ILLINOIS CENTER FOR TRANSPORTATION

REQUEST FOR PROPOSAL #25-01

Effectiveness of Wearable Safety Lights for Nighttime Workers

PROJECT INFORMATION

Funds: $175,000 total (includes a required 25% cost share of $43,750 from proposing agency)

Estimated Contract Term: 24 months

Projected Start Date: 8/16/2025

Posted Date: 04/01/2025
Close Date: 04/30/2025 at 11:59 p.m. CST

Submit Proposals to:
ICTProjectManagement@illinois.edu

BACKGROUND

LED technology for worker safety is an emerging field with limited research on its effectiveness in specific contexts such as nighttime roadwork. Existing studies primarily explore LED lighting for general safety improvements, but few focus on rigorous comparisons of competing products across various criteria such as brightness, color, durability and user feedback in real-world environments. The TRID (Transport Research International Documentation) and RIP (Research in Progress) databases show ongoing studies related to construction zone safety and reflective gear. However, the effectiveness and efficiency of personally worn LED systems in transportation work zone environments are not well understood.

Many commercially available options exist for personally worn lighting to provide enhanced visibility for workers. Some of these options are marketed to runners, bicyclists, law enforcement and construction workers. These devices are available in different colors. The energy efficiency of LEDs makes it possible for these devices to work while consuming very little energy. The technology spans from lights integrated into hard hats, vests and other garments, to lights that can be attached to clothing workers wear. The amount of light these devices produce varies widely. In addition, their size, cost and ability to be recharged also varies.

A literature review, a small component of this project, shall identify the published studies related to this project. In addition, the literature review shall identify products to be considered for testing in this project.

OBJECTIVE

This research shall provide the Illinois Department of Transportation with a systematic and scientific approach for selecting the most effective LED lighting for worker safety. Testing under varied environments shall generate data to inform policy, reduce crashes and improve visibility across nighttime operations throughout Illinois. The project shall quantify safety enhancement and worker effectiveness due to the use of personally worn LED lighting.

The expected outcomes include specific recommendations for personally worn LED lighting configurations (colors, intensities) tailored to different job functions and work environments. The project's outcome is expected to increase worker safety, reduce crash rates and generate cost savings through the adoption of effective lighting technologies.

RESEARCH TASKS AND REQUIRED DELIVERABLES

The research should include the following tasks:

Task 1 — A current state-of-knowledge report to determine the following:

a) Completed and ongoing studies on personally worn LED lighting.
b) Selected state departments of transportation and other agencies' specifications as they apply to personally worn lighting technologies.
c) Commercially available products and technologies.
d) Existing specifications, policies and guidance for required illumination of light systems.
e) State and federal minimum requirements for nighttime work activities, including requirements for nighttime work in the *Manual on Uniform Traffic Control Devices*.

Task 2 — Recommended illumination levels (maximum and minimum levels) for LED devices worn by workers in various highway activities.

Task 3 — Deployment of several commercially available products (number and types to be determined in coordination with the Technical Review Panel) in various applications for active road work including at a minimum lighted urban work areas and dark rural areas, emergency patrol applications, nighttime construction and night maintenance.

Task 4 — Site investigations of nighttime work area projects and visibility tests in controlled areas to evaluate the effectiveness of various products on safety and worker efficiency.

Task 5 — Final report: Assimilate all the findings and develop a recommended nighttime lighting specification appropriate for the Illinois Department of Transportation.

INSTRUCTIONS FOR SUBMITTING A PROPOSAL

The proposal shall be prepared in accordance with the guidelines presented in Appendix A.

By submitting a proposal, potential principal investigators are acknowledging they have read and understand the IDOT/ICT PI responsibilities and Guidebook and terms and requirements under the current IDOT-ICT Intergovernmental Agreement (IGA).

Technical questions regarding the research project or RFP procedures should be submitted to the ICT Project Management team via email at ICTProjectManagement@illinois.edu within 14 days of the posting date. Technical questions and answers will be posted on ICT's website as they are received.

SPECIAL CONDITIONS FOR REVIEWING PROPOSALS AND AWARDING ICT FUNDS

Please note that the following conditions will be applied when reviewing all received proposals and in awarding ICT funds:

1) Preference will be given to Illinois universities (both public and private) when multiple proposals from this solicitation are reviewed and have identical scores.

2) The award of this project is contingent upon the availability of funds at the time of award.

APPENDIX A:
Guidelines for Preparing Proposals for the Illinois Center for Transportation

Please use the following format when submitting Illinois Center for Transportation proposals for consideration. Proposals should be a maximum of 15 pages (excluding the cover page, itemized budget, budget justification and optional appendices) with a minimum 11pt font, standard margins and in an Adobe PDF format.

1. Cover Page

Please include the following information on the proposal cover page:

- RFP Number (e.g., RFP #25-XX)
- Proposal title
- Proposed Principal Investigator (and co-investigator, if any), along with associated organizations and email addresses.

2. Research Plan

Clearly and concisely address the proposed approach for solving the issue described in the problem statement. The research plan should be subdivided into the following sections:

(a) Introduction, Including Research Objective

Introduce the proposal and provide a concise overview of the research approach. Outline the objectives of the research project and explain the questions that will be answered by the research.

(b) Research Approach/Work Plan

Include details of the research project and strategies to accomplish the project objectives. Itemize the tasks and provide a clear explanation of the research approach, deliverables and identify the research team lead for each task.

(c) Anticipated Research Results

State the anticipated research results and deliverables.

(d) Expected Implementable Outcome(s)

All IDOT-ICT research is expected to be implementable. Describe what implementable outcomes (e.g., specification, test, recommendations, etc.) are anticipated that will facilitate implementation of the research results.

3. Qualifications and Accomplishments of the Research Team

Identify who will perform the research and provide a brief explanation of each researcher’s qualifications and related research efforts.

4. Other Commitments of the Research Team

Outline the other commitments of the research team to demonstrate the ability to fulfill the commitments of the proposal.

5. Facilities and Equipment

Describe the facilities and equipment available to conduct the research.

6. Timeline Requirements

Include a timeline of the research project's tasks in this section. Describe the required time to complete the research, including final report preparation, ICT's editing process, review of the report by the Technical Review Panel and publication of the report. Please note the final report must be submitted in Section 508 compliant format at least three months before the project's end date. Below is an example of a project timeline.

Project Milestones (Assuming an August 16 Start Date, and a 24-month project)		2025					2026											2027							
		8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
1	**Kickoff Meeting**																									
2	**PI conducts Project Task X**																									
3	**PI conducts Project Task XX**																									
4	**PI conducts Project Task XXX**																									
5	**PI conducts Project Task XXXX**																									
6	**PI conducts Project Task XXXXX**																									
7	**PI writes DRAFT report**																									
8	**PI Submits Final DRAFT report to ICT for editing**																									
9	**ICT Preliminary editing phase**																									
10	**PI/TRP editing phase**																									
11	**Final editing phase**																									
12	**Report published**																									
	(Quarterly Progress Reports Due)																									
	(TRP Meetings)																									

7. Itemized Budget

Provide an itemized project budget including the cost of personnel, consultants, subcontracts, equipment, materials, travel, indirect costs and cost share.

A minimum of 25% of the total project budget must be cost share from the proposing agency. Under the IGA effective July 1, 2024, the indirect cost rate used for institutions with a federally negotiated F&A rate cannot exceed 42.97% of the modified total direct costs. If the proposing agency does not have a federally negotiated rate, a 10% de minimis rate must be used.

Subaward costs from outside the proposing agency cannot exceed 50% of the total project budget without prior approval.

A part of the cost share requirement may be fulfilled using unrecovered indirect costs. Any proposal submitted by an agency outside the University of Illinois system that plans

to use unrecovered indirect costs as cost share must submit a request for approval to IDOT/Federal Highway Administration. More information on this letter will be provided if a proposal is selected for funding.

Please utilize ICT's budget templates when submitting a proposal: UIUC Budget Template and Subawardee Budget Template.

8. Budget Justification

Include a budget justification that explains the itemized budget in narrative form. The budget justification shall provide sufficient detail so there is a clear understanding of how the project costs were calculated and why they are necessary. The narrative discussion of the project cost categories and related line items should be presented in the same order as they appear in the itemized budget. If the project requires the purchase of equipment, out-of-state travel, or out-of- or in-state conference registration/attendance expenses, please list and explain here.

*Under the terms of our IGA, equipment is defined as any tangible or intangible product, having a useful life of **two years or more**, an acquisition cost of at least **$500**, and solely purchased for use in the IDOT-ICT project. Equipment purchased on IDOT-ICT projects is to be returned to IDOT at the conclusion of the project, unless otherwise agreed upon. Equipment purchases on IDOT-ICT projects must have a **signed** pre-approval.*

*Travel expenses should include, but are not limited to, travel to TRP meetings, travel for testing / sampling, etc. Any out-of-state travel expenses and **any** conference expenses charged to the project must have a **signed** pre-approval.*

Inclusion of equipment and travel expenses in the project budget and workplan does not meet the requirement for pre-approval. Signed, pre-approval request forms must be submitted prior to purchase of any equipment or travel meeting the above criteria to be considered allowable expenses on the project. Expenses not meeting this requirement may not be reimbursed.

9. Cooperative Features (if appropriate)

If assistance or cooperation is required from other agencies, public or private, to complete this proposed research, describe the plans for securing this assistance.

10. Appendices (if appropriate)

References or any additional materials deemed necessary may be provided here.