



Safety and Security in Remote Bridge Operations

- PI: Randall Sandone, UIUC
- Co-Pls: Matt Mowrer, ABS
 - Blake Benson, ABS
 - Scott Blough, Simple Cyber
- Students engaged in MSC research: Melissa Gabriele, TU



A DEPARTMENT OF HOMELAND SECURITY CENTER OF EXCELLENCE





FR

E STATE UNIVERSIT











Transportation & Logistics

MIT Center for

Research Project Overview



 Problem: Transitioning to remote bridge operations creates new safety and security concerns stemming from vulnerabilities of ICT/OT



Research Project Overview



- **Project objectives:** Enhance the safety, security, and resilience of remote bridge operations
 - Establish situational awareness
 - Inventory, categorize, taxonomy
 - Macro-level cybersecurity assessment
 - Annotated NIST RMF
 - NIST CSF Profile
 - Release SaaS application
 - Reduce cost and accelerate compliance
 - Improved security, safety, and resilience



Milestones



No.	Milestone	Percentage completed	Completion Date	New Plans / Contingency
M1	Kickoff Meeting	100%	26 Sept 2019	
M2	Landscape & Scoping Study	100%	24 Apr 2020	
M3	Taxonomy/Inventory		30 May 2020	
M4	Site Visits		30 Jun 2020	Delay visits to July. If July not feasible, replace test with virtual meetings
M5	RMF/CSF Profile		30 Sept 2020	

No.	Deliverable	% Complete	Completion Date	New Plans / Contingency
D1	Literature Review	100%	26 Sept 2019	
D2	Landscape & Scoping Study	100%	24 Apr 2020	
D3	Taxonomy		30 May 2020	
D4	Completion of Draft NIST RMF & CSF Profile		30 Sept 2020	
D5	Cyber Dashboard implementation of developed NIST CSF Profile		31 Oct 2020	

COVID19 Impact – Contingency Plans



- Impact: Travel restrictions preventing/delaying site visits
- Contingency Plan: Conduct Site Visits via remote mechanisms
 - Requires an engagement strategy and process that will deliver appropriate and adequate information
 - Results <u>may</u> lack the granularity we would prefer but should be adequate to achieve objectives of project



End User Engagement



Stakeholders	Roll	Interaction date	Outcome
Janet St. John	Director, Cyber Security Association of American RR	6 March 2020	Janet (AAR) Initial discussion to gauge interest, AAR is interested and willing to work with us but due to COVID, schedule is in flux. AAR's intention is to take our project goals and brief them to railways as an opportunity to get involved from an industry perspective on regulatory authority.
Jeff Hieb	Port Security Specialist, Milwaukee	13 March 2020	Jeff agreed to develop a list of key contacts within the City of Milwaukee and to help arrange and coordinate site visits either physical or virtual.
Kamal Elnahal, Ph.D., P.E.	Chief, Bridge Operations and Engineering Division (CG-BRG-1), Bridge Program, U.S. Coast Guard	30 Jan 2020 30 Apr 2020	USCG updated and satisfied with progress to date. USCG provided Office of Bridge Programs data for use in landscape study.
Christopher Barkan, Ph.D.	George Krambles Director, Rail Transportation & Engineering Center, UIUC	7 May 2020	Initial discussion to map out engagement with RR owners and operators and rail industry associations

Research Work and Accomplishments



- Activities:
 - Kick-off Meeting
 - Literature review
 - Landscape study
 - COVID 19 contingency analysis/planning
 - Update briefing to USCG
- Outcomes to date:
 - Literature Review Complete—current state of remote bridge operations and challenges.
 - Landscape Study Complete—Provided detailed analysis of physical attributes of all remotely operated movable drawbridges including created a detailed risk scenarios.
 - Landscape Infographic Complete



Anticipated Project Impact and Transition



Overall Impact

- <u>Enhanced safety, security, and resilience</u> of our nation's remote bridges
- Clarity regarding national bridge landscape (numbers, types, plans, etc.)
- Clarity regarding cyber threats and current security postures
- Tailored NIST Risk Management Framework
- Tailored NIST CSF Profile
- Tool to standardize and accelerate cyber security maturity

Audience Impact

- End users: standardized cyber risk management standard and process
- USCG: greater awareness of risk; cyber security standards to apply to policy and regulation

Tech Transition

- Published annotated Risk Management Framework & NIST CSF Profile
- Commercially available and sustainable SaaS application

Plans for the next year



- Promote use of annotated NIST Risk Management Framework
- Promote adoption of NIST CSF Profile for Remote Bridges



This material is based upon work supported by the U.S. Department of Homeland Security under Cooperative Agreement No. 2014-ST-061-ML0001. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Department of Homeland Security.