Balancing Resources to Risk

Presentation to

SCOTS / NCHRP 20 - 59

26 – 29 August 2007  Irvine, CA

Maritime Safety, Security and Stewardship

Risk Management Directorate

Port Security Evaluation Division

LCDR Brady Downs,  U. S. COAST GUARD
MISSION

– Prevent terrorist attacks within the United States - (PREVENT)

– Reduce America’s vulnerability to terrorism - (PROTECT)

– Minimize the resulting damage if prevention fails - (RESPOND)

– Recover from attacks that do occur - Ensure economic security - (RECOVER)

Homeland Security Act of 2002
Federal departments and agencies will **identify**, **prioritize**, and coordinate the **protection** of “critical infrastructure” and “key resources” in order to prevent, deter, and mitigate the effects of deliberate efforts to destroy, incapacitate, or exploit them.

Homeland Security Presidential Directive - 7

Operation Snow Flake
NADB
Illustrative
For demonstration purposes
Critical Infrastructure Protection

“Risk is where risk is”
# National Critical Infrastructure and Key Resources (CI/KR) Sectors

## Critical Infrastructure
1. Agriculture & Food *
2. Water (WTS) *
3. Public Health
4. Emergency Services
5. Defense Industrial Base *
6. Information Technology
7. Telecommunications *
8. Energy *
9. Transportation *
10. Banking and Finance
11. Chemical & Hazardous Materials *
12. Postal and Shipping

## Key Resources
1. National Monuments & Icons *
2. Nuclear Power & Materials *
3. Dams *
4. Commercial Facilities *
5. Government Facilities *
The complexity of the maritime transportation system is a pressing dilemma facing the Coast Guard. This includes the vast array of critical infrastructure, important assets, key resources, various systems, & networks that make up our nation’s sea/river ports crossing DHS sectors.
Critical Infrastructure Protection

Maritime Security Risk Analysis Model

(MSRAM)
The MSRAM was designed to enhance security and reduce the risk of terrorism by identifying and prioritizing critical infrastructure, key resources and high consequence transits and events across sectors using a common risk methodology, taxonomy and metrics to measure security risk at the local, regional, and national levels.

Support Senior Leadership risk based decision making process
National Security Risk Profile

Illustrative

Security risk displayed geographically using common risk methodology, taxonomy and metrics to measure risk locally, regionally and nationally

Illustration from: http://www.globalincidentmap.com/home.php
Port Security Risk Formula

Total Port Risk

Threat (Grouped by Threat Tiers)

Vulnerability & Consequence (Port Area and Facility Risk)

Economic Consequences
DHS RMD

Area and Population Risk
DHS RMD

Asset Risk
USCG (MSRAM)
Ferry Security Risk Formula

Total Ferry System Risk

USCG (MSRAM) 
(Threat x Vulnerability X Consequence)

Vulnerability & Consequence

Passenger Index
(Annual Ridership)

Cargo Index
(# of Vehicles Carried Annually)
Critical Infrastructure Protection

SAFE Port Act 2006

• In applying for grants..., the Secretary ... shall make available, and Area Maritime Security Committees may use a risk assessment tool that uses standardized risk criteria, such as the Maritime Security Risk Assessment Tool used by the Coast Guard.”
Greenlane Maritime Cargo Security Act 2006

• SEC 16. Port Security Grant Program

(k) Risk Assessments – The Secretary shall make available to grant applicants a risk assessment tool, which uses standardized risk criteria, such as the Maritime Security Risk Assessment Model used by the Coast Guard.”
CG has built a good foundation in risk management

Challenges are to refine and strengthen the process

- CG needs to improve on data limitations
  1. Threat information needs improvement
  2. CG needs to measure vulnerability reduction from CG activities
  3. CG needs to calculate cascading impacts of consequences
  4. CG needs a formal feedback process &
  5. CG needs to be able to assess risk across ports

**GAO comments on USCG Progress**

- CG improving MSRAM to address threat component
- CG improving MSRAM to calculate risk reduction from security activities
- CG improving MSRAM to calculate collateral impacts on consequences
- CG will use formal feedback system in MSRAM risk mgmt process
- CG improving MSRAM to allow national comparison of ports
CG Vulnerability assessments and PSRAT need improvement

Good foundation
MSRAM addresses risk concerns
• Includes Threat
• Accounts For Cascading Effects
• Creates Formal Feedback Loop

MSRAM used to
• effectively apply resources
• Improve AMSPs
• Mature into the all hazard risk management process

Coast Guard Mission Change = Paradigm Shift

2001
PSRAT 1 | PSRAT 2 | PSRAT 2a

2006
MSRAM 1

2007
MSRAM 2 / Enterprise MSRAM 3,4,5,6,7

2015

ONS

CMT 1

GAO 1

GAO 2

CMT2

Maritime Sentinel

GAO 3

Path Forward
In recognition by the Commandant for outstanding innovation and implementation, the Coast Guard Maritime Security Risk Analysis Model (MSRAM) Team won the 2006 Joel Magnussen Innovation Award for Management. Pictured above left to right: Admiral Thad Allen, Commandant, U.S. Coast Guard, Mrs. Joel Magnussen, LCDR Brady Downs, The Honorable Mr. Michael Jackson, Deputy Secretary, Department of Homeland Security.
“What should drive our intelligence, policies, operations, and preparedness plans and the way we are organized is the strategic matrix of **threat**, **vulnerability** and **consequence**.

And so, we'll be looking at everything through that prism and adjusting structure, operations and policies to execute this strategy.”  

*Secretary Chertoff 4/20/05*

**Risk = Threat * Vulnerability * Consequence**
# Maritime Security Risk Analysis Model

Brady Downs, Mark Shepard, Jeff Fuller

## Scenario

- **Target / Asset**
- **Attack Mode**

## Threat Attack Probability

### Intentions & Confidence
- Geographic Threat
- Death Injury
- National Security
- Environment Impact
- Response - Owner/Operator
- Response - Local 1st Responder
- Response - USCG
- Achievability
- System Security - Owner/Operator
- System Security - LEA
- System Security - USCG

### Capability & Confidence
- Primary Economic Impact
- Secondary Economic Impact
- Redundancy
- Target Hardness

## Consequence

### Scenario Consequence

- **Primary Consequence** + **Secondary Economic Impact**

## Risk

Created by USCG HQ, Areas, Districts, Sectors SMEs
MSRAM Elements

ель Scenario

Target / Asset

Attack Mode

⇒ MSRAM Design is Based on Terrorist Attack Modes against Types of Targets

National Critical Infrastructure and Key Resources/Assets (CI/KA) Sectors

Critical Infrastructure
1. Agriculture & Food
2. Water (WTS)
3. Public Health
4. Emergency Services
5. Defense Industrial Base
6. Information Technology
7. Telecommunications
8. Energy
9. Transportation
10. Banking and Finance
11. Chemical & Hazardous Materials
12. Postal and Shipping

Key Resources/assets
1. National Monuments & Icons
2. Nuclear Power & Materials
3. Dams
4. Commercial Facilities
5. Government Facilities

Threat Attack Modes
- Aerial
- Cyberspace
- Insider
- Landside
- Waterside
- Combined

Attack Modes address the full range of DHS Attack Modes (WMD)
MSRAM Threat elements

- Intel Coordination Center Robust Threat Component
- Capture intention and capability for each possible scenario
- Time Horizon to attain capability
- Geographic threat overlay

Warning
### Field users assess primary and secondary consequences of a specific attack mode against the specific target

### Field users assess the mitigation impact of the Owner/Operator, First Responders and USCG

#### Table: X Scenario Consequence

<table>
<thead>
<tr>
<th>X Scenario Consequence</th>
<th>Primary Consequence</th>
<th>Secondary Economic Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Death Injury</td>
<td>Primary Economic Impact</td>
</tr>
<tr>
<td></td>
<td>Symbolic Effect</td>
<td>Symbolic Impact</td>
</tr>
<tr>
<td></td>
<td>National Security</td>
<td>National Security Impact</td>
</tr>
<tr>
<td></td>
<td>Environment Impact</td>
<td>Environment Impact</td>
</tr>
<tr>
<td></td>
<td>Response - Owner/Operator</td>
<td>Response - Owner/Operator Impact</td>
</tr>
<tr>
<td></td>
<td>Response - Local 1st Responder</td>
<td>Response - Local 1st Responder Impact</td>
</tr>
<tr>
<td></td>
<td>Response - USCG</td>
<td>Response - USCG Impact</td>
</tr>
<tr>
<td></td>
<td>Recoverability</td>
<td>Recoverability Impact</td>
</tr>
<tr>
<td></td>
<td>Redundancy</td>
<td>Redundancy Impact</td>
</tr>
<tr>
<td></td>
<td>Secondary Economic Impact</td>
<td>Secondary Economic Impact</td>
</tr>
</tbody>
</table>

#### Diagram: MSRAM Consequence elements

- Scenario
- Target / Asset
- Attack Mode

- Field users assess primary and secondary consequences of a specific attack mode against the specific target
- Field users assess the mitigation impact of the Owner/Operator, First Responders and USCG
MSRAM Vulnerability elements

The vulnerability factors in MSRAM assess the probability that the **layered defense** strategy in place will successfully interdict and protect the target against the attack.

- **Probability of local, state (other federal) LEA to interdict the attack on the target**
- **Probability of USCG to interdict the attack on the target**
- **Probability of owner/operator to interdict the attack on the target**
- ** Probability of terrorist delivery of a successful attack**
- **Probability that the target withstands the attack given they have thwarted your layered system security**
MSRAM Countermeasures Checklists to Capture Facility Defense Postures

Considered Countermeasures

- Fencing/gates
- Perimeters/access points
- Waterside barriers
- Anti-swimmer
- Access control
- Intrusion detection
- CCTV
- CBRNE detection
- Blast mitigation
- Guard forces
- Communication
- Public notification

Example Checklist

**Landside Fencing/Gates Classes**

<table>
<thead>
<tr>
<th>High Security (Class IV)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class IV fence is designed to provide optimal restriction or delay to pedestrian based attacks. (Vehicle and pedestrian gates are designed to be complimentary to the structural integrity of the fence line.)</td>
<td></td>
</tr>
<tr>
<td>Guideline:</td>
<td></td>
</tr>
<tr>
<td>Double buried fence line with 10ft clear zone between fences, curved out = 10ft anti-climb/anti-cut fencing with top guard. Fence posts are hardened and counter-sunk into concrete. 30ft or more interior clear zone and at least a 10ft exterior clear zone.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medium Security (Class III)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class III fence is designed to restrict or delay pedestrian based attacks. (Vehicle and pedestrian gates are designed to be complimentary to the structural integrity of the fence line.)</td>
<td></td>
</tr>
<tr>
<td>Guideline:</td>
<td></td>
</tr>
<tr>
<td>Single buried, curved or straight 10ft anti-climb/anti-cut fence with top guard. Fence posts are hardened and counter-sunk into concrete. 15ft interior clear zone and up to 10ft exterior clear zone.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intermediate Security (Class II)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class II fence is designed to restrict or delay pedestrian based assaults. (Vehicle and pedestrian gates are designed to be complimentary to the structural integrity of the fence line.)</td>
<td></td>
</tr>
<tr>
<td>Guideline:</td>
<td></td>
</tr>
<tr>
<td>7ft chain-link fence, posts are sunk into concrete, with top guard 10ft interior clear zone.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Low Security (Class I)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I fence will provide minimal delay to a pedestrian based assault. (Vehicle and pedestrian gates are designed to be complimentary to the structural integrity of the fence line.)</td>
<td></td>
</tr>
<tr>
<td>Guideline:</td>
<td></td>
</tr>
<tr>
<td>7ft chain-link fence.</td>
<td></td>
</tr>
</tbody>
</table>
Security Risk Construct

Threat = Capability X Intent (with confidence level) geographic weight factor overlay

Vulnerability = Achievability X Owner/operator, LEA, and USCG System Security X Target Hardness

Consequence = Death and Injury, Primary and Secondary Economic impact, Environment, National security, Symbolic Impacts mitigated by Response Capability

Mitigated by Interdiction Capability

Mitigated by Response Capability
## Maritime Security Risk Analysis Model

**Scenario**

- **Target / Asset**
- **Attack Mode**

<table>
<thead>
<tr>
<th>Threat Attack Probability</th>
<th>X Scenario Consequence</th>
<th>Secondary Economic Impact</th>
<th>X Vulnerability</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intentions &amp; Confidence</td>
<td>Primary Consequence +</td>
<td>Secondary Economic Impact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capability &amp; Confidence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geographic Threat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death Injury</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Economic Impact</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symbolic Effect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Security</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment Impact</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response - Owner/Operator</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response - Local 1st Responder</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response - USCG</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recoverability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Redundancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary Economic Impact</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achievability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Security - Owner/Operator</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Security - LEA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Security - USCG</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target Hardness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Created by USCG HQ, Areas, Districts, Sectors SMEs

Brady Downs, Mark Shepard, Jeff Fuller
# MSRAM-MAST-RAMCAP Relationships

<table>
<thead>
<tr>
<th>MSRAM - FRONT END</th>
<th>MSRAM Add-on</th>
<th>MAST</th>
<th>RAMCAP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Threat</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Consequence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary Economic Impact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Survivability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use Physical Security Measures Checklist</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAST Security Countermeasures Assessment (Vulnerability Reduction)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Response Capabilities Assessment (RCA)</strong></td>
<td>(Consequence Mitigation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAST Field Interviewing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAST Security Countermeasures Assessment (Vulnerability Reduction)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Physical Security Security Countermeasures Assessment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area Wide Security Countermeasures Assessment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use Physical Security Measures Checklist</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Consequence Modeling</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health and Human Safety - Acute Fatalities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health and Human Safety - Acute Injuries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic Impact - Figure 6-4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental - Narrative Description</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Security - Narrative Description</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vulnerability</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Attack Mode</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Created by USCG Mark Shepard, Brady Downs, Jeff Fuller
Blast & Consequence analysis

Model Simulation
Plume Analysis
Field tests
Historical data
**Inputs**

**Threat**
- ICC Strategic Threat Analysis
  - Intent w/Confidence
  - Capability w/Confidence
  - Time Horizon Until Capability Acquired

**Consequence**
- Studies (Blast & Consequence)
- Plans (AMSP, FSP, VSP)
- Tools (Chemtap, Oiltap, CAMEO)
- Consequence Data (RMP, GCOA)

**Vulnerability**
- Assessments (AMSC, VSP, FSP, RAM-D, MAST, PSA, RAMCAP, CRs, SAV, PIVA, HLS-CAM, JISVA).
- Tools (MMCT, ACAMS, ViSAT, CSR, TRAM, FHWA)
- Studies / Grants (BZPP)
- Workgroups (SME)

**MSRAM - Analysis**

**Outputs**
- Prioritized Risk Ranking - Common Risk Model (NADB)
- Security Risk Profiles
- Risk Drivers
- Data for Risk Management Analysis
- Risk Management Priorities

**Analyze & Exercise**
- Strategic Risk Analysis Process
- Protective Security Analysis Center (PSAC)
- National Infrastructure Simulation and Analysis Center (NISAC)
- Coast Guard R & D Center / National Labs
- Exercises: PREP, PORTSTEP, AMSTEP
Consequence-Based Approach

One Dimension Consequence Scale

LOW Consequence

High Consequence

Consequence-Based Approach

- Freight Ship
- Oil Tanker
- Ferry
- CDC Barge
- Cruise Ship
- Chemical Plant
- Nuclear Power Plant
- Defense Facility
- Bridge
- Refinery
- Waterway

One Dimension Consequence Scale
Base Line Risk Provided By MSRAM

- Risk Group 1
- Risk Group 2
- Risk Group 3

CONSEQUENCE

LIKELIHOOD (Threat * Vulnerability)

Low

High
Risk-Based Profile Provided By MSRAM

For Official Use Only
## Risk Summary by Port - SAN FRANCISCO BAY

### ALAMEDA, CA
- **10 Required** Alameda Harbor Bay Ferry Terminal, Facility - Passenger terminal - ferry
- **11 Required** Alameda Main Ferry Terminal, Facility - Passenger terminal - ferry
- **12 Required** Alameda Main Ferry Terminal, Facility - Passenger terminal - ferry
- **13 Required** Alameda Harbor Bay Ferry Terminal, Facility - Passenger terminal - ferry
- **14 Required** Harbor Bay Maritime Pier, Facility - Passenger terminal - ferry
- **15 Required** Harbor Bay Maritime Pier, Facility - Passenger terminal - ferry

### BENECIA, CA
- **16 Required** Benicia Highway Bridge HS3, Infrastructure - Bridges and tunnels (highway)
- **17 Required** Benicia Highway Bridge HS3, Infrastructure - Bridges and tunnels (highway)

### EUREKA, CA
- **19 Required** POZE Humboldt Bay/Eureka, Key Asset - Power plant - nuclear
- **20 Required** Port of Humboldt Bay (Eureka), Facility - Passenger terminal - cruise ship
- **21 Required** Port of Humboldt Bay (Eureka), Facility - Passenger terminal - cruise ship
- **22 Required** POZE Humboldt Bay/Eureka, Key Asset - Power plant - nuclear
- **23 Required** Chevron Eureka, Facility - Petroleum - fuel storage tank(s)
- **24 Required** POZE Humboldt Bay/Eureka, Key Asset - Power plant - nuclear

### MARTINEZ, CA
- **25 Required** Shell Martinez Refinery Company, Facility - Petroleum refinery
- **26 Required** Tesoro Golden Eagle Refinery, Facility - Petroleum refinery

### MONTEREY HARBOR, CA
- **27 Required** Monterey Harbor W/Ship (Arroyo A/E), Facility - Passenger terminal - cruise ship

### SAMPLE DATA
### Risk by Target Class

**Agricultural and Food**

| Car/Truck Bomb | PORT OF PORT ARTHUR | PORT AMUR | PORT ARTHUR, TX | DE | 77 24 | 70% 70% | 3 2 2 1 1 3 7 7 7 2 4 4 7 6 7 7 6 |
| PORT OF ORANGE | Port Amur | ORANGE, TX | DE | 16 19 | 70% 70% | 2 2 1 1 1 6 6 6 2 3 3 7 6 7 7 6 |

**Bridges and tunnels (HWY/RR)**

**SAMPLE DATA**

<table>
<thead>
<tr>
<th>THREAT</th>
<th>CONSEQUENCE - PRIMARY</th>
<th>CONSEQUENCE - SECONDARY</th>
<th>VULNERABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>H90 Bridge</td>
<td>4 2 1 1 3 7 6 6 4 4 4</td>
<td>4 7 6 6 4</td>
<td>SAMPLE DATA</td>
</tr>
<tr>
<td>RAINBOW VETERANS BRIDGE</td>
<td>2 3 4 3 7 7 7 7 7 3 4 4</td>
<td>5 7 6 6 5</td>
<td></td>
</tr>
<tr>
<td>MLK BRIDGE</td>
<td>3 3 2 1 1 6 6 6 4 4 4</td>
<td>4 7 6 6 4</td>
<td></td>
</tr>
<tr>
<td>146 CASAHERO BRIDGE</td>
<td>4 3 1 1 1 7 7 6 6 3 4 4</td>
<td>5 7 6 6 5</td>
<td></td>
</tr>
<tr>
<td>MLK BRIDGE</td>
<td>4 4 1 1 1 7 7 6 6 3 4 4</td>
<td>5 7 6 6 5</td>
<td></td>
</tr>
<tr>
<td>146 CASAHERO BRIDGE</td>
<td>3 3 1 1 1 7 7 6 6 3 4 4</td>
<td>5 7 6 6 5</td>
<td></td>
</tr>
<tr>
<td>MLK BRIDGE</td>
<td>3 3 1 1 1 5 4 4 3 4 4 3 4 4 5 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Boat Bomb**

| MLK BRIDGE  | 46,257 70,757 | 70% 70% | 2 3 1 5 3 7 6 5 6 1 5 6 7 6 5 7 |
| MLK BRIDGE  | 96,257 97,757 | 70% 70% | 4 4 1 1 1 7 7 6 4 4 4 5 7 6 6 4 |
| RAINBOW VETERANS BRIDGE | 601,968 70% 70% | 2 2 1 1 1 7 7 5 2 3 3 6 7 6 5 7 |

**Bridges & Tunnels**
Risk by attack mode

### NEW YORK

<table>
<thead>
<tr>
<th>CoT Scenario</th>
<th>Rank Type</th>
<th>Target Class</th>
<th>Port</th>
<th>Threat</th>
<th>Vuln</th>
<th>Consq</th>
<th>PRIMARY RISK</th>
<th>2ND Consq</th>
<th>TOTAL RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attack by Hijacked Vessel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>174 Required</td>
<td>AMBROSE CHANNEL WATERWAY</td>
<td>Infrastructure - Waterway transportation system</td>
<td>NEW YORK BAY, NY (LOWER)</td>
<td>56%</td>
<td>22.8%</td>
<td>12</td>
<td>2</td>
<td>1,650</td>
<td>158</td>
</tr>
<tr>
<td>175 Required</td>
<td>STATEN ISLAND FERRY</td>
<td>Vessel - High capacity ferry - greater than 1000 passengers</td>
<td>NEW YORK BAY, NY (UPPER)</td>
<td>42%</td>
<td>17.1%</td>
<td>1.436</td>
<td>108</td>
<td>16</td>
<td>106</td>
</tr>
<tr>
<td>176 Required</td>
<td>AMTRAK HILL GATE BRIDGE</td>
<td>Infrastructure - Bridges and tunnels (WY/RR)</td>
<td>NEW YORK, NY (UPPER)</td>
<td>30%</td>
<td>9.3%</td>
<td>1.369</td>
<td>33</td>
<td>16</td>
<td>36</td>
</tr>
<tr>
<td>177 Required</td>
<td>VERRAZANO BRIDGE</td>
<td>Infrastructure - Bridges and tunnels (WY/RR)</td>
<td>NEW YORK BAY, NY (UPPER)</td>
<td>30%</td>
<td>9.3%</td>
<td>29</td>
<td>0</td>
<td>1,036</td>
<td>0</td>
</tr>
<tr>
<td>178 Required</td>
<td>GEORGE WASHINGTON BRIDGE</td>
<td>Infrastructure - Bridges and tunnels (WY/RR)</td>
<td>HUDSON RIVER LOWER, NY (BATTERY TO YONKERS)</td>
<td>30%</td>
<td>7.0%</td>
<td>37</td>
<td>1</td>
<td>105</td>
<td>5</td>
</tr>
<tr>
<td>179 Required</td>
<td>LINCOLN TUNNEL VENTILATORS</td>
<td>Infrastructure - Bridges and tunnels (WY/RR)</td>
<td>HUDSON RIVER LOWER, NY (BATTERY TO YONKERS)</td>
<td>30%</td>
<td>2.0%</td>
<td>34</td>
<td>0</td>
<td>105</td>
<td>2</td>
</tr>
<tr>
<td><strong>Boat Bomb</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>180 Required</td>
<td>STATEN ISLAND FERRY</td>
<td>Vessel - High capacity ferry - greater than 1000 passengers</td>
<td>NEW YORK BAY, NY (UPPER)</td>
<td>42%</td>
<td>38.5%</td>
<td>1.436</td>
<td>202</td>
<td>16</td>
<td>205</td>
</tr>
<tr>
<td>181 Required</td>
<td>AMTRAK HILL GATE BRIDGE</td>
<td>Infrastructure - Bridges and tunnels (WY/RR)</td>
<td>EAST RIVER, NY</td>
<td>42%</td>
<td>57.9%</td>
<td>186</td>
<td>63</td>
<td>16</td>
<td>57</td>
</tr>
<tr>
<td>182 Required</td>
<td>GEORGE WASHINGTON BRIDGE</td>
<td>Infrastructure - Bridges and tunnels (WY/RR)</td>
<td>HUDSON RIVER LOWER, NY (BATTERY TO YONKERS)</td>
<td>42%</td>
<td>29.9%</td>
<td>32</td>
<td>3</td>
<td>167</td>
<td>20</td>
</tr>
<tr>
<td>183 Required</td>
<td>LINCOLN TUNNEL VENTILATORS</td>
<td>Infrastructure - Bridges and tunnels (WY/RR)</td>
<td>HUDSON RIVER LOWER, NY (BATTERY TO YONKERS)</td>
<td>42%</td>
<td>1.6%</td>
<td>125</td>
<td>1</td>
<td>160</td>
<td>3</td>
</tr>
<tr>
<td>184 Required</td>
<td>UNITED NATIONS BUILDING</td>
<td>Key Asset - Monuments and icons (including historic vessel)</td>
<td>EAST RIVER, NY</td>
<td>32%</td>
<td>0.2%</td>
<td>23</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>185 Required</td>
<td>VERRAZANO BRIDGE</td>
<td>Infrastructure - Bridges and tunnels (WY/RR)</td>
<td>NEW YORK BAY, NY (UPPER)</td>
<td>42%</td>
<td>1.2%</td>
<td>17</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Car/Truck Bomb</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>186 Required</td>
<td>UNITED NATIONS BUILDING</td>
<td>Key Asset - Monuments and icons (including historic vessel)</td>
<td>EAST RIVER, NY</td>
<td>32%</td>
<td>0.4%</td>
<td>98</td>
<td>2</td>
<td>16</td>
<td>3</td>
</tr>
</tbody>
</table>

**SAMPLE DATA**
Risk by Port or City

SAMPLE DATA
Risk by Target Class

SAMPLE DATA

Infrastructure - Water crossings: pipelines, electrical power, communications
Facility - Petroleum: Fuel storage facilities
Vessel - Cruise ships
Vessel - Petroleum tank vessels
Facility - Passenger terminal - cruise ship
Facility - Petroleum refinery
Infrastructure - Waterway transportation systems
Facility - CDC: Material Poisonous by Inhalation (PIII-HH)
Other - Waterside attraction/event: large congregations of people
Vessel - Chemical tank vessels
Power of MSRAM: Risk Mitigation Strategies

Consequence

Risk Group 1
High

Risk Group 2
Low

Risk Group 3
High

Mitigation strategies implemented to reduce risk

Prevention / Protection

Response / Recovery

Regulatory Regime (CMT2)

Risk Group 1

Risk Group 2

Risk Group 3

LIKELIHOOD (Threat * Vulnerability)

Low

CONSEQUENCE

Low

High
Risk Management Guidance
Response/Recovery

- Chapter 15 Terrorism
- Chapter 16 Maritime Security/Antiterrorism
- Chapter 17 Law Enforcement
- Chapter 23 Event Management
- Chapter 18 Search and Rescue
- Chapter 19 Oil Spill
- Chapter 20 Hazardous Substance (Chemical, Biological, Radiological, Nuclear)
- Chapter 21 Marine Fire
- Chapter 22 Multi-Casualty
ICS Risk Management Cycle

MSRAM Supports (ICS & JOPES)
Operational Planning for Special Events, Security Operations & Contingency Response

MSRAM Initial Assessment

ICS = Incident Command System

JOPES = Joint Operations Planning and Execution System

Begin Next Operational Period

MSRAM Analyze Impact of Operations
MSRAM Review Process

1. COTP/Sector Assessment with AMSC Input - Identifies risk profile for individual targets

2. District Review Provide consistency/normalization between Sectors

3. Area Review Provide consistency/normalization between Districts

4. HQ Assessment, Review & Analysis Provide consistency/normalization between Areas

Security Sensitive Information

SECRET SIPRNET

United States Coast Guard
MSRAM Operational Use: Geospatial Risk Map

- Provides strategic, operational and tactical planners and risk managers a view of what the greatest risks are and where they exist based on MSRAM risk analysis and target location.

- MSRAM feeds the COMDT’s geospatial risk map to illustrate geographical distribution of CI / KR, targets, assets, events, NSSE, hazmat transits…

See Classified Brief
Current National Maritime Security Risk Analysis Model Geographic Coverage

Chemical Facilities, Bridges, Passenger terminals (Vessel and Rail), Stadiums, Cruise ships, vehicle ferries, maritime events, high capacity ferries, vessel transits with hazardous cargoes through High Population Density Areas

18,000 MTSA facilities, vessels, Critical Infrastructure / Key Resources, events Across sectors
Risk Density by State

Illustration

Risk Density for Type Target by Gulf State
(Illustrative)

- Florida
- Alabama
- Louisiana
- Mississippi
- Texas

Key Assets
- Other
- Vessels
- Key Assets
- Infrastructure
- Facilities
- Barges

SAMPLE DATA
Risk Density Illustration by Target Type for States

Risk Density by Type Target for Gulf States (Illustrative)

- Texas
- Mississippi
- Louisiana
- Alabama
- Florida

SAMPLE DATA
Unified Risk Coast Guard Missions

Expected Residual Loss (Risk) that the CG has the ability to influence due to:

*All incidents* (excluding transfer of WMD)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category-8</td>
<td>Grounding</td>
</tr>
<tr>
<td>Category-7</td>
<td>Seasonal Conditions</td>
</tr>
<tr>
<td>Category-6</td>
<td>Release of HAZMAT</td>
</tr>
<tr>
<td>Category-5</td>
<td>Marine Casualty Affecting Waterway</td>
</tr>
<tr>
<td>Category-4</td>
<td>Interruption of Military Operations</td>
</tr>
<tr>
<td>Category-3</td>
<td>Fire-Explosion</td>
</tr>
<tr>
<td>Category-2</td>
<td>Illegal Migrant Entry</td>
</tr>
<tr>
<td>Category-1</td>
<td>Species Damaged by Marine Operations</td>
</tr>
</tbody>
</table>

Important Note: These are not suggested resourcing profiles! Context is required before these profiles are able to meaningfully inform planning and budgeting decisions.

MSRAM data contributes to this risk profile.
All Hazards Risk Profile

Illustrative

Risk displayed geographically using common risk methodology, taxonomy and metrics to measure risk locally, regionally and nationally

Illustration from: http://www.globalincidentmap.com/home.php
Maritime Domain Awareness
Global Supply Chain Risk Profile
MSRAM HELP DESK – MSRAMHelp@uscg.mil

MSRAM Contacts Policy Questions
– CAPT Don Grant, USCG
– LCDR Brady Downs, USCG
– LT Dixon, LT Pisares, LT Thayer, USCG

MSRAM Technical Issues
– Mr. Bob Vaeth, Mr. Matt Mower ABS Consulting

MSRAM Senior Technical Advisor
– Jeff Fuller, Teledyne Brown Engineering

HOMEMPORT Customer Service - HomeportHelp@osc.uscg.mil
MSRAM
Questions / Answers
Topics for Discussion

“In the absence of emotion and political influence: Risk is where risk is”.

Quote by LCDR Brady Downs, USCG
Risk Management

“We need to adopt a risk-based approach in both our operations and our philosophy. Risk management is fundamental to managing the threat, while retaining our quality of life and living in freedom. Risk management must guide our decision making as we examine how we can best organize to prevent, respond and recover from an attack.”

Secretary Chertoff 3/16/05

DHS must use risk based decision making

Risk Management Framework

MSRAM Assesses Unit risk at the individual target / attack mode level. Data analysis supports risk based decisions at the tactical, operational & strategic levels of the chain of command.
Network System Critical Node Analysis

Critical Node / System inter-connectivity Risk displayed geographically using common risk methodology, taxonomy and metrics to measure risk locally, regionally and nationally.
Risk Group 1

Risk displayed geographically using common risk methodology, taxonomy and metrics to measure risk locally, regionally and nationally.
Risk Group 2

Risk displayed geographically using common risk methodology, taxonomy and metrics to measure risk locally, regionally and nationally.
Risk Group 3

Risk displayed geographically using common risk methodology, taxonomy and metrics to measure risk locally, regionally and nationally.
Critical Infrastructure Protection

Sector-Specific Agencies

In accordance with guidance provided by the Secretary, shall:

• (a) **collaborate** with all relevant Federal departments and agencies, State and local governments, and the private sector, including with key persons and entities in their infrastructure sector;

• (b) conduct or facilitate vulnerability **assessments** of the sector; and

• (c) encourage **risk management strategies** to protect against and mitigate the effects of attacks against critical infrastructure and key resources.

HSPD 7