MEETING NOTES
Iowa Advisory Council on Automated Transportation (ATC)
Economic Development (EcDev) and Infrastructure Readiness (IR) Joint Subcommittee Meeting
Tuesday, January 24
11:00 am - 12:00 pm CT

Action Items: None

1. **Welcome and introductions** – Erin Mullenix, Infrastructure Subcommittee Chair
   a. Attendees – 39 attendees
      - Erin Mullenix – Iowa League of Cities (IR Chair)
      - Rick Peterson – Iowa Economic Development Authority, (EcDev Chair)
      - Brian Mulcahy – Des Moines Airport Authority
      - Colonel Nathan Fulk – Iowa State Patrol
      - Abbie Christophersen – Iowa Economic Development Authority
      - John Gibson – Iowa Division of the Federal Highway Administration
      - Ray H. Warner – Aureon
      - Dave Ness – City of Dubuque
      - Eric Minge – SFR Consulting
      - Peter Rafferty – Cambridge Systematics
      - Marcus Coenen – Felsburg Holt & Ullevig
      - Austin Wilson – Velodyne
      - Rob Denson – Des Moines Area Community College
      - John Davis – City of Des Moines
      - Mickey Shields – Iowa League of Cities
      - Heather Thomas – Marshalltown PWD
      - Derek Snead – Jones County
      - Eric Porter – Iowa Communications Network
      - Eric Johnson – Arnold Motor Supply/The Merrill Company
      - John Hartog – Northwest Iowa Community College
      - Neal Hawkins, Skylar Knickerbocker – Iowa State University, InTrans
      - Dan McGehee, Omar Ahmad, Cherie Roe – University of Iowa, National Advanced Driving Simulator
      - Newman Abuissa, Tina Greenfield, Kelli Huser, Peggi Knight, Andrew Lewis, Donna Mutalac, Garrett Pedersen, Jim Schnoebelen, Adam Shell, Emma Simmons, Toni Smith, Mark Van Dyke, Andrea White, Brian Worrel – Iowa DOT

2. [**Strengthening Mobility and Revolutionizing Transportation (SMART) Grants Program**](#)
   Application, Des Moines International Airport – Brian Mulcahy, Assistant Executive Director, Des Moines (DSM) Airport Authority
      a. Brian Mulcahy is the Assistant Executive Director for the Des Moines Airport Authority. He has been with the Authority since 2011, previously serving as the Director of Finance and Administration. In this role Brian is responsible for overseeing the daily operations of the Des Moines International Airport. Prior to joining the Authority in 2011, he held management positions in auditing, financial accounting, and operations within the insurance industry.

b. Numerous projects are currently underway or planned for the Des Moines Airport. Construction for the future terminal will begin next year. It will include 5- 6 new gates, a baggage claim, ticket counters, and a security checkpoint. A di-icing pad is being added in a central location away from the gates. This should allow the di-icing process to happen more quickly and easily in the mornings. Aircraft parking is being added which will take over one of the commuter parking lots. This is necessary because there isn't enough room currently and the construction will eliminate a few more. The designated automated vehicle (AV) lane mentioned in the SMART grant application will likely not proceed if the SMART grant is not funded.

c. The SMART grant application was initiated to address several problems with transporting passengers from a distant parking lot to the airport terminal. The AV offer the ability to provide a reliable shuttle that will be able to operate all day without a river. This should lead to higher reliability and throughput while increasing passengers' confidence levels. The ability to operate without a driver may solve the problem with the driver shortage. If the AVs are also connected, they will provide an opportunity to communicate key information about the terminal to the passengers (e.g., TSA checkpoint que times).

d. The DSM airport authority partnered with Stantec Generation AV because they had several AV projects in the US. Other partners on the project are Foth (civil engineering airport projects), BBS architects in Des Moines (electrical work at airport) and AON (risk management).

e. The grant highlights that there will be a dedicated AV lane. To minimize risk, this lane would separate AVs from most of the traffic. Unfortunately, the AV Lane still would have to deal with three intersections (car rental place, de-icing area, gate onto airfield). The AV Lane would start south of airport. It would enter the gray lot on the east side, go through the middle, stop at the parking shelters to pick up passengers and then go back towards the terminal then loop back around.

f. Three potential selling points for this project. A semi-controlled environment with a dedicated AV lane and minimal intersections. One way to try and manage AVs at the intersections could include using gates. Another possibility would be to augment the route with other shuttles. These could be used during peak times. This may be necessary when demand is high anyway since many AV shuttles can only have about 6-10 passengers. The existing and ongoing shuttle user base allows for high AV usage and data. Project reat opportunity for data sharing and replication potential for other smaller airports or smaller colleges that might be able manage traffic.

g. Questions
    i. Omar Ahamad (UI) – asked if a safety driver would be utilized? Also asked about Brian's understanding of challenges with intersections.
        i. Brian - The goal is a driverless solution.
        ii. Brian - Knows that many AVs still have safety drivers. Understands that it would be better to avoid the intersections however they are unavoidable. Mitigation solutions will be considered if the grant is funded.
    ii. Adam Shell (IDOT) – provided insight to the group that even if the SMART grant doesn't work out this time, that there will be opportunities to submit additional proposals in the future as.
    iii. Adam encouraged Brian to find an opportunity to personally ride in an AV shuttle. Adam encouraged Brian to reach out to Minnesota DOT (MNDOT)

regarding their AV shuttle deployment that lasted about a year. The MNDOT route isn't closed like the project airport is proposing but a lot of lessons learned from the project. MNDOT is struggling with electrification, especially in winter months. Adam is interested in having MNDOT present at an upcoming meeting.
- i. Brain indicated that electrification is known issue for airport as they need more electrical shuttles and electrical charging needs for rental companies.
- iv. Daniel McGehee (UI) commented that it important to consider in these kinds of project is that "driverless" doesn't mean that no one is monitoring the vehicle. AVs generally require a support team to monitor the vehicles when they are operational. Often these personnel can be more expensive than an hourly shuttle driver. Some companies have found how expensive these operations personnel can be on the front end but also on the operational side.
  - i. Brian mentioned that the airport has an operation center 24/7 that could potentially be used to monitor the vehicles if necessary.
- v. Austin Wilson (Velodyne) shared a thought (through chat) about using pedestrian detection systems that communicate with your AVs might be useful for intersection concerns.
- vi. Toni Smith (IDOT) identified herself as the person that Brian should reach out to when the times come to obtain titles and registrations for the AVs.

3. **IR Tactical Updates** – Neal Hawkins & Skylar Knickerbocker, InTrans (Iowa State University)
   a. Engagement with SAE on-Road Automated Driving (ORAD) Committee
      i. Neal and Skylar met with Lisa Spellman, Director of Vulnerable Road User Safety Consortium (VRUSC) and George Nicols with Toyota Motor North America.
      ii. Lisa informed InTrans about VRUSC which is part of a larger SAE Consortia. Neal and Skylar shared updates to Lisa regarding InTrans projects related to infrastructure, pedestrians, and visibility. Lisa, Neal, and Skylar have plans to continue the discussion at an upcoming conference in Phoenix.
      iii. George shared information about the work being doing within the various SAE committees.
   b. Pavement markings
      i. Scott Marler was on the radio recently to talk about pavement markings and why they cannot be seen at night.
      ii. Iowa is working to improve pavement markings statewide. This will benefit all motors as well as vehicles with ADAS. An improvement was made to use a more durable material, an epoxy. Contrast stripes include 10 foot of a white skip followed by a 10 foot of black skip. The width of the stripes has been increased from 4 to 6 inches. The white skip includes an additional recoverable material, a bead, that should help with visibility at night when it is wet. The modifications should last longer and increase visibility
      iii. A paper, Crash Modification Factors for Contrast Pavement Markings on Light-Colored Pavement was recently published that examined contrast pavement markings. The study focused on three high-speed roadway configurations (four, six, and eight lanes) in urban and suburban areas. The findings suggest that the contrast pavement markings reduced roadway departures between 5 and 29% and resulted in economic savings that greatly outweighed the additional costs to

pavement markings. These appear to be improving visibility, driver behavior and roadway departures.

    iv. *Question:* Newman Abuissa (IDOT) asked about the durability of the new pavement marking and if there were any studies that have checked the reflectivity over time. Neal replied that MNDOT has been monitoring the retro reflectivity and they are comfortable with getting 3 - 4 even up to 7 years once it is in a groove.

c. Automating audible attenuator warning system

    i. Iowa DOT had an audible system with a huge speaker that has been instrumented on the attenuator trailers for road paint crews. This project worked to automate this alerting system. The system incorporates cameras, radar, artificial intelligence (AI) to automatically identify threats and send the appropriate warning (light and/or sound) as needed. Audible tone is very loud.

    ii. Ten trucks are equipped, however there isn't much data be collected at this time since it isn't painting season

    iii. Virginia DOT will be equipping three trucks.

d. [Work Zone Data Exchange (WZDx)](#)

    i. The WZDX is part of U.S. DOT [Data for AV Integration (DAVI)](#) Initiative to improve data for AV integration. IDOT has been involved since 2018. The goal is to enable infrastructure owners and operators (IOOs) and other agencies owning the roadways to provide work zone data to third parties (OEMs, mapping companies) to be able to consume it. This is intended to be an open specification, where IOOs and OEMs can collaborate about what might be the best way to share the data. Several state DOTs as well as representatives from local agencies, General Motors, Google, Waze, and others are involved.

    ii. Currently IDOT is using version 4.1. Version 4.2 release will be coming out soon.

    iii. US DOT is pushing for wide scale adoption. As of October 2022, 11 state DOT and the National Park Service have active WZDx data feeds, with an additional 7 to 10 feeds expected.

    iv. WZDX in Iowa is part of a demonstration grant from IDOT. Started publishing with version 4.0 in September 2022. Smart arrow boards will update the location of the work zone, which provides a verified location and time of when the work zone is active which improves the accuracy of the data to provide better alerts to the vehicles.

e. Connected temporary traffic signals

    i. Other devices have been tested to be used in work zones, and the connected traffic signals was selected. These signals would provide similar data as the smart arrow board to identify locations of work zones more precisely.

    ii. The initial deployment was to occur in 2024 however the decision was made to delay the implementation of the devices in Iowa so that Iowa could follow a broader specification to be used nationally, rather than the Iowa specific standards.

    iii. Iowa coordinated with other manufactures and state agencies to develop the Traffic Signal Object within WZDx 4.1 which allows for the WZDX the ability to identify the traffic signal.

    iv. Testing to begin in 2024. Current plan is to require connected traffic signals to be connected in 2025.

f. FHWA Emerging data in work zones

      i.   Literature review and agency interviews have been completed regarding how others are using connected vehicle data to improve safety in work zone whether it is through alerting, identification of lane closures or performance measures (from the braking events). Some sources are using movement data to identify the back of the que location. Performance measures are used to identify the amount of congestion related to the hard braking events. The presence of dynamic speed feedback signs showed a 5 mph decrease in median speeds.

      ii.   The next step is to include up to three case study locations for implementing connected vehicle data. The plan is for one to be in Iowa and two elsewhere.

4. **Economic Development Update**
   a. There have been some staffing changes at the Iowa Economic Development authority, who were leading some subcommittee objectives related to the workforce of the future. Rick and Adam are exploring opportunities and have had early conversations with staff at Iowa Workforce Development to get them involved with the labor and workforce related activities while working to potentially engage with a variety of K-12 and post-secondary education agencies.
   b. We will also be providing awareness to other subcommittee or upcoming council meetings that may be opportunities for economic development leaders in the state to participate to stay engaged and informed on the latest related to advanced technology advancements and deployments.

5. **Recent & Upcoming Activities**
   a. **Policy & Legislation Subcommittee Meeting** – Wednesday, February 8 from 10:00 – 11:00 a.m. *AV Insurance 101 – Steve Miller, Innovation Lead, Insurance Office of America*
   b. **Public Safety & Enforcement Subcommittee Meeting** – Wednesday, February 15 from 2:00 – 3:00 p.m. *Partnership for Analytics Research & Traffic Safety (PARTS) – Chris Wiacek, Co-Chair of ADAS Effectiveness Working Group, National Highway Traffic Safety Administration*
   c. *ADS for Rural America Webinar #3: Rider and Safety Driver Experience* – Thursday, February 2 from 1:00 – 2:00 p.m. – *Cher Carney, Cheryl Roe and Omar Ahmad, University of Iowa, National Advanced Driving Simulator*

ATC JOINT SUBCOMMITTEE MEETING

Economic Development & Infrastructure Readiness
January 24, 2023

Automated drive
Destination: 50° 43' 50.34" N   6° 10' 55.294" E
Arrival: 08:55 pm - Distance 783 miles

TCP/IP:192.56.327.684.1
SYNC: enabled | Sensors: active | Cameras: active

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MEETING AGENDA

1. **Welcome and introductions** – Erin Mullenix, Infrastructure Readiness Subcommittee Chair & Rick Petersen, Economic Development Subcommittee Chair (5 minutes)

2. **<u>Strengthening Mobility and Revolutionizing Transportation (SMART) Grants Program</u> Application, Des Moines International Airport** - (25 minutes)
   a. Brian Mulcahy, Assistant Executive Director, Des Moines Airport Authority

3. **IR Work Plan Tactical Updates** – Neal Hawkins & Skylar Knickerbocker, InTrans (Iowa State University) (25 minutes)
   a. Engagement with SAE On-Road Automated Driving (ORAD) Committee
   b. Pavement markings
   c. Audible attenuator
   d. Work Zone Data Exchange (WZDx)
   e. Connected temporary traffic signals
   f. FHWA Emerging data in work zones

4. **EcDev Subcommittee Update** – (5 minutes)

5. **Recent & Upcoming Activities**
   a. Policy & Legislation Subcommittee Meeting – Wednesday, February 8 from 10 – 11 am
   b. Public Safety & Enforcement Subcommittee Meeting – Wednesday, February 15 from 2:00 – 3:00 p.m.

WELCOME AND INTRODUCTIONS

Erin Mullenix –

Infrastructure Readiness Subcommittee Chair

Rick Petersen –

Economic Development Subcommittee Chair
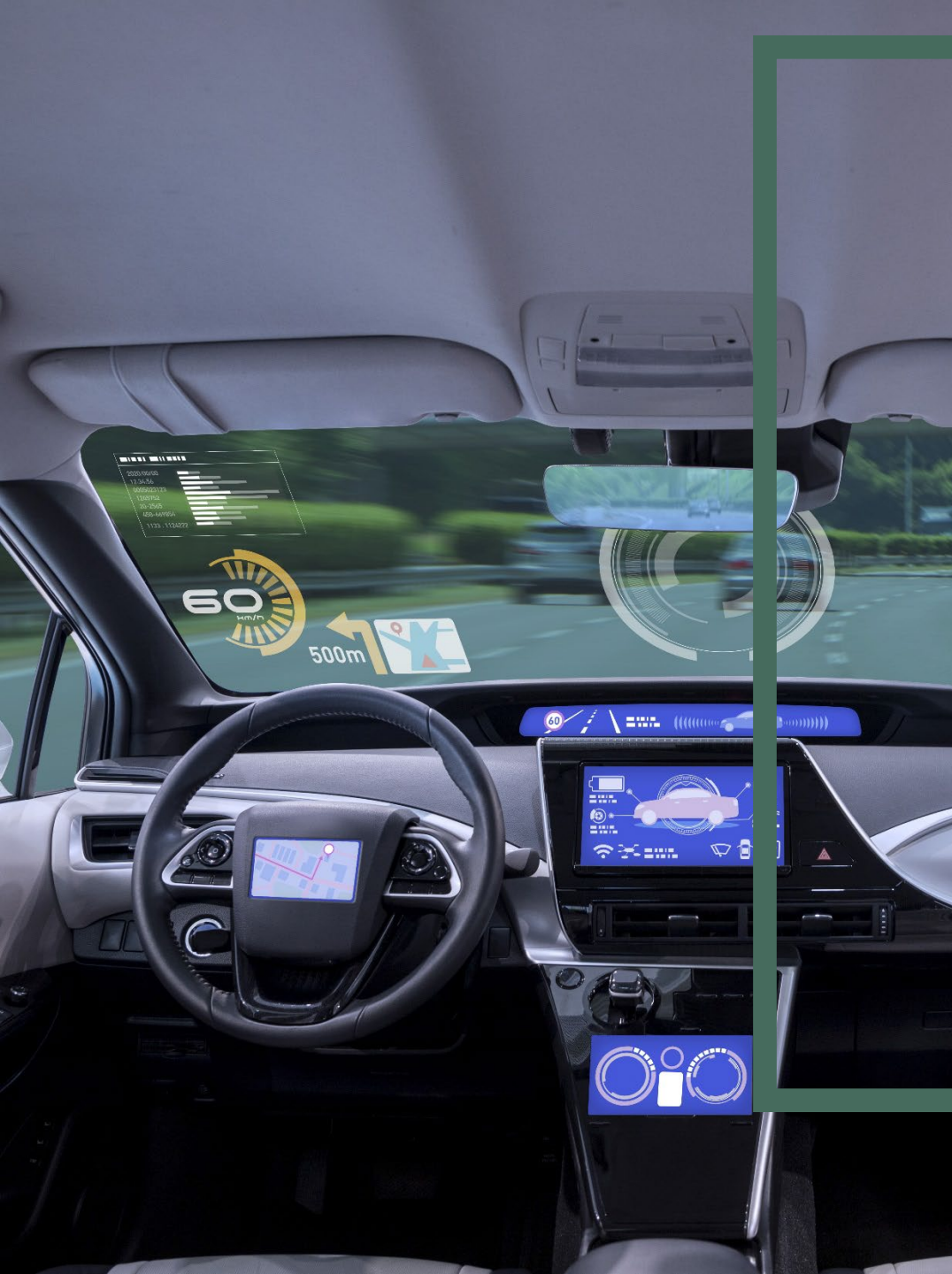
STRENGTHENING MOBILITY AND REVOLUTIONIZING TRANSPORTATION (SMART) GRANTS PROGRAM APPLICATION, DES MOINES INTERNATIONAL AIRPORT

Brian Mulcahy – Assistant Executive Director, Des Airport Authority

SMART Grant process

- What problem are we trying to solve?

- Who can we partner with on the project?
  - Credibility
  - Experience in the space
  - Knowledge of requirements

- Compressed timeline to apply

Des Moines International Airport Autonomous Vehicle (AV) Passenger Shuttles

DES MOINES International Airport

STANTEC GENERATION AV™

Foth

bbs ARCHITECTS

AON

DES MOINES International Airport
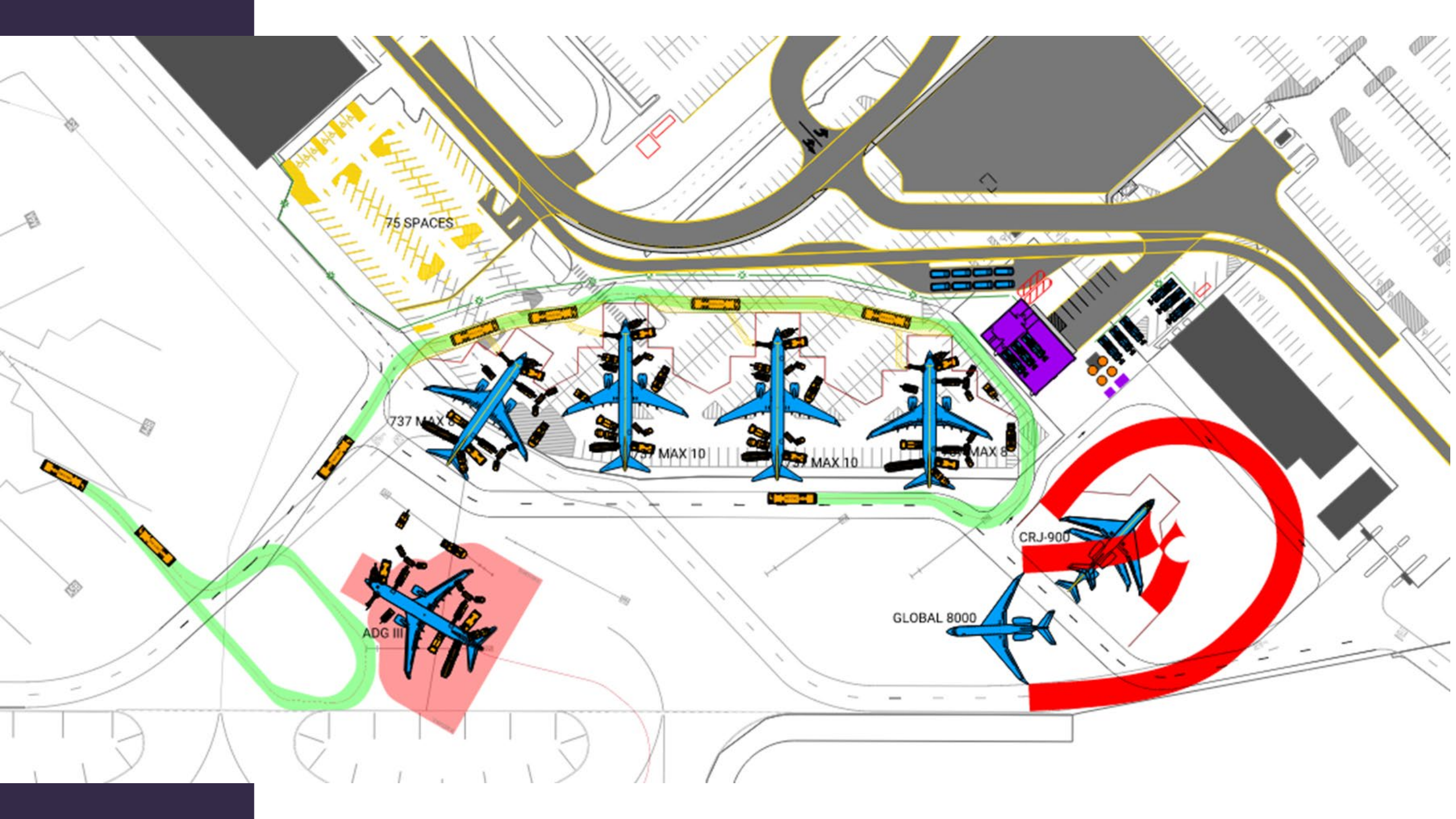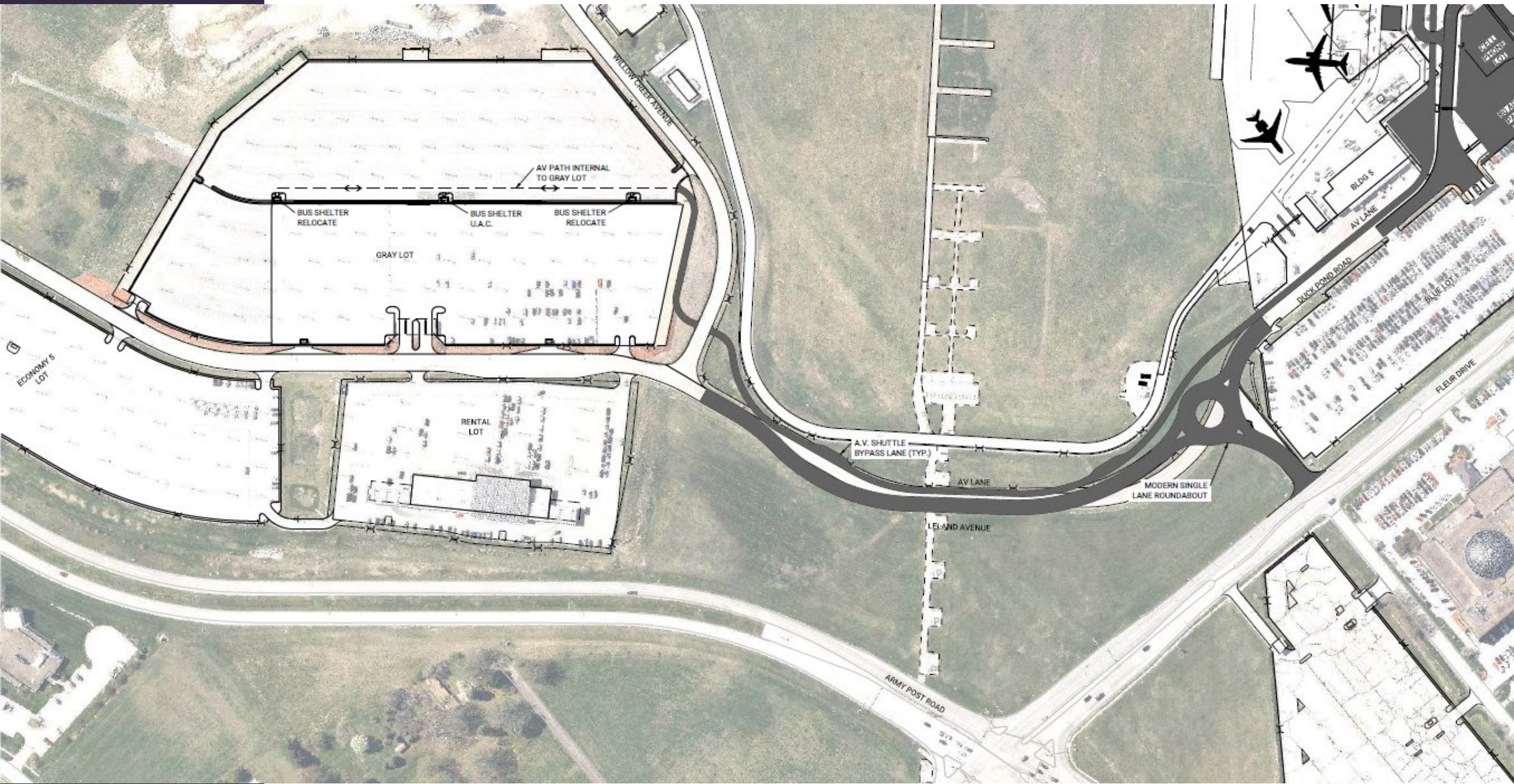
Potential selling points for this project

- Controlled environment for the AV

- Data sharing and replication potential

- Existing and ongoing shuttle user base

IR WORK PLAN TACTICAL UPDATES

Neal Hawkins & Skylar Knickerbocker, InTrans (ISU)

- **Engagement with SAE On-Road Automated Driving Committee (ORAD)**
- Pavement markings
- Audible attenuator
- Work Zone Data Exchange (WZDx)
- Connected temporary traffic signals
- FHWA Emerging data in work zones

Iowa Advisory Council on Automated Transportation
Economic Development & Infrastructure Readiness Joint Subcommittee Meeting
January 24, 2023

IOWA STATE UNIVERSITY
Institute for Transportation

Neal Hawkins

Skylar Knickerbocker

IOWA DOT

ENGAGEMENT WITH SAE ON-ROAD AUTOMATED DRIVING (ORAD) COMMITTEE

Lisa Spellman, Director Vulnerable Road User Safety Consortium™ (VRUSC)

George Nicols (Toyota Motor North America)

Lisa Spellman, Director Vulnerable Road
User Safety Consortium™ (VRUSC)

George Nicols
(Toyota Motor
North America)
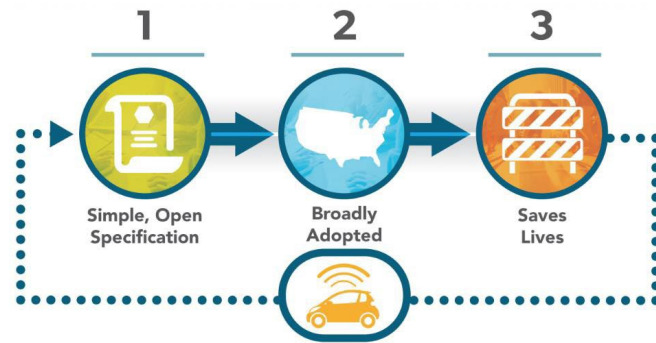
ATSSA

IR WORK PLAN TACTICAL UPDATES

Neal Hawkins & Skylar Knickerbocker, InTrans (ISU)

- Engagement with SAE On-Road Automated Driving Committee (ORAD)
- **Pavement markings**
- Audible attenuator
- Work Zone Data Exchange (WZDx)
- Connected temporary traffic signals
- FHWA Emerging data in work zones

PAVEMENT MARKINGS

WHO radio

PAVEMENT MARKINGS

New 6" wide line (lasts 4 years)

Old 4" wide line (lasts 1 year)

I-29 Sioux City

- Based on the findings, contrast pavement markings are believed to be effective at reducing Roadway Departure Crashes on the three high-speed roadway configurations tested—four, six, and eight lanes —in urban/suburban areas.

- They provide crash reductions resulting in economic savings related to crash costs that greatly outweigh the additional cost of contrast pavement markings.

- The findings suggest contrast pavement markings reduce RwD crashes between **5% and 29%** on all roadway types and severity levels

Crash Modification Factors for Contrast Pavement Markings on Light-Colored Pavement

IR WORK PLAN TACTICAL UPDATES

Neal Hawkins & Skylar Knickerbocker, InTrans (ISU)

- Engagement with SAE On-Road Automated Driving Committee (ORAD)
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AUTOMATING THE AUDIBLE ATTENUATOR WARNING SYSTEM

AUTOMATING THE AUDIBLE ATTENUATOR WARNING SYSTEM

- **Equipped all 10 trucks**

- **Collecting data in non-paint situations due to time of year**

- **Automate triggering this coming paint**

IR WORK PLAN TACTICAL UPDATES

Neal Hawkins & **Skylar Knickerbocker**, InTrans (ISU)

- Engagement with SAE On-Road Automated Driving Committee (ORAD)
- Pavement markings
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WORK ZONE DATA EXCHANGE (WZDX)

Part of U.S. DOTs Data for AV Integration (DAVI) Initiative:

"Access to data is a critical enabler for the safe, efficient, and accessible integration of automated vehicles (AVs) into the transportation system"

Enables infrastructure owners and operators (IOOs) to make harmonized work zone data available for third party use

Get Involved @ https://github.com/usdot-jpo-ode/jpo-wzdx

WIDE SCALE ADOPTION

WZDx Activity

As of October 2022

Publishing a WZDx Feed
Developing a WZDx Feed
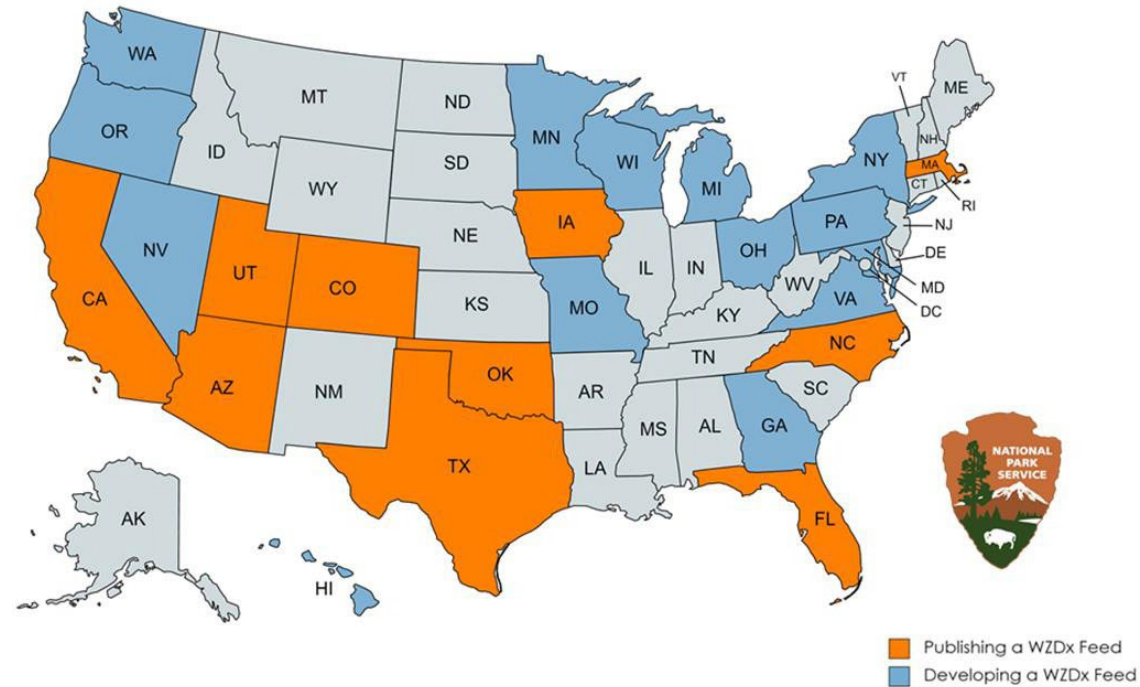
WZDX IN IOWA

Began publishing WZDx using Version 4.0 in September 2022

Updating work zones using smart arrow boards

Allows for verified location and time of work zone

Through 3rd parties, notification directly to vehicle
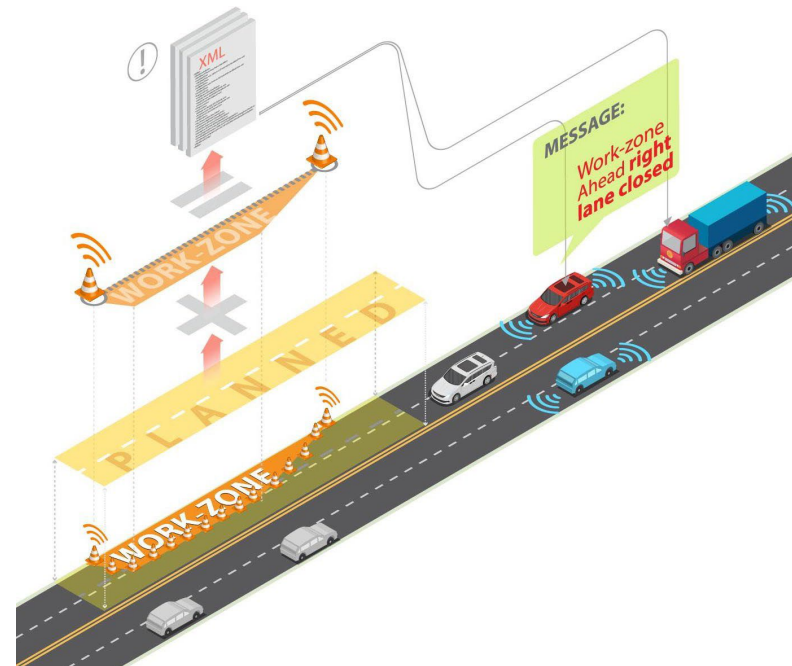
511 Work Zone

Arrow Board Data
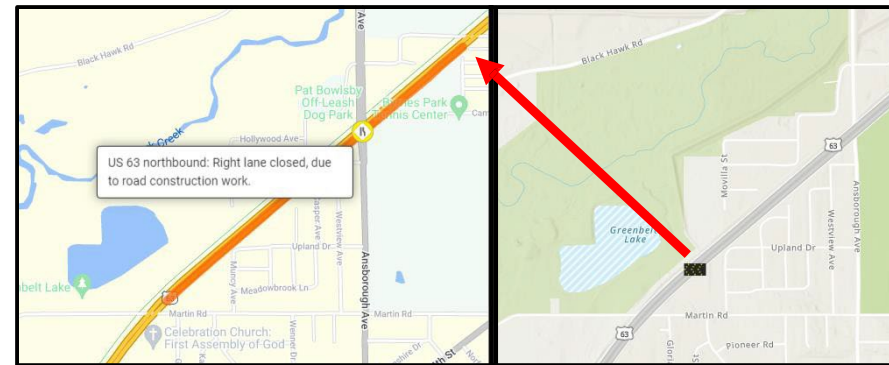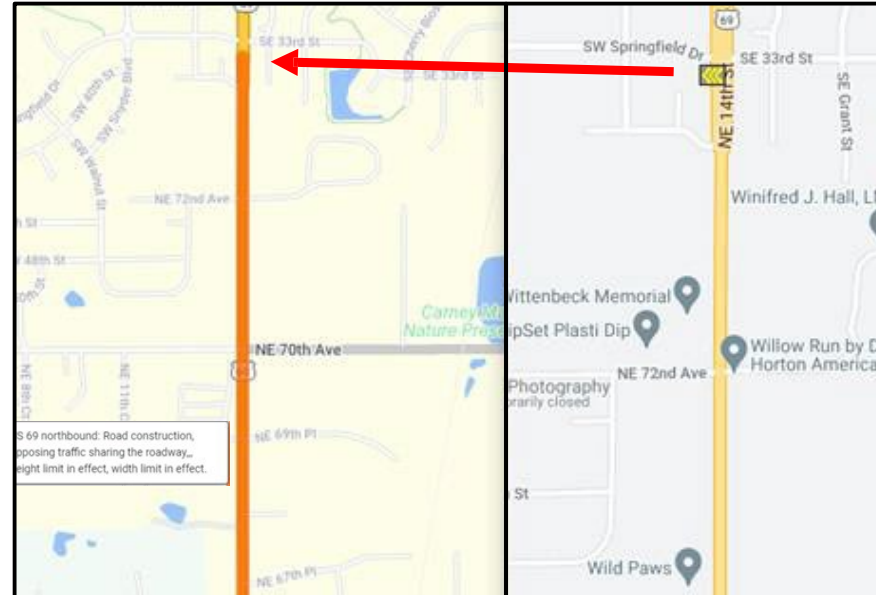
IR WORK PLAN TACTICAL UPDATES

Neal Hawkins & **Skylar Knickerbocker**, InTrans (ISU)

- Engagement with SAE On-Road Automated Driving Committee (ORAD)

- Pavement markings

- Audible attenuator

- Work Zone Data Exchange (WZDx)

- **Connected temporary traffic signals**

- FHWA Emerging data in work zones

CONNECTED TEMPORARY TRAFFIC SIGNALS

- Continuing expansion of connected work zone equipment similar to smart arrow boards

- Utilizing WZDx Device Feed for protocol instead of Iowa developed

- Traffic Signal Object in WZDx Version 4.1

CONNECTED TEMPORARY TRAFFIC SIGNALS

Will begin coordinating with manufacturers in 2023

Devices will be tested and added to MAPLE in 2024

Current plan to require temporary traffic signals to be connected in 2025

IR WORK PLAN TACTICAL UPDATES

Neal Hawkins & **Skylar Knickerbocker**, InTrans (ISU)

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- Work Zone Data Exchange (WZDx)
- Connected temporary traffic signals
- **FHWA Emerging data in work zones**

FHWA – EMERGING DATA FOR WORK ZONE SAFETY

Identifying emerging data that can be utilized for improving work zone safety

Connected Vehicle Data

- 6.3% Penetration Rate
- Ability to identify instantaneous back of queue and queue length
- Associating decreases in speed with geometric changes
- One crash for every 147 hard braking events in Indiana
- Countermeasure and policy evaluations

Probe Data

- Used for quantify crash rates in congested and non-congested conditions
- Used to estimate lane closures to minimize queues in Texas
- subXD data can allow for more granular analysis and can be used validate queue warning accuracy

Camera Analytics

- Requires complex processing to track multiple things
- Used to gain insights from existing camera network
- Uses include track trajectory, classifying vehicles, and identify incidents
- Ability to identify traffic cones using vehicle type cameras

LiDAR

- Simulation used to test intrusion warning system to alert workers
- Potential application for tracking resources and work zone progress
- Used for identifying traffic factors such as narrow lanes, short tapers, etc
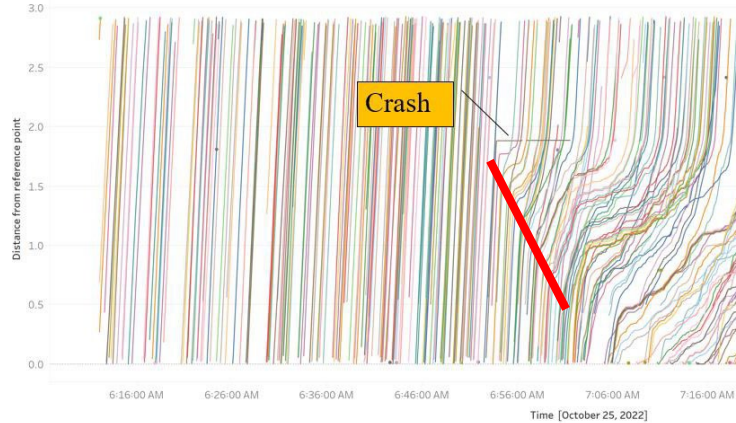
Smart Work Zone Devices

- Smart arrow boards have been used by Minnesota and Iowa
- Data being used in conjunction with WZDx
- Devices include queue warning and intrusion warning systems
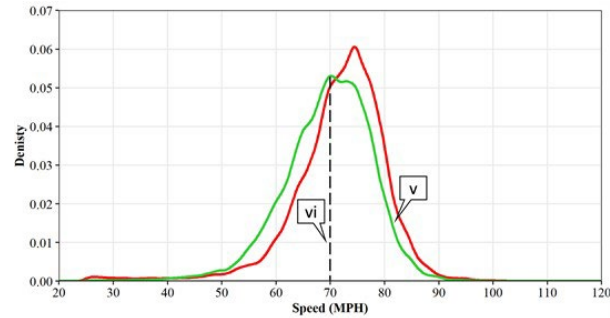- Smart vests can be used for geo-locating and warning workers

In-Vehicle Notifications

- Alabama incorporated alerts into their traveler information systems
- Multiple DOTs working to provide in-cab alerts to commercial vehicles
- Alerts provide through RSU, WZDx or dangerous slowdowns

IOWA STATE UNIVERSITY
Institute for Transportation

REACTOR
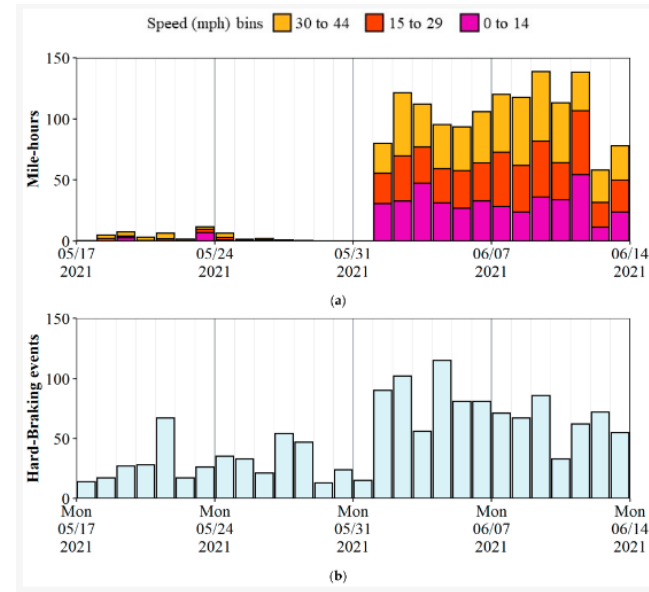Realtime Analytics of Transportation Data

FHWA – EMERGING DATA FOR WORK ZONE SAFETY

Accurate back of queue location

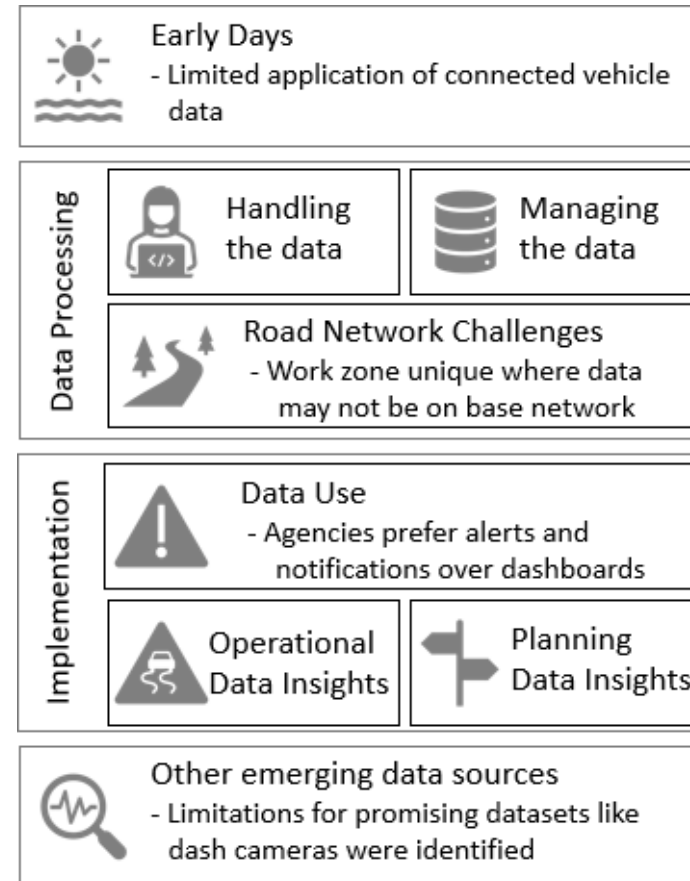Dynamic speed feedback signs had
5 mph decrease in median speeds

Performance Measures Before/After
Work Zone

FHWA – EMERGING DATA FOR WORK ZONE SAFETY

Literature review and agencies interviews completed

Next steps include identifying up to three case study locations for implementing use case

ECDEV SUBCOMMITTEE UPDATE

Rick Petersen, Economic Development
Subcommittee Chair

RECENT & UPCOMING ACTIVITIES

Policy & Legislation Subcommittee Meeting – Wednesday, February 8 from 10:00 – 11:00 am

- *Presentation title forthcoming – Steve Miller, Innovation Lead, Insurance Office of America*

Public Safety & Enforcement Subcommittee Meeting – Wednesday, February 15 from 2:00 – 3:00 pm

- *Partnership for Analytics Research & Traffic Safety (PARTS) – Chris Wiacek, Co-Chair of the ADAS Effectiveness Working Group at PARTS, National Highway Traffic Safety Administration*

ADS for Rural America webinar #3 – Rider and Safety Driver Experience – Thursday, February 2 from 1:00 – 2:00 p.m.

- *Cher Carney, Cheryl Roe, Omar Ahmad – University of Iowa, National Advanced Driving Simulator*

THANK YOU