Deliverables and Reporting Requirements for UTC Grants Awarded in 2023 (June 2023)

**Intelligent Transportation Network Decision Support**

**with Real-time Routing and Data Analytics**

# Exhibit D

**Recipient/Grant (Contract) Number:** University of Nebraska-Lincoln: University of Iowa 69A3552348307

# Center Name: Mid-America Transportation Center

**Research Priority:** Promoting Safety

# Principal Investigator(s): Dr. Ibrahim Demir (PI), Dr. Ann Campbell (Co-PI)

**Project Partners:**

**Research Project Funding:** Federal: $90,000; non-Federal: $90,000

**Project Start and End Date:** 06/01/2023 – 07/31/2024

**Project Description:** In the face of natural disasters, such as flooding, communities grapple with profound social, environmental, and economic upheavals. Transportation infrastructure emerges as the backbone of recovery, yet flooding often jeopardizes its functionality, cutting off access to critical services. In direct alignment with the strategic goals of enhancing safety, addressing climate-related challenges, and pioneering transformative solutions, this project seeks to innovate how communities respond to and navigate during such crises.

We envision a real-time interactive data analytics framework that revolutionizes transportation network analysis, routing, and wayfinding amidst disasters. This advanced tool aims to empower emergency service workers, providing them with real-time insights to navigate flood-stricken networks effectively. Beyond that, the broader community benefits by gaining immediate access to evacuation routes, temporary shelters, and emergency supply storage points.

To bring this vision to life, we'll weave in state-of-the-art wayfinding techniques, integrating dynamic data streams from the DOT and federal agencies, ensuring timely flood updates. Our pilot will be rooted in Iowa's cities, historically vulnerable to floods, offering a tangible model for real-world impact. But our vision doesn't stop there; the framework's potential will be augmented with AI-driven decision recommendations and voice-enabled AI assistants. By factoring in multifaceted system and environmental variables, from road capacity to geospatial constraints, we're ensuring a comprehensive, adaptive, and forward-thinking solution, laying the foundation for a safer, more resilient future in transportation during disaster events.

**US DOT Priorities:** The project is relevant to the following strategic goals: Climate and Sustainability, Safety, and Transformation.

**Outputs:** In the first year of the project, we will focus on the development of a comprehensive database, web-based decision support system, and routing analysis functions. Development of a comprehensive database includes integrating data for transportation networks, flood maps, and infrastructure data in Iowa. Web-based decision support system development includes a mapping interface with data analytics functions and database integration. Routing analysis functions including shortest path, evacuation, and rerouting capabilities.

**Outcomes/Impacts**: By introducing a real-time interactive data analytics framework, the project has the potential to revolutionize disaster response on a national scale, ensuring more efficient and effective recovery efforts. The incorporation of advanced AI technologies will foster innovation in transportation and emergency management sectors, setting a new standard for data-driven decision-making. Furthermore, the research's emphasis on safety and resilience can instill a sense of confidence and security among communities, fortifying social trust in both technological advancements and governance. As we pilot this initiative in Iowa's flood-prone cities, we'll be creating a replicable model that can be adapted for other disaster scenarios and geographies, promoting a future where communities worldwide are better equipped to face, respond to, and recover from natural calamities.

**Final Research Report:** (Upon completion of the project, provide URL link to final report.)

U.S. Department of Transportation

**Office of the Secretary of Transportation**