
MORS Terrorism Risk Workshop
Sponsored by Department of Homeland
Security Science and Technology
Directorate
13-16 April, 2009

Chair: Dr. Arch Turner
Co-Chair: Dr. Jerry Diaz

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- 1st DHS Sponsored MORS Event
 - 140+ Attendees
 - Valuable mix of academics, practitioners and interagency participants
 - Substantial DHS Participation
 - Planning
 - Conduct
 - Participation
 - Overall Event Support
 - Solid MORS'ian Support
 - Gratifying Feedback – Follow-On W/S Desired

DHS Mission

- Prevent-Protect Against-Respond To-Recover From Catastrophic Events
 - 18 Critical Infrastructure Sectors
 - Thousands of Miles of Borders / Coastlines
 - Millions of Maritime Containers / Year
 - Thousands of International Flight Arrivals / Border Crossings Daily
 - Broad Range of “All Hazard” Threats (Natural Disasters, Accidents, **Terrorism (C-B-R-N-E-Cy, etc.)**)
 - 24 hrs/day, 7 days/week, 52 weeks/year, year in and year out

“Securing” The Homeland A Monumental Task That Could Impoverish Our Nation

- **Most Have Heard Former Sec’y Chertoff State To The Effect ...** ‘we cannot afford to protect everyone/everything all the time, everywhere, against every threat’ “risk management must guide our decision-making”
- **National Strategy for Homeland Security ...** “assessment and management of risk underlies the full spectrum of our homeland security activities... We must apply a risk-based framework across all homeland security efforts”
- **DHS Strategic Plan Guiding Principle...** “homeland security mission is complex and resources are constrained” ...DHS “will use qualitative and quantitative risk assessments to inform resource decisions” ... “resources will be targeted at the most significant threats, vulnerabilities, and potential consequences.”
- **Sec’y Napolitano Day One “Action Directive” ...** “ What is the status of risk analysis ...how can DHS enhance risk management as the basis of decision making?”
- **2009 Obama HLS Position...** *“Allocate our precious homeland security dollars according to risk, not as pork-barrel spending or a form of general revenue sharing.”*

**DHS Resource Allocations Risk “Informed” –
Invest In Managing Greatest Risks To Nation**

Why This Workshop Topic (3)

- Traditional Risk Construct
 - Risk = Probability x Consequences Of Adverse / Undesired Event or Outcome
- DHS Terrorism Risk Construct
 - Risk = Threat x Vulnerability x Consequences
 - Threat: Probability of Attack
 - Vulnerability: Probability of Damage If Attack Occurs
 - Consequences: Expected Cost / Loss If Successful Attack
- Model Intuitive / Straightforward - What's The Problem?
- Risk Model Factors Subject to Substantial Estimation Uncertainty / Difficulty
 - Terrorists Intelligent, Adaptive; Behavior Neither Random nor Statistics Based
 - Event Circumstances / Conditions Virtually Infinite
 - Consequences Complex and Diverse, Difficult to Predict / Measure / Prioritize / Combine
- Estimating Risk Mitigation Benefits / Payoff – How Will Terrorists React?

An Important (And Tough) Challenge For Our Nation/DHS

Workshop Objectives (ToR)

1. Identify and document terrorism risk information needs of DHS resource allocation decision makers.
2. Identify and document proven “best practice” terrorism risk assessment analytical approaches, methods, and tools.
3. Increase homeland security risk community awareness and understanding of, and access to, proven “best practice” terrorism risk assessment analytical approaches, methods, and tools.
4. Identify, prioritize, recommend mitigations for shortfalls / gaps in current “best practice” terrorism risk assessment analytical approaches, methods, and / or tools.
5. Identify and recommend prioritized research areas and / or strategies for closing identified terrorism risk assessment analytical approach, methodology, and / or tool shortfalls / gaps.

Findings, Conclusions, Recommendations Relative To Objectives Will Be Documented In Workshop Report

Workshop Organization

- **Plenary Sessions**
 - Opening / Closing / Brief Daily Morning Feature Talks / Panel Session
- **Working Groups (WG's) Led By DHS SME Chairs / Co - Chairs**
 1. Terrorism Threat Assessment
 2. Terrorism Vulnerability Assessment
 3. Terrorism Consequence Assessment
 4. Predicting / Measuring Risk Mitigation Measure Effectiveness / Benefit
- **Synthesis Group**
 - Common Themes / Interdependencies / Apparent Disconnects / Overall Perspective
- **WG Sessions – “Heart of Workshop”**
 - Topical Presentations / Panels / Discussions
 - Generate Findings / Conclusions / Recommendations Regarding Objectives

- **Monday**

- Tutorials (Dr.'s Alderson, Cox, Parnell)

- **Tuesday**

- AM: Opening Plenary (Keynote / Speakers)
- Lunch / Speakers
- PM: Working Group Session 1 and Social

- **Wednesday**

- AM: Morning Plenary / Panel Session and Working Group Session 2
- Lunch / Speaker
- PM: Working Group Session 3

- **Thursday**

- AM: Opening Plenary / Speaker and Working Group Session 4
- Lunch / Speaker
- PM: Closing Plenary (Working Group Outbriefs / Concluding Comments)

Terrorism Threat Assessment

Chair: Mr. Steve Chase, Director, Strategic Analysis Group, DHS Intelligence/Analysis

Representative Discussion Topics

- Examination of current best practices in terrorism threat analysis
- Identification of shortfalls and challenges of probabilistic threat assessments as applied to terrorist events
- Examination of alternative non-probabilistic approaches

Vulnerability Assessment

Chair: Ms. Susan Smith, Deputy Chief, Risk Development, DHS HITRAC

Representative Discussion Topics

- Defining concept of vulnerability as it applies to risk analysis in HLS environment
- Sources and acceptable levels of uncertainty in vulnerability analysis
- Best metrics for assessing / communicating vulnerability factors

Terrorism Consequence Assessment

Chair: Dr. Adam Rose, Economics Coordinator, DHS University of Southern California Center for Risk and Economic Analysis of Terrorist Events

Representative Discussion Topics

- Recent advances in modeling physical/economic terrorism consequences
- Components of a comprehensive framework for consequence analysis including linkages between direct effects/indirect effects
- Evaluating consequences that defy quantification
- Tradeoffs between/weighting of impacts measured with differing accuracies

Risk Mitigation Effectiveness/Payoff

Chair: Mr. Bob Ross, DHS S&T Risk Science Branch Chief

Representative Discussion Topics

- Defining “effectiveness” in context of risk management actions
- Other relevant factors to consider in risk management decisions
- Source/magnitude of uncertainty in assessing risk management effectiveness
- Best metrics for effectiveness and other decision-relevant factors
- Best practices from other management disciplines/risk analytic processes

Workshop “Rules of Engagement”

- Goal was to share knowledge, learn, and – hopefully – generate new knowledge
 - Non-attribution
 - No “sacred cows”
 - No “bloviating”¹ / “soap boxing” in WG sessions
 - Keep focused on workshop objectives

1. “to speak pompously and excessively,” or “to expound ridiculously”

There is a need for **research** of the suitability/usefulness of the present DHS risk model.

- Risk = Threat x Vulnerability x Consequences
- Risk = P(Attack) x P(Damage|Attack) x E[Damage]

- Many (most?) understand/acknowledge risk model factors/variables interdependent
- Significant problems predicting/estimating/measuring factors/variables with acceptable (useful?) accuracy
- Some times factors/variables “unknowable”
- Practical to reduce factors to one-dimensional (scalar) variables?

Is model useful as a representation of risk – a mental construct – in the face of intelligent/adaptive adversaries?

Tentative Workshop Findings (2/6)

There is a need for **research** of the measurement of indirect effect consequences (often several times magnitude of direct consequences) including infrastructure linkages and “extended linkages” through which non-physical consequences are transmitted and possibly amplified.

There is a need for **research** on how to measure and evaluate/compare psychological, behavioral, sociological, political consequences of events with other more easily quantified consequences (direct economic, etc.).

There is a need for **research** on how to value/combine/compare risks associated with terrorism, natural disasters, and other “all hazard” catastrophic events.

Tentative Workshop Findings (3/6)

Research is needed to provide better ways of assessing/measuring effectiveness/payoff of risk mitigation measures.

- Right MOE? (Total risk reduced? Cost-effectiveness? Cost-benefit?)
- How model/account for “deterrence” effects?
- How account for terrorist target, tactic, time shifting effect on “total risk”?
- How verify/validate models?

There is a need for **research** into how to mitigate the risks associated with low-probability, high consequence events – often referred to as “Black Swans”.

Tentative Workshop Findings (4/6)

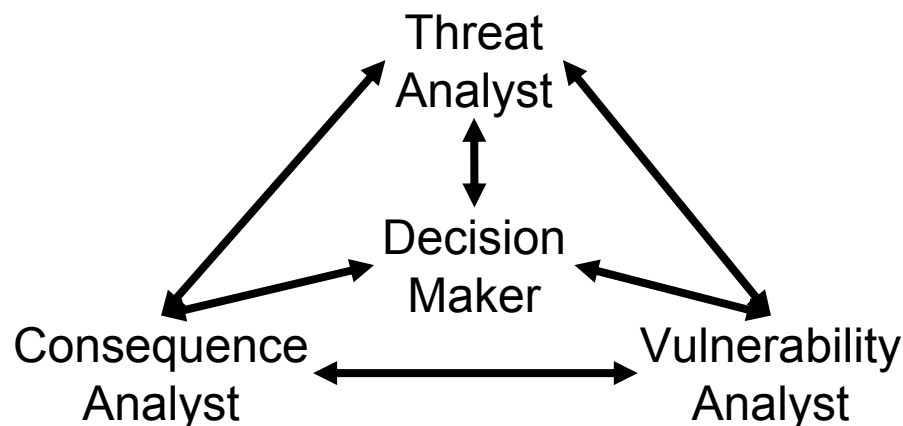
Research is needed into the communication of inherent uncertainty among actors within the risk assessment process, to decision makers being supported, and to the public.

- How to effectively convey risk uncertainty to decision maker?
- How to effectively convey and deal with what is “unknowable”?
- Candid public dialogue about achievable level of risk mitigation
- What is public perception of “acceptable risk”?
- Visualizations

How can infrastructure owners be motivated/incentivized to be candid regarding vulnerabilities?

- Mitigate legitimate concern over potential legal liability if vulnerability acknowledged but not addressed (PANYNJ judged 2/3 responsible for first WTC attack!)
- Incentivize non-government regulated security/resilience investment

There is a need for more/better collaboration - and elimination of organizational/inter - discipline stovepipes.



- Accepted common/consistent terms and definitions – “joint doctrine”
 - DHS Risk Lexicon a “good start”
- More supportable (data availability)/collaboratively developed models/methods
- Independent (i.e., “stovepiped”) T, V, C analyses can result in erroneous/inconsistent risk estimates due to “double counting”
- Dynamic nature of T, V, C dictate need for ongoing analyst interaction
- Better decision maker/analyst understanding
- DHS should consider organizational approach to risk analysis (e.g. , centralized vs. decentralized; personnel rotations; etc.)

There is need for a coherent structure of national strategic, operational, and tactical risk assessment and management strategies/approaches.

- How should risks at different levels be prioritized for risk management investment?

There is a need for quality education and training within and between disciplines associated with homeland security risk management activity.

- Threat Analysts (Intelligence Community?)
- Vulnerability (Risk Science SME's?)
- Consequences (Economists/Others?)
- Resilience (Systems/Engineering?)
- Consumer(s) (Decision Maker(s)?)

Next Steps

- Workshop report in final draft/review
- Convene discussion of DHS WG chairs & other stakeholders to discuss findings
 - Concurrence on findings/takeaways
 - Prioritize recommendations for action
 - Brief to DHS leadership
- Substantial interest in follow on workshop(s)

Abundance of worthy homeland security topics for future workshop consideration!

Sincere “Thank You!” MORS Colleagues

- Co-chair Dr. Jerry Diaz
- Bulldog/WG Co-chair/Counselor Jack Keane
- Bulldog/Synthesis WG Chair Greg Keethler, Roy Reiss
- MORS Thematic WG Co-chairs
 - Dan Maxwell
 - Greg McIntyre
 - Mike Bailey
- Synthesis WG Members (Chris Fossett, Ted Smyth, Roy Reiss, Jerry Glasow)
- Krista and MORS Office Staff

Sincere “Thank You!” DHS Colleagues

- Keynote Speakers
 - DAS Snyder
 - Bob Ross
 - Brandon Wales
- Working Group Chairs
 - Steve Chase
 - Susan Smith
 - Adam Rose
 - Bob Ross
- Numerous Working Group Co-Chairs and Other Speakers/Supporting Roles
- OIP, HITRAC, RMA, I&A moral support/participation
- Sponsor Representative & OAD Director Ervin Kapos

DHS: Preparing for the Unexpected in the 21st Century

