

12 October 2001

# MILITARY OPERATIONS RESEARCH SOCIETY



**Homeland Security (HLS)  
Mini-Symposium  
13-15 March 2001**

**Chair**  
LTC George Stone

**UNCLASSIFIED**  
Approved for Public Release

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This Military Operations Research Society report summarizes the proceedings of a Mini-Symposium conducted over three days by experts, users and participants interested in homeland security. It is not intended to be a comprehensive treatise on the subject. It reflects the major concerns, insights, thoughts and directions of the participants at the time of the mini-symposium.

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The purpose of the Military Operations Research Society (MORS) is to enhance the quality and effectiveness of classified and unclassified military operations research. To accomplish this purpose, the Society provides media for professional exchange and peer criticism among students, theoreticians, practitioners and users of military operations research. These media consist primarily of the traditional annual MORS Symposia (classified), their published abstracts or proceedings, special mini-symposia, workshops, colloquia and special purpose monographs and other publications. MORS publishes two quarterly periodicals, *PHALANX* and *Military Operations Research*. *PHALANX* is the MORS bulletin and *Military Operations Research* is a refereed journal. The forum provided by these media is intended to display the state of the art, to encourage consistent professional quality, to stimulate communication and interaction between practitioners and users, and to foster the interest and development of students of operations research. The Military Operations Research Society does not make nor advocate official policy, nor does it attempt to influence the formulation of policy. Matters discussed or statements made during the course of its symposia or printed in its publications represent the positions of the individual participants and authors and not of the Society.

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## **Summary**

### **Homeland Security**

The Homeland Security (HLS) Mini-Symposium, held at the Johns Hopkins University Applied Physics Lab, 13-15 March 2001, was a great success. With 98 attendees and 28 speakers, analysts and practitioners presented background information, attacked the issues and offered ideas for the military analyst to assist in HLS operational decision making.

The HLS mini-symposium's initial goal was to provide interaction between the analysis community and subject matter experts by establishing an exchange on the state of the practice and art in HLS operations for the military analyst. Also, we wanted to raise awareness of the shortfalls that limit our ability to perform assessments for decision makers. Judging by the comments of attendees, I believe we met these goals.

Highlights of the mini-symposium included remarks by MORS Sponsor, Mr. Walt Hollis, FS, DUSA(OR) about the US involvement in homeland defense in the 1930's and 1940's. The public was a lot more aware of potential damage from bombing and, even invasion, at least in the Eastern United States during these years in which many civilians (young and old) were involved in security of the homeland's population and resources.

Mr. Dave Jerome presented an overview on how the incorporation of HLS into a national strategy will require a new security partnership to utilize State assets (including the National Guard) and local government. President Bush recognizes that the threat of an asymmetric attack is real and has charged the Federal Government to take the lead in heading up the National Homeland Security Agency (as proposed by Hart-Rudman).

COL Jerry Brown, ODCSOPS War Plans chief, stated that MORS could provide an analytic backdrop for Homeland Security by leading/facilitating development and integration of M&S. He suggested adding an HLS working group to the MORS annual symposium and integrating HLS workshops with other activities.

Supervisory Special Agent Emmerson Buie, Jr., FBI, WMD Operations Unit presented great background information related to the threats. He discussed the spectrum of terrorists who employ chemical/biological agents, bombs, and other devices against the US. These include lone offenders, splinter groups, non-aligned terrorists, doomsday cult-type group and state sponsored insurgents or rebels.

Dr. Michael Fineberg, BAH, and Mr. Larry Heystek, IITRI, both shared the human behavior implications associated with HLS scenarios, with emphasis on stress and panic.

Mr. Gene Visco, FS, presented a lunch-time briefing on the *Posse Comitatus* 'Act' of 1878 which made it unlawful to employ the US Army for the purpose of executing laws except when expressly authorized by Constitution (Article I and IV) or by act of Congress.

Mr. Tom Antush, FEMA, shared that, in addition to assisting after the disaster, FEMA has a new preparedness strategy to organize and coordinate planning, training, exercises, and equipment at state and local levels. They will give equal weight to intelligence, law enforcement, and emergency management.

Navy Captain Robert West expressed the realistic role and need of the Joint Task Force-Computer Network Defense against strategic malicious attacks on an internet that has grown from four nodes to four million internet service providers over the last 35 years.

LTC Jerry Glasow, ODUSA(OR), summed up the results of the MORS CB-WMD Workshop. That workshop concluded that the WMD community must develop data values, models and analytic methods. The community should also establish central data and analytic repositories, with approved data values and ranges, to support improved and current WMD decision analyses.

To relay the critical roles and responsibilities of the US Army's Chemical Corps in Homeland Security, CPT Cedrick Farrior, Maneuver Support Center (MANSCEN) Combat Developments, presented an informative briefing. A good point to remember in the decontamination on homeland soil is that the Army decontamination process assumes foreign soil where the water drains into the ground. If the Army decontaminates in the US, they will have to revise decontamination procedures.

Representing the Director of Military Support (DOMS), COL Robert Fitton, DAMO-OD, asserted that from terrorism to postal work stoppage, animal disease to mudslide, flood to epidemic, Military Support to Civil Authorities (MSCA) capabilities are required across the spectrum of operations from domestic disaster relief to strategic nuclear war.

Ms. Mickie Krause, SAIC, relayed the results of an Army QDR Study for a basic taxonomy of HLS for Army forces in missions such as defense of sovereign territory, National Missile Defense, Information Operations, CBRNE response, natural disaster response and civil disturbance reactions.

Ms. Suzanne Milchling and Mr. John Walther elaborated on the first responder duties and capabilities of SBCCOM in terms of Roles, Missions, Tools and Simulations. They both reiterated that OR/analytical techniques are needed to support the HLS decision making process.

Mr. John Kimball, National Fire Academy, part of FEMA Federal Family, entertained us at our second luncheon with fire-fighting tales, HAZMAT team evolution and the dangers of domestic threats that fire-fighters encounter daily. This is a standing army of first responders over a million strong with different levels of training, organization and equipment that respond to medical incidents and injuries beyond fires.

Dr. Julian Palmore discussed education and the "Preventive Defense and Homeland Security" course he has developed and leads at the University of Illinois-Urbana.

From the National Institute of Justice, Mr. Chris Tillery stood in for Dr. Peter Nacci, and shared work being done for HLS needs assessment, technology development, advocacy and technical support at all levels.

Dr. Michael Simon, SPARTA, proposed development of an information architecture to assimilate and disseminate the necessary information.

Mr. Greg Tackett, US Army Aviation and Missile Command, Research, Development, and Engineering Center, presented his research in virtual urban area modeling of HLS event locations.

Mr. John Brinkerhoff, IDA, discussed an analytical perspective and rationale for conducting Homeland Defense of America.

Mr. Jeffrey McManus briefed us on the critical infrastructure protection tools developed by the Joint Program Office for Special Technology Countermeasures.

Dr. Robert Kehlet, DTRA, presented the nation-wide program, FEMA Consequences Assessment Tool Set (CATS), being developed and fielded throughout state and local governments for hazard prediction and preparation.

Mr. John Ellis, PMO Security Service, shared the aspects of truck bombs and preventive tactics against drivers. John has written several books that include descriptions of threats, various weapons, militias, and rules of engagement (<http://www.ccthomas.com>).

Mr. Mike Webb, USAF C2 ISR presented a command and control methodology and measures of effectiveness.

Lastly, for personal computer security, Mr. Manuel Miranda, ANADAC, educated and demonstrated biometric identification technologies to read retinal patterns, fingerprints, facial features and even keystroke dynamics.

Led by LTC George Stone and Mr. Fred Hartman, FS with Dr. Roy Rice's assistance, the HLS Mini-Symposium wrap-up session included a summary of the issues and follow-up activities. The issues are:

- How should we consider the impact of **other governmental and NonGovernmental Organizations** (NGO) in HLS environments?
- What is the best analytic infrastructure for HLS with regard to:
  - A Lexicon and Taxonomy for HLS
  - Data Derivation and Validation
  - Modeling and Simulation requirements
  - HLS-related Heuristics
  - Communications
    - Networks
    - Fusion/Synthesis of information
- How do we **measure success** in missions where standard MOEs are not sufficient?

Is there a relationship between the performance of units and forces with different systems and HLS mission goals?

- What contributes directly to HLS mission accomplishment?
- Can we measure or identify what HLS circumstances hinder our own forces?
- What factors do we need to be aware of with respect to **opposing forces** (mankind, nature)?

The first follow-up activity called for a future MORS HLS workshop to further examine the issues above (Winter/Spring of 2002). Secondly, the group concurred on the utility of a standing working group at the MORS Symposium in 2002. HLS Mini-Symposium presentations are posted on the MORS web site (<http://www.mors.org>).

Acknowledgements: Chairing the HLS Mini-Symposium was easy with such a great support team assisting. The DUSA(OR) staff, the MORS office, JHU/APL staff, MORS Fellows, Mr. Dave Jerome and other volunteers advised and contributed immensely. Credits for the informative and relevant presentations at the mini-symposium go to Mr. Doug Gaskell, session coordinator and organizer. Finally, Jeff Sands, MITRE, Greg Keethler and CPT Farrior provided notes used in this report.

## **Appendix A – List of Acronyms Homeland Security**

BAH	Booz Allen and Hamilton
CATS	Consequences Assessment Tool Set (FEMA)
CBRNE	Chemical, Biological, Radiological, Nuclear High-Yield Explosives
DOMS	Director of Military Support
FBI	Federal Bureau of Investigations
FEMA	Federal Emergency Management Agency
FS	Fellow of the Society, MORS
HAZMAT	Hazardous Materials
HLS	Homeland Security
IDA	Institute for Defense Analyses
IITRI	Illinois Institute of Technology Research Institute
JHU/APL	Johns Hopkins University Applied Physics Laboratory
MANSCEN	Maneuver Support Center
MSCA	Military Support to Civil Authorities
NGO	Non Governmental Agencies
ODCSOPS	Office of the Deputy Chief of Staff, Operations & Plans
ODUSA(OR)	Office Deputy Under Secretary of the Army (Operations Research)
PMO	Program Management Office
QDR	Quadrennial Defense Review
SAIC	Science Applications International Corporation
SBCCOM	Soldier & Biological Chemical Command (US Army)
WMD	Weapons of Mass Destruction



## Appendix B – Terms of Reference Homeland Security (HLS)

### 0. Changes in this Version

This is the tenth copy of the HLS TOR. The third day of the Mini-Symposium was added.

### 1. Background

Homeland Security/Defense is defined as follows:

“Protecting our territory, population and infrastructure at home by:

- Deterring, defending against, and mitigating the effects of all threats to US Sovereignty
- Supporting civil authorities in crisis and consequence management
- Helping to ensure the availability, integrity, survivability, and adequacy of critical national assets”<sup>1</sup>

The importance of Homeland Security (HLS) has been recognized since the founding of the United States. “Recently, several government reports [including QDR ’01 efforts] have emphasized the need for increased attention to the defense of the American homeland. The proliferation of technology for creating weapons of mass terror and conducting chemical, biological, nuclear, and information warfare has reawakened interest in protecting the homeland.”<sup>2</sup> From the perspective of a soldier who has his family living on homeland soil to the military decision maker responsible for executing HLS missions, there is the need to be ready for situations often overshadowed by other world events and obscured by a false sense of security. The US Commission on National Security/21<sup>st</sup> Century has asserted that:

“the United States needs five kinds of military capabilities:

- *nuclear* capabilities to deter and protect the United States and its allies from attack
- *homeland security* capabilities
- *conventional* capabilities to win major wars
- rapidly deployable *expeditionary/intervention* capabilities
- and *humanitarian relief* and *constabulary* capabilities.”<sup>3</sup>

As the physical reach of threat weapons systems grows, the internet proliferates communication and the cultures assimilate more through our society, there is much to be gleaned from serious introspection and review of our capabilities to operate and prepare for Homeland Security missions. The military operations research and assessment community’s methodologies and tools are not always called upon to assist in this area,

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<sup>1</sup> “Homeland Security- Army Strategic Plan”, Third Council Draft, v. 0.6, 8 Jan 2001, ODCSOPS.

<sup>2</sup> “Protecting the Homeland: The Best Defense Is to Give No Offense” by Ivan Eland, May 5, 1998. (Available at <http://www.cato.org/pubs/pas/pa-306.html>)

<sup>3</sup> <http://www.nssg.gov/PhaseII.pdf>, p. 14.

but there are tools that may readily be made available through conversion and transformation. Some areas for military OR analysts to assist are:

- Operations (e.g., identify and implement the HLS tools and methodologies needed to support a military operation);
- Acquisition (e.g., support the lifecycle tradeoffs associated with the acquisition of a major HLS training and analytical systems);
- The Planning, Programming, and Budgeting System (PPBS) (e.g., allocate resources in a balanced way within HLS programs or between HLS programs and other systems); and
- Architecture development (e.g., formulate the HLS systems needed).

MORS has never held a mini-symposium devoted to this topic. To address the dynamics of future global instability and development, this mini-symposium is essential. Key to this forum's success is participation from all agencies and their leaders, to begin what may become a series of symposia dedicated to addressing this emerging focus area.

## **2. Goals, Objectives, & Scope**

The overall goal of the HLS mini-symposium is to provide timely *education and exchange* of tools and models that can *be used or adapted for* Homeland Security operations research analysts and decision makers. This mini-symposium will afford the military assessment community and subject matter experts the opportunity to exchange information on the state of the practice and art in HLS assessment and raise awareness of the shortfalls that limit our ability to perform assessments consistent with the needs of the decision makers. In order to satisfy this goal, a number of objectives will be addressed. These include:

- Identification of useful tools and methodologies for prevention, response and recovery in homeland security missions within the context of physical, informational and cultural dimensions;
- Exploration of the methodologies that will link tools and models to HLS Measures of Merit or Measures of Effectiveness;
- Creation of a compendium of assessment techniques that can evaluate the impact of HLS tools and methods on mission effectiveness. This compendium will include descriptions of the tools or techniques, an assessment of their capabilities and limitations, and an articulation of the data requirements.

Because the overall dimension of this subject area is enormous, it is important to scope the effort consistent with the resources available during a two-day mini-symposium. To that end, some of the potential focus areas and topics should include:

- Information that the decision makers need in operations, acquisition, PPBS, architecture areas on matters relating to HLS;
- Mission areas of interest (e.g., domestic contingencies [physical, cultural], urban environments [physical, cultural], cyberwarfare defense [informational, cultural], information operations [informational], weapons of mass destruction [physical], humanitarian assistance [cultural], disaster relief [cultural]).

### 3. Issues

Within the context of these goals and objectives, the mini-symposium participants should address some of the following issues in developing approaches to analysis and structure of tools, measures, and requirements.

- How do we measure success in missions where standard MOEs are not sufficient? Is there a relationship between the performance of units and forces with different systems and HLS mission goals?
- What factors do we need to be aware of with respect to opposing forces (mankind, nature)?
- What contributes directly to HLS mission accomplishment? Can we measure or identify what HLS circumstances hinder our own forces?
- How should we consider and model the effects of nongovernmental agencies in HLS environments?
- What problems does HLS pose for analyzing physical, informational and cultural considerations?
- What is the best analytic infrastructure for HLS with regard to:
  - Data Derivation/Validation
  - Simulation requirements
  - HLS-related Heuristics
  - Communications networks

### 4. Approach

To address the issues identified for this workshop, the approach will be to organize presentations and discussions in three categories- physical, informational and cultural areas. These three categories will solicit papers that cover the spectrum of HLS and focus on prevention, response and recovery activities. The presentations will be made to all participants and open to the general public. All briefings and discussions will be unclassified.

Discussions will be generated through invited papers. A leader will be designated for each category (physical, informational and cultural). Leaders are encouraged to invite presenters and subject matter experts for their areas. Each presentation should highlight HLS issues, developments, tools and methodologies. The category leader will also lead the discussion related to tools/methodologies and measures of effectiveness. Potential topics for future seminars, workshops, papers, tools and methods relating to HLS will be identified and documented at the close-out session on the second day.

The categories are described below:

**Physical** -- The focus of this area is on HLS as it relates to deterrence, mitigation, response, and remediation/reconstitution of physical structures incident to chemical or biological accidents, incidents, or terrorist events. In the area of deterrence, issues will revolve around HLS applied to threat detection and warning. Mitigation will focus on how information can be used to support contingency planning to reduce and control risk. HLS response will investigate the issues of first response and intergovernmental and nongovernmental crisis command and control of operations. Finally, recovery will

address the issues associated with long-term effects of incidents on physical infrastructure. The group will focus primarily on domestic response situations, but some discussion may include the security of US bases and forces overseas.

**Informational**-- Similar to Physical in that it involves applied force against Homeland defense, but distinct in that it is intended to coerce a response through cyber warfare onto the infrastructure that affects US military power. This type of operation potentially poses a different set of analytic challenges since targets and responses may or may not be military in nature. Sensitivity to "national interest" and the U.S. economy may also be part of this work. The considerations of HLS in cyber defensive and offensive warfare apply to this category as well.

**Cultural** -- This category will examine the cultural aspects of the HLS, from all three areas of preparation, response and recovery. For these operational HLS missions, there are numerous effects on our society that result from natural disasters, fear of global events and tragedies, etc. In this category, we will address general concepts like adequacy, and efficiency of tools and methodologies to determine preparation, training and reaction to natural disasters and other cultural impacts on society

**Summary:** Within each of these categories, participants will identify applicable tools and measurable characteristics that define performance at system levels, functional levels, force effectiveness levels, and possibly effectiveness levels. Once such tools and metrics are defined, future workshops will identify "mapping functions" that describe the logical relationships between the levels of performance. Across the HLS mission types, there may be functions that can be transformed from current models or tools. They may be more esoteric, requiring research and further definition. To the degree that these transformations are identified and accepted, the mini-symposium participants may arrive at near-term suggestions for analytic progress and long-term recommendations for research and development of tools, methods, and data. The mini-symposium will provide an impetus for continued efforts that review and scrutinize the military OR community's ability to analyze the HLS issues and models using today's tools and available data. Future MORS workshops may incorporate subgroups that address mission or scenario variants.

## 5. Products

Several products will be generated from this mini-symposium:

- A summary briefing of papers and discussions will be provided to the Sponsors within 30 days.
- A final report will be produced within three months:
- The first part will be a summary of the presentations and discussions that characterize the tools and methodologies recommended for use in HLS
- The second part will postulate the ability of our analytical infrastructure to support such investigations. The report will be written in the form of a set of recommendations.
- An article summarizing the meeting and its findings will be produced and submitted to *PHALANX* within 3 months.

## 6. Administrative Details

- **Dates:** Mar 13-15, 2001
- **Place:** Applied Physics Lab, Johns Hopkins University, Maryland
- **Classification:** UNCLASSIFIED
- **Registration fees are as follows:** US Federal Government \$200; and others \$400.
- **Attendees:** Estimate 100 people, open
- **Proponent:** DUSA(OR) [Mr. Walter Hollis, FS]
- **Organizing Committee:**
  - **Program Chair:** LTC George Stone
    - **Co-chair:** Mr. David Jerome
    - **Category Chair/Co-Chair:**
      - Physical: Dr. Jeff Grotte, IDA
      - Informational: Dr. Peter Sharfman, MITRE; Dr. Roger Smith, BTG
      - Cultural: Mr. Bob Bovey, IDA; Ms. Susan Hockett, TASC
      - Other Personnel
        - Service Representatives:
          - Navy, AF, Marine Corps, Joint Staff
          - Army: COL Brown, MAJ Tennis, DCSOPS SSW
        - Other Key Personnel: Mr. Gene Visco, FS, Advisor.
        - MORS Special Meeting Bulldog: Mr. Fred Hartman, FS, IDA.

## 7. Agenda

### Tuesday, 13 March

0700-0830	Registration	Lobby, Kossiakoff Center
0830-1145	Plenary Session Overview/Intro to HLS Department of the Army Perspective on HLS Proponent's Perspective on Homeland Security Threat of Terrorism Psychological Effects of Weapons of Mass Destruction (WMD) and Cyber Attacks	Auditorium, Kossiakoff Center Dave Jerome, BAH COL Jerry Brown, DAMO-SS Mr. Walter Hollis, FS, DUSA-OR SSA Emmerson Buie, Jr., FBI Michael Fineberg, BAH
1145-1300	Lunch Posse Comitatus and What it Means To the Military	Kossiakoff Center Gene Visco, FS, Consultant
1300-1700	Plenary Session Consequence Management for WMD Events JTF – Computer Network Operations MORS CB-WMD Workshop Report Panic in a disaster? Army TRADOC Support to HLS Doctrine	Auditorium, Kossiakoff Center Tom Antush, FEMA CAPT Robert West, JTF-CND LTC Jerry Glasow, ODUSA(OR) Larry Heystek, Illinois Inst of Tech CPT Cedrick Farior, MANSCEN Combat Developments
1700-1830	Mixer	Kossiakoff Center

**Wednesday, 14 March**

0700-0800	Registration	Lobby, Kossiakoff Center
0800-1200	Plenary Session Military Support to Civil Authorities HLS Taxonomy SBCCOM Roles & Missions How Modeling, Simulation & Analysis Can Support Homeland Security SBCCOM Tools & Simulations	Auditorium, Kossiakoff Center COL Robert Fitton, DAMO-OD Mickie Krause, SAIC Suzanne Milchling, SBCCOM Mark Herman, BAH  John Walther, SBCCOM
1200-1315	Lunch How many of what in your model: Quantifying first responder capabilities	Kossiakoff Center John Kimball, National Fire Academy
1315-1700	Plenary Session Preventive Defense and Homeland Security  National Institute of Justice Technologies Information Architecture for WMD Real-Time Generation of Urban/Suburban Cultural Feature Entities for HLS Environments Defending America: An Analytical Perspective Event Management for the Inauguration	Auditorium, Kossiakoff Center Dr. Julian Palmore, University of Illinois Dr. Peter Nacci, NIJ Dr. Michael Simon, SPARTA Greg Tackett, AMCOM RDEC  Dr. John Brinkerhoff, IDA Dolores C. Derrington, DARPA

**Thursday, 15 March**

0700-0800	Registration	Lobby 1, Main Building, JHU
0800-1200	Plenary Session (Models & Tools) JPO for Special Technology Countermeasures: Critical Infrastructure Protection Models FEMA Consequence Assessment Tool Set (CATS) Federal Aviation Authority Models Decision Criteria: Internal Use of Force Against Weapons of Mass Destruction Information Technologies for HLS	Parsons Auditorium, Main Building Jeffery McManus, JPO-STC  Dr. Paul Bryant, FEMA Chuck Burke, FAA John W. Ellis, PMO Security Service  Roderick Holland, MITRE
1200-1315	Lunch (on your own)	Cafeteria, Main Building
1315-1445	Plenary Session (Models & Tools) Biometric Identification Technologies C2 for Homeland Defense Wrap-Up Discussion/Summary: How Can the OR Community Assist HLS?	Parsons Auditorium, Main Building Eric J. Bowman, ANADAC Mike Webb, C2ISRC LTC George Stone, JWARS Office