NATIONAL TRANSPORTATION SECURITY CENTER OF EXCELLENCE
STRATEGIC PLAN

Strengthening surface transportation security today ... FOR A BETTER TOMORROW
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EXECUTIVE SUMMARY

Our nation’s surface transportation systems are essential for the free movement of people and goods, and therefore are vital to the social and economic well-being of our country. At the same time, these systems are highly vulnerable to terrorist attacks and natural disasters with large potential consequences to human lives and economic activity. The challenges associated with development of safe, secure and resilient surface transportation systems are highly complex and require integrated multidisciplinary and multilevel approaches. These approaches include threat analyses specifically developed for transportation systems; new technologies for protecting human lives and critical transportation infrastructure; risk analysis methods for complex transportation networks; new policies and practices to address transportation security issues; and education and professional training tailored to the transportation sector.

The array of threats and risks to our nation’s transportation systems is widespread and diverse.

• Although there have been no successful attacks against mass transit systems in the United States thus far, mass transit systems have been the targets of multiple terrorist plots. The interrupted terrorist attacks include: a January 2003 plot to release cyanide on the New York City subway systems; an August 2004 plot to blow up a subway station in Manhattan; a July 2006 plot to explode improvised explosive devices (IEDs) concealed in backpacks on commuter trains transiting tunnels under the Hudson River; a 2008 plot to attack passengers on the MTA Long Island Rail Road, and a September 2009 plot to blow up New York subways. Any of these attacks, if successful, could have resulted in thousands of deaths and injuries.

• With approximately 600,000 bridges and over 500 major tunnels on our nation’s highway and rail systems, there is a strong need to develop new approaches and technologies to protect transportation infrastructure. These infrastructure components provide non-redundant connections within transportation networks and, consequently, are at high risk. At the same time, our ability to protect this infrastructure is limited.

• A major priority for the U.S. is the revitalization of our existing rail systems and the construction of new high speed rail networks. As rail travel becomes increasingly important, rail systems and passengers will also become more attractive targets for terrorism, and the consequences from natural hazards and disasters impacting them will be magnified. As our nation embarks on this important initiative, the need for robust rail security will become even more essential.

• Large-scale supply chain disruptions resulting from natural disasters, terrorist attacks, or transportation network failures can dramatically reduce supply chain effectiveness and result in significant economic loss. The 2007 Commodity Flow Survey (DOT, 2009) estimates that more than 13 billion tons of freight, valued at $11.8 trillion, were transported nearly 3.5 trillion ton-miles in the United States during 2007. Supply chain disruptions can create economic losses of an estimated $50 to $100 million per day.

• Inland waterways are a tremendous asset to the U.S., providing the most economically and environmentally sound mode of moving goods and commodities. The inland and intra-coastal waterways serve 38 states. With a total of $700 billion in merchandise handled annually through U.S. ports and waterways, an attack on the inland waterway system could have widespread economic impact.

• Over 4,000 commercial products are classified as petrochemicals and are essential components in many commonly used products. Secure transport of these products is crucial because disruption of the petrochemical supply chain would result in significant economic impact on the United States. The specific risks associated with the transport of petrochemicals by rail and trucking need to be addressed.

• It has become increasingly necessary to facilitate improvements in resource allocation, infrastructure resilience, and human capital utilization to manage risk in complex transportation systems. Robust methods are needed to make informed risk management decisions that will make it more difficult to significantly degrade critical transport systems. Additional methods are needed that provide alternative paths in response to emergency events and allow for rapid recovery from system blockages. These methods need to inform the key policy and programmatic issues and debates surrounding the establishment of a safe and secure transportation environment.

• To increase security and safety in our nation’s transportation sector and to build and maintain a quality transportation workforce of the future, it is critical to develop transportation security undergraduate and graduate programs and to train both frontline employees and agency decision-makers to institute preventive measures, increase awareness of potential threats, prevent incidents and respond quickly and effectively when incidents occur.

• Public awareness and public participation in the safety, security and resilience of transportation systems is increasingly more important as the terrorist threat shifts from Islamic extremists directed from outside the U.S. to the smaller, homegrown variety of Islamic extremist inspired to act. Public education and training needs to focus on enhancing the public’s attention, community involvement, vigilance, and timely reporting of unusual items, behaviors or events to local authorities.

With these grand challenges facing our nation, the National Transportation Security Center of Excellence (NTSCOE) was formed to address all aspects of transportation security including education and training of transportation professionals, identification of existing and emerging threats, development of new technologies for resilient infrastructure, and establishment of national transportation security policies. With this comprehensive mission, the NTSCOE will help to create robust multilevel approaches for our nation’s surface transportation systems through innovative training, education and research.
THE NATIONAL TRANSPORTATION SECURITY CENTER OF EXCELLENCE (NTSCOE)

ABOUT THE CENTER
The Department of Homeland Security (DHS) established the National Transportation Security Center of Excellence (NTSCOE) within its Science & Technology Directorate (S&T) in August, 2007 to address all aspects of transportation security including identification of existing and emerging threats, development of new technologies for resilient infrastructure, the establishment of national transportation security policies, the training of transportation professionals and the development of undergraduate and graduate education to build and maintain a quality transportation security workforce of the future. DHS S&T manages the NTSCOE through the Office of University Programs (OUP) in accordance with HR1, Implementing the Recommendations of the 9/11 Commission Act of 2007. The NTSCOE is made up of seven institutions: Center for Resilient Transportation Infrastructure at the University of Connecticut, Tougaloo College, Texas Southern University, Center for Transportation Safety, Security and Risk at Rutgers, the State University of New Jersey, Homeland Security Management Institute at Long Island University, Mack Blackwell Rural Transportation Center at the University of Arkansas and the Mineta Transportation Institute at San José State University.

NTSCOE VISION
Our nation’s transportation systems, infrastructure and skilled professionals are vital resources to ensure the safe and secure movement of people and goods, which is critical to our nation’s economic and social prosperity. The vision of the National Transportation Security Center of Excellence (NTSCOE) is to be the foremost resource within our nation’s homeland security enterprise for developing new technologies, policies and practices, and training future professionals to build and maintain secure and resilient transportation systems and infrastructure. Our goal is to strengthen surface transportation security today… for a better tomorrow.

NTSCOE MISSION
The NTSCOE will support our nation’s homeland security enterprise through premier research, education, and training initiatives. The NTSCOE will develop and transition new technologies, effective tools and advanced methodologies to defend, protect and increase the resilience of the nation’s multi-modal surface transportation infrastructure and those who utilize it. The NTSCOE will provide innovative and relevant education and training for transportation security and emergency response professionals.
The NTSCOE will conduct research and develop education, training and outreach programs based on this research, related case studies, and trend analysis that will help secure our nation’s surface transportation system. The specific goals and objectives outlined in this strategic plan will be accomplished through the combined efforts of the NTSCOE institutions:

**MACK-BLACKWELL RURAL TRANSPORTATION CENTER (MBTC), UNIVERSITY OF ARKANSAS**

The Mack-Blackwell Rural Transportation Center (MBTC) at the University of Arkansas has been a nationally-recognized transportation research and education center since 1991. As a member of the NTSCOE, MBTC conducts engineering research and education programs that focus on the security of the multi-modal transportation systems of the U.S. at the local, state, regional, and national levels. The goal is to develop comprehensive, cost effective, and imminently implementable solutions to critical security issues facing the transportation systems of the nation, and to prepare transportation professionals for leadership roles in professional and research careers in support of securing the nation’s transportation systems. MBTC research strengths include supply chain modeling, risk analysis, statistical and probabilistic modeling, emergency logistics planning, and structural health monitoring of transportation infrastructure.

**KEY FOCUS AREAS:**
- Inland Waterways and Rural Transportation Networks
- Supply Chain Risk Assessment & Emergency Logistical Response
- Transportation Infrastructure Protection

**CENTER FOR RESILIENT TRANSPORTATION INFRASTRUCTURE (CRTI), UNIVERSITY OF CONNECTICUT (UConn)**

The Center for Resilient Transportation Infrastructure (CRTI) operates within the School of Engineering at the University of Connecticut and serves as the Research Lead Institution for the NTSCOE. CRTI is part of the UConn Consortium of Transportation Centers along with the Connecticut Transportation Institute and the Center for Transportation and Livable Systems which together provide a full spectrum of transportation related research. CRTI research encompasses a multi-level strategy for transportation security that incorporates the development of new materials, monitoring and modeling of transportation infrastructure and analysis and simulation of large-scale transportation networks. CRTI expertise includes advanced construction materials; modeling and simulation of infrastructure behavior including bridges, tunnels, earth structures and rail; transportation network simulation and analysis; sensor system development and structural health monitoring; and infrastructure protection and control.

**KEY FOCUS AREAS:**
- Advanced materials for transportation infrastructure
- Modeling and simulation of transportation infrastructure and networks
- Sensor networks and structural health monitoring systems
HOMELAND SECURITY MANAGEMENT INSTITUTE (HSMI), LONG ISLAND UNIVERSITY

The Homeland Security Management Institute (HSMI) at Long Island University offers a 36-credit Master of Science in Homeland Security Management degree and a 15-credit graduate-level Advanced Certificate in Homeland Security Management. Both programs are fully accredited and delivered entirely in an asynchronous online format. Since its inception in 2004, HSMI was quickly recognized as the nation’s leading graduate educator in the Homeland Security Management field. Approximately 90 percent of students hold management- or executive-level positions in agencies and entities that include the Port Authority of New York and New Jersey, National Security Agency, DHS, FBI, NYPD, U.S. Coast Guard, and all branches of the Department of Defense as well as leading defense contractors. Students also include professionals in the financial, health care, and education sectors as well as state and local law enforcement in urban and rural agencies across the nation. HSMI’s faculty of Senior Fellows are all highly experienced homeland security professionals with doctoral degrees and other outstanding academic credentials, and HSMI’s renowned Board of Advisors includes the Nation’s leading experts in a diverse array of homeland security fields. HSMI’s rigorous and challenging graduate curriculum is “designed and delivered by professionals, for professionals.”

KEY FOCUS AREAS:
• Graduate degree and graduate-level certificate programs for Homeland Security managers, executives and professionals
• Training of transportation security and Homeland Security professionals, first responders and the public
• Public education and the development of K-12 curricula in awareness and preparedness

MINETA TRANSPORTATION INSTITUTE (MTI), SAN JOSÉ STATE UNIVERSITY

The Mineta Transportation Institute (MTI) at San José State University was established by Congress in 1991 to conduct research, education, and information transfer programs, specializing in transportation policy and management. MTI is under the policy control of a 25 member world-class Board of Trustees led by former Secretary of Transportation Norman Mineta. Since 1996 MTI has completed numerous transportation security research projects including threat analysis, security systems development and training, emergency plan development and exercises (NIMS), continuity of business/government plans and exercises; international case studies; and a coded terrorist attack database. Since 1998 MTI has offered a fully accredited California State University System’s Master of Science in Transportation Management and professional Certificates in Transportation Management and Transportation Security Management. The MTI NTSCOE for both DHS and DOT is directed by renowned international security expert Brian Michael Jenkins supported by an experienced team of certified research associates.

KEY FOCUS AREAS:
• Historical and current threat analyses of terrorist attacks against surface transportation
• Passenger screening policy and procedures
• Training programs and materials for security, safety, and emergency planning and response
CENTER FOR TRANSPORTATION SAFETY, SECURITY AND RISK (CTSSR), RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY

The Center for Transportation Safety, Security and Risk (CTSSR) at Rutgers University develops state-of-the-art responses to transportation security and risk analysis challenges of the 21st century. CTSSR research projects apply decision tools, GIS mapping and risk modeling to real-world transportation contexts in order to better assess and manage risks and improve resiliency related to security incidents. CTSSR creates relevant and innovative security training products for both frontline employees and managers in the transportation industry. A strong foundation of research grounds this training in the best security practices and latest delivery technologies of the day. The Center also offers a Certificate program for graduate students interested in careers in the transportation security field.

KEY FOCUS AREAS:
- Training for surface transportation industry on security topics
- Policy-focused research on transportation risk and resilience

TOUGALOO COLLEGE

Tougaloo College has been designated a Co-Lead for the National Transportation Security Center of Excellence and is responsible for integrating the NTSCOE member institutions’ Surface Transportation Security Education and Training efforts. Tougaloo College was instrumental in transforming the legislative directive into reality, through the development of a strategic plan for NTSCOE education and training initiatives. The strategic goal of the NTSCOE efforts at Tougaloo College is to educate and train transportation executives, employees and customers to heighten their knowledge and awareness of threats and appropriate responses particularly in the area of detection of suspicious behavior.

KEY FOCUS AREAS:
- Behavior awareness training
- Public awareness campaigns for surface transportation security
- Civil rights/civil liberties

TEXAS SOUTHERN UNIVERSITY (TSU)

Texas Southern University (TSU) spearheads the NTSCOE’s research into the unique security issues surrounding the transportation security of petrochemical products. In addition, TSU researchers conduct research in the fields of public transit systems; multi-modal transportation systems; ports security; transportation design and analysis; transportation modeling; highway traffic operations; traffic signal control and optimization; air quality issues in transportation; Intelligent Transportation Systems (ITS); and transportation planning and management. TSU has developed advanced transportation laboratories for transportation related education and research, and offers transportation degrees, concentrations which include a new concentration in Homeland Security, and specializations in both the College of Science & Technology and the School of Public Affairs.

KEY FOCUS AREAS:
- Petrochemical security
- Transportation security planning and management
RESEARCH

Goal One

Strengthen the resilience of our nation’s critical surface transportation infrastructure and operating systems against current and emerging threats by conducting relevant and high quality research.

OBJECTIVES
1. Employ advanced materials and integrated analysis capabilities to develop new methods and technologies that enhance resilience and protect surface transportation infrastructure against all hazards.

2. Develop approaches that achieve effective response and rapid recovery of surface transportation systems after emergencies, based on innovative damage assessment and post-event analysis capabilities.

3. Develop analysis and decision support tools that will help surface transportation stakeholders identify threats and effectively manage risks.

Goal Two

Develop scientific and policy-related solutions to address safety and human health threats resulting from acts of terrorism, man-made or natural disasters by conducting domestic and international research that improves knowledge and understanding of surface transportation security.

OBJECTIVES
1. Conduct research to identify lessons learned and best practices, within different segments of the industry, to identify threats and manage risks to surface transportation systems.

2. Integrate databases, detailed case studies, and other empirical analyses to assist in identifying threats, systemic weaknesses, policy gaps, and strategic lapses in current transportation security policy and practice and identify strategies to address them and to create safer and more resilient transportation systems.

3. Develop policy recommendations to reduce threats and manage risks to safety and security within surface transportation systems.

PERFORMANCE MEASUREMENTS
(Apply to all objectives.)

- Number of peer-reviewed publications resulting from NTSCOE research.
- Number of presentations resulting from NTSCOE research.
- Number of products (new materials, methodologies, tools, recommendations, mitigation strategies and policies) implemented in practice.
- Number of times research, case studies and empirical analyses are cited by transportation security customers.
- Number of additional research grants and other resources from state, federal and private sources based on NTSCOE research results.
- Number of awards and recognition related to NTSCOE research.
EDUCATION

Goal

Develop and deliver the highest quality undergraduate, graduate and continuing professional education programs in surface transportation security disciplines to build and maintain a highly qualified workforce.

OBJECTIVES AND PERFORMANCE MEASUREMENTS

1. Develop and implement undergraduate and graduate degree programs that integrate science, technology, engineering and mathematics (STEM) disciplines with transportation security related coursework and research to increase the number of future engineers and professionals who can deliver technological solutions for transportation infrastructure security problems.

- Number of students graduating from NTSCOE schools with a STEM degree and a transportation security concentration (reported by category)
- Number of transportation security related undergraduate capstone projects or theses, Master’s theses or Ph.D. dissertations
- Number of students registered through in-person or on-line NTSCOE institutions in transportation security related courses
- Number of students working on independent student research projects and faculty research projects related to the NTSCOE portfolio

2. Develop and implement undergraduate and graduate degree and certificate programs that integrate transportation management, planning and policy disciplines with transportation security related coursework and research to increase the number of future transportation security management professionals.

- Number of students completing degree and certificate programs from NTSCOE schools in homeland security or transportation security, transportation management, planning and policy disciplines with a transportation security concentration (reported by category)
- Number of transportation security related undergraduate capstone projects or theses, Master’s theses or Ph.D. dissertations in transportation management, planning and policy disciplines
- Number of students registered through in-person or online NTSCOE institutions in transportation security related courses
- Number of students in transportation management, planning and policy disciplines working on independent student research projects and faculty research projects related to the NTSCOE portfolio

3. Develop and implement continuing education degree and certificate programs in transportation and homeland security disciplines that are designed for working professionals to strengthen their expertise in transportation security related careers.

- Number of degrees, certificates and Continuing Education Units (CEUs) conferred by organizational category, i.e., operations personnel, managers, directors or Chief Executive Officers (CEOs)
- Number of transportation security related Master’s theses
- Number of students registered through in-person or online NTSCOE institutions for transportation security related courses
- Number of students working on independent student research projects and faculty research projects related to the NTSCOE portfolio

4. Identify current and emerging security education requirements for the present and future surface transportation workforce and design curricula and courses using a variety of delivery mechanisms, to address these requirements.

- Scores and comments from surveys of advisory boards’ members regarding curricula and syllabi as well as qualitative data from interviews of advisory boards and from transportation security and homeland security thought leaders
- Number of existing courses revised to incorporate current and emerging security requirements
- Number of new courses developed to address current and emerging security requirements

5. Develop and implement procedures to regularly evaluate the effectiveness of the educational programs and refine or modify the programs accordingly.

- Scores and comments from self-assessment instruments completed by students in and/or graduating from NTSCOE education programs
- Scores and comments from employer surveys of professionals who have received certificates or CEUs
- Scores and comments from surveys of advisory boards members regarding curricula and syllabi as well as qualitative data from interviews of advisory boards and from transportation security and homeland security thought leaders
In collaboration with federal, state, local, tribal and private sector partners, develop and deliver high quality training programs for surface transportation and emergency response professionals to enhance the security of surface transportation and provide safe movement of people, goods and services.

OBJECTIVES AND PERFORMANCE MEASUREMENTS

1. Identify gaps in current transportation security knowledge and skills and recommend learning objectives and processes that are not being met by existing training programs.
   - Production of transportation security training needs assessment
   - Generation of a gap analysis to identify security training needs and priorities

2. Identify existing programs, materials, and partnerships that can be leveraged or modified to address training gaps in a cost effective manner.
   - Development of an inventory of existing training programs

3. Based on identified learning objectives and processes, develop and deliver high quality training programs that incorporate experiential learning strategies to train surface transportation professionals and emergency responders in awareness of security threats, and response and recovery from incidents.
   - Development of an inventory of learning objectives based on the gap analysis
   - Creation and maintenance of a mechanism to assess and identify current security threats against transportation systems
   - Development of training courses and/or materials, based on identified learning objectives

4. Ensure that the training and experiential learning programs are rooted in and consistent with best practices for transportation security and are consistent with evolving national strategies.
   - Number of best practices identified and contributed into the best practice repository
   - Frequency of repository use in revising or developing training courses and materials

5. Develop and implement methods and metrics to evaluate the effectiveness of training programs and use these metrics to continually improve training programs to maximize their value to surface transportation and emergency response professionals and their capacity to achieve specific learning objectives.
   - Creation of a standardized, level-one form of evaluation for all NTSCOE training products
   - Development of a multi-platform survey mechanism that can be used to measure the organizational impact of NTSCOE training on surface transportation and emergency response professionals.
   - Statistical analysis of level-one evaluation tool applications
   - Comparative analysis of survey mechanism application results
   - Number of course revisions based on level-one and survey mechanism application feedback

6. Facilitate the integration of research tools and products developed by DHS Centers of Excellence into training products and programs for surface transportation security and emergency response professionals.
   - Number of training products and programs that have integrated DHS Centers of Excellence research tools and products into the curriculum
TRANSITION AND OUTREACH

Goal
Strengthen surface transportation security by transitioning research to and collaborating with public agencies, private sector organizations and the public.

OBJECTIVES AND PERFORMANCE MEASUREMENTS

1. Facilitate dialogue among transportation system managers, unions and government agencies to contribute to a repository of best practices that can improve the coordination of transportation security approaches and responses.
   - Identify a best practices repository, such as the Homeland Security Digital Library at the Naval Postgraduate School, and work on processes for depositing and maintaining NTSCOE best practices materials
   - Number of contributions to best practices repositories
   - Repository is being accessed and information used by NTSCOE, transportation system managers and government agencies (need mechanism to track visits and downloads)

2. Identify and develop sound policies and effective outreach programs that foster innovative collaborations between public-and private-sector organizations as well as members of the public to advance surface transportation security.
   - Each NTSCOE has developed a written outreach plan to foster collaborations between public-and private-sector organizations built around its expertise and involvement in the surface transportation security arena
   - Number of partnerships, collaborations and cooperative arrangements established by each NTSCOE with other NTSCOE, other DHS Centers for Excellence, DHS and other federal, state, local and tribal government agencies, as well as private sector organizations
   - Number of research reports and education or training courses/materials disseminated in hard copy or downloaded electronically
   - Number of contacts/inquiries received by NTSCOE member organizations from public and private sector entities regarding published and in-process research, education and training projects

3. Develop materials to communicate transportation security practices and priorities and utilize workshop and conference opportunities to share this information with appropriate stakeholders.
   - Number of workshops/conferences related to transportation security practices and priorities offered and the number of participants at each event
   - Number of regional, national and international presentations given by NTSCOE affiliates related to NTSCOE research, training, and education projects at non-NTSCOE sponsored events (very similar to Research metric – how do we distinguish between them)
   - Number of research reports and education or training courses/materials disseminated in hard copy at workshops and conferences, or subsequently requested or downloaded electronically

4. Create public awareness programs and campaigns in conjunction with other public and private sector initiatives that increase security effectiveness through a heightened public understanding of the importance of transportation resiliency.
   - Number of programs and campaigns developed by NTSCOE institutions in conjunction with other federal, state, local, tribal and private sector entities
   - Number of persons reached by public awareness programs and public education campaigns (hard to measure)
   - Number of security related issues/concerns reported by the public measured pre- and post- program and campaign implementations (hard to measure)
   - Number of media appearances or newspaper / periodical articles (in local and national outlets) conducted regarding transportation security and homeland security issues

5. Create an international forum for the continuing exchange of information about transportation security risks, threats, security measures, emergency response and methods of ensuring resiliency.
   - Number of international forums hosted about transportation security risks, threats, security measures, emergency response and methods of ensuring resiliency
   - Number of presentations given at other international conferences related to these subjects
   - Number of research reports and education or training courses/materials about these subjects disseminated in hard copy at international forums, or subsequently requested or downloaded electronically
   - Number of contacts/inquiries received from public and private sector regional, national and international entities regarding forum materials presented or published

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6. Enhance understanding, among stakeholders, of surface transportation security terminology.
   - Develop and implement a "glossary" of surface transportation security terminology
   - Number of glossaries disseminated in hard copy or downloaded electronically

7. Develop and implement processes and procedures to strengthen the transition of basic transportation security research to tools and applications.
   - Number of transition processes/procedures implemented
   - Number of tools/applications developed from NTSCOE research
   - Number of cases where NTSCOE tools and applications are utilized by external agencies

NEXT STEPS
Drafting this strategic plan is only a first step. Defining a performance measurement system that truly reflects the NTSCOE’s strategy and vision is an iterative process in which continuous improvement is a critical and constant objective. We intend to use this Strategic Plan and begin collecting the data for each of the measures to establish baselines. At the same time we will be researching other organizations to define benchmarks and best practices to compare NTSCOE performance. We will also refine the number of measures by developing linkage and alignment charts that define causal relationships between performance drivers and objectives. This will allow us to identify those key measures and targets that reflect progress toward the NTSCOE vision to strengthen surface transportation security today ... for a better tomorrow.
KEY REFERENCES


Legislation


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