USDOT Tier-1 UTC Transportation Cybersecurity Center for Advanced Research and Education (CYBER-CARE)

Request for Proposals

Date issued	11/30/2023
Fiscal year	2024-2025
Proposal format	Appendix D
Questions	Online form
Pre-proposal submission deadline	02/09/2024
Pre-proposal submission form	Online form
Proposal submission deadline	03/22/2024
Proposal submission form	Online form
Final decisions	05/24/2024

1. Overview

The Transportation Cybersecurity Center for Advanced Research and Education (CYBER-CARE), funded by the US Department of Transportation (DOT) as a Tier 1 University Transportation Center (UTC) is seeking proposals focused on cybersecurity for transportation systems. Proposals should have a duration of one year or two years and total expenses are up to $20,000 to $90,000 per year depending on the type of proposal and funding availability (see details below). Please refer to Section 3 for eligibility.

CYBER-CARE addresses the DOT statutory research priority area of "Reducing Transportation Cybersecurity Risks." Cyberattacks are constantly expanding alongside modern transportation infrastructure's increasing communications and computing capabilities, such as intelligent transportation systems (ITS) and advanced traffic management systems (ATMS). Future connected and automated vehicle (CAV) systems must be fully protected against such attacks. Cybersecurity and risk management represent core elements of CAV systems design, and reducing cybersecurity risks remains a crucial goal, as security breaches or software/sensor/network failures can have significant consequences for cyber-physical systems. Reducing cybersecurity risks will both enhance the safety and privacy of users within digital communication channels and increase society's acceptance of novel technologies. CYBER-CARE aims to uncover ways to mitigate the road traffic safety impacts due to cybersecurity attacks on transportation infrastructure and CAV systems.

2. Topics of interest

CYBER-CARE's mission is to develop the world's leading innovative, healthy, sustainable, and intelligent transportation cybersecurity system and protect the American people, supply chains, public transit systems, and the economy through the safe, resilient, and sustainable movement of people and goods. The research topics of interest to the center are the following:

1) Connected and Automated Vehicle (CAV) cybersecurity:

CAV cybersecurity research is a key component of the USDOT ITS research program. CYBER-CARE will fund research towards approaches to ensure future CAV safety in cyber environments.

2) Transportation data cybersecurity

Given the key role of data in transportation communications with inadequate cybersecurity detection, CYBER-CARE will fund research that addresses the challenging problem of identifying cyberattacks via big data analysis.

3) Advanced traffic management system (ATMS) cybersecurity

In highly dynamic, wide-area traffic scenarios, e.g., in Advanced Traffic Management Systems (ATMS), centralized communication frameworks are insufficient. CYBER-CARE will fund research on decentralized communication frameworks and future transportation solutions to ensure participants' security and safety.

4) Next-generation transportation cybersecurity system

Protecting next-generation transportation cybersecurity systems is a complex task due to their reliance on multiple sub-systems, including sensors, weather stations, and smart vehicle networks. CYBER-CARE will fund research that addresses this problem and enables reliable, next-generation transportation cybersecurity systems.

3. Eligibility

The funded investigators (PIs and Co-PIs) submitting a proposal must be faculty members from the universities within the consortium, including the University of Houston, Embry-Riddle University, Rice University, Texas A&M University-Corpus Christi, University of Cincinnati, and the University of Hawai'i at Manoa. Postdoctoral researchers and other professional researchers may also submit proposals as PIs, provided that the proposal includes a faculty member as a Co-PI.

4. Matching funds

The US DOT UTC program requires **50% of matching funds from non-federal sources**.

5. Types of proposal

Type	Description	Max. amount (Federal Funding)
White paper	Supports the development of a white paper identifying research gaps in cyber-security for transportation systems. Should include meetings with other researchers, policy-makers, and/or practitioners.	$20,000
Seed grant	Supports the development of a larger proposal focused on cybersecurity for transportation systems. Should include target RFP, potential team, and research topic.	$25,000
Educational project (site university director shall be the PI or a co-PI)	Supports the development of educational materials on cybersecurity for transportation. This might include course materials, tutorials, bootcamps, outreach activities, etc.	$80,000
Technology transfer project (site university director shall be the PI or a co-PI)	Supports the development technology transfer materials on cybersecurity for transportation. This might include workshops, training, software development, etc.	$50,000
Research project	Supports original research on cybersecurity for transportation systems. Research projects should be classified as advanced, applied, or practical research.	$90,000 per year, up to 2 years.

Research proposals can have a duration of one or two years. For two-year proposals, a preliminary project report (same format as the final report) is required at the end of the first year (see Section 7: Deliverables). Funding for the second year will be conditioned on the 1st year project performance and funding availability. All other proposals will have the duration of one year.

6. Pre-proposal

PIs are **required to submit a brief pre-proposal** before the submission of the full proposal. Pre-proposals will be briefly reviewed by the center executive committee for eligibility and fit to the topics of interest. Accepted pre-proposals will be invited for the full proposal submission. See Appendix A for the pre-proposal format.

7. Proposal content

Proposals should include the following (see Appendix D for format):
- Cover page, including title and list of PIs with their unique ORCID (Open Researcher and Contributor ID) identifiers.
- Abstract (1 page).
- Project description (maximum 7 pages).
- Outcomes (maximum 1 page) covering data, software, hardware, patents, etc.
- Impacts (maximum 1 page) including on policy, regulations, practice, etc.
- Similar work disclosure briefly describing related projects already funded.
- Data management plan (see Appendix B).
- PIs CVs (maximum 2 pages per PI/co-PI, any format).
- Budget table with expenses by category with associated amounts, matching funds, and explanatory notes (see Appendix C).

8. Deliverables

A **semi-annual report** should be submitted describing the progress towards the goals of the project and the activities executed (see format in Appendix D). A **final report** following the report formatting instructions should be submitted at the end of the project and uploaded to the **TRB Transportation Research Information (TRID) database** (https://trid.trb.org) and the **National Transportation Library (NTL) Digital Repository** (https://ntl.bts.gov/ntl). The report should cover how the project (1) addresses the national transit strategic goals; (2) provides practical value to transit decision-makers and professionals; (3) results in original research and/or education (including dissemination via publications, presentations, and policy briefings); (4) enabled student participation and workforce development; (5) creates opportunities for technology transfer (including technologies, inventions, patent applications, and licenses). Publications funded through this program should also be uploaded to the TRID database. Publications, datasets, slides, videos, and other digital content produced using funds from this program should be uploaded to the NTL repository.

For more information on reporting requirements, see the UTC 2023 Grant Requirements (https://www.transportation.gov/utc/bil-grant-deliverables-and-reporting-requirements).

9. Selection criteria

Successful proposals should address the following:
- Responsiveness to national transit strategic goals.
- Practical value to transit decision-makers and professionals.
- Original research.
- A research team with the expertise needed to conduct the research effectively.
- Student participation.
- A sound research approach and clear methodology.
- A proposed budget that is reasonable for the work outlined in the proposal.
- Clearly identified technology transfer and partnership opportunities.

Projects will be subject to a rigorous external review by an unbiased group of subject matter experts, including national and international academics and practitioners and FTA Regional Administrators. Each proposal will receive at least 3 reviews.

10. Timeline

Date issued	11/30/2023
Deadline for inquiries	12/15/2023
Pre-proposal submission deadline	01/26/2024
Proposal Submission deadline	03/15/2024
Final decisions	05/17/2024
Proposal feedback	07/12/2024
Proposal revisions	08/16/2024
Expected start date	09/01/2024
Semi-annual report due	As same as USDOT's timeline
Expected end date	08/31/2025
Final report and other deliverables due	08/31/2025

All deadlines must meet the USDOT's requests. If there is a conflict, the deadline will be adjusted accordingly.

11. Acknowledgement

All materials published based on work funded by this proposal should include the following acknowledgement:

12. Contact

Please submit any inquiries regarding this RFP via this online form:
https://forms.gle/mDkDFySvuRPMTX3h7

Appendix
Appendix A: Pre-proposal format

Proposal title	Expected duration
Proposal title	October 2024-
Investigators	**Proposal type**
Name, affiliation, ORCID # (PI)	Example: e.g., white paper, advanced research
Name, affiliation, ORCID #	
	Budget
	Federal/non-Federal (at least 50%)

Primary topic
Topic from the list of topics of interest

Project description
Maximum 1400 words. Please do not change the font size.

Suggested content:
- Motivation
- Problem
- Transformative research activities
- Expected outcomes and their impact on technologies, practices, and federal regulations
- Student participation and workforce development
- Partnerships and technology transfer opportunities

B: Data Management Plan

Projects must fully comply with the U.S. DOT Public Access Plan (https://www.transportation.gov/mission/open/official-dot-public-access-plan-v11). The Data Management Plan (DMP) should describe the project's strategy for processing and archiving Digital Data Sets in a repository that enables and allows for public access and sharing. DMPs that do not meet the minimum US DOT requirements, provided below, will be rejected:

- A high-level description of the types of data that the project anticipates gathering in the course of conducting research activities, including whether the data should be preserved for long-term access;
- A proposed outline of the standards and machine-readable formats that will be used for the entire scope of research activities;
- A description of any data access policies that govern (and prevent) the disclosure of identities, confidential business information, national security information, etc., and whether public use files may be generated from the data;
- A general discussion of policies for re-use and re-distribution of research data; and
- A high-level description of how, when, and where the Center plans to archive, preserve, and deposit the research data.

For more information about creating data management plans, see: http://www.ntl.bts.gov/publicaccess/creatingaDMP.html.

For more information about data sharing requirements, see: https://www.transportation.gov/utc/bil-grant-deliverables-and-reporting-requirements.

Appendix C: Budget Format

CATEGORY	Budgeted Amount from Federal Share	Budgeted Amount from Matching Funds	Explanatory Notes
Faculty Salaries			
Administrative Staff Salaries			
Other Staff Salaries			
Student Salaries			
Staff Benefits			
Total Salaries and Benefits			
Student Tuition			
Technology Transfer			
Expendable Property, Supplies, and Service			
Other Direct Costs (specify)			
Total Direct Costs			
F&A (Indirect) Costs			
TOTAL COSTS			

Appendix D: Project Proposal Format

Starts from next page.

Investigator(s):

Investigator 1, Affiliation, ORCID # (PI)

Investigator 2, Affiliation, ORCID #

Project Partner(s):

Partner 1, address, ORCID #

Partner 2, address, ORCID #

Provide a brief caption for every picture. Use Times New Roman 11 or 12 font throughout the document with the exception of the project title (use Calibri 12) and photo captions use (Calibri 9). Single space in between sentences. Five to six lines of text within a vertical space of one inch. Margins: an inch for all sides. No proposer-supplied information may appear in the margins. Paper size: 8 ½ by 11". Use single-column format for the text.

Abstract

Maximum 1 page. Try to reduce acronym usage in your one-page summary.

1. **Project Description**

Maximum 7 pages. Please make sure the project description explicitly addresses the following:

Major objectives.

Description of how the proposed project or activity supports the DOT priorities, the RD&T strategic goals, and research priorities, and the statutory area of focus for the UTC.

Description of how the proposed project or activity engages in breakthrough, advanced, or transformative research., education and workforce development, or technology transfer activities that cut across disciplines and span multiple modes of transportation.

Description of potential partnerships to be established to conduct the project or activity.

2. Outputs

½ - 1 page. The results of the work performed. Describe what new research, technology, or process this research project has or will produce. The outputs could include processes and methods; data, hardware, software, and databases; invention disclosures, patent filings, inventions, etc.

3. Outcomes/Impacts

½ - 1 page. Describe the application of the output and any changes this output has or will make to the transportation system, or its regulatory, legislative, or policy framework, including a description of products or patents, or a change in practice, or instances of research results informing policy decisions. Discuss how this research output will positively impact the transportation system in terms of safety, reliability, durability, costs, etc.

4. Similar Work Disclosure

CYBER-CARE needs to ensure that the work proposed for our funding is not overly similar to work already funded elsewhere. Please briefly describe any similar work currently funded through other sources that is closely related to the work proposed here and, more specifically, highlight the differences between the two scopes. CYBER-CARE may request a copy of the most closely related proposal or project report for evaluation purposes.

5. Data Management Plan

See Appendix A for data sharing requirements.

6. **References (APA format)**

Appendix D: Final and Semi-annual Project Report Format

Starts from next page.

Project Title

Grant Number: XXXXXXX

USDOT Tier-1 University Transportation Center for Advancing Cybersecurity Research and Education (CYBER-CARE)

Research Priority:

Reducing Transportation Cybersecurity Risks

Investigators:

Investigator 1, Affiliation, ORCID # (PI), address

Investigator 2, Affiliation, ORCID # (Co-PI)

Partners:

Partner 1: PI, Affiliation, ORCID #, address

Partner 2: PI, Affiliation, ORCID #, address

Research Project Funding: Federal and non-Federal

Project Start and End Date: month/day/year to month/day/year

Report #: XXXXX

Index terms: (keywords that describe the project)

Technical Report Documentation Page

1. Report number Enter the report number assigned by the sponsoring agency.	2. Government access number	3. Recipient's Catalog No. XXXXXXXXXXXXXX
4. Title and Subtitle Enter title and subtitle (use mixed case with initial caps for first word in title and subtitle) with volume and part numbers, if applicable.		5. Report date Enter same date as is on the report cover. Enter full publication date, including month and date, if available, and full year. Example: June 5, 2014 or June 2014 or 2014
		6. Performing Organization Code Enter any/all unique numbers assigned to the performing organization, if applicable.
7. Author(s) Enter name(s) of person(s) responsible for writing the report, performing the research, or credited with the content of the report. Form of entry is first name, middle initial (if applicable), last name, and any additional qualifiers. Primary author is listed first. After each author name, enter ORCID (https://orcid.org/) URL, when available. Example: Josiah Carberry, Ph.D. https://orcid.org/0000-0002-1825-0097		8. Performing Organization Report No. Enter any/all unique alphanumeric report numbers assigned by the performing organization, if applicable.
9. Performing Organization Name and Address Enter the name and address of the organization(s) performing the research.		10. Work Unit No.
		11. Contract or Grant No. Enter the number of the contract, grant, and/or project number under which the report was prepared. Specify whether the number is a contract, grant, or project number. Example: Contract # 8218
12. Sponsoring Agency Name and Address Enter name and address of the organization(s) financially responsible for the work. After each agency name, enter funding type (e.g. SPR). Example: Missouri Department of Transportation (SPR)		13. Type of Report and Period Covered Enter the type of report (e.g., final, draft final, interim, quarterly, special, etc.)

	followed by the dates during which the work was performed. Example: Final Report (June 2012-June 2014)
	14. Sponsoring Agency Code If available, enter the office code or acronym if a sponsoring agency (such as FHWA or NHTSA) is named in field #12. For FHWA office codes, see https://fhwaapps.fhwa.dot.gov/foisp/hqphone.do]

15. Supplemental notes
Conducted in cooperation with the U.S. Department of Transportation, Federal Highway Administration. Enter information not included elsewhere, such as translation of (or by), report supersedes, old edition number, alternate title (e.g. project name), hypertext links to documents or related information in the form of URLs, PURLs (preferred over URLs - https://archive.org/services/purl/help), DOIs (https://www.doi.org/), insertion of QR codes, copyright or disclaimer statements, etc. Edit boilerplate FHWA statement above if needed.

16. Abstract
Enter a brief factual summary of the most significant information, including the purpose, methods, results, and conclusions of the work. When appropriate, the abstract should include advice on how the results of the research can be used. For guidance, please see ANSI/NISO Z39.14-1997 (R2015) Guidelines for Abstracts (https://www.niso.org/publications/ansiniso-z3914-1997-r2015-guidelines-abstracts).

17. Key Words Enter words, terms, or phrases that identify important topics in the report. When possible, terms should be selected from the Transportation Research Thesaurus (TRT) (http://trt.trb.org) in addition to terms not found in the TRT.		**18. Distribution Statement** No restrictions. This document is available through the National Technical Information Service, Springfield, VA 22161. Enter any other agency mandated distribution statements. Remove NTIS statement if it does not apply.	
19. Security Classification (of this report) Enter security classification of this report (e.g. Unclassified). Reports carrying a security classification will require additional marking giving security and downgrading information as specified by the sponsoring agency.	**20. Security Classif. (of this page)** Enter the security classification of the form (e.g. Unclassified). When at all possible, this form should remain unclassified. If a classification is required, identify the classified items	**21. No. of Pages** Enter the total number of pages in the report, including both sides of all pages and	**22. Price** Refers to the price of the report. Leave blank unless applicable.

	on the page by an appropriate symbol as per instruction from the sponsoring agency.	the front and back covers.	

The University Transportation Center for Advancing Cybersecurity Research and Education (CYBER-CARE)

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transportation infrastructure and CAV systems.

Disclaimer

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the information presented herein. This document is disseminated in the interest of information exchange. The report is funded, partially or entirely, by a grant from the U.S. Department of Transportation's University Transportation Centers Program. However, the U.S. Government assumes no liability for the contents or use thereof.

Executive summary

Maximum 1 page. Try to reduce acronym usage in your one-page summary.

Table of Contents

1. Project description

Maximum 2 pages. Final research reports must give a complete description of the problem, approach, methodology, findings, conclusions, and recommendations developed as a result of the project and must completely document all data gathered, analyses performed, and results achieved.

Please highlight how the project: (1) Addresses the national transit strategic goals; (2) provides practical value to transit decision-makers and professionals; (3) results in original research and/or education (including dissemination via publications, presentations, and policy briefings); (4) enabled student participation and workforce development; (5) creates opportunities for technology transfer (including technologies, inventions, patent applications, and licenses).

Provide a brief caption for every picture. Use Times New Roman 12 font throughout document with the exception of project title use Calibri 12 and photo caption use Calibri 9. Single space in between sentences.

Figure 1: Please, provide a brief caption for every image. Use this format.

2. Outputs

The results of the work performed. Describe what new research, technology, or process this research project has or will produce. The outputs could include processes and methods; data, hardware, software and databases; invention disclosures, patent filings, inventions, etc.

2.1 Journal publications:
1. Publication 1
2. Publication 2
3.

2.2 Conference publications:
1. Publication 1
2. Publication 2
3.

2.3 Presentations
1. Presentation 1
2. Presentation 2
3.

2.4 Book chapters and other non-periodical publications

Report any book, monograph, dissertation, abstract, or the like published as or in a separate publication, rather than a periodical or series. Include any significant publication in the proceedings of a one-time conference or in the report of a one-time study, commission, or the like.
1. Publication 1
2. Publication 2
3.

2.5 Policy papers
1. Publication 1
2. Publication 2
3.

2.6 Website(s) and other internet(s) sites

List the URL for any Internet site(s) that disseminates the results of the research and/or program activities. A short description of each site should be provided. It is not necessary to include the publications already specified above in this section.

1. Item 1
2. Item 2
3.

2.7 New methodologies, technologies, and techniques

Identify technologies or techniques that have resulted from the research activities. Describe the technologies or techniques and how they are being shared.

1. Item 1
2. Item 2
3.

2.8 Inventions, patents, and licenses

Identify inventions, patent applications with date, and/or licenses that have resulted from the research. Submission of this information as part of an interim research performance progress report is not a substitute for any other invention reporting required under the terms and conditions of an award. For additional requirements pertaining to patents and copyrights, refer to *General Provisions of Grants for University Transportation Centers*, Section III, 12.

1. Item 1
2. Item 2
3.

2.9 Other products

Such as data or databases, physical collections, audio or video products, application software, analytical models, educational aids, courses or curricula, instruments, equipment, or research material.

1. Item 1
2. Item 2
3.

3. Outcomes/Impacts

Describe the application of the output and any changes this output has or will make to the transportation system, or its regulatory, legislative, or policy framework, including a description of products or patents, or a change in practice, or instances of research results informing policy decisions. Discuss how this research output will positively impact the transportation system in terms of safety, reliability, durability, costs, etc.

Examples of outcomes include:
- Increased understanding and awareness of transportation issues;
- Passage of new policies, regulation, rulemaking, or legislation;
- Increases in the body of knowledge;
- Improved processes, technologies, techniques and skills in addressing transportation issues;
- Enlargement of the pool of trained transportation professionals; or
- Adoption of new technologies, techniques or practices.

This section should also describe ways in which the work, findings, and specific outputs/outcomes of the program have had an impact during this reporting period. Describe distinctive contributions, major accomplishments, innovations, successes, or any change in practice or behavior that has come about as a result of the program relative to:
- The effectiveness of the transportation system;
- Technology transfer (include transfer results to entities in government or industry, adoption of new practices, or instances where research outcomes have led to the initiation of a start-up company);
- The increase in the body of scientific knowledge; and
- Transportation workforce development.

This section should also include impacts on leadership and outreach, diversity, and community engagement.

4. Data Summary

This section should cover points discussed in the data management plan for the project, including research products, data format and content, data access and sharing, and reuse and distribution.

See Appendix B for data sharing requirements.

5. **References (APA format)**

6.   Appendix