NSPE-OH ™TOLEDO CHAPTER OHIO SOCIETY OF PROFESSIONAL ENGINEERS

2021 2nd Quarter

NEWSLETTER

TOLEDO SOCIETY OF PROFESSIONAL ENGINEERS

Message from James Gonya, President, TSPE

Thank you all for a great year. Even with all the hard times TSPE held CPD hours throughout the year virtually. As well as grow as an organization. TSPE also won the OSPE Engineers Week Observance Award-Overall. Thanks to our great E-Week Committee. In closing I would just like to say. It has been an honor to serve as the TSPE 2020-2021 President, thank you.

2021 TSPE Golf Outing

The 2021 TSPE Golf Outing will be held on September 10, 2021, at the Legacy Golf Club. Proceeds from the outing are used to provide scholarships to local engineering students. The outing will be a scramble format with a 9:30 am shotgun start. Please see our website (tspeohio.com) or contact Trent Hathaway (thathaway@hullinc.com) for additional informa8on. Hope to see you there!

Chapter Officers 2020-21

President – James Gonya, EI
President-Elect – Laurie Adams, PE
State Rep - Travis Rhoades, PE
Secretary - Alexandra Anhwere, PE
Treasurer - Trent Hathaway, PE
1st Past President – Vincent DiPofi, PE
2nd Past President - Richard Martinko, PE

Trustees 2019-21

Bernadette Caris
Ariya Fathi, PE
Ahmed Hamid, PE
Dean Michael Toole, Ph.D., PE

Trustees 2020-22

Joe Cherry, PE
Douglas Nims, Ph.D., PE
Mike Pniewski, PE
Richard Springman, PE

Student Chapter President

Jennifer Abney

TSPE Board Meetings 4:30 pm

September 1st, 2020
October 6th, 2020
November 3rd, 2020
December 1st, 2020
January 5th, 2021
February 2nd, 2021
March 2nd, 2021
April 6th, 2021
May 4th, 2021
July 13th, 2021

Dr. Liang Cheng Appointed Chair of Electrical Engineering and Computer Science

Dr. Mike Toole, PE, Dean of the UToledo College of Engineering, is pleased to announce the appointment of a new Chair of Electrical Engineering and Computer Science. Dr. Liang Cheng arrives at UToledo from Lehigh University and has more than 18 years of experience in creating and fostering new research and education programs. His research focuses on Cyber-Physical Systems and the Internet of Things and is geared toward enabling intelligent infrastructure through inter-disciplinary projects. As the principal investigator, he led a DOE project (Keystone Smart Grid Fellowship Program) that enhanced the sustainability of the Energy Systems Engineering Institute at Lehigh University and the Power and Energy Initiative at the University of Pittsburgh. He was a founding member of the INE cluster (a research cluster in Integrated Networks for Electrical, Information and Financial Flows) at Lehigh University. Leading a multidisciplinary team of researchers from 20 universities and institutes in 6 countries, he co-edited a book on Underground Sensing published by Elsevier Academic Press in 2018. Cheng obtained his Ph.D. degree in Electrical and Computer Engineering from Rutgers, The State University of New Jersey in 2002. He has been a Computer Science and Engineering faculty at Lehigh University and advised 2 postdocs, 7 doctoral candidates to their graduation, and supervised 25 Master's degree theses since 2002. Cheng takes his passion for diversity, equity, and inclusion in collaborating with colleagues to spearhead policy changes during his service on the Faculty Senate and as a Faculty Tri-Chair of the Council for Equity and Community at Lehigh University.

Project Spotlight – SR 795 Smart Corridor Initiative.

The Wood County Port Authority in conjunction with the Ohio Department of Transportation (ODOT) District 2, has hired HDR consultants is to study an area of Wood County, Ohio bounded on the West by I-75; on the North by Wales Road; on the East by I-280; and on the South by US 20 ("SR 795 Corridor"), it is anticipated that there will be a vast increase in roadway traffic creating many logistic and safety issues which makes it necessary that a Safety and Congestion Analysis be completed for this area

The primary purpose of the study is to identify, quantify, and examine current and future potential safety and congestion-related issues along the SR 795 Corridor. HDR will conduct an inventory of potential environmental red flags that may need to be considered if proposed improvements are performed in their vicinity. HDR will identify a variety of SMART countermeasures that could mitigate these safety and congestion issues. HDR will prepare a draft list that prioritizes these countermeasures based on a comparison of the potential benefit or improvement to safety and congestion to the cost of the countermeasure. A team of University of Toledo graduating seniors participated. They prepared a parallel study as a CAPSTONE project. Here is a link to the UT CAPSTONE report. https://www.youtube.com/watch?v=V-7jBv23rhg. Please take a look at the video.

The workshop brief is included in the newsletter.

March 4, 2021

SR 795 SMART CORRIDOR
WORKSHOP BRIEF

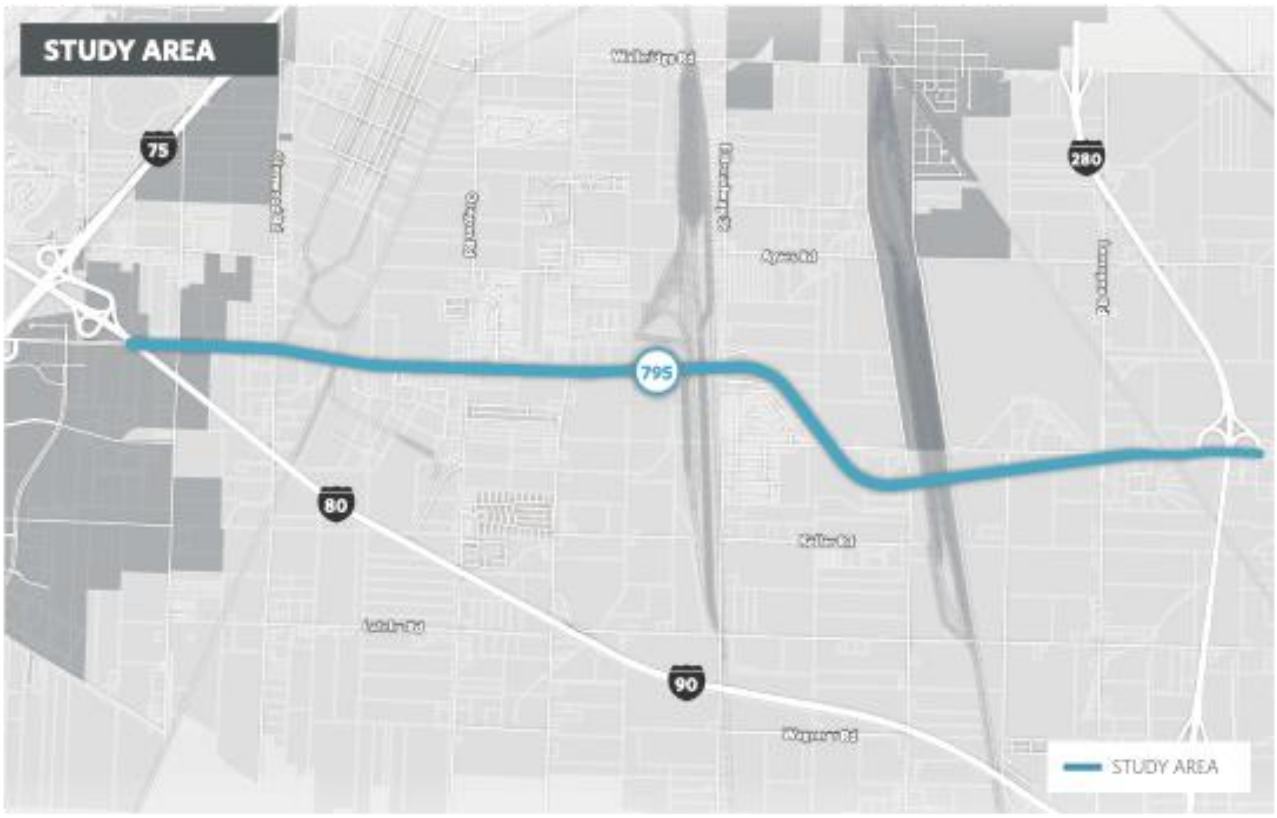
Introduction

This document aims to inspire creativity, energy, and productivity at the upcoming workshop for the SR 795 Smart Corridor project. It presents preliminary background information for consideration in order to facilitate effective brainstorming among workshop participants.

Project Overview

The State Route 795 (SR 795) Smart Corridor project aims to investigate and conceptualize potential transportation technology strategies for the corridor. Wood County Port Authority will collaborate with the consultant team and stakeholders to identify the vision for the future of the corridor. A technology concept will be identified that has buy-in from stakeholders and highlights the region in a positive, innovative light. Steps will be identified for future implementation and funding opportunities.

This workshop is occurring at the outset of the study to facilitate initial brainstorming on concept development. The study will conclude in May 2021. The schedule is deliberately short in order to quickly move from a blank slate to a preferred vision and technology concept for the corridor.



Workshop Agenda

- Introductions
- Vision Statement
- Current Technology Initiatives
- Presentation of Potential Concepts
- Additional Concepts
- Discussion
- Finalization of Focus Area/Concept
- Review Project Stakeholders

Potential Corridor Concepts

Concepts discussed to date internally among the project team include six potential focus areas. A focus area can be described as the "hook" or "elevator pitch" that summarizes the essence of the corridor's future.

Potential Focus Areas:

Traffic Management - Technologies, infrastructure improvements, and programs to optimize the safety and reliability of the existing and planned transportation system.

Connected Vehicles - Connectivity enables vehicles, roads and other infrastructure, and smartphones to communicate and share vital transportation information through advanced wireless communication technology.

Automated Vehicles - The ability for a vehicle to navigate and operate without human intervention. These systems have been progressing rapidly over the last several years.

Drones - Technological advances in unmanned aerial systems (UAS) using lower altitude airspace can increase efficiency and improve resiliency of the ground transportation network.

Smart Infrastructure - An ecosystem that intuitively responds to the needs of the world around it.

Electrification - Technological advances, economic forces, and public policy support continued growth in the electrification of the country's vehicle fleet.

Potential Concepts

A concept, for the purposes of the workshop discussion, provides additional detail about the types of improvements that will be planned for the corridor. To date, the project team has identified fifteen potential concepts to consider. These concepts are summarized briefly below to facilitate effective brainstorming among workshop participants. A goal is to eliminate several concepts quickly, while also identifying concepts with potential promise. Participants are encouraged to review this list and bring additional new ideas to highlight at the workshop. Together, the workshop participants will collaborate on identifying concepts to advance for further consideration.

TRAFFIC MANAGEMENT

General Purpose Traffic "Queue Jump" Lanes

General purpose traffic queue jump lanes provide safe passing of pedestrian vehicles from slower moving trucks by holding trucks at traffic signals ("truck only" signal phase) in a dedicated approach lane. Queue jump lanes are traditionally a component of transit facilities by allowing buses to enter traffic flow at a signalized intersection in a priority position. If applied on SR 795, queue jump treatments could alter the application to trucks and cars, thereby reducing corridor delay and increasing travel reliability.

Dynamic Exclusive Truck Lanes/Truck Restrictions During Key Times

Separation of trucks and regulations on movements at certain times of day provide opportunities for improved safety, fewer conflict points, and improved mobility. In this concept, trucks could be limited to the inside lane of SR 795 during AM and PM peak travel times for all or a portion of SR 795. Right hand turns would be prohibited for segments of the corridor where there are high turning movements and vehicles entering the mainline.

Grade Separation of Freight at Key Intersections

This concept would separate truck and passenger vehicle traffic at key intersections to provide continuous movements for trucks along SR 795. Grade separation is a treatment to reduce conflict and improve reliability where multiple modes or speeds may interact. By separating the different movements and characteristics of trucks and cars, intersection safety and travel time reliability can be improved. Infrastructure improvements to create an underpass or overpass at key intersections will

enhance the flow of trucks by eliminating starting and stopping. Truck emissions and noise would be reduced.

Consolidate Access Using Frontage Roads
Access management can reduce potential conflict points and improve travel time. The approximately 6-mile SR 795 corridor has roughly 45 driveways. The corridor can reduce conflict from slow moving vehicles turning onto SR 795 or off-of SR 795 by consolidating access points using frontage roads, or consolidated driveways. A successful implementation will reduce potential driver confusion and enhance safety.

Dynamic Reduction In Cross-Traffic Turning Movements Based Upon Traffic, Time-Of-Day, Etc.
Restrictions on cross-traffic turning movements based upon time of day and traffic conditions could facilitate mainline throughput. Roadway conditions can change throughout the day as adjacent schools begin and end, warehousing facilities change shifts, or traffic incidents cause delays. Through dynamic monitoring and signage, cross-traffic turning movements could be managed as needed to address roadway conditions.

Larger Staging Zone For Mid-Intersection Turning Movement
Midblock turning movements have potential to impact safety and operations of a corridor. As SR 795 traffic growth occurs in future years, mid-intersection turning movements may need to be improved. Increased size of the median staging zone for midblock turning movements could increase safety at select locations.

CONNECTED VEHICLES

Connected-Vehicle Based Freight Traffic Signal Priority
Connected vehicle technology offers opportunities to enhance the movement of freight along SR 795. Truck signal priority can mitigate truck operational issues and improve efficiency of the transportation network. By communicating from vehicle on-board units to traffic signals, registered trucks can be prioritized for green lights so there is less stopping and starting and faster movement of goods. Installation of Cellular V2X radio would enable freight signal priority and Signal Phase and Timing (SPaT).

AUTOMATED VEHICLES

Dedicated Automated Vehicle Lane
Automated vehicles are undergoing testing and deployment in mixed traffic conditions throughout the world. The next decade will be an exciting time for self-driving innovation, with rapid advances in technology shifting closer to high levels of vehicle automation. Roadway infrastructure and policies can assist in the shift to automated vehicles by designating a lane of SR 795 as an automated vehicle lane. While the complexities of a real-world roadway environment still create challenges, SR 795 could be a testbed for automated vehicles that advances the industry's understanding of benefits and impacts.

DRONES

"Air Traffic Control" for Ground-Based Freight
Portable and tethered drones could be used for traffic control, emergency response, and work zone safety. Drones would provide guidance to freight in innovative ways that provide a connection between private industry innovation and ongoing Ohio initiatives. DriveOhio is moving drone research and smart mobility forward by testing unmanned aerial vehicles for monitoring traffic and road conditions. Companies such as Amazon have applied for patents on a variety of aerial freight delivery methods.

Air Freight Hub
Toledo Executive Airport is a unique asset along the SR 795 corridor that can be leveraged for the next generation of aerial technology. This concept creates an automated drone air freight hub at the airport. SR 795 would become a drayage road between the airport and warehouses along the corridor. Customers could pay to fly freight along the turnpike median to combination vehicle lots. The air freight hub could become an innovative national testbed that creates synergies among the corridor's public assets and private businesses.

SMART INFRASTRUCTURE

Self-Healing Concrete Road

This concept provides an opportunity to repave all or portions of SR 795 with self-healing concrete or asphalt to lower maintenance costs due to truck traffic. Bio-concrete is a self-healing form of concrete designed to repair its own damage from wear and tear. This could promote truck traffic by reducing future maintenance. Self-healing technologies could increase environmental sustainability by requiring less reconstruction over time.

Conductive Concrete

The region could promote the "always-open corridor" by reducing weather-related traffic impacts. Conductive concrete could melt snow and ice, particularly on overpasses, turning locations, or other crash-prone areas due to weather. This concept provides an opportunity to repave all or portions (e.g. overpasses) of SR 795 with conductive concrete that heats when electrified to melt snow and ice. Solar power would provide an innovative power source using a solar field at the airport, thereby using existing resources to move innovative ideas forward.

ELECTRIFICATION

Promote Industries in Area to Adopt Electrification

This multifaceted concept includes the potential for grant funding and policy initiatives such as designation as an Alternative Fuel Corridor. Infrastructure upgrades, such as installation of DC fast chargers at Turnpike facilities, would promote electric vehicles for drayage operations and long-haul routes. Coordinated promotion of electric vehicles is effective in creating buy-in among stakeholders. For instance, matched with other initiatives, the central Ohio region has outpaced national rates of electric vehicle adoption as a result of targeted Smart Columbus outreach to corporate leaders.

Traffic Signal Renewable Energy Test Bed

Renewable energy traffic signals with monitored power backup could provide an opportunity for innovative use of solar power. This concept would include installation of a solar farm at the airport, which would be used to provide energy to power some or all of the signalized intersections. Backup power would provide robust safety and resiliency. Ongoing observations about the frequency of backup power utilization could provide insight into future deployments. This concept provides an opportunity for the SR 795 corridor to be a laboratory for solar power and electrification.

In-Pavement Wireless Power Transfer (WPT) Test Bed

An "Energy Innovation Corridor" could brand SR 795 as "the" corridor for research and development on the use of renewable and battery-electric technologies. An In-Pavement Wireless Power Transfer (WPT) Test Track could test a variety of use cases for inductive charging. This concept could include 100 feet of inductive charging at six intersections and 0.25-mile on Turnpike to create variable speed tests. The deployment would create High-Speed, Low-Speed, and Stopped real-world test track for inductive charging.

Conclusion

This SR 795 Smart Corridor Workshop Brief aims to prepare participants for the types of discussion and collaboration that will occur at the upcoming workshop. Participants are encouraged to bring ideas that build upon existing corridor assets and private sector initiatives in the region. This workshop is occurring at the outset of the study to facilitate initial brainstorming on concept development. Together, workshop participants will make the most of this opportunity to create the vision, focus area, and future concept for the SR 795 Smart Corridor.