



TRANSPORTATION RESEARCH BOARD

## Cybersecurity

### TRB at a Glance

The mission of the Transportation Research Board (TRB) is to provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal.

A resource to the nation and to the transportation community worldwide, TRB provides an extensive portfolio of services:

- Opportunities for information exchange on current transportation research and practice,
- Management of cooperative research and other research programs,
- Analyses of national transportation policy issues and guidance on federal and other research programs
- Publications and access to research information from around the world.

More info at [www.trb.org](http://www.trb.org)

### TRB's Transportation Research Information Services (TRIS)

**TRIS includes the TRB Library and the TRIS Databases (listed below) which are available for free on TRB's website.**

**The TRB Library provides information services to TRB staff, sponsors, TRB Committee members and panels and researchers. Access to the TRB Library is a benefit to TRB sponsors and TRB committee members.**

In cooperation with your State DOT Library or Information Service, the TRB Library provides:

- Reference and research assistance
- Literature searches
- Articles for TRB Committee work

**The TRB Library provides training on effective and efficient use of the following TRIS resources:**

**TRID** - The world's largest and most comprehensive bibliographic source on all modes and disciplines of transportation

[trid.trb.org](http://trid.trb.org)

**Practice Ready Papers (PRP) Database** - Papers with information that is ready for immediate implementation or requires minimal additional research or implementation effort.

[prp.trb.org](http://prp.trb.org)

**Publications Index (PubsIndex) Database** - The papers, articles and reports published by the Transportation Research Board, Highway Research Board, Strategic Highway Research Programs or the Marine Board

[pubsindex.trb.org](http://pubsindex.trb.org)

**Research in Progress (RiP) Database** - Current or recently completed transportation research projects

[rip.trb.org](http://rip.trb.org)

**Research Needs Statements (RNS)** - Research needs as identified by TRB Technical Activities standing committees

[rns.trb.org](http://rns.trb.org)

More information about TRIS is available online at: <http://www.trb.org/InformationServices/InformationServices.aspx>

Contact the Library at [TRBLibrary@nas.edu](mailto:TRBLibrary@nas.edu) or 1 (202) 334-2989

## Committees

### TRB standing committees that have a cybersecurity component (6)

- ABR10 Standing Committee on Critical Transportation Infrastructure Protection  
Subcommittee on cyber security
- D205948 NCHRP Project Panel for the Protection of Transportation Infrastructure from Cyber Attacks
- DA0502ACRP Project Panel on Airport Cyber Security Best Practices
- AV090 Standing Committee on Aviation Security and Emergency Management
- ABJ50 Standing Committee on Information Systems and Technology
- ANB00 Section – Safety

### National Academies' entities (committees, roundtables, etc.) that have a cyber security component (17)

- Division on Engineering and Physical Sciences (DEPS)
  - Computer Science and Telecommunications Board
    - Forum on Cyber Resilience
  - Naval Studies Board
    - Committee for a Review of U.S. Navy Cyber Defense Capabilities
- Policy and Global Affairs
  - Committee on International Security and Arms Control (CISAC)
- Committee on Information Assurance for Network-Centric Naval Forces
- Committee on the Role of Information Technology in Responding to Terrorism
- Committee on Deterring Cyberattacks
- Committee on Deterring Cyberattacks: Informing Strategies and Developing Options for U.S. Policy
- Committee on Developing a Cybersecurity Primer: Leveraging Two Decades of National Academies Work
- Committee on Freight Transportation Information Systems Security
- Committee on Future Research Goals and Directions for Foundational Science in Cybersecurity
- Committee on Improving Cybersecurity Research in the United States
- Committee on Professionalizing the Nation's Cybersecurity Workforce: Criteria for Future Decision-Making
- Cyber Resilience Workshop Series

## Reports

### Completed reports/material that TRB has produced related to cybersecurity (16 reports)

Also see: <http://trbcybersecurity.erau.edu/>

- Bloom, R. W. (2016). Understanding the human element: Preventing insider threats and betrayals. TR News(304), pp 44-45.
- Haass, J. C., Sampigethaya, K., & Capezzuto, V. (2016). Aviation and cybersecurity: Opportunities for applied research. TR News(304), pp 39-43.
- Thomas, L. W. (2016) Liability of transportation entity for the unintentional release of secure data or the intentional release of monitoring data on movements or activities of the public. (pp. 60p): Transportation Research Board.
- Countermeasures, A., Security Experts, L. L. C., Western, M., & Consulting, L. L. C. (2015) Protection of transportation infrastructure from cyber attacks: A primer. (pp. 183p): Transportation Research Board.
- Murphy, R. J., Sukkarieh, M., Haass, J., & Hriljac, P. (2015) Guidebook on best practices for airport cybersecurity. (pp. 162p): Transportation Research Board.
- Cambridge, S., North River Consulting, G., & University of Washington, S. (2013) Freight data sharing guidebook. (pp. 68p): Transportation Research Board.

- Schofer, J. L. (2013). Ensuring the long-term stewardship of the safety data. TR News(289), p 39.
- Schofer, J. L., & Transportation Research Board (2013). Committee on the long-term stewardship of safety data from the second strategic highway research program (shrp 2) letter report: October 14, 2013.
- Krenzke, T., Li, J., Freedman, M., Judkins, D., Hubble, D., Roisman, R., & Larsen, M. (2011) Producing transportation data products from the american community survey that comply with disclosure rules. (pp. 386p): Transportation Research Board.
- Thomas, L. W. (2011) Legal arrangements for use and control of real-time data. (pp. 55p): Transportation Research Board.
- Helping airports understand the payment card industry data security standard (pci dss). (2010), (pp. 29p): Transportation Research Board.
- Dempsey, P. S. (2008) Privacy issues with the use of smart cards. (pp. 25p): Transportation Research Board.
- Sands, J. N., & Transportation Research Board (2004). Trb special report: Cybersecurity of freight information systems: A scoping study. TR News(230), p. 33-35.
- Transportation Research Board (2003). Cybersecurity of freight information systems: A scoping study. (pp. 96 p.): Transportation Research Board.
- O'Neil, D. J., & Transportation Research Board (2000). Statewide critical infrastructure protection: New mexico's model. TR News(211), 4 p.
- Murakami, E., Butler, J., & Transportation Research Board (1993). Transportation data needs: Programs for a new era - implications for state dots and mpos. Proceedings of a conference, irvine, california, may 27-29, 1992. Panel on data requirements related to land use, economic development, and growth management: Workshop reports. Transportation Research Circular (407), p. 60-63.

**Completed reports/material that other parts of the National Academies have produced related to cybersecurity**  
(24 reports)

Also see: [http://sites.nationalacademies.org/CSTB/CSTB\\_045327#Cybersecurity](http://sites.nationalacademies.org/CSTB/CSTB_045327#Cybersecurity)  
[http://sites.nationalacademies.org/CSTB/CSTB\\_059144](http://sites.nationalacademies.org/CSTB/CSTB_059144)

- National Academies of Sciences, Engineering & Medicine (2016). Data breach aftermath and recovery for individuals and institutions: Proceedings of a workshop. Washington, DC: The National Academies Press.
- National Research Council (2015). A review of the u.S. Navy cyber defense capabilities: Abbreviated version of a classified report. Washington, DC: The National Academies Press.
- National Academy of Sciences (2015). Cybersecurity dilemmas: Technology, policy, and incentives: Summary of discussions at the 2014 raymond and beverly sackler u.S.-u.K. Scientific forum. Washington, DC: The National Academies Press.
- National Research Council (2014). At the nexus of cybersecurity and public policy: Some basic concepts and issues. Washington, DC: The National Academies Press.
- National Academy of Sciences (2014). India-united states cooperation on science and technology for countering terrorism: Summary of a workshop. Washington, DC: The National Academies Press.
- National Research Council (2013). Professionalizing the nation's cybersecurity workforce?: Criteria for decision-making. Washington, DC: The National Academies Press.
- National Research Council (2010). Biometric recognition: Challenges and opportunities. Washington, DC: The National Academies Press.
- National Research Council (2010). Critical code: Software producibility for defense. Washington, DC: The National Academies Press.
- National Research Council (2010). Information assurance for network-centric naval forces. Washington, DC: The National Academies Press.
- National Research Council (2010). Letter report for the committee on deterring cyberattacks: Informing

strategies and developing options for u.S. Policy. Washington, DC: The National Academies Press.

- National Research Council (2010). Proceedings of a workshop on deterring cyberattacks: Informing strategies and developing options for u.S. Policy. Washington, DC: The National Academies Press.
- National Research Council (2010). Toward better usability, security, and privacy of information technology: Report of a workshop. Washington, DC: The National Academies Press.
- National Research Council (2009). Technology, policy, law, and ethics regarding u.S. Acquisition and use of cyberattack capabilities. Washington, DC: The National Academies Press.
- National Research Council (2007). Toward a safer and more secure cyberspace. Washington, DC: The National Academies Press.
- National Research Council (2003). Critical information infrastructure protection and the law: An overview of key issues. Washington, DC: The National Academies Press.
- National Research Council (2003). Information technology for counterterrorism: Immediate actions and future possibilities. Washington, DC: The National Academies Press.
- National Research Council (2003). Who goes there?: Authentication through the lens of privacy. Washington, DC: The National Academies Press.
- National Research Council (2002). Making the nation safer: The role of science and technology in countering terrorism. Washington, DC: The National Academies Press.
- National Research Council (2002). Cybersecurity today and tomorrow: Pay now or pay later. Washington, DC: The National Academies Press.
- Summary of discussions at a planning meeting on cyber-security and the insider threat to classified information. (2001). Washington, DC: The National Academies Press.
- National Research Council (1999). Realizing the potential of c4i: Fundamental challenges. Washington, DC: The National Academies Press.
- National Research Council (1999). Trust in cyberspace. Washington, DC: The National Academies Press.
- National Research Council (1996). Cryptography's role in securing the information society. Washington, DC: The National Academies Press.
- National Research Council (1991). Computers at risk: Safe computing in the information age. Washington, DC: The National Academies Press.

## Current Research

### Ongoing activities TRB has in the cybersecurity field (9 items)

- AASHTO highway subcommittee on traffic engineering. Cybersecurity of traffic signals and related its equipment.
- Airport cyber security best practices.
- Deploying transportation security practices in state dots.
- Effective practices for the protection of transportation infrastructure from cyber incidents.
- Impacts of connected vehicles and automated vehicles on state and local transportation agencies--task-order support. Task 10. Cybersecurity implications of cv/av technologies on state and local transportation agencies.
- Legal problems arising out of highway programs. Topic 22-04. Summary of federal law restricting use of highway safety data in tort litigation.
- Research support for transit industrial control systems and cyber security.
- Synthesis of information related to transit problems. Topic sb-20. Proactive use of social media in public transportation.
- Update of security 101: A physical security primer for transportation agencies.

### **Ongoing activities the National Academies has in the cybersecurity field (12 items)**

- DEPS-CSTB-12-03 - A Primer on Cybersecurity: Leveraging Two Decades of National Academies Work
- DEPS-CSTB-11-01 - Building and Sustaining the Nation's Cybersecurity Workforce
- DEPS-CSTB-11-07 - Distributed Approaches to Achieving a Healthy Cybersecurity Ecosystem: A Meeting of Experts
- DEPS-CSTB-11-03 - Escalation Dynamics and Conflict Termination in Cyberspace: A Workshop
- DEPS-CSTB-11-06 - Market and Other Incentives to Improve Cybersecurity
- DEPS-CSTB-16-02 - Cyber Resilience Workshop Series
- DEPS-CSTB-15-04 - Data Breach Aftermath and Recovery for Individuals and Institutions: A Workshop
- DEPS-CSTB-09-03 - Deterring Cyberattacks: Informing Strategies and Developing Options for U.S. Policy
- DEPS-CSTB-13-03 - Forum on Cyber Resilience
- DEPS-CSTB-11-04 - Future Research Goals and Directions for Foundational Science in Cybersecurity
- DEPS-CSTB-11-02 - Planning for International Dialogue with China on Cybersecurity for International Security
- PGA-CISAC-13-01 - International Dialogue with China on Cybersecurity for International Security

### **Sessions at the 2017 Annual Meeting that are cyber security related (10 sessions)**

- Workshop 133 (AHB30, AHB15)  
Key Findings from 2016 Automated Vehicles Symposium
  - Cybersecurity Challenges for Automated Vehicles  
P17-20358
- Workshop 160  
Understanding Transportation Resilience Intersection with Cybersecurity
- Workshop 180 (AHB25)  
IGNITE: Traffic Signal Systems with Innovative Technologies
  - What Everyone Should Know about Cybersecurity but are Afraid to Ask  
P17-21953
- Cyber Security Subcommittee, ABR10(7)
- Event 548 (AV090)  
Aviation Cybersecurity Issues and Challenges
- Event 557 (ABR10, ABR10, AHB15, AV090)  
Cyber Security and Resilience for the Internet of Moving Things
- Session 579 (AHB25)  
Evaluating the Performance of Traffic Signal Systems
  - Framework for Evaluating Severity of a Traffic Cabinet Cyber-Vulnerability  
17-00846
- Event 619 (ABR10, ABC20)  
Transportation Workforce Needs for Critical Infrastructure Resilience for Physical Security and Related Cyber-Security Challenges
- Session 729 (AH000, A0000)  
Disruptive and Transformational Technologies Affecting Transportation: What are the New Frontiers?  
*Public agencies are being challenged to adapt to innovative technologies and services to achieve public policy objectives. A TRB symposium brought the public and private sectors and academia together to lay a foundation for new research partnerships and identify research needs. Technologies addressed included connected and automated vehicles, shared-use mobility services, smart cities, unmanned aircraft systems, cybersecurity, and alternate fueled vehicles.*
- Session 888 (ANB00, ANB20)  
National Highway Traffic Safety Administration Data Systems & Vehicle Safety Research

○ Automation and Cybersecurity

P17-21843