 2008. The 2nd Western Hemisphere Maritime Domain Awarenessⁱⁱⁱ Workshop is a continuation of an inaugural workshop conducted in December 2007 by ONRG Americas to facilitate a regional dialogue among key Western Hemisphere nations to improve information sharing in the maritime domain. The 2nd workshop took place from 3 to 5 December 2008 and was coincident with the GMDA Conference.

The purpose of the GMDA conference and workshop was to continue the dialogue from the aforementioned efforts and to develop a roadmap that coalesce the global MDA community behind a comprehensive maritime security framework. The first portion of the conference was devoted to the sharing of regional perspectives on MDA through speakers from Europe, Asia, Africa, the Middle East and the Americas with the intent of discussing common practices that could be leveraged to achieve interoperability amongst partner nations' MDA systems. The second part of the conference/workshop was devoted to focusing on the progress made on those actions recommended in the 1st Western Hemisphere MDA Workshop.

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On the first day of the conference, and as in the past events, the Sub-Secretary of the Chilean Navy, Ms. Carolina Echeverria, inaugurated the event by speaking about the strategic importance of maritime security in the Americas and the need to develop holistic, multinational solutions to the array of maritime threats. The main concern from the Chilean Navy's perspective is how to reduce the risks to maritime shipping in an environment where it is difficult to discern the origin of the threats and where everyone depends on the courses of action taken by other state and international actors.

The Chilean Director General of the Maritime Territory and Merchant Marine (DIRECTEMAR), Vice Admiral Edmundo Gonzalez, followed the Sub-Secretary by giving an overview of MDA efforts in Chile and the national supporting infrastructure. During his remarks he described the Chilean Navy activities in the international domain, in particular those related to promoting the broader implementation of the Maritime Safety and Security Information System (MSSIS) and the deployment of the Long Range Identification and Tracking of Ships (LRIT) system in the region^{iv}. Chile is the first South American country to contribute Automated Identification System (AIS) data to MSSIS, and he highlighted the facts that Chile is the first country in the

world with a certified IMSO Data Center to date, and that Spain, Mexico and Colombia have expressed their interest in hiring their services to develop similar facilities in their respective countries.

Following Admiral Gonzalez, Vice Admiral Harry B. Harris, the Deputy Chief of Naval Operations for Communication Networks, spoke to the relevance of MDA in the international context, in particular the importance that networks – both physical and relational – are to the broad MDA effort. Admiral Harris explained how the dramatic expansion of economic linkages in cyberspace around the globe is rapidly eroding traditional geographic boundaries and how the issue of maritime security has now broader effects beyond the traditional maritime construct. He emphasized the fact that without international partnerships for data sharing, analysis and maritime action, the ability of individual countries to maintain situational awareness and counter the maritime threat will be sub-optimized. In this context, Admiral Harris’ message was clear: *Maritime security issues affect the global economy*. He pointed to the increase in piracy in the Gulf of Aden and how these attacks may have a disproportionate effect on the global economy. In addition to building a wide range of international partnerships, the Admiral stressed the importance for the United States and all partner nations to continue improving the efforts to share maritime information from multiple sources and classification levels, using both technology and process to the mutual benefit of all involved. Of special note, he highlighted Chile’s contribution to MSSIS via its “Sistema de Graficación Marítima” (GRAFIMAR), emphasizing that this linkage of Chilean AIS data with the worldwide MSSIS database is a valuable first step in building the trust so important for information sharing. Admiral Harris challenged the international scientific and technical community to make emerging MDA technologies available in secured Internet-accessible unclassified systems; standardized data collection and information-processing protocols; develop automatic processes for data acquisition, data validation, correlation, and track generation; and generate improvements in orders of magnitude in the time required for data analysis. For these he highlighted the deployment of the U.S. Navy Spiral 1 MDA initiative that seeks to achieve such objectives and the leverage of networks such as CENTRIXS – IANTN (Combined Enterprise Regional Information Exchange System - Inter-American Naval Telecommunications Network) to enable collaborative processing and analysis of the overall data being collected and shared. With the addition of this data, Admiral Harris pointed out that the global MDA community will be much closer to building the maritime haystack in which we must look for the elusive “needle.”



Figure 1 – Left: Sub Secretary Ms. Carolina Echeverria, Center: VADM Edmundo Gonzalez, and Right: VADM Harry B. Harris addresses the audience.

After Admiral Harris' speech, Admiral Gonzalez chaired a panel discussion with representatives from Italy, Brazil, Singapore, and South Africa. As a lead in to the panel discussion, he posed the following points to be addressed by the representatives on the panel:

- [How is] MDA / Maritime Situational Awareness (MSA) being implemented in your region?
- Regarding data exchange with other agencies and countries in your region, how have [any] political, technological and operational challenges been addressed?

Each of the distinguished panelists offered their perspectives in response to the questions listed. Of note, Vice Admiral Maurizio Gemignani, the Commander of Allied NATO Maritime Component Command in Naples, expressed in his remarks that NATO will reduce the number of dedicated surface/subsurface assets supporting MDA missions in the Mediterranean, but that the new Concept of Operations (CONOPs) for the region calls for increased reliance on aerial surveillance to maintain Maritime Situational Awareness (MSA) and making greater use of information sharing networks such as MSSIS.

Mr. Tam Peng Yam, Deputy Chief Executive for the Defence Science and Technology Agency of Singapore, provided Singapore's perceptive of the maritime security challenges in the Strait of Malacca where he stressed the importance of regional and international collaboration to ensure the co-existence of different collaborative frameworks, including information sharing technical capabilities.



Figure 2 – Left: VADM Maurizio Gemignani, Center: RADM Edlander Santos, and Right: Mr. Tan Peng Yam shared their regional perspectives on MDA.

RADM Edlander Santos, Coordinator of the South Atlantic Maritime Area (CAMAS in Portuguese) from the Brazilian Navy, described how MDA would be integrated into CAMAS and the work being pursued for a Regional Information Exchange Center for Maritime Traffic within CAMAS. In addition, RADM Santos also presented the concept behind a new LRIT regional center expected to be operational by June 2009.

Finally, Mr. Moambo Jabulani Moleya, National Head of Security, Transnet National Ports Authority of South Africa, provided South Africa's perspective regarding the maritime security challenges in the strategically situated African sea routes (East-West) and the Southern Oceans. Mr. Moleya discussed the challenges confronting his region regarding maritime security, namely the lack of a cohesive regional maritime security policy which leads to the duplication of efforts; lack of agreements on functional delimitations and boundary disputes leading to non-performance of critical maritime tasks; lack of a sound information sharing mechanism both

nationally and regionally; and lack of a regional coordinating mechanism for the implementation of maritime security plans.



Figure 3 – Mr. Moambo Jabulani Moleya sharing South African regional perspectives on MDA

The afternoon of the first day concluded with two keynote speakers on the topic of “*Security Challenges Facing the Global Maritime Supply Chain*”.

Rear Admiral Wayne Justice, the Assistant Commandant for Capability in the U.S. Coast Guard (USCG), presented a “Maritime Law Enforcement” perspective where he pointed out that to secure the global supply chain from 21st century challenges, a systems approach to maritime governance must be employed. He stated that this approach must be global in scope and built upon a foundation of international cooperation. This was complemented by an informational briefing from the Secretary General of the largest shipping company in South America, Compañía Sud Americana de Vapores S.A (CSAV). Rear Admiral (Retired) Alexander Tavra discussed the importance of maritime security, its impact on global economics, and highlighted the willingness of industry to be a part of enhancing maritime awareness. The concluding presentation for the first day of the conference was given by Admiral (Retired) Walter Doran, former Commander of the U.S. Pacific Command. He presented the Technology Industries’ notional system architecture for increased maritime awareness in domains ranging from intercoastal to offshore. He also highlighted the recent events in Mumbai, India as proof that the world must take MDA seriously and that the time for action is now.



Figure 4 – Left: RADM Wayne Justice, Center: RADM (Ret) Alexander Tavra, and Right: ADM (Ret) Walt Doran spoke on the security challenges to the maritime supply chain.

The second day of the conference began with opening remarks from the Commanding Officer of ONR Global. Captain Dave Maynard made it a point to acknowledge the audience in attendance and exclaimed his confidence in the continued success of the ongoing dialogue with the region

and key partners, in the area of increased maritime domain awareness. Mr. Bruce Stubbs, the Executive Agent for MDA in the U.S. Navy, followed ONR Global's remarks. In his keynote address, he stressed the importance of a "whole of government" approach to MDA and openly acknowledged that the scope of that effort was too broad for any single entity to tackle. Mr. Stubbs referenced Admiral Harris' mention of the U.S. Navy's "Spiral 1" increment of a unified operational MDA capability, and the Maritime Safety and Security Information System (MSSIS), as key enablers to interagency and international cooperation. Rear Admiral Robert Parker, Director for Security and Intelligence, U.S. Southern Command (USSOUTHCOM), highlighted the importance of security as a precondition for economic and social prosperity and lasting democratic institutions. Moreover, he emphasized USSOUTHCOM's commitment to hemispheric security efforts in partnering and countering transnational threats and challenges; increased MDA being a key element of that effort. He concluded his presentation by stating that challenges in the 21st Century will require multinational and interagency cooperation; that regional information sharing is and will continue to be essential for mutual security; that regional challenges require and will continue to require regional solutions and lasting partnerships; and lastly, that the 21st Century security environment will continue to evolve in ways that cannot be predicted but that multinational cooperation is the best hope for mutual security.

The early morning series of presentations and talks highlighted those MDA related activities and capabilities in the Caribbean and South American regions.

Captain Gilberto Rodrigues, from the "Comando Local de Control Operativo of the Brazilian Navy", briefed the group on their Maritime Traffic Information System, or "Sistema de Informações Sobre o Tráfego Marítimo" (SISTRAM). Initially, the purpose of this system was to oversee the movement of shipping in Brazil's Search and Rescue (SAR) area of responsibility. With the advent and integration of AIS kits, SISTRAM has increased its service in the area of maritime awareness in support of Brazilian national interests and those of its partners. Over the last year, SISTRAM has been modified to be able to exchange information with the international LRIT system and the Italian Navy V-RMTC system. It is currently being modified to be able to exchange information with MSSIS with the assistance of the U.S. Department of Transportation Volpe Center. Commander Marcelo Albarran of DIRECTEMAR followed Captain Rodrigues and presented Chile's efforts in promoting the broader adoption of the LRIT system within the region. He presented Chile's progressive efforts in this area to include the establishment of an LRIT Data Fusion center which contributes greatly to the Common Operating Picture (COP) managed by their GRAFIMAR system, or Maritime Information System.

Rear Admiral Carlos Alberto Paz of Argentina detailed his nation's efforts through CAMAS and the Specialized Inter-American Naval Conference (SIANC) in the area of maritime control and surveillance. He covered the tenets of their national maritime surveillance strategy and the system enabling it called the Maritime Traffic Control System or "Sistema De Control Del Tráfico Marítimo" (CTM), which is compatible with the Naval Merchant Shipping Information System (NAMEISIS), among other systems. For the Panama Canal Authority (PCA), Mr. Antonio Michel, the Director of Security and Emergency Services, described the institutional implementation of recognized standards by the PCA such as: Safety of Life at Sea (SOLAS), International Ship and Port Facility Security Code (ISPS) and the International Organization for Standardization (ISO) 9001:2000. In addition, he presented the risk analysis performed at PCA which encompasses the protection of the canal's critical facilities, information on the ships transiting the canal including: cargo, crew, port of origin and destination information, personnel information and background checks. The security of the canal is based on access control,

inspection and surveillance, patrolling and response. Each vessel is scrutinized by means of a matrix with information that includes vessel flag, type of cargo, crew and passengers, next port, 10 last visited ports, emergencies and situations, information about ISPS, and intelligence received 96 hours before the transit through the canal. Mr. Michel was followed by CDR Dave Wirth representing the Commander Fourth Fleet and U.S. Naval Forces Southern Command, recapped their efforts in propagating AIS throughout the region by means of MSSIS; with 53 participating nations subscribed as users in the network. As an added capability to the AIS connectivity that MSSIS provides, Naval Forces Southern Command is identifying options to provide access to the Baseline for Rapid Iterative Transformational Experimentation (BRITE) to Latin American Navies who participate in MSSIS and the VRMTC-Americas experiment. Commander Wirth is currently serving as the Permanent Secretary for the Inter-American Naval Telecommunications Network (IANTN). Rear Admiral Gustavo Mario Bourilhon, the General Director of Computer Technology and Communications of the Argentine Coast Guard (Prefectura), gave a most impressive demonstration of their vessel traffic system "Sistema de Posicionamiento de Embarcaciones" in which they used AIS data to maintain an awareness of maritime traffic in their inland, intercoastal and coastal waters.

Later that afternoon, the focus of the conference turned to North American Maritime Security Activities, European Maritime Situational Awareness efforts, and a panel discussion on the roadmap to action in regards to Global MDA. Rear Admiral Dennis FitzPatrick, Director, Joint Operations Division U.S. Fleet Forces Command presented the United States Northern Command (USNORTHCOM) Maritime Security Initiatives. A key point in his briefing on NORTHCOM's strategy was anchored on the U.S. Chief of Naval Operations guidance regarding the imperative of building relationships with other navies and nations as an integral component of the new U.S. Maritime Strategy for the 21st Century. In order to illustrate this point, Admiral FitzPatrick presented examples of ongoing efforts with Canada, Mexico and other global partners. Commander Jorge V. Vázquez Zárate of Mexico's "Secretaria de Marina" (SEMAR) described a U.S./Mexico cooperative policy and operational scheme driven mainly by mutual national interests that stemmed from 3,000 Kilometers of a shared land border as well as maritime approaches. Then, Rear Admiral Tyrone Pile, the Commander of Canadian Maritime Forces Pacific, spoke on the national Marine Security Operations Centers' (MSOC) history and implementation scheme. The MSOC serves as Canada's Multi-Agency Information Fusion Center integrating efforts across five discrete organizations. In their current state, MSOCs are providing 24/7 management, analysis and exchange of maritime intelligence, surveillance and reconnaissance data.

Dr. Alenka Brown, a Senior Science Advisor from the U.S. Office of the Secretary of Defense, shared her thoughts on Human Interoperability as it applied to building partnerships, sharing the work of her enterprise to date. Her work has gained momentum recently due to U.S. Presidential Directives and legislation which required a collaborative and coordinated response between the U.S. and its partners in times of international crisis. For the final of the North American presentations, Lieutenant Commander Dan Manu-Popa of the Canadian Directorate of Maritime Policy, Operations and Readiness (DMPOR), presented their efforts in the application of Naval Cooperation and Guidance for Shipping (NCAGS) principles in order to build a more complete Regional Situational Awareness (RSA). He also posed the notion that the global NCAGS partnership, if tied by a global network with national connectivity to commercial maritime organizations, could bring all nations closer to realizing Global MDA (GMDA).

Commander Andy Hancock of the Royal Navy Fleet Operations Center in Northwood, United Kingdom (UK), discussed the challenges and opportunities presented in regional maritime security from a UK/European perspective. In particular he stressed that the commercial maritime sector's concerns must be acknowledged as they represent the majority of the maritime community and it is their safety and security that allows the creation of wealth and prosperity through international trade. In his view, building the picture is not an end in itself, but the means to having the awareness to protect the global trading system and deliver security. Commander Hancock pointed out that from a coalition perspective UK's main efforts are focused in the high risk regions of the world where the threat to maritime security is highest such as: the South China Sea, the Strait of Malacca, the Horn of Africa and the Caribbean Sea. In these areas, according to him, the key challenges tend to be resources in the form of assets, the ability to build and maintain a recognized maritime picture, and the speed of reaction. For Commander Hancock, critical enablers such as Intelligence, Surveillance, Target Acquisition and Reconnaissance are in limited supply and have to be competed for with many other demands on their availability. In many of these high risk areas, the patrol areas tend to be vast and without the assistance of intelligence-led operations, and plagued with infrastructure challenges such as the establishment and operation of AIS, which it is a particular problem in the Gulf of Aden. Besides the legal challenges and national rules of engagement to pursue maritime offenders, Commander Hancock expressed his optimism with regard to a future of opportunities led by initiatives such as the NATO Shipping Centre at Northwood, which provides a very clear picture of activity in the Mediterranean Sea that when combined with Operation ACTIVE ENDEAVOR, can give them a warmer feeling of security on Europe's southern flank. For the Americas, he highlighted the Colombian Navy's intention to build an International Maritime Interdiction Operations Center in Cartagena which it is expected to significantly increase regional cooperation.

Following Commander Hancock, Lieutenant Commander Marco Cresca of the Italian Navy General Planning and Maritime Policy Department, gave an overview of the Italian Navy's "Med-Centric" approach for maritime information sharing, in particular its successes in running the Virtual Regional Maritime Traffic Centre (V-RMTC)^v system. He described the evolution of the V-RMTC system from its regional application in the Mediterranean and bilateral application with countries such as Lebanon to a broader trans-regional experimentation that includes Brazil and Singapore. Commander Cresca highlighted that just in May 2008 the navies of Italy and Brazil were able to exchange over 7,000 merchant contacts via their respective V-RMTC and SISTRAM systems.

Before the convening of the panel for the final discussion of the second day, Mr. James E. Caponiti, Assistant Administrator for the United States Maritime Administration (MARAD)^{vi}, described how today maritime security is at the forefront of ship-owners' minds and that insurance premiums continue to increase in areas such as the Gulf of Aden, where shippers are seriously considering paying as much as 60-thousand dollars per voyage for private security. Mr. Caponiti continued saying that for industry, maritime security is not just linked to piracy and premiums, but primarily to keeping ports operating at full capacity as commerce thrives in a secure environment. Although, Mr. Caponiti believes that there are a growing number of people in the maritime industry who have an interest in supporting and benefiting from global Maritime Situational Awareness (MSA), he pointed out that there is nothing close to universal support for widespread maritime information sharing. His rationale is that historically maritime activities have been shrouded in anonymity giving those with access to information such as: who is out there?... what are they doing?... what are they carrying?... where are they going?... and when are they getting there?... a source of power and competitive advantage, which those who possessed it

guard it closely. But with globalization, Mr. Caponiti expressed, the sheer number of players hoarding small bits of information is causing more friction on the system; thus, making the world more dangerous than it needs to be—not only for those who do not have the information, but also, in the long run, for those who have a little information and will not share. In his view, one way to better understand this is to approach it as three inter-related components: technology, policy and relationships. For the Assistant Administrator, technology is the easy piece, with development of rules, policies, and processes for sharing information as the greater challenge. Mr. Caponiti is convinced that relationships are the key to progress. He highlighted this Global MDA Conference as a great example to continue furthering the discussions and concepts of MDA, but also identified other forums such as the Naval Cooperation and Guidance for Shipping (NCAGS), the Specialized Inter-American Naval Conference on Science and Technology (SIANC-S&T), the Inter American Defense Board at the Organization of American States (OAS), and the International Maritime Organization (IMO) as mechanisms to move the MDA effort forward by establishing regional operations and technology working groups that leverage these longstanding forums and relationships. He closed by posing the following questions to the panel and the group:

- What organizations do you think can help us advance the MSA effort?
- How do you think we can build relationships between our countries?
- How do we best bring the commercial and trade sector into the discussion?

Captain Gus Otero, U.S. Navy representative of the U.S. Office of Global Maritime Situational Awareness (OGMSA), led the aforementioned panel discussion beginning with a short introduction of his organization and their role in the 1st Western Hemisphere MDA conference mentioned earlier in this report. He presented the tenants of OGMSA’s strategic approach and goals, and provided a recap of the 2007 workshop recommendations along with those activities accomplished in 2008. The panel included representatives from USSOUTHCOM, USFFC/NCAGS, Canadian National Defense, and the U.S. National Maritime Awareness Technology Subcommittee. The panel set the stage for the VRMTC-Americas discussions of the last day of the conference, which were centered on the development of a wider VRMTC community for the Americas following the model established by the Italian Navy in the Mediterranean. Annex A provides a summary of the discussions that took place during the VRMTC-Americas closed session in the afternoon of 5 December. This activity marked the conclusion of the second day of the conference.

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The third and final day of the conference began with a keynote address from the Commander of the U.S. Southern Command (USSOUTHCOM), Admiral James Stavridis. He delivered a most compelling plea for maritime cooperation and emphasized the significance of leveraging MDA activities to achieve a long-lasting stability, security, and prosperity in the Americas. Mr. Juan Hurtado, the Science Advisor of USSOUTHCOM, presented the scope and objectives of the Virtual Regional Maritime Traffic Center Americas (VRMTC-Americas) Experiment. VRMTC-Americas is a Fiscal Year 2008 Coalition Warfare Project (CWP^{vii}), modeled after the V-RMTC Wider Mediterranean Community led by the Italian Navy, as described above. This effort was showcased at last year’s conference and is intended to provide a means for partner nations to collaborate on technical and operational fronts using existing national systems and partnerships

to help realize an increased level of maritime situational awareness in the Americas. This presentation was followed up by the closed session working group meeting later in the day.

The next series of presentations focused on the enabling efforts of space-based technologies on MDA. Representatives from the U.S. National Maritime Awareness Technology Subcommittee (NMATS), the Canadian Shipping Working Group, the U.S. Naval Research Laboratory (NRL), and the U.S. Office of Naval Research (ONR) gave informed updates on the subject.

Mr. Guy Thomas, the Science & Technology Advisor for OGMSA and co-chairman of the NMATS provided an overview of opportunities for Collaboration in Space for International Global Maritime Awareness (C-SIGMA). This overview included not only an array of solutions available to the international community of interest, but also the potential implications of those capabilities on MDA operations. He stressed the need for, and importance of, international collaboration, especially in regards to space system utilization, to achieve global maritime awareness. He proposed the creation of an international body to organize and coordinate such an effort.

Lieutenant Commander Dan Manu-Popa of Canada presented their efforts in leveraging commercially available satellite solutions for MDA through "Project Polar Epsilon". Phase 1 of this project encompasses arctic surveillance (land) and environmental sensing, including surveillance of Canada's maritime approaches providing environmental information (ocean color, oceanographic products, input to sonar/radar predictions and sea surface temperature), direct reception of NOAA satellites for Joint Task Force (JTF)s Atlantic/Pacific Meteorological & Oceanographic Centers (METOCs), and environmental information processed by JTF A/P METOCs. Phase 2 will address near real-time ship detection using the RADARSAT 2 Maritime Satellite Surveillance Radar.

Mr. Jay Middour, NRL, presented the Global Awareness Data-exfiltration International Satellite (GLADIS) concept, a space-based system to provide broad unclassified collaboration among international partners to achieve and sustain Global Situational Awareness at a minimum cost. GLADIS is expected to employ a set of capabilities that makes it global, persistent, and that allows it to exfiltrate data from unattended maritime and terrestrial sensors; thus, expanding nations perspectives from local to global; being government-to-government sponsored (subsidized) vice full commercial (for profit only).

Finally, Dr. Robert McCoy, Head of Space Technology Programs at ONR, concluded this series of presentations with an update on the Tactical Space Innovative Naval Prototype (INP). The objectives of this INP are the development of low-cost, rapidly-launched, maritime technology space demonstrations to test unconventional approaches to spaceflight using commercially available aerospace technologies, and the use of spaceflight demonstrations to experiment with small satellites for UHF Communications, blue force tracking, AIS, electronic ship tracking, maritime hyper-spectral imaging, and data exfiltration.

Before the closing ceremonies of EXPONAVAL 2008, the Workshop had the pleasure of hearing prepared remarks from DIRECTEMAR, Vice Admiral Edmundo Gonzalez. Vice Admiral Gonzalez stated the challenges in the implementation of MDA (i.e. the adoption of a common MDA system by participating countries) in order to obtain useful information in real-time; the need to move on to the next level in the implementation of MDA by bringing the topic in forums such as the Specialized Inter-American Naval Conference on Science and Technology and in Naval Control of Shipping; and noted with interest the proposal of the establishment of an Operational Agreement to implement the VRMTC program in the Americas.

After the closing ceremonies, a select group of individuals were hosted by the Chilean Navy at the Dirección de Seguridad y Operaciones Marítimas (DIRSOMAR's) Punta Angeles Headquarters in Valparaiso, Chile for the VRMTC-Americas workshop. Representatives from 7 countries (Argentina, Brazil, Canada, Chile, Mexico, Panama, and the United States) met to discuss the implementation of this project in the region and the various coordination efforts. Annex A provides the summary report with recommendations and action items that resulted from that meeting.

Key Findings and Workshop Recommendations

As for Findings and/or Recommendations stemming from this conference/workshop, those listed in the following paragraphs will be socialized and coordinated with the appropriate stakeholders. That said, the following are offered:

Findings

It is clear that the global community understand the maritime security challenges that the world economy will face in the 21st Century. Most nations represented at the conference have established MDA programs of their own, but most agree that expansion of the MSSIS network and the global adoption of the LRIT system are steps that can be taken in the short term to continue expanding the Global MDA initiative. As such, the recommendations from last year's workshop are valid with much remaining to be accomplished. A condensed restating of those recommendations is provided below for the reader's review.

- Create or leverage existing regional forums in order to develop an increased level of trust and cooperation as it pertains to information sharing. This should be done with the intent of creating a greater level of maritime situational awareness and an increased capability in the region. Enabling actions to this end might include:
 - Bring together national authorities to agree on a minimum set of shared data standards.
 - Establish a regional/global MDA website, or similar forum, that facilitates communications among partners. Capabilities of such a forum might include: chat with trans-lingual instant messaging capability, email with addresses and contact list of national MDA points of contacts, and the communication of best practices/lessons learned.
 - Create regional operations and technology working groups for MDA that leverage longstanding forums such as the SIANC-S&T, the International Maritime Organization (IMO), and others as appropriate.
- Include more maritime awareness activities in regional military exercises and technology experiments in coordination with entities such as CAMAS and NCAGS. Candidate naval exercises may include: PANAMAX, TRANSAMERICA, BELL BUOY^{viii}, COAMAS^{ix}, TRANSOCEANIC^x, UNITAS, and Rim of the Pacific (RIMPAC).
- In the near to mid term (9-12 months), explore with partner nations the possibility of linking their national AIS systems to MSSIS; thus, advance the implementation of the VRMTC-Americas initiative. This would enable an increased regional capability and contribute to the global MDA picture.

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- In the far term (1-3 years), consider other areas of potential collaboration such as: more advanced collaboration tools, multi-level security, space based sensors, and the potential establishment of a multi-national MDA operations center.

Accomplishments in 2008 in support of the aforementioned include: MSSIS participation continues on the rise globally with well over 50 nations - Chile being the first in this hemisphere. An inaugural Global Maritime Information Sharing Symposium (GMISS) was held at the U.S. Merchant Marine Academy (USMMA) Global Maritime and Transportation School (GMATS) in August, bringing together international constituents from the maritime industry, Government Interagency, and international navies and coast guards. South American partners expanded their use of MDA technologies in TransOceanic, TransAmerica and CAMAS exercises. Finally, NCAGS operators furthered their dialogue on new MDA technologies to be applied in related activities.

Recommendations

As proposed by the panel led by OGMSA, the broad areas of activity proposed can be categorized under three headings: Relationships, Policy, and Technology. Under Relationships, a continued international dialogue and outreach is encouraged as well as the establishment of a VRMTC-Americas (VRMTC-A) operational charter. In terms of Policy for the Americas, the establishment of a VRMTC-Americas steering committee should be pursued to help coordinate the operational charter, draft a concept of operations and champion the pursuit of long term sustainment for this program. On the Technology front, the most pressing actions are the continued integration of existing national MDA capabilities into a global MDA framework, the establishment of a Web portal or collaborative site that brings together the global MDA community of interest in a forum that allows the exchange of concepts and programs being led either by government maritime organizations, shipping industry, or international organizations, and the incorporation of Web 2.0 tools philosophy to enhance information network sharing framework.

ANNEX A

USSOUTHCOM VRMTC-Americas Working Group Meeting Report

5 December 2008

The report in this Annex was published by the USSOUTHCOM VRMTC-Americas Program Manager, Mr. Rick Arias. e-mail: ricardo.arias.ctr@hq.southcom.mil office: (305) 437-1894

Executive Summary:

On 5 December 2008, following the conclusion of the 2nd Western Hemisphere Maritime Domain Awareness Conference, 29 representatives from 7 countries – Argentina, Brazil, Canada, Chile, Mexico, Panama, and the United States – met to participate in the Virtual Regional Maritime Traffic Center - Americas (VRMTC-Americas) Workshop. A complete list of participants and point of contact (POC) information is provided separately.

The VRMTC-AMERICAS Workshop, hosted by the Chilean Navy at DIRSOMAR's Punta Angeles Headquarters, Valparaiso, Chile, was held with the purpose of continuing regional MDA dialogue and was focused on developing a plan of action for realization of VRMTC-Americas.

The workshop built on the general consensus achieved during the 2nd Western Hemisphere Maritime Domain Awareness Conference. Specific areas of consensus included: the strategic importance of maritime security, the need for collaboration and synergy of efforts, and the need for a regional approach to the development of solutions to maritime threats.

Discussion:

The workshop was moderated by Mr. Ricardo Arias, Program Manager, Science, Technology & Experimentation, U.S. Southern Command, and Mr. Elmer Roman, Regional Director, ONRG-Americas. Mr. Arias provided a brief on efforts since original discussion of VRMTC-Americas at the 1st Western Hemisphere Maritime Domain Awareness Workshop, held in Santiago, Chile, 05-07 December 2007.

VRMTC-Americas is an interagency, multi-national, technology demonstration project that proposes to leverage and integrate existing regional efforts that contribute to, or aim at, developing Maritime Domain Awareness (MDA). It is modeled after a similarly named initiative in the Mediterranean – V-RMTC. The Mediterranean initiative leverages the Maritime Safety and Security Information System (MSSIS) network and collects distributed MDA data from participating navies. The data is collated centrally and then distributed, unaltered, over a Common Operating Picture (COP). Distribution is done bilaterally between several federations to accommodate political sensitivities.

Like V-RMTC in the Mediterranean, VRMTC- Americas is a regional approach and it proposes to leverage and integrate MSSIS, to fuse regional MDA data, and to distribute data via a COP. Unlike the Mediterranean initiative, VRMTC- Americas will automate the collecting and fusing

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processes and will incorporate analytical and collaboration tools. VRMTC- Americas will also extend participation to non-military organizations or agencies such as coast guards, port authorities, law enforcement agencies, and other ministries. Additionally, VRMTC- Americas will distribute data evenly and multilaterally to all partners, allowing for today's distributed and independent efforts to work collectively towards an enhanced regional maritime domain awareness capability over one common operating picture.

The efforts over the past year have focused on: a) "socializing" VRMTC- Americas with various potential partners, including non-military agencies and ministries, b) on developing an understanding for regional challenges and operational requirements, and c) on identifying the desired operational capabilities.

The range of potential partners considered was broad and included navies, coast guards, and port authorities in Argentina, Brazil, Canada, Chile, Dominican Republic, Panama, and Uruguay.

The socialization process facilitated identification of 3 operational requirements: 1) the need to develop a regional Common Operational Picture (COP), 2) the need for analytical tool(s) to screen and analyze AIS data for the purpose of generating actionable information, and 3) the need for a non-classified information sharing and collaboration environment. Correspondingly, 3 generic components of a desired Initial Operating Capability (IOC) were identified: 1) a COP, 2) an analytical tool, and 3) an information sharing and collaboration environment.

The workshop discussed the success of MSSIS as a means to facilitate information exchange of Automated Identification System (AIS) data and agreed to leverage MSSIS and its COP, TV32, in the integration of regional MDA capabilities. TV32 is GIS software developed and implemented by the United States Department of Transportation's Volpe Center to provide real-time display of vessel tracking and navigation information. TV32 is:

- Adaptable across a number of projects; can be customized readily and used for prototyping in new situations.
- Configurable to satisfy various display requirements, including enhanced navigation safety, waterway efficiency, traffic situation awareness, force protection, and data analysis.

The workshop concluded that participation in VRMTC- Americas or use of TV32 as the COP would not preclude any partner from continuing use of its own MDA network(s) or system(s).

The workshop discussed and agreed on the need for analytical tools to help screen and analyze the large amounts of AIS data that would result from integration of MSSIS with regional MDA capabilities for the purpose of generating actionable information and thus providing a measure of "intelligence" to the COP. Workshop participants agreed that an analytical tool should be a component of the IOC.

Possible use of BRITE as the IOC's analytical component was discussed. BRITE is an application that can analyze the stream of MSSIS data to identify and resolve anomalies by cross-referencing and checking the data's consistency against other data in the system (detecting duplicates, etc.) and comparing reported data to other reliable sources such as the Lloyd's of London database. It provides alerts based on defined criteria, pointing out vessels that may warrant additional scrutiny or attention.

The workshop discussed and agreed on the need for AIS information sharing and on the need for a non-classified information sharing and collaboration environment as a component of the IOC.

The information sharing and collaboration environment would facilitate collaboration on technical and operational issues.

Recommendations:

Participants provided numerous Action Items and Suggestions. Not all items and suggestions were discussed due to time constraints. The following recommendations were discussed and agreed to:

1. Incorporate discussion of VRMTC- Americas within established regional conferences such as the Specialized Inter-American Naval Conference for S&T (CNIE S&T). Commander Jose Sepulveda, DIRECTEMAR, recommended VRMTC- Americas be briefed at the next CNIE conference and offered to do so, but pointed out he was not invited. Mr. Elmer Roman offered to get Commander Sepulveda an invitation.
2. Plan the next VRMTC- Americas meeting as a Technical Workshop. Partners would need to identify and provide technical representatives (TR). TRs should understand their organizations' MDA systems/networks and MDA requirements. A date and venue will need to be selected. RADM Edlander Santos, Naval Operations Command, Brazil, offered to host the Technical Workshop in Rio de Janeiro, Brazil, scheduled for 6-8 April 2009. Partners should keep in mind that travel notice requirements for many of the partners range from 30 to 60 days. Date and venue for the Technical Workshop should be determined soon.
3. Establish a Steering Group comprised of one representative per partner organization.
4. Partners should identify POCs within their organizations for representation on both executive and technical matters. An organization's POC for executive matters could also serve as that organization's representative in the Steering Group.
5. Set up a WIKI or other web-accessible FAQ page as a collaboration portal for the purpose of advancing VRMTC- Americas. Portal would serve as a discussion forum to help develop ideas and track issues. It should provide a basic "connect and collaborate" capability (blog, post and chat).

The following is a list of the remaining Action Items (A) and Suggestions (S) submitted but not discussed during the workshop due to time constraints:

- A – Begin work on a draft "Operational Arrangement" or other operational construct so that VRMTC- Americas can eventually transition from a technology demonstration project to a residual capability in the region.
- A – Develop and agree on Information Exchange Requirements (IER) before a technology solution is fully developed.
- A – Define VRMTC- Americas Concept of Operations (CONOPs).
- A – Develop a VRMTC-Americas Implementation Plan that outlines the scope and supporting efforts required for implementing VRMTC- Americas and provides expected outcome and residual capabilities.
- S – Develop basic operationally focused scenarios, such as a SAR case, to be exercised before VRMTC- Americas is implemented and after IOC is fielded.

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- S – Broaden the scope of possible partners beyond military and navies. Partners could include coast guards, port security, law enforcement agencies, or other government ministries.
 - S – Explore the possibility of leveraging and integrating the CNIES network.
 - S – Continue to utilize MSSIS and later integrate the CNIES and PNN networks within a VPN for the purpose of experimenting with analytical tools such as BRITE.

Plan of Action:

Based on the workshop discussion and recommendations presented above, a Plan of Action is being drafted for review by all partners. Your inputs are kindly requested and can be forwarded to Mr. Ricardo Arias, Program Manager, Science, Technology & Experimentation, U.S. Southern Command.

ANNEX B

Global Maritime Domain Awareness Conference

2nd Western Hemisphere Maritime Domain Awareness Workshop

AGENDA

3-5 December 2008
Valparaiso, Chile

EXPONAVAL 2008
Venue: 6th International Maritime and Naval
Exhibition and Conference for Latin
America

TUESDAY, 2 DECEMBER

1900-2100 **Ice-Breaker Reception at Club Naval, Valparaiso**
Hosted by Ambassador Paul E. Simons, U.S. Ambassador to Chile

WEDNESDAY, 3 DECEMBER (Location: EXPONAVAL Main Plenary Room)

1430-1440 **Welcome and Introductions**
Mr. Elmer Roman, Regional Director, ONR Global – Americas, US Navy

1440-1500 **Opening Remarks for Global MDA Conference**
Ms. Carolina Echeverria, Under Secretary of Navy, Chile

1500-1530 **Chilean Navy Maritime Domain Awareness Program**
VADM Edmundo Gonzalez, Director General of Maritime Territory & Merchant Marine, Chilean Navy

1530-1650 **Regional Perspectives on Maritime Domain Awareness**
Keynote: *VADM Harry B. Harris, Deputy Chief of Naval Operations for Communication Networks, U.S. Navy*

Panel:

- *VADM Edmundo Gonzalez, Director General of Maritime Territory & Merchant Marine, Chilean Navy (Chairman)*
- *VADM Maurizio Gemignani, Allied CC-MAR Commander Naples, Italian Navy*
- *RADM Edlander Santos, Coordinator Atlantic Maritime Area South, Brazilian Navy*
- *Mr. Tan Peng Yam, Deputy Chief Executive for the Defence Science and Technology Agency, Singapore*
- *Mr. Moambo Jabulani Moleya, National Head of Security, Transnet National Ports Authority, South Africa*

1650-1700 **Break**

1700-1800 **Security Challenges Facing Global Maritime Supply Chain**

Presentations by:

- *Maritime Law Enforcement Perspective - RADM Wayne Justice, U.S. Coast Guard*

- *Commercial/Shipowners Perspective - RADM Alexander Tavra, Ret., Secretary General Sudamericana de Vapores, Chile*
- *Technology Industry's Perspective - ADM Walt Doran, Ret., President Raytheon International Asia-Pacific Region, USA*

1800-1815 **Closing Remarks**
CDR Jose Sepulveda, Directorate General of Maritime Territory & Merchant Marine, Chilean Navy

2030-2230 **No Host Dinner at Armandita Argentine Steakhouse**
 Location: 6 Norte 119, casi esquina San Martin, tel: 032-268-1607

THURSDAY, 4 DECEMBER (Location: EXPONAVAL Main Plenary Room)

0830-0845 **Welcome & Workshop Overview**
CAPT David Maynard, Commanding Officer, Office of Naval Research Global, US Navy

0845-0915 **Keynote: United States Maritime Domain Awareness Initiative**
Mr. Bruce Stubbs, SES, Director, Office of the DoD Executive Agent for MDA, US Navy

0915-0940 **U.S. Southern Command Maritime Security Initiatives**
RADM Robert Parker, Director for Security and Intelligence, U.S. Southern Command, USA

Regional MDA Activities in South America and the Caribbean

0940-1000 **Brazil's Maritime Traffic Information System (SISTRAM)**
CAPT Gilberto Rodrigues, Comando Local de Control Operativo, Brazilian Navy

1000-1020 **Long Range Identification and Tracking System**
CDR Marcelo Albarran, Directorate General of Maritime Territory & Merchant Marine, Chilean Navy

1020-1040 **Break**

1040-1100 **Argentine Maritime Security Programs**
RADM Carlos Alberto Paz, Director of Operational Policy and Plans, Argentine Navy

1100-1120 **Panama Canal Maritime Awareness Initiatives**
Mr. Antonio Michel, Executive Manager, Security and Emergency Response, Panama Canal

1140-1200 **Spotlight on the Caribbean Initiative**
CDR Dave Wirth, Asst Chief of Staff for C4I / IANTN Secretary, Commander US 4th Fleet, US Navy

1200-1220 **MDA: Argentine Maritime Authority**
Prefecto General Gustavo M. Bourilhon, Prefectura Naval, Argentina

1220-1400 **Lunch**

North American Maritime Security Activities

1400-1420 **North America Maritime Security Initiatives**
RDML Dennis E. Fitzpatrick, Director Joint Operations, U.S. Fleet Forces Command, USA

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- 1420-1440 **Mexican Maritime Security Initiatives**
CDR Jorge Vazquez Zarate, Secretaria Marina, Mexican Navy
- 1440-1500 **Canadian Maritime Security Initiatives**
RAdm Tyrone Pile, Commander Maritime Force Pacific, Canadian Navy
- 1500-1520 **Building Partnerships and Human Interoperability**
Dr. Stefania Brown, SES, Office of the Secretary of Defense, USA
- 1520-1540 **Naval Cooperation and Guidance for Shipping activities in support of MDA**
LCDR Dan Manu-Popa, NCAGS/Pacific and Indian Ocean Shipping Working Group, Canada
- 1540-1600 **Break**

European Maritime Situational Awareness Efforts

- 1600-1620 **Challenges and Opportunities to Regional Maritime Security**
CDR Andy Hancock, Fleet Operations Division, Northwood Headquarters, Royal Navy, UK
- 1620-1640 **Virtual Regional Maritime Traffic Center - Europe**
LCDR Marco Cresca, General Planning and Maritime Policy Department, Italian Navy

Global MDA Discussions – A Roadmap for Action

- 1640-1710 **Keynote:** Synchronizing Efforts to Improve Information Sharing
Mr. James Caponiti, SES, Assistant Administrator, Maritime Administration, USA [Speech]
- 1710-1750 **Workshop Discussion Panel**
CAPT Gus Otero, National Office of Global Maritime Situational Awareness, USA
- *Mr. Robert Barry Walker, Director Maritime Information Requirements, National Defense, Canada*
 - *CDR Jose Sepulveda, Directorate General of Maritime Territory & Merchant Marine, Chilean Navy*
 - *Mr. Guy Thomas, Co-Chairman, National Maritime Awareness Technology Sub-committee, USA*
 - *CAPT Andy Bjork, Naval Cooperation and Guidance for Shipping, US Navy*
 - *Mr. Ricardo Arias, Programs Manager, Science and Technology and Experimentation, USSOUTHCOM*
- 1750-1800 **Day Wrap-Up**
Mr. Elmer Roman, Regional Director, ONR Global – Americas, US Navy

FRIDAY, 5 DECEMBER (Location: Empresa Portuaria de Valparaiso Auditorium)

- 0845-0900 **Previous Day's Highlights**
CDR Jose Sepulveda, Directorate General of Maritime Territory & Merchant Marine, Chilean Navy
- 0900-0930 **Keynote:** Maritime Cooperation for Security in the Americas
Admiral James Stavridis, Commander U.S. Southern Command, USA

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0930-0950 **Virtual Regional Maritime Traffic Center – Americas**
Mr. Juan Hurtado, Science Advisor, US Southern Command, USA

Space-Based Maritime Domain Awareness

0950-1010 **Collaborative International Space Systems for Maritime Awareness**
Mr. Guy Thomas, Co-Chairman, National Maritime Awareness Technology Sub-committee, USA

1010-1030 **Leveraging Commercial Space Systems for MDA – RADSAT II**
LCDR Dan Manu-Popa, NCAGS/Pacific and Indian Ocean Shipping Working Group, Canada

1030-1050 **Global AIS & Data-X International Satellite Constellation (GLADIS)**
Mr. Jay Middour, Head Advanced Space Systems Branch, Naval Research Laboratory, US Navy

1050-1110 **Office of Naval Research Space Initiatives**
Dr. Robert McCoy, Head, Space Branch Code 321SP, Office of Naval Research, US Navy

1110-1120 **Workshop Closing Remarks**
VADM Edmundo Gonzalez, Director General of Maritime Territory & Merchant Marine, Chilean Navy

1130 -1400 **EXPONAVAL 2008 Closing Ceremony at Exposition Pavilion**

1400-1800 **CLOSED SESSION (By Invitation Only)**
Virtual Regional Maritime Traffic Center – Americas Working Group Meeting
Location: DIRSOMAR, Recinto Punta Angeles, Valparaiso, Chile

ANNEX C

Reference End Notes

ⁱ Argentina, Belize, Bolivia, Brazil, Canada, Chile, China, Colombia, Costa Rica, Ecuador, El Salvador, France, Guatemala, Holland, Israel, Italy, Jamaica, Malaysia, Mexico, Morocco, New Zealand, Panama, Peru, Philippines, Spain, Switzerland, Turkey, United States, United Kingdom, and Uruguay

ⁱⁱ Valparaíso (literally in Spanish: Valle Paraíso (Paradise Valley) and also called "Valpo" locally) is a major city in Chile and one of that country's most important seaports and an increasingly vital cultural centre in the hemisphere's Pacific Southwest. The city is located in central Chile, where it is capital of the Region of Valparaíso. Although Santiago is Chile's official capital, Valparaiso houses the National Congress.

ⁱⁱⁱ For the purposes of this report, the terms Maritime Domain Awareness (MDA), Regional Situational Awareness (RSA), and Maritime Situational Awareness (MSA) are interchangeable and represent an enhanced ability to identify threats to the Maritime Domain be they safety, security, environmental or economic, as early and as distant from a nation's shore as possible by integrating intelligence, surveillance, observation, and navigation systems into a common operating picture accessible to respective National agencies.

^{iv} Developed by the U.S. Department of Transportation's Volpe Center as an: unclassified, multinational, freely shared, Automatic Identification System (AIS) network and used by NATO and other countries in the broader European and African theater. It has recently gained some prominence in the Western Hemisphere with Chile establishing and contributing to MSSIS through its operations center at DIRECTAMAR. The MSSIS provides clients with real-time AIS data derived from shore side, waterborne, and airborne platforms.

^v The Virtual Regional Maritime Traffic Centre is a virtual network connecting operational centers of the Navies participating in this Initiative. This network resorts to baseline Internet capabilities to provide unclassified information on merchant shipping of greater than 300 tons. Data is delivered according to a specific format (MERSIT), developed by the Italian Navy, and gathered at a hub located at the Italian Fleet HQ (CINCNV), where it is made available to all the participants. (<http://www.marina.difesa.it/vrmtc/2007/uk/vrmtcen.asp>)

^{vi} MARAD promotes the development and maintenance of an adequate, well-balanced U.S. merchant marine, sufficient to carry the Nation's domestic waterborne commerce and a substantial portion of its waterborne foreign commerce, and capable of service as a naval and military auxiliary in time of war or national emergency. The Maritime Administration also seeks to ensure that the United States maintains adequate shipbuilding and repair services, efficient ports, effective intermodal water and land transportation systems, and reserve shipping capacity for use in time of national emergency.

^{vii} The CWP is a defense-wide effort to assist the Combatant Commanders, Services, and DoD Agencies in integrating coalition-enabling solutions into existing and planned U.S. programs. The program focuses not only on short-term, interoperability-enhancing solutions, but also on early identification of coalition solutions to long-term interoperability issues (architectures, coalition requirements, major system acquisition) with a broad range of potential coalition partners. (<http://www.acq.osd.mil/ic/cwp.html>)

^{viii} BELL BUOY is a Naval Control of Shipping exercise that is coordinated through the Naval Coordination Shipping Working Group (BBNCSWG), is established to advance NCAGS doctrine and procedures in the Pacific and Indian Oceans (<http://www.pacioswg.org/>)

^{ix} COAMAS exercises are carried out on a yearly basis between the navies of Brazil, Paraguay, Uruguay, and Argentina, as well as transoceanic exercises, which, in spite of the Inter-American nature, provide for the participation of the South African Navy.

^x TRANSOCEANIC are a series of NCAGS exercises carried out yearly between the navies of Argentina, Brazil, Chile, Ecuador, U.S.A., Paraguay, Peru, Uruguay, Venezuela and South Africa.

Workshop Presentations and Speeches: For your convenience, ONRG Americas has posted the presentations and speeches on a document exchange website to facilitate downloading them should you wish to do so. The following instructions will assist you in obtaining those files:

1. Go to <https://insideextra.saic.com/docexch>
2. **Username:** RomanE (Not case sensitive)
3. **Password:** onrga_123 (Case sensitive)

Directions: After logging onto the site, you will see a dropdown menu on the left of the screen; choose “ONRG Americas” and select “switch”. Once in the ONRG Americas area click on the hyperlink called “File Manager” in the left hand navigation bar. The area you are in now will allow you to download files. A directory has already been created labeled “2nd Western Hemisphere MDA Workshop”, double click on that folder and you will see a directory labeled, “Presentations”. Double click on Presentation folder and you will see that four other folders labeled: 3 December 2008, 4 December 2008, 5 December 2008 and VRMTC A Working Group Meeting. Each of the aforementioned folders will allow you to download files from them as you deem necessary. If you have any difficulties, please contact Mr. Rob Aguilera (robert.w.aguilera@saic.com) via email.