Hazard and Security Activities of the Transportation Research Board

An All Hazards Context for Coordinated, All Modes, Security-Related Research

October 2008
1863 Charter of the National Academy of Sciences

“. . . the Academy shall, whenever called upon by any department of the Government, investigate, examine, experiment, and report upon any subject of science or art . . .”

The work of The National Academies is reported through an Annual Report to Congress.
The National Academies—Private, Nonprofit Congressionally Chartered 1863

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Charles M. Vest, President

National Academy of Sciences
Ralph J. Cicerone, President

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**Cycle of All Hazards Research — Transportation**

1. TRB Committee on Critical Transportation Infrastructure Protection shares **research results** from all sources & identifies **research needs**

2. AASHTO Special Cmte on Transportation Security identifies and refers research needs

3. NCHRP 20-59 panel funds applied research or refers prioritized requests

- 10,000 TRB Annual Meeting Participants
- 75 other technical meetings
- TRB Annual Field Visits to DOTs and University Research Centers
- State/Local Government
- Non-Government Organizations
- Federal Agencies
- Private Sector
The Hazards and Disaster Management System

Pre-Impact Interventions
Mitigation Practices
Emergency Preparedness Practices
Recovery Preparedness Practices

Post-Impact Responses
Emergency Activities (planned and improvised)
Recovery Activities (planned and improvised)

EVENTS

Disaster Impacts
Physical
Social

Disaster Event Characteristics
Frequency
Magnitude of Impact
Predictability
Scope of Impact (spatial and social)
Controllability
Duration of Impact
Length of Forewarning

Hazard Vulnerability
Hazard Exposure
Physical Vulnerability
Social Vulnerability

Hazard Vulnerability

CHRONOLOGICAL TIME
Pre-Impact
Trans-Impact
Post-Impact

SOCIAL TIME

Developing a Strategy to Counter Terrorism Requires a Roadmap; Each Component of the Roadmap Requires Research

- Political, Economic, Cultural Sources
- Strategy, Tactics, Capabilities
- Offensive/Foreign
  - Military Strategy and Programs
  - Intelligence Strategy and Programs
  - Police and Justice
- International Development
- Support Denial
  - International Development
  - Political Actions
  - Counter- and Non-Proliferation
- Defensive/Domestic
  - Preventive Measures
  - Response Measures
  - Threat and Risk Analysis

Why do they hate us? What makes them hate us more?

How can we best reduce the supply of terrorists?

Direct Action
- Military Strategy and Programs
- Intelligence Strategy and Programs
- Police and Justice

Support Denial
- International Development
- Political Actions
- Counter- and Non-Proliferation

Source: Riley, (2004), Reducing the Risks and Consequences of Terrorism, CREATE Conf.
Disasters Roundtables
January 2001 - present

23: Making the World Safer from Disasters: The U.S. Role
   (Thursday, October 2, 2008)
22: Disaster Risk Management in an Age of Climate Change
21: Disaster Recovery
20: Creating and Using Multi-Hazards Knowledge and Strategies
19: Protecting Lives and Property at our Coastlines
18: Citizen Engagement in Emergency Planning for a Flu Pandemic
17: Rebuilding for Health, Sustainability, and Disaster Preparedness
   in the Gulf Coast Region
16: Community Disaster Resilience
15: Law, Science, and Disaster
14: The Indian Ocean Tsunami Disaster: Implications for U.S. and
   Global Disaster Reduction and Preparedness
13: Lessons Learned Between Hurricanes: From Hugo to Charley,
   Frances, Ivan, and Jean
12: Creating a Disaster Resilient America: Grand Challenges in
   Science and Technology
11: Public Health Risks of Disasters: Building Capacity to Respond
10: Reducing Future Flood Losses: The Role of Human Actions
  9: Hazards Watch: Reducing Disaster Losses Through Improved
     Earth Observations
  8: The Emergency Manager of the Future
  7: The National Earthquake Hazards Reduction Program at Twenty-
     Five Years: Accomplishments and Challenges
  6: Alerting America: Effective Risk Communication
  5: From Climate to Weather: Impacts on Society and Economy
  4: Countering Terrorism: Lessons Learned from Natural and
     Technological Disasters
  3: Sea Level Rise and Coastal Disasters
  2: Natural Disasters and Energy Policy
  1: Urban/Wildland Fire Interface (January 26, 2001)
Making the Nation Safer: The Role of Science and Technology in Countering Terrorism

NRC Policy Study released June 25, 2002

- **Predict**: Intelligence and surveillance of targets and means
- **Prevent**: Disrupt networks, contain threats
- **Protect**: Harden targets, immunize populations
- **Interdict**: Frustrate attacks, manage crisis
- **Response & Recovery**: Mitigate damage, expedite cleanup
- **Attribute**: Identify attacker to facilitate response

Source: Downey, TRB Annual Meeting 2003
Making the Nation Safer

General Strategies and Research Needs

• Biological  Research, prepare, distribute response to pathogens
• Chemical/Explosives  Sensors & filters
• Info Technology  Network security/ER communications
• Energy  SCADA controls/adaptive grid/vulnerabilities
• Cities/Infrastructure  Emergency responder support
• Transportation  Layered system security
• People  Trusted spokespersons
• Complex Systems  Data fusion/data mining/red-teaming
• Cross-Cutting Technology  Sensors/robots/SCADAs/systems analysis
• Deployment  Homeland Security Institute, Partnerships among feds/states/locals/universities
• Nuclear  Control weapons & materials at source

Source: Downey, TRB Annual Meeting 2003
Advisors to the Nation

The National Academies perform an unparalleled public service by bringing together committees of experts in all areas of scientific and technological endeavor. These experts serve *pro bono* to address critical national issues and give advice to the federal government and the public.
Mission of the National Research Council

The National Research Council serves as the “Operating Arm” of The National Academies to:

- Provide authoritative, unbiased advice on issues involving science, technology, and medicine based on scientific facts, not opinion
- Assess the state of current understanding that helps to illuminate public policy decision making
- Survey the broad possibilities of science, engineering, and medicine
- Direct the attention of scientific and technical communities to the value of their knowledge to the achievement of national goals
- Promote cooperation in research, at home and abroad
- Broadly disseminate its work
Ongoing Hazard and Security Activities at The National Academies

–Critical Infrastructure Roundtable
–Disasters Roundtable
–Government-University-Industry Research Roundtable
–Committee on Law and Justice
–Research Associateship Program
–TIGER Committee (Technology Insight – Gauge, Evaluate, and Review)
–Improving Cybersecurity Research in the United States
–The Forum on Microbial Threats
–Microbial Threats to Health—Emergence, Detection, and Response
–Biological Threats and Terrorism
–Pandemic Influenza Research Gaps
–Measures to Enhance the Effectiveness of CDC Quarantine Station Expansion Plans for US Ports of Entry
–Technologies for Transportation Security
–Committee on Critical Transportation Infrastructure Protection
–Radiation Source Use and Replacements
–Committee on Biodefense Analysis and Countermeasures
–The Role of Naval Forces in the Global War on Terror
–News & Terrorism: Communicating in a Crisis
–Committee on Operational Science and Technology Options for Defeating IEDs
Standing Boards and Committees: Division on Engineering and Physical Sciences (DEPS)

Government Missions
Space and Aerospace:
  Aeronautics and Space Engineering Board (ASEB)
  Space Studies Board (SSB)
Defense:
  Air Force Science and Technology Board (AFSTB)
  Board on Army Science and Technology (BAST)
  Naval Studies Board (NSB)

National Infrastructure
  Board on Energy and Environmental Systems (BEES)
  Board on Infrastructure and the Constructed Environment (BICE)
  Computer Science and Telecommunications Board (CSTB)
  Board on Manufacturing and Engineering Design (BMED)

Disciplinary Programs
  Board on Mathematical Sciences & Applications (BMSA)
  Board on Physics and Astronomy (BPA)
  National Materials Advisory Board (NMAB)

Continuing Program Assessment
  Army Research Lab Technical Assessment Board (ARLTAB)
  Board on Assessment of Nat’l Institute of Standards & Technology Prog. (NIST)
Key Hazard and Security Activities in Scoping or in Progress at The National Academies

- Review of the Department of Homeland Security’s Approach to Risk Analysis
- Assessing Fundamental Attitudes of Life Scientists as a Basis for Biosecurity Education
- Committee on Disaster Research in the Social Sciences
- Government-University-Industry Workshop on Sensitive but Unclassified Information
- Whither Biometrics?
- Improving Cybersecurity Research in the United States
- Technical and Privacy Dimensions of Information for Terrorism Prevention and Other National Goals
- Committee on Basic Research for Countering IEDs
- Assessment of Maintenance Costs for Explosive Detection Systems
- Assessment of Security Technologies for Transportation
- Systems Approach to Building Security Into the Transportation System
- Effective Screening Methods
- Dual Use Technologies & Processes
- Risk-based Routing Decisions for Hazardous Materials
- Counter IED Experimentation, Testing and Evaluation: Responding to a Dynamic Operational Environment
- Forum on Medical and Public Health Preparedness
Key Hazard and Security Activities in Scoping or in Progress at The National Academies (cont.)

–Role of Public Transportation in Emergency Evacuation
–Private Sector Input into Design of DHS’s National Program of Exercises
–Enhancing the Robustness and Resilience of Future Electric Transmission and Distribution in the United States
–Testing and Evaluation of Biological Stand-off Detection Systems
–Protecting Occupants of DOD Buildings from Chemical or Biological Release
–Full System Testing and Evaluation of Personal Protective Equipment Ensembles in Simulated Chemical and Biological Warfare Environments
–Units of Measure for Biological Material in the Testing and Evaluation of Aerosol Detection Systems
–Committee on a New Government-University Partnership for Science and Security
–Medical Isotope Production Without Highly Enriched Uranium
–New Methods for Understanding Systemic Risk in the Financial Sector: Summary of a Workshop
–Interim Report on the Methodology for DHS Bioterrorism Risk Analysis
–Evaluation of the Methodology for DHS Bioterrorism Risk Analysis
–Statistics on Networks: Proceedings of a Workshop
–Strengthening Forensic Science in the United States
Programs of The National Academies Attract Broad Participation and Support

Revenue Applied to 2007: $243 million

- Department of Transportation: 25%
- National Science Foundation: 7%
- Department of Defense: 14%
- Department of Health and Human Services: 6%
- Grants and Contracts: 8%
- Other Contributions: 19%
- National Aeronautics and Space Administration: 6%
- Department of Energy: 3%
- Department of Commerce: 2%
- Environmental Protection Agency: 2%
- US Agency for International Development: 2%
- Department of Veterans Affairs: 2%
- Social Security Administration: 1%
- Department of the Interior: 1%
- Department of Education: 1%
Source: Englot, PANY&NJ, 2004

An Infrastructure Owner’s View of a Layered, Integrated Security System

- Structural Hardening to Survive Threat (Engineered)
- Physical Denial/Barrier (Eng)
- Facility Screening/Intrusion Detection (Operations)
- State/Local Law Enforcement
- DHS – Weapons/Explosives/Bio Chemical Tracking/Control
- DHS – Global Intelligence
- DHS – Immigration
- Facility Screening/Intrusion Detection (Operations)
- Physical Denial/Barrier (Eng.)

Target
Damage
Facility
1. **Safety first**: build on the successful experience of the systems approach, and extend the mission of existing safety personnel

2. **Build on DOT expertise in response**: urban areas work with law enforcement, fire, rescue, and towing and recovery on traffic incident management; statewide presence with emergency contracting, equipment (e.g., communications systems), personnel, and common response to weather emergencies; trained to observe and report

3. **Build on transit expertise in security**: in urban areas parallel size and location of high-value infrastructure; invested; bring expertise on policing and security; trained to observe and report

4. **Make interdependence an asset**: transportation depends on, and is depended on, by other critical infrastructures; roads and transit are publicly owned and managed, and house public involvement experts
**Six Goals for Transportation Security**

1. **Social**: Involve the public—make pre-operational surveillance riskier
2. **Budget & Policy**: Make risk-informed decisions the norm
3. **Technical**: focus on countermeasures & design (instead of vulnerabilities & threats) with dual benefits
4. **Operational**: quick, layered response with effective surge capability
5. **Psychological**:
   - for the public, peace of mind/acceptance of risk: security ≈ satisfaction
   - for the attack planner, transportation is a difficult target, prepare more or attack something easier
6. **Intelligence**: Support police/military/intelligence by having trained transportation employees report suspicious activities and by making the bad guys stretch out their planning time

**Desired Outcome**

*Mainstreaming* an integrated, high level, all-hazard, National Incident Management System (NIMS)-responsive, multimodal risk management process into major transportation agency programs and activities
TRB is Broadly Engaged in Hazards and Security

Transportation Research Board

- Technical Activities
  - Cmte on Critical Transp. Infrastructure Protection
- Administration and Finance

Policy Studies
- IDEA & Countering Terrorism
  - Panel on Transportation

Strategic Highway Research Program II

Cooperative Research Programs
- National Cooperative Highway Research Program
- Transit Cooperative Research Program
- Airport Cooperative Research Program
- National Cooperative Freight Research Program
- Hazardous Materials Cooperative Research Program
- Commercial Truck and Bus Safety Synthesis Program
Transportation Research Board
Communications and Outreach

• TR News magazine
• Weekly newsletter
• Open calls for papers
• Open solicitations for
  - Research problems
  - Project proposals
  - IDEA proposals
  - Panel nominations
• Interactive Annual Meeting program

November-December 2000

May-June 2007

March –April 2004

May-June 2005

www.TRB.org
TRB Mission Statement

To provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal.

1920: Advisory Board on Highway Research
1924: renamed Highway Research Board
1974: renamed Transportation Research Board

TRB Today
TRB 2007: 78 Sponsors and Sustaining Affiliates

- State Transportation Departments
- U.S. Department of Transportation
  - Federal Aviation Administration
  - Federal Highway Administration
  - Federal Motor Carrier Safety Administration
  - Federal Railroad Administration
  - Federal Transit Administration
  - National Highway Traffic Safety Administration
  - Research and Innovative Technology Administration
- Bureau of Indian Affairs, U.S. Department of the Interior
- National Aeronautics and Space Administration
- U.S. Army Corps of Engineers
- U.S. Coast Guard

- 105 Organizational Affiliates from 16 Nations
- More than 2,800 Individual Affiliates
In Progress
– Assessment of Security Technologies for Transportation (National Materials Advisory Board, lead)
– Role of Public Transportation in Emergency Evacuation

Scoping Activities
– Systems Approach to Building Security Into the Transportation System
– Private Sector Input into Design of DHS National Program of Exercises
Transportation Research Information Services (TRIS) Database—World’s Largest

http://ntl.bts.gov/tris

Research In Progress (RiP) Database

Research Needs Statements Database http://rns.trb.org/
Policy and Applied Research Audiences Differ

Applied research is developed through cooperative programs to provide tools, guides, and resources to owners and operators of transportation infrastructure.

Research program guidance and policy advice are provided to Legislative and Executive branches upon request.
Transportation Modes & Disciplines Addressed by TRB Standing Committees

Modes
- Highways
- Public Transportation
- Freight Systems
- Rail
- Air
- Marine
- Non-Motorized

Disciplines
- Policy and Organization
- Planning & Environment
- Design & Construction
- Operations & Maintenance
- Safety & Systems Users
- Legal Resources
Committee on Critical Transportation Infrastructure Protection: One of 200-plus TRB Standing Committees

More than 10,000 attendees will see more than 3,000 presentations as they participate in 600 sessions of the Transportation Research Board Annual Meeting held every January in Washington, D.C.


THE SOUNDS OF SCIENCE PODCAST FROM THE NATIONAL ACADEMIES

This informative and entertaining weekly series of audio podcasts puts the spotlight on the high-impact work of the National Academies. Focusing on a wide range of critical issues in science, engineering, and medicine, these short 10-minute episodes are a quick and easy way to tune in to all the key findings and important recommendations made by the Academies.

http://media.nap.edu/podcasts/
Cooperative Research Programs at the Transportation Research Board

- National Cooperative Highway Research Program (NCHRP) – 1962
  American Association of State Highway and Transportation Officials (AASHTO)
- Transit Cooperative Research Program (TCRP) – 1992
  Federal Transit Administration
- Commercial Truck and Bus Safety Synthesis Program – 2001
  Federal Motor Carrier Safety Administration
- Airport Cooperative Research Program (ACRP) – 2005
  Federal Aviation Administration
- Strategic Highway Research Program II (SHRP II) – 2005
  Federal Highway Administration in association with AASHTO
- National Cooperative Freight Research Program (NCFRP) – 2006
  Research and Innovative Technology Administration
  Pipeline and Hazardous Materials Safety Administration
Continuous Development of Risk Management and Emergency Response Planning Guidance

2002: Guides to Vulnerability Assessment & Emergency Response Planning
2002-2003: workshops
2004-2005: publications that anticipated NIMS, NRP, and NIPP.
2008-2009: publications for balloting by AASHTO

2008
A Guide to Risk Management of Multimodal Transportation Infrastructure
(NCHRP Project 20-59(17))

2009 (anticipated)
A Guide to Emergency Response Planning at State Transportation Agencies
(NCHRP Project 20-59(23))
Innovations Deserving Exploratory Analysis (IDEA)

Eight Transit IDEA projects address security; five have been completed.

January 6, 2006, presentation on Transit IDEA Project 45, Chemical and Biological Decontamination System for Rail Transit Facilities (completed January 2007).
Cooperative Research Security Projects Authorized: 97
—Projects in Development or Contracts Pending: 7
—Projects in Progress: 18
—Projects Completed: 72
Go to www.TRB.org/SecurityPubs for live links to Transportation Research Board documents

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Transportation Security: A Summary of Transportation Research Board Activities
9/19/2008
A slideshow summary of the Transportation Research Board's pre- and post-September 11 security activities is updated monthly. [More]

Cooperative Research Programs Security Research Status Report
9/19/2008
TRB's Cooperative Research Program produces a table summarizing more than 80 security and emergency preparedness projects representing over $11 million in the contract research programs for state departments of transportation and the public transportation industry. Updated monthly. [More]

Transportation Security; Emergency Response and Recovery 2008
8/13/2008
TRB's Transportation Research Record: Journal of the Transportation Research Board, No. 2041 includes 10 papers that explore reliability and security in transportation networks, intergovernmental cooperation in the conduct of a local...

Bridge/Tunnel/Highway Infrastructure Vulnerability Workshops February-March 2003
1. Sacramento, California
2. Albany, New York
3. Austin, Texas

http://security.transportation.org/?siteid=65&pageid=1363
http://security.transportation.org/sites/security/docs/guide-VA_Appendices.pdf
CONTRACTOR’S FINAL REPORT

A Guide to Updating Highway Emergency Response Plans for Terrorist Incidents

Examples of Different Communications Systems to Achieve Redundancy

- Statewide land-mobile radio communication systems
- State microwave telephone systems
- Satellite information systems
- Public telephone systems and facsimile operations
- Cellular telephone systems
- Vehicle scanners
- Auxiliary radio system
- Emergency radio system
- Computer systems
- Two-way direct-connect communications, e.g., NEXTEL, and two-way pagers
- Internet communications
- High priority telephone service for government agencies. For example:

Table 1: Program of Commitments

**COMMIT** to a program that enables the public transportation system to:

- **PREVENT** incidents within its control and responsibility, effectively protect critical assets;
- **RESPOND** decisively to events that cannot be prevented, mitigate loss, and protect employees, passengers, and emergency responders;
- **SUPPORT** response to events that impact local communities, integrating equipment and capabilities seamlessly into the total effort; and
- **RECOVER** from major events, taking full advantage of available resources and programs.
“Blue Ribbon Panel on Bridge and Tunnel Security” report presented institutional, fiscal, and technical recommendations

http://www.fhwa.dot.gov/bridge/security/brpcover.htm
CRP Research Anticipated National Incident Management System Requirements (and National Infrastructure Protection Plan)

Four Overlapping Phases of NIMS Adoption

First Phase: Initial Staff Training: Complete EMI Course – NIMS, An Introduction

Second Phase: Evaluation of Existing Plans, Policies, and Procedures

Third Phase: Modification of Existing Plans, Procedures, and Policies

Fourth Phase: Verify Achievement of NIMS Integration Center Standards

- Certification and Credentialing
- Conducting Exercises

Source: NIMS Implementation Plan Template, 30 December 2004
## Cooperative Research to be Consolidated 2008-09

### AASHTO Committees Expected to Adopt and Maintain Flagships

**Operations**

<table>
<thead>
<tr>
<th>Guide/Volume/Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-59(23) Guide to Emergency Management at State Transportation Agencies</td>
</tr>
<tr>
<td>NCHRP 525, Vol. 6: Guide for Emergency Transportation Operations (ETO)</td>
</tr>
<tr>
<td>TCRP 86, Vol. 11: Security Measures for Ferry Systems</td>
</tr>
<tr>
<td>NCHRP 525, Vol. 10: A Guide to Transportation’s Role in Public Health Disasters</td>
</tr>
<tr>
<td>NCHRP 525/TCRP 86, Vol. 9: Guidelines for Transportation Emergency Training Exercises</td>
</tr>
<tr>
<td>NCHRP 525/TCRP 86, Vol. 8: Continuity of Operations (COOP) Planning Guidelines for Transportation Agencies</td>
</tr>
</tbody>
</table>

**Infrastructure**

<table>
<thead>
<tr>
<th>Guide/Volume/Title</th>
</tr>
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<tbody>
<tr>
<td>20-59(17) Guide to Risk Management of Multimodal Transportation Infrastructure</td>
</tr>
<tr>
<td>NCHRP 525, Vol. 11: Disruption Impact Estimating Tool—Transportation (DIETT): A Tool for Prioritizing High-Value Transportation Choke Points</td>
</tr>
<tr>
<td>NCHRP 525/TCRP 86, Vol. 12: Making Transportation Tunnels Safe and Secure</td>
</tr>
</tbody>
</table>
National Cooperative Highway Research Program

Report 525, Volume

13  A Guide to Traffic Control of Rural Roads in an Agricultural Emergency
12  Making Transportation Tunnels Safe and Secure
11  Disruption Impact Estimating Tool—Transportation (DIETT): A Tool for Prioritizing High-Value Transportation Choke Points
10  A Guide to Transportation's Role in Public Health Disasters
  9  Guidelines for Transportation Emergency Training Exercises
  8  Continuity of Operations (COOP) Planning Guidelines for Transportation Agencies
  7  System Security Awareness Training for Transportation Employees—CD
  6  Guide for Emergency Transportation Operations
  5  Guidance for Transportation Agencies on Managing Sensitive Information
  4  A Self-Study Course on Terrorism-Related Risk Management of Highway Infrastructure
  3  Incorporating Security into the Transportation Planning Process
  2  Information Sharing and Analysis Centers: Overview and Supporting Software Features
  1  Responding to Threats: A Field Personnel Manual
Transit Cooperative Research Program

Report 86, Volume

12 Making Transportation Tunnels Safe and Secure
11 Security Measures for Ferry Systems
10 Hazard and Security Plan Workshop: Instructor Guide
9 Guidelines for Transportation Emergency Training Exercises
8 Continuity of Operations (COOP) Planning Guidelines for Transportation Agencies
7 Public Transportation Emergency Mobilization and Emergency Operations Guide
6 Applicability of Portable Explosive Detection Devices in Transit Environments
5 Security-Related Customer Communications and Training for Public Transportation Providers
4 Intrusion Detection for Public Transportation Facilities Handbook
3 Robotic Devices for the Transit Environment
2 K9 Units in Public Transportation: A Guide for Decision Makers
1 Communication of Threats: A Guide

Legal Research Digest 22: The Case for Searches on Public Transportation

New IDEAs for Transit: Annual Report of the Transit IDEA Program
Projects Delivered to Others or Publication Pending

Completed, Delivered to Others

- Scan: Tools for Prioritizing Anti-Terrorist Security Measures
- White Paper on Decontamination Procedures
- White Paper on Technology Clearinghouse
- Transit Security Roundtables and International Conference
- *Blue Ribbon Panel on Bridge and Tunnel Security*
- Emergency Response Workshops
- *Vulnerability Assessment Workshops*
- A Guide to Updating Highway *Emergency Response Plans for Terrorist Incidents*
- A Guide to Highway Vulnerability Assessment for *Critical Asset Identification and Protection*
- National Needs Assessment for Ensuring Transportation *Infrastructure Security*
- Peer Review of Disaster *Response Issues in Transportation Planning*
- Transportation Security *Research Plan*
- Strategic Assessment of Wireless Capabilities/Needs for Transit
- Fundamentals of All Hazards & Security Management for State DOTs
- Safety and Security in Roadway Tunnels

Completed, Publication Pending

- Costing Asset Protection: An All Hazards Guide for Transportation Agencies
- Security 101: *Physical Security Standards* and Guidelines
- An Airport Guide for Regional Emergency Planning for CBRNE Events
Current Cooperative Research Program Security Projects

- A Guide to Transportation and Hazards Resources  
- Blast-Resistant Highway Bridges: Design/Detailing Guidelines  
  Final report due: Nov. 2008
- Emergency Evacuation & Repopulation  
  Final report due: Dec. 2008
- Guide to Emergency Response Planning at State Transp. Agencies  
  Final report due: Jan. 2009
- Airport & Air Carrier Manual: Employees Coping with Traumatic Events  
  Final report due: Jan. 2009
- Managing Transportation Emergencies CD-ROM  
- Emerging Technologies Applicable to HazMat Transp. Safety/Security  
  Final report due: Mar. 2009
  Final report due: Sept. 2009
- Exercising Command-Level Decn Mkg for Critical Incidents at Airports  

In development/contract pending

- Transportation Security Research Implementation Plan
- Role of Transportation in the Incident Command System Structure & the National Incident Management System Structure
- Co-Location of Emergency Operations Centers/Intelligent Transportation Centers
- All Hazards Emergency Evacuation Guide for State DOTs
- Pre-Planned Recovery and Accepted Practices for Replacement of Transportation Infrastructure
- Economic Implications of Loss of Transportation Infrastructure
<table>
<thead>
<tr>
<th>Disease / Reference</th>
<th>Symptoms in Early Stage (prodromal stage)</th>
<th>Symptoms for Full blown Disease (Incubation stage)</th>
<th>Isolation Period (average and range for 95% of cases)</th>
<th>Mechanisms of Contagion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza A/B</td>
<td>Malaise, sore throat, loss of appetite, no fever, cough, and wheezing.</td>
<td>Abnormal gray appearance from overexpression of the coronavirus and adenovirus.</td>
<td>5-7 days (range 1-10 days).</td>
<td>Direct person-to-person transmission by indirect respiratory and physical contact. Contaminated fomites important in transmission.</td>
</tr>
<tr>
<td>Pneumonia TB</td>
<td>Prolonged recurrent fever, chronic cough, pain, night sweats, and weight loss.</td>
<td>Coughing blood from the lungs, chronic obstructive pulmonary disease, abnormal weighting and enlarged of the respiratory passages caused by mucus blockage. Fluid in the lungs.</td>
<td>Average incubation period 21 weeks, 95% of cases within 10-17 weeks.</td>
<td>Airborne route, extended period of close contact.</td>
</tr>
<tr>
<td>Cholera</td>
<td>&lt;20% of cholera patients will show any symptoms before first stool of disease.</td>
<td>Diarrhea, vomiting, nausea, and fever.</td>
<td>Short incubation period, from less than one day to five days.</td>
<td>Abnormal stool examination. Excessive virus in stools.</td>
</tr>
<tr>
<td>Salmonella</td>
<td>Diarrhea, bloody diarrhea, cramps, dehydration, and fever.</td>
<td>Abnormal fecal examination. Diarrhea in 1-3 days.</td>
<td>Incubation period averages about 12 to 14 days but range from 6 to 7 days.</td>
<td>Characteristic stools, which may contain bloody stool.</td>
</tr>
<tr>
<td>Hepatitis A/B</td>
<td>Fever, jaundice, nausea, or abdominal pain.</td>
<td>Abnormal liver function tests.</td>
<td>Spread by ingestion of food and water.</td>
<td>Characteristic stools which may contain bloody stool.</td>
</tr>
<tr>
<td>Yersinia Pestis</td>
<td>Fever, chills, headache, muscle aches, and vomiting.</td>
<td>Abnormal liver function tests.</td>
<td>Short incubation period, from less than one day to five days.</td>
<td>Characteristic stools which may contain bloody stool.</td>
</tr>
</tbody>
</table>

### APPENDIX A: CDC DISEASE QUARANTINES

- **Measles**: Airborne route, extended period of close contact.
- **Chickenpox**: Airborne route, extended period of close contact.
- **Poliomyelitis**: Airborne route, extended period of close contact.
- **Rubella**: Airborne route, extended period of close contact.
- **Typhoid Fever**: Airborne route, extended period of close contact.
- **Brucellosis**: Airborne route, extended period of close contact.
- **Tuberculosis**: Airborne route, extended period of close contact.
- **Saramonic**: Airborne route, extended period of close contact.
- **Kuru**: Airborne route, extended period of close contact.
- **Acquired Immunodeficiency Syndrome**: Airborne route, extended period of close contact.
- **Rubella**: Airborne route, extended period of close contact.
- **Mumps**: Airborne route, extended period of close contact.
- **Varicella Zoster**: Airborne route, extended period of close contact.
- **Leprosy**: Airborne route, extended period of close contact.
- **Yersinia Pestis**: Airborne route, extended period of close contact.
- **Plague**: Airborne route, extended period of close contact.
- **Tularemia**: Airborne route, extended period of close contact.
- **Brucellosis**: Airborne route, extended period of close contact.
- **Coxiella Burnetii**: Airborne route, extended period of close contact.
- **Q Fever**: Airborne route, extended period of close contact.
- **Relapsing Fever**: Airborne route, extended period of close contact.
- **Borreliosis**: Airborne route, extended period of close contact.
- **Borreliosis**: Airborne route, extended period of close contact.
- **Lyme Disease**: Airborne route, extended period of close contact.
- **Rickettsiosis**: Airborne route, extended period of close contact.
- **Sandfly Fever**: Airborne route, extended period of close contact.
- **Malaria**: Airborne route, extended period of close contact.
- **Yellow Fever**: Airborne route, extended period of close contact.
- **Typhus**: Airborne route, extended period of close contact.
- **Tickborne Encephalitis**: Airborne route, extended period of close contact.
- **Hantavirus Pulmonary Syndrome**: Airborne route, extended period of close contact.
- **Borreliosis**: Airborne route, extended period of close contact.
- **Borreliosis**: Airborne route, extended period of close contact.
- **Lyme Disease**: Airborne route, extended period of close contact.
- **Rickettsiosis**: Airborne route, extended period of close contact.
- **Sandfly Fever**: Airborne route, extended period of close contact.
- **Malaria**: Airborne route, extended period of close contact.
- **Yellow Fever**: Airborne route, extended period of close contact.
- **Typhus**: Airborne route, extended period of close contact.
- **Tickborne Encephalitis**: Airborne route, extended period of close contact.
- **Hantavirus Pulmonary Syndrome**: Airborne route, extended period of close contact.
- **Borreliosis**: Airborne route, extended period of close contact.
- **Borreliosis**: Airborne route, extended period of close contact.
- **Lyme Disease**: Airborne route, extended period of close contact.
- **Rickettsiosis**: Airborne route, extended period of close contact.
- **Sandfly Fever**: Airborne route, extended period of close contact.
- **Malaria**: Airborne route, extended period of close contact.
- **Yellow Fever**: Airborne route, extended period of close contact.
- **Typhus**: Airborne route, extended period of close contact.
- **Tickborne Encephalitis**: Airborne route, extended period of close contact.
- **Hantavirus Pulmonary Syndrome**: Airborne route, extended period of close contact.
- **Borreliosis**: Airborne route, extended period of close contact.
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- **Lyme Disease**: Airborne route, extended period of close contact.
- **Rickettsiosis**: Airborne route, extended period of close contact.
- **Sandfly Fever**: Airborne route, extended period of close contact.
- **Malaria**: Airborne route, extended period of close contact.
- **Yellow Fever**: Airborne route, extended period of close contact.
- **Typhus**: Airborne route, extended period of close contact.
- **Tickborne Encephalitis**: Airborne route, extended period of close contact.
- **Hantavirus Pulmonary Syndrome**: Airborne route, extended period of close contact.
- **Borreliosis**: Airborne route, extended period of close contact.
- **Borreliosis**: Airborne route, extended period of close contact.
- **Lyme Disease**: Airborne route, extended period of close contact.
- **Rickettsiosis**: Airborne route, extended period of close contact.
- **Sandfly Fever**: Airborne route, extended period of close contact.
Table 7. Mitigation measures.

<table>
<thead>
<tr>
<th>Mitigation of intrusion</th>
<th>Mitigation of privacy concerns</th>
<th>Mitigation of claims with respect to unreasonable detention, etc.</th>
<th>Mitigation of health risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral assessments</td>
<td>Same as for intrusion.</td>
<td>Same as for intrusion.</td>
<td>N/A</td>
</tr>
<tr>
<td>Radiation detection</td>
<td>Not a primary risk.</td>
<td>Require positive results to treat cause for suspicion, not evidence of guilt, and process accordingly in conducting secondary screening.</td>
<td>Not a primary risk.</td>
</tr>
<tr>
<td>Trace detector</td>
<td>Not a primary risk.</td>
<td>Require positive results to treat cause for suspicion, not evidence of guilt, and process accordingly in conducting secondary screening.</td>
<td>Not a primary risk.</td>
</tr>
<tr>
<td>Explosives detection</td>
<td>Not a primary risk.</td>
<td>Require positive results to treat cause for suspicion, not evidence of guilt, and process accordingly in conducting secondary screening.</td>
<td>Not a primary risk.</td>
</tr>
<tr>
<td>Visual physical</td>
<td>Not a primary risk.</td>
<td>Require positive results to treat cause for suspicion, not evidence of guilt, and process accordingly in conducting secondary screening.</td>
<td>Not a primary risk.</td>
</tr>
<tr>
<td>Handheld trace detector</td>
<td>Not a primary risk.</td>
<td>Require positive results to treat cause for suspicion, not evidence of guilt, and process accordingly in conducting secondary screening.</td>
<td>Not a primary risk.</td>
</tr>
<tr>
<td>Handheld magnetometers</td>
<td>Not a primary risk.</td>
<td>Require positive results to treat cause for suspicion, not evidence of guilt, and process accordingly in conducting secondary screening.</td>
<td>Not a primary risk.</td>
</tr>
<tr>
<td>Backscatter X-ray</td>
<td>Conceal sensitive body areas or reduce image details. Also ensure that images are not displayed in a manner that the inspector cannot see them.</td>
<td>Require positive results to treat cause for suspicion, not evidence of guilt, and process accordingly in conducting secondary screening.</td>
<td>Not a primary risk.</td>
</tr>
<tr>
<td>Millimeter wave</td>
<td>Not a primary risk.</td>
<td>Require positive results to treat cause for suspicion, not evidence of guilt, and process accordingly in conducting secondary screening.</td>
<td>Not a primary risk.</td>
</tr>
<tr>
<td>Puffer portal</td>
<td>Not a primary risk.</td>
<td>Require positive results to treat cause for suspicion, not evidence of guilt, and process accordingly in conducting secondary screening.</td>
<td>Not a primary risk.</td>
</tr>
<tr>
<td>Baggage X-ray</td>
<td>Not a primary risk.</td>
<td>Require positive results to treat cause for suspicion, not evidence of guilt, and process accordingly in conducting secondary screening.</td>
<td>Not a primary risk.</td>
</tr>
<tr>
<td>Z backscatter van</td>
<td>Not a primary risk.</td>
<td>Require positive results to treat cause for suspicion, not evidence of guilt, and process accordingly in conducting secondary screening.</td>
<td>Not a primary risk.</td>
</tr>
</tbody>
</table>

Includes measures for:
1. Mitigation of intrusion
2. Mitigation of privacy concerns
3. Mitigation of claims with respect to unreasonable detention, etc.
4. Mitigation of health risks
Table 72. How countermeasures deter, detect, and respond to hazards and threats.

<table>
<thead>
<tr>
<th>Deterrence</th>
<th>Detection</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational Tactics</td>
<td>Operational Tactics</td>
<td>Operational Tactics</td>
</tr>
<tr>
<td>- Roving patrols</td>
<td>- Intelligence</td>
<td>- Command and control (multi-tenant)</td>
</tr>
<tr>
<td>- Bomb-sniffing dogs</td>
<td>- Security awareness training of operating and maintenance personnel</td>
<td>- Evacuation protocol</td>
</tr>
<tr>
<td>- Background checks of employees and contractors</td>
<td>- Roving patrols</td>
<td>- Information sharing</td>
</tr>
<tr>
<td>- Background checks of facility vendors</td>
<td>- Guards at entry points</td>
<td>- Tunnel ventilation</td>
</tr>
<tr>
<td>- Access control</td>
<td>- Bombing-sniffing dogs</td>
<td>- Portable fire extinguishers</td>
</tr>
<tr>
<td>- Credentialing and identification card system</td>
<td>- Identification card system</td>
<td></td>
</tr>
<tr>
<td>- Guards at entry points</td>
<td>- Inspections</td>
<td></td>
</tr>
<tr>
<td>- Intelligence</td>
<td>- System integration</td>
<td></td>
</tr>
<tr>
<td>- Hazardous material restriction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Inspections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- CCTV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Intrusion detectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- System integration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Blast design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Elimination of hidden corners, alcoves, and shelves</td>
<td>- Chemical/biological/radiological detectors</td>
<td></td>
</tr>
<tr>
<td>- Open, unimpeded lines of sight</td>
<td>- Seismic/stress detectors</td>
<td></td>
</tr>
<tr>
<td>- Lighting</td>
<td>- Mobile monitoring</td>
<td></td>
</tr>
<tr>
<td>- Locked facility doors</td>
<td>- Explosive detectors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- System integration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Fire detection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 1. Categorization of GSMS. (General Security Measures)

<table>
<thead>
<tr>
<th>GSM Categories and Sub-Categories</th>
<th># of GSMS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fencing/Barriers</strong></td>
<td></td>
</tr>
<tr>
<td>Retractable vehicle barriers/gates</td>
<td>5</td>
</tr>
<tr>
<td>Fixed vehicle deterrent with pedestrian access</td>
<td>4</td>
</tr>
<tr>
<td>Fixed, both vehicle and pedestrian deterrent</td>
<td>5</td>
</tr>
<tr>
<td><strong>Access Control</strong></td>
<td></td>
</tr>
<tr>
<td>Credentials</td>
<td>13</td>
</tr>
<tr>
<td>Locks</td>
<td>3</td>
</tr>
<tr>
<td>System Control</td>
<td>3</td>
</tr>
<tr>
<td><strong>Intruder Sensors</strong></td>
<td></td>
</tr>
<tr>
<td>Perimeter (doors &amp; windows, walls &amp; fences, and buried)</td>
<td>13</td>
</tr>
<tr>
<td>Volume sensors – motion detectors</td>
<td>9</td>
</tr>
<tr>
<td><strong>Monitoring</strong></td>
<td></td>
</tr>
<tr>
<td>Lighting</td>
<td>3</td>
</tr>
<tr>
<td>CCTV/video</td>
<td>7</td>
</tr>
<tr>
<td><strong>Procedural/Low Cost</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>Waterside Security</strong></td>
<td></td>
</tr>
<tr>
<td>Surface</td>
<td>4</td>
</tr>
<tr>
<td>Underwater</td>
<td>5</td>
</tr>
<tr>
<td><strong>Screening</strong></td>
<td></td>
</tr>
<tr>
<td>Passengers and Cargo</td>
<td>7</td>
</tr>
<tr>
<td>Trace Detection</td>
<td>14</td>
</tr>
<tr>
<td><strong>Human Observation</strong></td>
<td></td>
</tr>
<tr>
<td>All Areas</td>
<td>3</td>
</tr>
<tr>
<td>Waterside</td>
<td>2</td>
</tr>
</tbody>
</table>
Highways, rail, and waterway choke points
Key variable: Impact on commercial shipments
Prioritize on net national economic impacts
Excludes replacement costs & collateral damage

- Transportation response options to an extreme event with chemical, biological, or radiological agents
- Focuses on the effect and role of transportation
- Applicable to all civilian sites (not just transportation sites)

**TERET (Tracking Emergency Response Effects on Transportation) – Spreadsheet Layout**

**Sheet 1: Introduction**
Provides summary instructions

**Sheet 2: Basic Services**
Assess criticalities that may develop from ER changes in traffic patterns.

**Sheet 3: Mass Care**
Assess needs during shelter-in-place, temporary shelters, or quarantine shelter.

Hazard and Security Planning Tools for Rural, Small Urban, and Community-Based Public Transportation Operations
<table>
<thead>
<tr>
<th>Naturally Occurring</th>
<th>Human-Caused</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intentional</td>
</tr>
<tr>
<td>Droughts</td>
<td>Bomb Threats and Other Threats of Violence</td>
</tr>
<tr>
<td>Dust/Wind Storms</td>
<td>Disruption of Supply Sources</td>
</tr>
<tr>
<td>Earthquakes</td>
<td>Fire/Arsenal</td>
</tr>
<tr>
<td>Electrical Storms</td>
<td>Fraud/Embezzlement</td>
</tr>
<tr>
<td>Floods</td>
<td>Labor Disputes/Strikes</td>
</tr>
<tr>
<td>High Winds</td>
<td>Misuse of Resources</td>
</tr>
<tr>
<td>Hurricanes</td>
<td>Riot/Civil Disorder</td>
</tr>
<tr>
<td>Ice Storms</td>
<td>Sabotage: External and Internal Actors</td>
</tr>
<tr>
<td>Landslides</td>
<td>Security Breaches</td>
</tr>
<tr>
<td>Naturally Occurring</td>
<td>Terrorist Assaults Using Chemical, Biological, Radiological, or Nuclear Agents</td>
</tr>
<tr>
<td>Epidemics</td>
<td>Terrorist Assaults Using Explosives, Firearms, or Conventional Weapons</td>
</tr>
<tr>
<td>Snowstorms and</td>
<td>Theft</td>
</tr>
<tr>
<td>Blizzards</td>
<td>Vandalism</td>
</tr>
<tr>
<td>Tornadoes</td>
<td>War</td>
</tr>
<tr>
<td>Tropical Storms</td>
<td>Workplace Violence</td>
</tr>
<tr>
<td>Tsunamis</td>
<td></td>
</tr>
<tr>
<td>Typhoons</td>
<td></td>
</tr>
<tr>
<td>Wildfires</td>
<td></td>
</tr>
</tbody>
</table>
Guidelines for Transportation Emergency Training Exercises

- Guidelines, resource CD-ROM and templates for developing a Progressive Exercise Program, compliant with DHS and ODP requirements
- Exercise program must address NIMS requirements and Transit Emergency Response Plan and procedures.
- Moves users through the steps necessary to develop and implement a three-year program.
- Practical emphasis on affordable exercises, cost sharing, and grant opportunities.
Survey results: State DOT emergencies most likely to require COOP activation
Survey results: Transit agency events most likely to require COOP activation
Overview of NIMS/NRP requirements.

Updated discussion regarding new threats to transportation agencies:
- Chronology of worldwide incidents.
- Capabilities and intentions of specified terrorist groups.

Guidance for updating Transit Emergency Response Plans.

Recommendations for establishing a Transit Incident Management Organization.

Specialized research and recommendations for mobilizing transit personnel resources to address a range of emergencies, including no-notice evacuations and terrorist events:
- Over all incident management phases: awareness, prevention, preparedness, response and recovery.
- Checklist for response to events indicating WMD agent release.
An interactive CD-ROM training course; also available as train-the-trainer and for direct delivery through the National Transit Institute
Sensitivity of the tested device: 10 nanograms (not to scale)
1. Establishing a Sensitive Information Management Policy, 1
2. Identifying Sensitive Information, 3
3. Controlling Access to Sensitive Information, 5
4. Keys for Success, 10

Appendix A
- Florida DOT’s Exempt Documents and Security System Plan Request Form, A-1

Appendix B
- Texas DOT’s Confidential Safety Information Memorandum, B-1

Appendix C
- Examples of State Legislation to Exempt Selected Sensitive Transportation-Related Information from State “FOIA” Laws, C-1
TCRP Report 86, Vol. 5


2. Overview (PowerPoint presentation)


CD-ROM contains all 4 items
<table>
<thead>
<tr>
<th>Vulnerability Issues</th>
<th>Countermeasures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception</td>
<td>• Demonstrated defense</td>
</tr>
<tr>
<td></td>
<td>• <strong>Deter</strong>: Discourage attacks by visibility of countermeasures</td>
</tr>
<tr>
<td>Ease of Access</td>
<td>• Adjacent land-use</td>
</tr>
<tr>
<td></td>
<td>• Road approach</td>
</tr>
<tr>
<td></td>
<td>• Vessel approach</td>
</tr>
<tr>
<td></td>
<td>• <strong>Deny</strong>: Increase standoff distance from bridge substructure and tunnel</td>
</tr>
<tr>
<td></td>
<td>entrances</td>
</tr>
<tr>
<td>Clear zone</td>
<td>• Adjacent vegetation</td>
</tr>
<tr>
<td></td>
<td>• Adjacent buildings</td>
</tr>
<tr>
<td></td>
<td>• <strong>Dynamic</strong>: Threat-adjustable operational measures (inspections)</td>
</tr>
<tr>
<td>Exposure</td>
<td>• Lighting level</td>
</tr>
<tr>
<td></td>
<td>• Visibility</td>
</tr>
<tr>
<td></td>
<td>• <strong>Detect</strong>: Monitor access to bridge substructure and tunnel portals to</td>
</tr>
<tr>
<td></td>
<td>minimize time on targets</td>
</tr>
<tr>
<td>Time on target</td>
<td>• Detection</td>
</tr>
<tr>
<td></td>
<td>• Response</td>
</tr>
<tr>
<td>Structure</td>
<td>• Scale</td>
</tr>
<tr>
<td></td>
<td>• Specific features</td>
</tr>
<tr>
<td></td>
<td>• <strong>Defend</strong>: Harden key structural elements</td>
</tr>
</tbody>
</table>
Checklist:

☐ Does the lighting system meet the transit agency's established security requirement?
☐ Does the lighting system comply with the local building and safety codes?
☐ Have lighting effects on neighboring buildings or private homes been considered?
☐ Are sufficient portable lighting devices available?
☐ Is there a need for specialized spotlighting or infrared (IR) lighting?
☐ If required, is there adequate backup electrical power to support the lighting system?
☐ Is the lighting system clear of any obstructions within 6-feet (minimum) to 20-feet (ideal)?
☐ Is the lighting system properly secured to prevent removal, displacement, modification or theft?
☐ If required, are there adequate signs or warning devices in the language(s)?
☐ Are procedures in place for routine inspection and maintenance of the hardware?
☐ Have the system operators/maintainers provided sufficient input to the selection of this system?
☐ Are there adequate spare parts to support the system?
☐ Is Point-of-Contact information readily available for the system?
Figure 3. Overview of the transportation planning process in the context of safety (adapted from FHWA, Citizen’s Guide to Transportation Decisionmaking, FHWA EP-01-013, 2001).
<table>
<thead>
<tr>
<th>1</th>
<th>INTRODUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>OVERVIEW</td>
</tr>
<tr>
<td>2</td>
<td>ENVIRONMENTS</td>
</tr>
<tr>
<td></td>
<td>Structures, 2</td>
</tr>
<tr>
<td></td>
<td>Vehicles, 4</td>
</tr>
<tr>
<td></td>
<td>Vehicle Access/Egress, 4</td>
</tr>
<tr>
<td></td>
<td>Vehicle Pathways, Overheads, and Transitions, 6</td>
</tr>
<tr>
<td></td>
<td>Vehicle Special Obstacles, 7</td>
</tr>
<tr>
<td></td>
<td>Roadways and Terrain, 9</td>
</tr>
<tr>
<td></td>
<td>Weather Conditions, 10</td>
</tr>
<tr>
<td></td>
<td>Optical Navigation Environments, 10</td>
</tr>
<tr>
<td></td>
<td>Radio Environments, 10</td>
</tr>
<tr>
<td></td>
<td>Hazardous Environments, 10</td>
</tr>
<tr>
<td></td>
<td>Other Requirements, 11</td>
</tr>
<tr>
<td></td>
<td>Requirements Specification, 12</td>
</tr>
<tr>
<td>13</td>
<td>AVAILABLE ROBOTIC SYSTEMS</td>
</tr>
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<td></td>
<td>Introduction to Robotic Systems, 13</td>
</tr>
<tr>
<td></td>
<td>Robot Vehicle</td>
</tr>
<tr>
<td></td>
<td>Operator Control</td>
</tr>
<tr>
<td></td>
<td>Available Systems, 13</td>
</tr>
<tr>
<td>20</td>
<td>SELECTION ANALYSIS</td>
</tr>
<tr>
<td></td>
<td>Selection Rationale, 20</td>
</tr>
<tr>
<td></td>
<td>Operator Demands, 20</td>
</tr>
<tr>
<td>22</td>
<td>GLOSSARY</td>
</tr>
<tr>
<td>23</td>
<td>BIBLIOGRAPHY</td>
</tr>
</tbody>
</table>
NCHRP Report 525, Vol. 2
Information Sharing and Analysis Centers: Overview and Supporting Software Features (2004)
### TABLE 22: ACTIVITY OF DUAL PURPOSE K9 TEAM

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Relations and Other Demonstrations</td>
<td>10-20</td>
</tr>
<tr>
<td>Patrol Tours or Routes (two-hour shifts)</td>
<td>500-700</td>
</tr>
<tr>
<td>Narcotics Searches</td>
<td>25-50</td>
</tr>
<tr>
<td>Article Search</td>
<td>25</td>
</tr>
<tr>
<td>Building Search</td>
<td>100</td>
</tr>
<tr>
<td>Suspect Tracking</td>
<td>50</td>
</tr>
<tr>
<td>Victim or Lost Person Tracking</td>
<td>1</td>
</tr>
<tr>
<td>Police Officer Assist Calls</td>
<td>50</td>
</tr>
<tr>
<td>Local Agency Assist Calls</td>
<td>25</td>
</tr>
<tr>
<td>Arrests Made or Supported</td>
<td>12-50</td>
</tr>
<tr>
<td>Trials and Competitions</td>
<td>2</td>
</tr>
</tbody>
</table>
Provides a draft template that contains basic security awareness training in a workbook format that can be redesigned as a pamphlet, glove-box brochure, or other user-specific document.
FIGURE 3: NOTIONAL SURFACE TRANSPORTATION THREAT INFORMATION FORUM

Notional Surface Transportation Threat Information Forum

- Open Sources
- Trans. Authorities
- Federal Authorities
- Authorized Analysts

Threat information is received via one of two mechanisms:

- Content is analyzed, categorized and disseminated according to protocol and shared with relevant stakeholders.
- Email, pager, fax, phone...(push)
- Web (pull)
- InfraGard (push)

FIGURE 4: DISTRIBUTED IMPLEMENTATION MODEL

National Portal
Performs analysis and information sharing with other national entities (e.g., InfraGard)