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MILITARY OPERATIONS RESEARCH SOCIETY

MORS Workshop
Homeland Security/Homeland Defense Decision Support

15-17 November 2005
Johns Hopkins University Applied Physics Laboratory
Laurel, Maryland

Chairs:
Tom Denesia and Dr. Andy Loerch

Technical Chair:
Jack Keane

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EXECUTIVE SUMMARY

At the request of NORAD and NORTHCOM, MORS conducted a Workshop on Homeland Security/Homeland Defense Decision Support at Johns Hopkins University/Applied Physics Lab, Laurel, MD, 15-17 November 2005. The conference was attended by 120 people representing all services, the Combatant Commands, OSD, the Joint Staff, the Department of Homeland Security, and the Homeland Security Institute. Of those attending, 40 were attending their first MORS event. Chairs of the workshop were Mr. Tom Denesia and Dr. Andy Loerch.

This workshop was a first major step in establishing relationships between the analytic communities from the Department of Defense (DoD) and the Department of Homeland Security (DHS). In addition to establishing relationships, the goal of the workshop was to provide the opportunity for analysts and operational planners from the DoD and DHS communities to address and understand the analytic issues that are common, as well as to identify the issues that are unique to the decision makers from each community.

The workshop itself consisted of six working groups: Maritime Security, Transportation, Air and Missile Defense, Land Defense, Consequence Management, and Scenario Development. The objectives were to identify key analytic issues and capabilities and to promote collaboration in addressing options and solutions. The specific objectives were:

- Examine critical analytic issues for protection of the homeland and identify capabilities to address these issues to support the decision makers.
- Examine specific opportunities for collaborative analyses and identify techniques to facilitate the collaboration.
- Examine tools, techniques and data sources that currently exist and ones that should be created to support decision makers.
- Examine shortfalls and gaps where analytic support could be applied to assist decision makers.

There were five common themes that cut across all of the Working Groups. The first was the need to better integrate air and maritime analyses. Much of the current work is being done in the separate domains. The second common theme was the need to better coordinate and integrate the development of scenarios between homeland security and homeland defense. The third theme was the need to integrate operations research analyses with the intelligence community in the development of scenarios and red teaming. The last two common themes that emerged were closely related — Security and Access to Data. How information is classified is very different between DoD and DHS. This is an extremely difficult problem to solve, but must be addressed for the departments to collaborate in support of decision makers at all levels.

Small steps can be taken to address these areas of concern. For example, invite interagency partners to war games and table-top exercises and encourage their involvement in the process of developing them — this process of collaboration has already started at NORTHCOM. Another example is the development of an information sharing database, allowing access from both communities on programs, projects and points-of-contact — a phase I prototype has already been developed by the NORTHCOM analytic staff, is being hosted on the NORTHCOM SIPRNET portal, and will be moved to the unclassified NIPRNET portal in the fall of 2006.

Finally, another step to foster working collaboration would be to refocus MORS WG-30 on Homeland Defense and Civil Support. Preliminary discussions in this regard occurred at the June 2006 MORS Symposium held at the Air Force Academy in Colorado Springs, CO.

The key to successfully working analytic support to senior decision makers in the areas of homeland defense and civil support is addressing the area of classified and sensitive information. Agencies outside the Department of Defense have different systems and methods for handling sensitive information. MORS must address how we can precipitate and host meetings in conjunction with the multitude of other agencies so that these analytic communities can share information and collaborate on various issues.

BACKGROUND

Since the September 11, 2001 terrorist attacks on the World Trade Center and US Pentagon, there have been major efforts in the United States to secure the homeland, particularly with the establishment of the Department of Homeland Security (DHS) and the establishment of US Northern Command (NORTHCOM) within the Department of Defense (DoD). From a DoD point of view, DoD is tasked to: 1) Conduct operations to deter, prevent, and defeat threats and aggression aimed at the United States, and 2) Provide Defense Support to Civil Authorities (DSCA) when directed. Many of the impacts to DoD in executing the homeland defense mission include: the force structure impact of homeland defense operations on other combatant commands; the identification of critical infrastructure; consequence management support; air and missile defense; land and border security; and transportation. Equally important are the many challenges in identifying and quantifying how DoD interfaces with civil authorities, since, in many situations, the civil authorities will have lead responsibility and DoD will be in a supporting role. Likewise, there are many challenges for DHS in determining when DoD support may be required and knowing what capabilities DoD can bring to "the fight." As a result, it is extremely important that both DHS (Homeland Security Institute (HSI), etc.) and DoD (NORTHCOM, etc.) understand each others' capabilities and each others' ability to quantitatively articulate these capabilities. The synergism between all homeland security (HS) and homeland defense (HD) organizations is vitally important to the security and defense of our homeland. The bottom line is that the value of analysts who support our homeland security and homeland defense organizations has and will continue to be a significant force multiplier in these efforts.

APPROACH OF THE WORKSHOP

The first morning of the workshop began with two keynote addresses. The first was given by Mr. Pete Verga, the Principal Deputy to the Assistant Secretary of Defense for Homeland Defense (PD ASD/HD) and the second address was given by Dr. Kirk Evans, Acting Director, Plans Programs and Requirements Office of Plans, Programs and Requirements, Science and Technology Directorate, Department of Homeland Security (S&T/DHS).

Mr. Verga spoke to the DoD roles within the United States, which consist of two major areas: 1) homeland defense, i.e., to defend US territory and interests; and, 2) DSCA, i.e., support to law enforcement, the US Coast Guard, wild land firefighting, etc. He went on to say that the Strategy for Homeland Defense and Civil Support provides a strategic context for the application of decision support capabilities and that they can play a significant role in the active, layered

defense of our nation. Mr. Verga closed with an appeal to the analytic community for help in developing and applying these capabilities.

Dr. Evans emphasized the creation of enduring homeland security capabilities through research, development, testing, evaluation, and transitioning of revolutionary and existing technologies to: 1) Detect, prevent, and mitigate chemical, biological, radiological, nuclear, and explosive threats; 2) Assess and analyze vulnerabilities; 3) Provide technical solutions to Federal, State, and local emergency responders in accordance with operational requirements; and 4) Secure the nation's borders and critical infrastructure.

Both keynote addresses were instrumental in laying the foundation for the working groups and ensuring that all participants had the same basic understanding of the Deliberate Planning Process.

In addition to these influential keynote addresses, two general information sessions were provided to the workshop participants on *Posse Comitatus* and the legal and law enforcement related responsibilities associated with Guard and Reserve forces (i.e. Title 10, Title 14, and Title 32).

WORKING GROUP SUMMARIES, FINDINGS, AND RECOMMENDATIONS

The Workshop consisted of six working groups plus a synthesis group. The findings of each working group are summarized below.

Working Group One: Maritime Security

Chair – **LCDR Jim Passarelli**, USCG, Co-Chairs – **Kelly Leone**, DHS-HSI, and **Duane Boniface**, JHU/APL, Recorder – **Mr. Javier Armendariz,** JHU/APL

Working Group One examined support to decision makers in the maritime security realm. Presentations and discussions were held on the employment of a variety of Operations Research (OR) tools ranging from optimization, to modeling and simulation, risk assessment and game theory to an equally wide-range of applications that included scheduling assets, evaluating cost-effectiveness of escort systems, and evaluating the requirements for and effects of deterrence. These and other methods and applications were identified by the group as extremely relevant to the maritime security problem, and a recommendation was formulated to more diligently and proactively note the potential support to decision makers.

A few challenges were discussed by the group, which included limited collaboration between organizations, complexity within the maritime domain, and the ability to ensure high quality analytic products. Regarding limited collaboration, the discussions focused heavily on the need for greater openness and access to data and underway/completed analytic efforts. To address these, several recommendations were made, including that MORS provide a quarterly forum for interchanges on maritime security. In these discussions, NORTHCOM representatives agreed to establish and host a POC list for maritime homeland security/homeland defense analytic efforts, and the Coast Guard agreed to establish and host a modeling and simulation (M&S) repository with access to DHS and DoD. On a less formal basis, participants agreed to continue to seek out means to enhance collaboration.

Another challenge noted by Working Group One was the complexity of the maritime domain. The maritime domain was noted as large, geographically dispersed, interconnected and interdependent — with unclear responsibilities and authorities. To address this, participants noted that the application of capabilities-based planning and broader use of OR capabilities would be a major step forward. An operations research for homeland security/homeland defense handbook was suggested, along the lines of the Coast Guard's *Risk-Based Decision-Making Guidelines* and the traditional MORS handbooks, which could not only help decision makers see the tools available, but also help ensure consistency and quality of the application of these tools.

A final major concern was the need for effective quality assurance/quality control (QA/QC) in analytic efforts. Concerns were raised by the group about a lack of QA/QC measures, such as, verification and validation, how to perform such activities in a cost-effective manner, and ensure that various disparate studies could be integrated or at least associated to support broader decision making needs. It was suggested that QA/QC measures should be matched to the level of detail in the original analysis and thus to the decision making needs, with approaches ranging from standard DoD verification, validation and accreditation processes, to academic peer reviews and application of standards related to, or similar in nature to, ISO9001.

Overall, Working Group One successfully established a meaningful dialogue within the relatively disparate homeland security/homeland defense communities dealing with maritime issues. A number of challenges were identified in the course of these discussions which this increased collaboration should help resolve.

Working Group Two: Transportation
Chair – **Vince Arconati**, TRANSCOM, Co-Chair – **CDR Scott Dix**, NORAD-NORTHCOM Analysis, Recorder - **Mr. Douglas "Deputy" Clark**, JHU/APL

The objectives of Working Group Two were: 1) Identify current capabilities with regard to transportation models and analytic tools used by HS and HD; 2) Discuss and assess applications where these capabilities could be used; and, 3) Try to determine if the HS/HD transportation requirements have been defined to an appropriate level and determine if the proper amount of lift is available to support the mission.

The working group was made up of participants from NORTHCOM, TRANSCOM, Argonne National Laboratory, Air Force Institute of Technology, Transportation Engineering Agency (SDDC), the JHU/Applied Physics Laboratory, Potomac Analysis Corporation, and Northrop Grumman.

The following transportation models and analytic tools were identified:

- Enhanced Logistics Integration Support Tool (ELIST) which is used for planning tactical-level moves from Origin-to-Port and from Port-to-Destination.
- Model for Inter-Theater Deployment by Air and Sea (MIDAS), used for strategic lift from port-to-port.

- Intelligent Road/Rail Information Server, used for surface movement execution. This web-based tool provides quality real-time-data on road and track availability, including clearance and ruble from satellite transmissions.
- Aerial Port of Debarkation (APOD), used to model aerial port capabilities.
- Aircraft Loading Model (ALM), used for aircraft load planning.
- Spreadsheet Analysis, which implies *ad hoc* approaches to compiling data and using logic and simple tools to identify elements of interest and concern.

A number of specific studies and analyses were cited by the members, as well as highlighted in presentations made by participants. These topics included:

- Mobility capability
- Operational availability
- Baselines
- Future requirements
- Strategic highway network
- Strategic rail network
- Critical infrastructure protection
- Sea ports for national defense
- Support to exercises

Many of the examples were in support of Combatant Commanders and dealt with contributions to war plans.

Since TRANSCOM is a supporting command, the members concluded that TRANSCOM representatives should participate in all of the working groups to provide mobility solutions to the HS/HD. A primary issue that surfaced from discussions was that requirements for transportation are not fully defined. The assumption is that adequate lift will be available to support HS/HD and that HS/HD has top priority. What needs to be developed is Time Phased Force Deployment Data (TPFDD) for each of the scenarios. This planning process is critical and time consuming. Both DHS and DoD need to dedicate the time and expertise to solve the problem.

Bottom Line: There are a number of transportation tools that have been developed and are available, but the utility of these tools are limited until further TPFDD development occurs.

Working Group Three: Air and Missile Defense
Chair – **Bob Koury**, Lockheed Martin, Co-Chair – **Jim Muccio**, AFSAA, Recorder – **Ms. Linda Phipps**, JHU/APL

The working group examined both the current and potential future threat to the US from air and missile attacks and organized its' thinking around kill chains from both the threat perspective (how the US might be attacked - red) and the US perspective (how DoD/DHS will counter the external threat from both a cruise missile and a ballistic missile attack – blue).

The true threat from air and missiles used as delivery vehicles comes in the form of their lethality. No one questions the lethality of the airliners used during the 9/11 attack. Truly

weapons employed in this manner can be characterized as weapons of mass destruction despite the absence of any payload at all. However, with the increasing availability of additional delivery means (both short-range from the sea and long-range from across the oceans of the world) this threat and the payload employed will continue to be a matter of grave concern.

Working Group Three organized thinking around the concept of the air and missile defense kill chains, both offensive and defense. The red kill chain (how the US might be attacked) that was constructed had 11 major tasks or activities ranging from acquisition of a delivery means and warhead to the impact of the warhead, given an unsuccessful engagement. These 11 major tasks were grouped into three "blue operational missions;" offense, defense, and consequence management kill chains. The working group then applied the idea of the Observe, Orient, Decide and Act (OODA) loop to the kill chain to allow categorization of the nature of the activity associated with each element of the OODA loop. This included the types of observation (intelligence) needed, the posture forces would take in relation to each activity of the chain, and the relationship of DHS and DoD in terms of leadership and execution activity. The idea of two crossover points became very apparent in regards to the level of activity with which DHS versus DoD would "flip flop."

After two days of discussion Working Group Three recommended the following areas for further work. First, create an effective means for sharing analysis products, tools and data across DoD and DHS at the analyst level. Second, develop a methodology to quantify the contribution of pre-launch measures to defend against weapons delivery via air and missile threats. Third, integrate consequence management and predictive tools. And finally, create a joint DoD — DHS analytic community to continue studying air and missile defense of the US.

Working Group Four: Land Defense
Chair – **Don Clements**, OSD PA&E, Co-Chair – **Jeff Paulus**, OSD PA&E, Recorder – **Ms. Erin Halferty**, JHU/APL

Working Group Four examined the application of analytical tools in support of a mission area that appears to be characterized as having DoD forces primarily assigned to support civil authorities. The Working Group agreed that in the land defense area, other federal agencies, especially DHS and the Department of Justice (DOJ), would more likely be the lead agency rather than DoD. The Working Group decided that the analytical tools and metrics normally used for campaign or other more traditional force on force modeling are not necessarily appropriate for Homeland Defense. The only time DoD was foreseen to act in a leadership capacity was in defense of actual DoD installations or when called to defend assets on the defense critical infrastructure protection list. DoD could also be the lead when the President of the United States invokes the Insurrection Act.

Unfortunately over the course of the three-day workshop, this Working Group was able to identify more questions than answers with regard to land defense. One major area of concern was how to "size" the potential DoD response in the land defense role. With DoD acting in a support role, the tools and metrics required needed to be able to model and measure indirect actions and their results. For example, how do you measure prevention/deterrence of a terrorist event? How do you measure DoD's impact when DoD provides only partial support? Two of

the briefings presented to the Working Group provided potential methodologies that might be used to formulate force requirements … one through a discussion of various risk assessment methodologies and the other through a detailed examination of the tasks that could potentially be assigned to the DoD.

The final conclusion of this Working Group was that this workshop identified the need to open this discussion in a forum with much greater participation from agencies other than DoD. Although the Working Group included one individual from HSI (Homeland Security Institute), the scheduled DHS participant was unable to attend at the last minute. Working Group discussions pointed out the need for this input, as well as input from other federal, state and/or local agencies. Working group participants also noted that the HS/HD mission area was not limited to the actions within the US Homeland. International partners also need to be included as the HS strategy calls for a layered defense that starts in the "Forward Regions" and continues through the "Approaches" before the threat finally arrives in the "Homeland."

Working Group Five: Consequence Management
Chair – **Doris Turnage**, TRAC Monterey, Co-Chair – **Capt Tim Porter**, NORAD-NORTHCOM Analysis, Recorder **Mr. Matt Garr**, JHU/APL

Working Group Five attempted to discuss analytical support to decision makers in the realm of consequence management response to a HS/HD incident. The topic of consequence management can reasonably span the entire spectrum of prevention, preparedness, response and recovery. To provide structure and to limit the scope of the discussions, the group attempted to keep the debate in the realm of response. This was seen as the most likely area involving DoD operations. Unfortunately, even this amount of scoping proved difficult.

Working Group Five consisted of participants from DoD, Department of Health and Human Services (DHHS), DHS, and private industry. Unfortunately, most of those present tended to be operators and users of analytical tools, not analysts or developers of analytical tools. Given the interaction between levels of government, the time pressure involved at execution, and the consequences (loss of life) for poor performance, Consequence Management (CM) response is often a controversial subject, at best. Most of those present wanted to spend the time available discussing various aspects of Consequence Management, rather than focus on CM ***analysis***. Discussions ranged from adherence to international standards, to historical perspectives on which government agencies were primarily responsible. It became an insurmountable task to move people beyond the complexities of CM and into the realm of CM analysis.

From the discussion, the group was able to begin to glimpse a few of the identified difficulties regarding CM analysis. First and foremost, there is a significant lack of data available regarding civilian capabilities. The group identified roles and responsibilities and catalogued available resources. But, there is little in the way of definite, quantifiable data on capabilities available at the local, state and federal levels. The group was also able to identify one of the scoping problems that contributed to some of the difficulties during the workshop. Consequence Management analysis must be applied to some aspect of the CM environment, even when confined to Consequence Management response. Planning, training and operations are perhaps three of the most important phases of CM response that must be considered when attempting any

analysis. Required analytical tools, models and data for analysis will change depending on the phase involved. While some planners discussed what they needed, the operators present were focused on an entirely different set of requirements.

Ultimately, the Working Group was forced to admit that more scoping was required for a meaningful discussion, qualified analysts with domain expertise needed to be present to keep the discussion in the realm in which it was intended, and those present needed to come prepared with an inventory of available and needed analytic tools. All present agreed that as decision aids were developed, they needed to get into the hands of decision makers at the local, state and federal level in a form that could assist the decision maker in their specific area of concern.

Each participant of the Working group was asked to provide additional input about known analytical tools and methods for distributing to organizations at the local, state, and federal levels.

Working Group Six: Scenario Development
Chair – **Dr. Clay Bowen**, AFSAA, Co-Chair – **Col(s) Joe Adams**, NORAD-NORTHCOM Analysis, **Mr. Neal Siegel**, NORAD-NORTHCOM Analysis, Recorder – **Mr. Jeffrey Levin**, JHU/APL

Working Group Six focused on the way analysts could frame the analytically tractable questions that would inform our leadership. While most of the membership was from DoD, and more familiar with HD than with HS issues, the group did not limit itself to DoD issues. The group concluded that the leadership being informed ought to include leadership in DoD, DHS, and other government entities concerned with both HD and HS.

Identification of the decisions that leaders will consider has major impact on scenario development. For example, if leaders are considering decisions regarding CONOPS, the scenario that will frame those issues and inform those decisions will be different from the scenario that will inform decisions regarding force structure or training. The capabilities of first responders do not appear to relate directly to the issue of DoD-unique capabilities. However, the group cannot identify what is unique to the DoD without identifying what other entities "bring to the fight."

Homeland Defense and Homeland Security cover a wide spectrum of challenges. Scenarios need to consider the tradeoff between covering adequate breadth (what story would a scenario tell, from a Red acquisition of a weapon to attack on the United States all the way through the conclusion of consequence management of the effects of the resultant attack) and sufficient depth (what is the level of detail needed to provide meaningful answers to specific challenges). While a useful analytical construct is established, progress is still needed in identifying the set of variables that will populate the analytical construct. Examples of possible variables include: Range of Red capabilities; Warning time and clarity of a potential attack; Extent to which first responders are eliminated in the attack; etc.

In the future, will it be known with certainty what the threat specifically is? Threats could be represented generically, abstractly, in order to capture their general/fundamental capabilities and

attributes. The biggest reason for identifying this as a scenario question was the level of disagreement in a room with mostly DoD people who have been wrestling with "Capabilities Based Analysis" and "Capabilities Based Planning" for several years now. Given the lack of agreement within DoD, expanding the audience for these issues to DHS and other government entities adds the potential of further confusion. Scenarios should consider the potential for this confusion when constructing scenarios that could reach a variety of audiences. Gaps between DHS and DoD, and between HD and HS was one of the principal findings of this group, to the extent that future scenarios can bridge this gap, so will both HD and HS scenarios be improved. Most of the DoD members of this work group have focused at the "Campaign" level (analyst lexicon) or the "Strategic" level (operator's lexicon). However, depending on the details of the questions our leadership could be considering, there are questions at other levels of resolution that are worth framing.

There have been some victories to date (however small), in bridging the gaps between DoD and DHS and between HD and HS. First, while there were not many members of the workshop from DHS and from HSI, the group did have a few. The working group in particular had a member from the Homeland Security Institute, who contributed greatly to the discussions. Furthermore, it was evident that there was a genuine interest across the DoD membership in the group in generating growing collaboration in scenario development with DHS and HSI. Dr. Rogers expressed similar interest, but cautioned that DHS is a new department, with a wide-range of disparate agencies, and that it was likely going to take some time to foster the same level of collaboration across this department that is still feeling its way.

Within the Homeland Defense Multi Service Force Deployment (MSFD) scenarios, the DoD has developed a useful analytic construct for analyzing a number of the interesting HD questions. However, there is much room for growth in describing appropriate variables within the HD scenario, and for articulating the appropriate range of those variables. The "Baseline Security Posture" (BSP) already includes one HD vignette in its Table 13 describing extent, duration, and frequency of events. However, the working group concluded that there is a much richer information set to be mined from the range of HD/HS scenarios, and that BSP Table 13 should be expanded to include that range of the scenario space. The group has already begun to make progress in inter-departmental collaboration through having DHS and HSI personnel attending the workshop. However, even greater progress can be made if more involvement is encouraged by DHS in the development of the next generation of the MSFD.

Synthesis Group
Chair – **Mr. Roy Reiss**, AFSAA, Co-Chairs –**Mr. Glen Roussos**, NORAD-NORTHCOM Analysis, **Ms. Lynee Murray**, CNO Strategic Studies

The Synthesis group participated in all of the working groups. Each working group had a member of the Synthesis group, who was responsible for participating and taking notes during the discussions. Twice daily the Synthesis group met to discuss themes or issues that the Working Groups were addressing. The Synthesis group member would then help the working groups to ensure all of the working groups were progressing toward the goals of the workshop. There were five common themes that cut across all of the working groups. The first was the need to better integrate air and maritime analyses. This is particularly true for areas such as

cruise missile defense. Much of the current analysis in these domains break up both domains and consider them separately. Combatant Commanders (COCOMs) need to look at the entire situation and consider analytic solutions from a family-of-systems approach. Another example may be analysis of a radar system that covers both air and maritime threats. As resources become more difficult to obtain, some such systems could satisfy the Intelligence Surveillance and Reconnaissance (ISR) requirements of both air and maritime threats to the homeland.

The second common theme was the need to better coordinate the development of scenarios between homeland security and homeland defense. Currently DoD and DHS develop scenarios independent of each other rather than coordinating their development. This makes it difficult to do analyses when the scenario in question does not make sense to the other department. The scenarios that are developed should, of course, cover all levels, strategic, operational and tactical.

The third theme was the need to integrate operations research analyses with the intelligence community in the development of scenarios and red teaming. Several members of the working groups mentioned that threat actions and red teaming sometimes did not add up. In some examples, threats exceed the physical characteristics of systems or capabilities analytically (time distance calculations, etc.).

The last two common themes were not unusual — security and access to data. There is a problem with both of these within the DoD so the problem is exacerbated when dealing with security and access to data from one department to another (DoD, DHS, DHHS, etc). The problem is additive because DHS also deals with law enforcement sensitive data, to which DoD has limited access.

The good news is that there are possible remedies to some of these problems and areas for collaboration between departments to support analysis. One solution is to invite interagency partners to war games and table-top exercises and involve them in the process of development. As part of these activities, interagency partners should work to collaboratively develop metrics that can support both homeland defense and homeland security whenever possible. This small step will also help organizations to collaborate on leveraging tools used by the various departments. *One area that NORTHCOM is working on is the development of an information-sharing database. This database will allow analysts to input and search for homeland security and homeland defense related programs, projects and points of contact. The intent is to have collaboration for analytical projects and programs (in support of HS and HD) in one central repository.*

Three recommendations to improve future workshops dealing with HS/HD emerged.

1. Create a working group for analytic issues dealing with command and control (C2). This working group would help tie scenarios together with other domains.
2. Employ transportation as an enabler rather than a separate working group. The Transportation Working Group wrestled with defining requirements with a lack of information. Transportation may be better served by considering requirements in all of the working groups.
3. Lastly, too much time was spent up front in the working groups trying to define terms and get all of the participants speaking the same language. It is recommend that the

working group chairs develop read ahead materials for participants to review prior to arrival so that work can begin immediately.

SUMMARY OF WORKING GROUP FINDINGS

Overall, there was an increased understanding between the communities represented and a number of findings by each of the working groups. The findings are listed below:

- ***Working Group One, Maritime Security*** — Establish a POC list and an M&S repository. Develop a QA/QC process for analyses. Host a quarterly forum for interchanges on maritime security.
- ***Working Group Two, Transportation*** — Define the transportation requirements for HS and HD and then develop TPFDDs for each of the scenarios.
- ***Working Group Three, Air and Missile Defense*** — Develop an effective means for sharing analysis products, tools and data. Develop a methodology to quantify the contribution of pre-launch measures in defense of air and missile threats. Integrate consequence management and predictive tools. Create a joint DoD-DHS analytic community.
- ***Working Group Four, Land Defense*** — DoD will be in a supporting role, providing civil support, for many domestic events. The resulting issue is how to size DoD forces for support and an important part of that would be a discussion forum with other agencies. Further, there was recognition that International partners need to be included in HS strategies for a layered defense.
- ***Working Group Five, Consequence Management*** — There is a lack of data available regarding civilian capabilities. Consequence management response must include planning, training, and operations. As decision aids are developed, they must get into the hands of the federal, state, local and tribal authorities. Follow up occurred during the June 2006 MORS Symposium.
- ***Working Group Six, Scenario Development*** — Engage DHS in the development of the next generation of the Homeland Defense MSFDs.
- ***Synthesis Working Group*** — Invite interagency partners to war games and table-top exercises and involve them in the process of development. Develop an information sharing database for use by both the DoD and DHS communities.

There were also a number of action items that resulted from the HS/HD Decision Support Workshop. First, there was a recognized need for a common database which would contain project information and points of contact. The NORAD-NORTHCOM/Analysis Directorate has already engaged in the development of this and has a prototype which will be web-hosted. Second, the Coast Guard representatives agreed to establish and host a modeling and simulation repository with access available to both DHS and DoD personnel. Third, it was recognized that transportation supports both HS and HD, but the transportation requirements have not yet been fully developed. What needs to be developed are TPFDDs for each potential scenario. The transportation community will be working with both the HS and HD communities to precipitate action for the development of these plans.

PARTING THOUGHTS

This was the first time that the analytic communities representing both homeland security and homeland defense met to discuss issues and exchange information. The goal was to not only

share common tools, databases, and analyses and identify gaps, but to also establish working relationships between the two communities. This major step forward in uniting both communities took a great deal of coordination and effort by many people throughout DoD and DHS and successfully engaged a broad spectrum of individuals in focusing on the defense of our homeland and North America. There is much more to do, but where do we go from here? Who are the people that should participate in future meetings/workshops and in what areas should the combined communities focus?

As we consider the next steps, there are a number of questions and issues to be identified. From a strategic perspective:

- How do we follow up?
- Should there be periodic workshops?
- Should there be follow up meetings at the MORS Symposium every June?
- How do we get first responders, i.e. state, local and tribal officials, involved if the meetings are classified?
- How do we get some of our foreign partners involved, i.e. Canada, UK, Australia and others, so that we can learn and draw from their experience?

If the MORS Sponsors believe it is important to continue the collaboration with the homeland security community, then the issue of information sharing at various security levels must be addressed.

To address this:

- Should MORS host split meetings (i.e. a portion classified and a portion unclassified)? If we are to include civil authorities and work together in understanding their capabilities, then we must host interchanges at an unclassified level.
- Should MORS host a classified meeting back-to-back with an unclassified meeting?
- Should MORS host an international meeting to collaborate with other countries (i.e. UK, Canada, Australia, etc.) on homeland security and homeland defense issues?

As a series of first steps, this report recommends the following:

1. Establish a follow up session within Working Group 30 during the June 2006 MORS Symposium at the US Air Force Academy. The purpose is to refine this collaborative effort and define the following:
    a. Specific analytic focus areas.
    b. Specific tools that can be shared and that can be developed to support the HS and HD communities.
    c. Ways to include civil authorities in the meetings and interchanges.
    d. A strategic road map defining future collaboration.
2. Organize an unclassified forum to include civil authorities.
3. Establish a MORSS Working Group to address the classified and unclassified communication issues between the many communities involved in securing the homeland.

Homeland Security/Homeland Defense
Decision Support Workshop
Johns Hopkins University/Applied Physics Lab
Laurel, MD
15-17 November 2005

Acronyms

AFSAA	Air Force Studies and Analyses Agency (Now HQ USAF/A9)
ALM	Aircraft Loading Model
APOD	Aerial Port of Debarkation
BSP	Baseline Security Posture
C2	Command and Control
CM	Consequence Management
COCOM	Combatant Command/Commander
DHHS	Department of Health and Human Services
DHS	US Department of Homeland Security
DoD	US Department of Defense
DOJ	US Department of Justice
DSCA	Defense Support to Civil Authorities
ELSIT	Enhanced Logistics Integration Support Tool
HD	Homeland Defense
HS	Homeland Security
HSI	Homeland Security Institute
ISR	Intelligence Surveillance and Reconnaissance
JHU/APL	Johns Hopkins University/Applied Physics Lab
M&S	Modeling and Simulation
MIDAS	Model for Inter-Theater Deployment by Air and Sea
MORS	Military Operations Research Society
MORSS	Military Operations Research Society Symposium
MSFD	Multi Service Force Deployment
NIPRNET	Unclassified but Sensitive Internet Protocol Router Network
NORAD	North American Aerospace Defense Command
NORTHCOM	United States Northern Command
OODA	Observe, Orient, Decide, Act
OR	Operations Research
OSD	Office of the Secretary of Defense
PD ASD/HD	Principal Deputy Assistant Secretary of Defense/Homeland Defense
POC	Point of Contact
QA/QC	Quality Assurance/Quality Control
S&T/DHS	Science and Technology Directorate, Department of Homeland Security
SDDC	Surface Deployment and Distribution Command
SIPRNET	Secret Internet Protocol Router Network
TPFDD	Time Phased Force Deployment Data
TRAC	TRADOC (US Army Training and Doctrine Command) Analysis Center

TRANSCOM	United States Transportation Command
UK	United Kingdom
USCG	United States Coast Guard

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Terms of Reference

(Last Updated – *19 October 2005)*

1. Background

Since the September 11, 2001 terrorist attacks on the World Trade Center, there have been major efforts in the United States to secure the homeland, particularly with the establishment of the Department of Homeland Security (DHS) and the establishment of US Northern Command (NORTHCOM) within the Department of Defense. From a DoD point of view, DoD is tasked to: 1) conduct operations to deter, prevent, and defeat threats and aggression aimed at the United States, and 2) provide military assistance to civil authorities including consequence management operations, when directed. There are many impacts on DoD in executing the homeland defense mission. For example, the force structure impact of homeland defense operations on other combatant commands; the identification of critical infrastructure; consequence management support; air and missile defense; land and border security; and transportation. Equally important are the many challenges in identifying and quantifying how DoD interfaces with civil authorities, since, in many situations, the civil authorities will have lead responsibility and DoD will be in a supporting role. Likewise, there are many challenges for DHS in determining when DoD support may be required and knowing what capabilities DoD can bring to "the fight." As a result, it is extremely important that both DHS (HSI, etc.) and DoD (NORTHCOM, etc.) understand each others' capabilities and understand each others' ability to quantitatively articulate these capabilities. The synergism between all HLS/HLD organizations is vitally important to the security and defense of our homeland. The bottom line is that the value of analysts who support our homeland security and homeland defense organizations has and will continue to be a significant force multiplier in these efforts.

Out of a homeland defense working group formed at the Dec 2004 MORS GWOT workshop, a number of specific areas were identified as being of major importance and interest in supporting forces being used to secure and defend the homeland. These include:

- Maritime, Land and Border Security
- Identification and Protection of Critical Infrastructure
- Air and Missile Defense
- Potential Scenarios

2. Sponsor Interest

All sponsors have expressed a strong interest in this workshop.

3. Goals and Objectives

The goal of this meeting is to provide an opportunity to bring together a multi-disciplined team of Homeland Security (HLS) and Homeland Defense (HLD) representatives and analysts in a forum for discussing tools and metrics being used by both organizations and to help identify critical analytic issues and capabilities. The workshop will identify areas where analytic efforts overlap, where decision support tools exist in one community and not the other, and where there is a lack of decision tools in both communities to address key issues and questions. The result will be the expansion of the envelope on quantitative decision support to secure and defend the homeland.

Each working group will consider the following overarching issues:

- Key areas: critical analytic issues, current and projected analytic capabilities, opportunities for cooperative analysis, current assessment techniques, tool sets and models, data repositories/sources, and analysis gaps/shortfalls.
- Threads: interoperability, communications requirements, connectivity and shared database access.
- Sharing: specific common tools for sharing between DHS and DoD
- Metrics: most appropriate to measure homeland security and homeland defense effectiveness

4. Approach

a. Mini-Symposium – The meeting will commence with a mini-symposium format that will include operational based discussions as well as a panel discussion. The purpose of this portion is to bring all participants up to speed on the state of the practice and frame the analytical challenges and issues for the working groups.

   - Keynote Presentation – (~ 1 hour presentation, including time for questions)
   - Panel Discussion – (~ 1 ½ panel, including time for questions)
   - Guest Speaker – (~ 1 hour presentation, including time for questions)

b. Workshop – The Mini-Symposium will be followed by a two-day workshop where participants will meet in working groups to further examine specific topics, including discussing the overarching issues of the Workshop. Working groups will prepare a report on their activities to present to other workshop participants at the last session of the workshop. The workshop attendees will be organized into six working groups plus a synthesis group. The working group structure is detailed below.

WG-1 Maritime Security—In the accelerating global economy, maritime trade will continue to serve as the life blood of this nation. Maritime security must be finely balance with unimpeded trade for this economy to flourish. As evidenced by the Long Beach, CA

dockworker strikes, shutting-down U.S. ports can cause a daily multi-billion dollar loss to the global economy. The National Maritime Security Strategy directs that we engage threats to the nation as early and as far from US shores as possible. This working group will identify tools, models, methods and metrics that will focus on measuring and predicting:

- Layered Defense in Depth - Homeland Defense or Homeland Security?
- Quantifying and Mitigating Maritime Risk
- Maritime Domain Awareness

WG-2 Transportation—Identify maritime, land and air transportation tools, models, methods and metrics. This working group will focus on assessing the impact of HLD/HLS on the Defense Transportation System (DTS). Has the HLD/HLS community defined transportations requirements well enough to support analyses? How will USTRANSOM balance the requirements of HLD/HLS and still meet the requirements of the other Combatant Commanders? Compare total DTS requirement against total DTS capability. Determine the analytical tools required to perform the analyses; can data be shared among agencies? Identify metrics to be used to define success.

WG-3 Air and Missile Defense As the global war on terrorism continues we face an uncertain environment in regards to which non state actors will be developing and deploying cruise and ballistic missile capabilities in order to attack the United States. As such some of these threats create the potential for use of Weapons of Mass Destruction (WMD) against our homeland. In light of these issues, the need to balance the risk associated with the development of a robust Air and Missile Defense system, both tactical and strategic, is absolutely necessary. These systems and command structure must provide the ability to defeat any threat with specific focus on Homeland Defense. Analysis that is ongoing and planned is critical in the evaluation of the appropriate systems to defeat the ever-changing complexion of Air and Missile Defense. The pillars of Attack Operations, Active Defense, Passive Defense, Battle Management/Command, Control, Communications, and Computers (BM/C4I) and the cooperation between DoD and DHS provide us the areas to focus our efforts and evaluating the concepts for defense of our Homeland against these genera of threat. As such the working group will provide special focus in the areas of:

- Analysis of force structure implications of providing Air and Ballistic Missile Defense to the Homeland
- Ongoing and planned analysis in the areas of Cruise Missile and Short Range Ballistic Missile Defense from the sea (maritime platforms such as container and break bulk cargo ships)
- Weapons of Mass Effects,
- Battle Management//Command, Control, Communications, Computers and Intelligence(BMC4I),
- Active Attack Operations,
- Passive Defense
- Interagency cooperation in this mission area (DoD to DHS to State and Local)

WG-4 Land Defense — The DoD Homeland Security Joint Operating Concept (HLS JOC) defines National Land Defense as: "All measures of HLD taken to detect, deter, prevent, defeat, or nullify hostile land threats against US territory, domestic population, and critical

infrastructure." Short of a Presidential directed DoD response to an invasion of the Homeland, the land defense mission remains an inherent protection and law enforcement responsibility of DoD's interagency partners. Military involvement will be part of a synchronized strategic approach involving federal, state, and local resources to defeat or otherwise respond to any adversary threat to the homeland. The focus of WG-4 will be to identify useful measures of effectiveness to evaluate the National Land Defense mission area and to identify interfaces between the Homeland Security (HLS) and Homeland Defense (HLD) arenas. Our primary areas of emphasis will be:

- Protection of locations/resources identified as elements of Critical Infrastructure
- Force and installation protection
- Border Security
- DoD support of civilian law enforcement and counterterrorism authorities consistent with US law
    - Availability and use of appropriately sized, trained, equipped, and ready quick reaction forces (QRFs) and rapid reaction forces (RRFs)

WG-5 Consequence Management — Effective consequence management may be considered in terms of the three phases listed below, each contributing to the other. Attention to each of these focus areas will be based on participants' primary areas of interest, requirements and capabilities.

1. Preparedness (includes training, planning, public awareness)
    - Training MOEs will necessarily be written in terms of "how well do training exercises and drills improve response and recovery performance (how much faster, how much more safely, how much more adaptable are teams, etc.)?"
    - Planning MOEs: How robust is the incident command/communications structure?
    - Public awareness MOEs: How quickly can the public be alerted to the disaster? How quickly can car and foot traffic be re-routed away from the disaster?
2. Response (1st 72 hours; save lives, relieve suffering, prevent further disaster)
    - How quickly can incident command post be set up?
    - How detailed, and up-to-date, is the geographic/infrastructure "database" (needed to help set up triage sites, temporary water/food/shelter stations)? How quickly, and correctly, can follow-on effects of initial attack be predicted (for example use of plume models)?
    - How quickly can debris blocking emergency vehicles (land, water, or air) be removed?
3. Recovery phase (follows response phase; return state and citizens to normal conditions; emphasis on cleanup and returning people to normal activities)
    - How accurately can the medical community predict the spread of airborne particulates, microorganisms?
    - How quickly can power grids (transportation networks, etc.) be returned to pre-incident status?
    - How well can costs for removal of debris be estimated?

WG-6 Scenario Development The focus for this working group will be to help decision makers assess current and future scenarios, understand the scenario development process, and examine ways to make future homeland defense scenarios more useful for analysis. The global war on terrorism and defense of the homeland confront scenario developers with unique challenges. In previous analytical efforts, a scenario for a traditional campaign began with an enemy incursion against an ally's territory and ended with a carefully scripted U.S. concept of operations for swiftly defeating that enemy. In these traditional scenarios, the choice of CONOPS -- the initiative of how we bring the fight to the enemy -- always remained with the U.S. coalition. However, when we consider scenarios for defending the homeland, the nature of the potential conflict places the initiative squarely in the hands of the attacker, and places U.S. forces in a reactive mode. Moreover, since the initiative is in the hands of the enemy, a single scenario for homeland defense might fail to capture the countless ways an enemy could choose to attack the homeland, and any "scenario" may end up a set of possible avenues for that attack. Further complicating the scenario problem, the distinctions between "Homeland Defense" and "Homeland Security" introduce technical and legal definition problems that make it more difficult to author a scenario on which to ground analyses of the range of Homeland Defense challenges. Given these challenges, the Scenario Development working group will focus on the following questions:

- What are the analytic questions we want a scenario to frame for us?
- Will analysis of Homeland Defense differ from traditional analyses? If so, how?
- How can we avoid ceding the analytic initiative to the other side?
- How do we appropriately incorporate features of Homeland Security in a Homeland Defense scenario?
- Is a "representative sample" of attack options sufficient and appropriate for analysis?

Synthesis Group—The synthesis group will bring together the work of the six working groups and develop the overall recommendations from the analysis community to the individual service operations analysts. As well, this group will provide inputs and recommendations on development of analytic support to the HLS and HLD communities.

These working groups are not mutually exclusive, and this is deliberate. Explicitly introducing overlap between the working groups provides synthesis points for integrating the conclusions from each, and reduces the probability that major ideas will "fall through the cracks" between the workshop topics.

5. Attendees

a. Attendance will be by invitation only. Attendees will include invited experts from the Department of Homeland Security, US Northern Command, OSD, all Services, the Joint Staff, University Affiliated Research Centers, Federally Funded Research and Development Centers, operational commanders, DoD contractors and others. Workshop chairs will control membership of their sessions in conjunction with the Organizing Committee. Attendance will be limited to 200 people.

b. Working Groups (WGs) will be led by a Chair, one to three Co-Chairs and an Advisor. This leadership group will be comprised of all MORSians or a combination of

MORSians and Subject Matter Experts (SMEs). The responsibilities of this team include:

(1) Chair –

(a) Dynamic individual that is a SME in the WG topic
(b) Solicits analysts and operators in the field to participate in the WG
(c) Guides the WG during the Workshop
(d) Challenged to provide the "substance" of the special meeting WG
(e) Develops the WG's final product

(2) Co-Chair – Individual interested in WG topic; assist Chair as Chair requests
(3) Advisor – Individual that is a SME in the operational side of the WG topic; assists Chair in WG membership, provides perspective during Workshop, and assists Chair as requested

c. Another key group of individuals during the Workshop is the Synthesis Group. This group will provide representation to each of the WGs and assist the Workshop Chairs consolidating the working group results and developing overall assessments/ recommendations from the analysis community.

6. Deliverables:

Several products will be generated from the workshop:

- An Executive Summary for the MORS Sponsors addressing the workshop objectives, findings, conclusions and recommendations will be offered within 60 days.
  - This will be in the form of a report and a scripted briefing that lists gaps and shortfalls between the communities and opportunities for cooperation.
  - This will include identification of current tools used by the communities and potential areas for tool and data sharing, as well as current repositories of data and information.

- A proceedings document containing summaries of all sessions and annotated copies of appropriate briefing slides and presentations.
  - The MORS Synthesis Group will provide documentation listing actionable items to pursue that will facilitate the ORSA community in supporting Homeland Security-Homeland Defense Decision Support Workshop.
  - Each working group will present a recommended analysis approach for each of their topics, including a course of action for implementing the approach. These suggested approaches will identify current tools, models, methods and metrics that may be used in assessing the effectiveness of Homeland Security and Homeland Defense.
  - Further, recommendations for future workshops and working group meetings that will concentrate on specific areas will be proposed for Sponsor consideration.

- An article summarizing the meeting and its findings will be produced and submitted to *PHALANX* in time for the next deadline after the meeting.

- A general session presentation will be made at the 74th MORSS.

7. Milestone Table:

See the *Homeland Security-Homeland Defense Decision Support Plan of Actions & Milestones.*

8. Proponent: TBD

9. Planning and Organizing Committee:

Workshop Chair:	Tom Denesia, NORAD-NORTHCOM/AN
Workshop Co-Chair:	Dr. Andy Loerch, George Mason University
Workshop Technical Co-Chair:	Jack Keane, JHU/APL
Synthesis Chair:	Roy Reiss, AFSAA
Co-Chairs:	Glen Roussos, N-NC/AN Dr. Lynee Murray, CNO Strategic Studies Group
Site Coordinator:	Jack Keane, JHU/APL
Administrative Coordinators:	Brian Engler, Executive Vice-President, MORS Natalie Kelly, Vice-President for Admin, MORS
MORS Bulldog:	Kirk Michealson, Lockheed Martin Center for Innovation

Working Group Chairs:

WG1 – *Maritime Security*:

Chair – LCDR Jim Passarelli, United States Coast Guard
Co-Chairs – Duane Boniface, JHU/APL
Kelly Leone, HLS-HIS
Recorder – Otis Brooks, JHU/APL

WG 2 – *Transportation*:

Chair – Vince Arconati, TRANSCOM
Co-Chair – CDR Scott Dix, NORAD-NORTHCOM/AN
Recorder – Douglas Clark, JHU/APL

WG 3 – *Air and Missile Defense*:

Chair – Bob Koury, Lockheed Martin Maritime Systems & Sensors
Co-Chair – Jim Muccio, AFSAA/SAFM
Recorder – Linda Phipps, JHU/APL

WG 4 – *Land Defense*:

Chair – Don Clements, OSD(PA&E) SAC
Co-Chair – Jeff Paulus, OSD(PA&E) SAC (AT&T)
Recorder – Erin Halferty, JHU/APL

WG 5 – *Consequence Management*:

Chair – Doris Turnage, TRAC-Monterey
Co-Chair – Capt Timothy Porter, NORAD-NORTHCOM/AN
Recorder – Matthew Garr, JHU/APL

WG 6 – *Scenario Drivers*:

Chair – Dr. Clay Bowen, AFSAA/SAAB
Co-Chair – Neal Siegel, NORAD-NORTHCOM/AN
Recorder – Jeffrery Levin, JHU/APL

Sponsor/Service Reps:

Air Force:	Roy Reiss, AFSAA
Army:	COL Hòa Generazio, ODUSA(OR)
Navy:	Herb Cupo, N81
Marine Corps:	Col Greg Reuss, MCCDC S&A
Joint Staff:	Bob Orlov, Joint Staff (J8)
OSD:	Jim Bexfield, FS, OSD(PA&E)

10. Administrative:

Name – *Homeland Security-Homeland Defense Decision Support*
Dates – 15-17 November 2005
Location – The Johns Hopkins University/Applied Physics Laboratory, Laurel, MD
Fees –

Entire Workshop:	U.S. Federal Government $260 and $520 for all others
Plenary (Day 1) Only:	U.S. Federal Government $140 and $280 for all others

Attendance – 200 people, by invitation
Classification – SECRET

11. Agenda

Day/Time	Activity	POC
Monday	**November 14, 2005**	
1700	Working Group Co-Chair Warm-Up Session	Workshop Co-Chairs (at Sheraton Columbia)
Tuesday	**November 15, 2005**	
0700	Registration and Continental Breakfast	
0800	Intro MORS President	Tom Denesia
0801	MORS President's Welcome	Col (s) Suzanne Beers
0805	Facility Host Welcome	Dr. Ron Luman
0810	Sponsor's Welcome	TBD
0820	Workshop Overview	Tom Denesia
0830	Keynote Speaker - DoD	Mr. Peter Verga, OASD (HD)
0945	Break	
1015	Keynote Speaker - DHS	Dr. John Kubricky DHS, S&T; Director SED & Acting Director HSARPA
1130	Lunch	
1300	Working Group Session #1	Working Group Co-Chairs
1430	Break	
1500	Panel: *"What are the issues where analysis can be improved to support DHS-DoD decision makers."*	Col Bryant Streett, Director NORAD-NORTHCOM Analysis Dr. Robert Bovey, Strategy, Forces, & Resources Division; IDA Ms. Ann Morimizu, Director PA&E, DHS/S&T
1700	Mixer	
Wednesday	**November 16, 2005**	
0715	Continental Breakfast	
0800	Working Group Session #2	Working Group Co-Chairs
0945	Break	
1000	Working Group Session #3	Working Group Co-Chairs
1130-1300	Lunch	
1200-1300	Title 10/32/14	LCDR Jon Odom
1300	Working Group Session #4	Working Group Co-Chairs
1545	Break	

1600	Combined Session (Auditorium) *Posse Comitatus*	Gene Visco
1700	Working Group Chair & Co-Chairs Hot wash	Workshop Chair

Thursday	**November 17, 2005**	
0715	Continental Breakfast	
0800	Working Groups Session #5	Working Group Co-Chairs
0945	Break	
1000	Working Groups Session #6 (Prepare Briefing)	Working Group Co-Chairs
1200-1330	Lunch	
1330	Working Groups: Present Briefings, WG 1, 2, 3	Working Group Co-Chairs
1500	Break	
1515	Working Groups: Present Briefings, WG 4, 5, 6 and Synthesis Group	Working Group Co-Chairs
1645	Workshop Wrap-Up	Workshop Chair
1700	Adjourn Workshop	Workshop Chair

Friday	**November 18, 2005**	
0800	Working Group Co-Chairs complete Working Group Annotated Briefing	Working Group Co-Chairs (at MORS Office)
1200	Adjourn Post-Workshop Session	Workshop Chair