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TECHNICAL COORDINATION COMMITTEE MEETING
December 10, 2024

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Opening Remarks and Introductions

The North Carolina Transportation Innovation Council (NC-TIC) Technical Coordination Committee (TCC) convened for its quarterly meeting on December 10, 2024, via Microsoft Teams. The purpose of the meeting was to provide the committee with key updates from the Federal Highway Administration (FHWA), key updates on NC-TIC changes, presentations from guest speakers, and the 2025 schedule for FHWA's State Transportation Innovation Councils (STIC) Incentive Program. The NC-TIC's mission is to cultivate a culture of collaboration within the North Carolina Department of Transportation (NCDOT), ensuring the swift adoption of significant innovations that contribute to the delivery of a contemporary, high-quality transportation system to the public.

Sarah Searcy welcomed attendees and introduced the meeting's agenda. The meeting's agenda, attendance, and the presentation slides are provided at the end of these minutes. Sarah shared that she will be taking over as the lead for the NC-TIC from Alyson Tamer moving forward. Sarah is the Emerging Technologies and Innovation Manager in NCDOT's Office of Strategic Initiatives and Program Support (SIPS). She has been with NCDOT for three years, previously as the Senior Advisor for Innovation in the Integrated Mobility Division where she managed the automated shuttle pilot program called CASSI for the division and led activities that evaluated emerging technologies and innovations for shared mobility through research, demonstrations, and pilots. Before her time at NCDOT, she worked at the Institute for Transportation Research and Education at NC State University for over eight years as an applied researcher and program manager.

FHWA Update

After opening remarks and introductions, **Sarah Searcy** welcomed **Yolonda Jordan**, Division Administrator of the North Carolina FHWA office, to provide updates on behalf of **Edward Parker**, the Deputy Division Administrator of the North Carolina FHWA office. Yolonda shared that the FY 2025 State Transportation Innovation Councils (STIC) Incentive Program funds are now available. $125,000 is available to North Carolina which is an increase from the $100,000 that was available two years ago. The NC-TIC decides which projects are selected to receive an award. In FY 2024, the NC-TIC selected a project to explore the use of Artificial Intelligence (AI) to improve vulnerable road user safety. Yolonda shared that projects based on AI was the fourth most frequent request of the top ten requests for funding throughout the country. From approximately 278,000 submissions, the top requests were next generation Traffic Incident Management (TIM) technology, Unmanned Aircraft Systems (UAS) drones for TIM, and digital as-builts. These requests were Every Day Counts (EDC)-7 initiatives.

Yolonda shared that FHWA has begun internally soliciting ideas for EDC-8 and that the Center for Accelerated Innovation plans to invite feedback from external stakeholders within the next two weeks. FHWA will set up a website and send out email announcements about the EDC-8 idea solicitation and the call for suggestions will be open for 60 days. FHWA anticipates unveiling the EDC-8 initiatives in November 2025.

Yolonda welcomed **Amit Armstrong** from FHWA to the meeting. Amit manages the Accelerating Market Readiness (AMR) Program and would be presenting on the program later in the meeting. Yolonda further shared that FHWA awarded $7.76 million in funding to eight states for the FY 2023 Accelerating Innovative Delivery (AID) Demo Program. The FY 2024 submissions have been reviewed and the solicitation for FY 2025 will open in February 2025.

Yolonda shared that FHWA is soliciting nominations for the STIC Excellence Awards through Friday, December 13, 2025. The awards program is run in partnership with Astro Innovation and Management Group. Awards have historically been announced at the American Association of State Highway and Transportation Officials (AASHTO) Spring Meeting.

Yolonda reminded the committee that progress reports on STIC Incentive Program projects and EDC initiatives are due twice a year, in May and in November, after the first project year. The next reports will be due by May 17, 2025.

NC-TIC Update

After the FHWA updates, **Sarah Searcy** provided updates on the NC-TIC and NCDOT's participation in FHWA's incentive programs. Sarah reminded the committee about the NC-TIC's purpose which is "to foster a collaborative culture within NCDOT for the rapid implementation of meaningful innovations to efficiently deliver to the public a modern, high quality transportation system."

The NC-TIC was established in 2011 as a part of FHWA's initiative to promote innovation at the state level within departments of transportation. NCDOT has focused on internal innovation, academic partnerships, and industry partnerships with support from FHWA partners and the agencies and organizations reflected in the TCC's membership. FHWA has established several incentive programs to encourage the consideration and deployment of technology and innovation. Through a multi-disciplinary collaboration process, the TCC is leading the consideration and approval of proposals for technical assistance and funding from the incentive programs.

The NC-TIC has coordinated proposals for the Accelerating Innovative Delivery (AID) Demo, State Transportation Innovation Councils (STIC) Incentive, and Every Day Counts (EDC) programs. The AID Demo Program provides a maximum of $1 million in funding to cover

the full cost of an innovation in a project. Eligible capital projects can be infrastructure, non-infrastructure strategies, and other activities, which incorporate proven innovative practices, or technologies intended to be adopted as a significant improvement from conventional practice. NCDOT was awarded funding through this program in the past. NCDOT was awarded funding for the Rocky Mountain Church Road, or SR 6000, bridge replacement in Anson County in 2015 and for the Harker's Island Bridge replacement in 2019. Both projects were implementing innovative construction practices and materials. In 2021, NCDOT submitted an application toward funding for a bridge rehabilitation in Ashe County but was not awarded. NCDOT is expecting to complete a debrief about the proposed project to gather feedback to improve the competitiveness of the proposal and future applications before participating in the next round of funding.

The STIC Incentive Program provides technical assistance and up to $125,000 in total funds per state to offset the cost of standardizing innovative practices. The program funds activities such as conducting internal assessments, initiating capacity building, developing guidance, drafting standards and specifications, organizing peer exchanges, and implementing system process changes. NCDOT has one recently completed project and three ongoing projects through this program. The recently completed project is titled "Creating Ladders of Opportunity to Advance NCDOT's Diverse Engineering Workforce." The project assessed and documented the current state and challenges of female engineers, including data analysis and staff interviews, and it recommended changes to the agency's organizational charts, position classifications, and promotional opportunities to improve representativeness and diversity in the workforce. The ongoing project, "Pilot Debris Removal Systems," will assess the viability and benefits of different debris removal systems installed on NCDOT's Incident Management Assistance Patrol (IMAP) vehicles. Integration of the equipment will allow IMAP drivers to remove debris from travel lanes without the IMAP responders needing to leave the protection of the vehicle. The ongoing project, "Development of Data Governance for Rail Division's Crossing Data," will review and recommend enhancements to the Rail Division's current processes and procedures regarding data collection, management, reporting, and publication/distribution for rail crossing data. The ongoing project, "Use of AI to Improve Vulnerable Road User Safety," will develop an Artificial Intelligence (AI) methodology as a proof-of-concept to extract data from turning movement counts and crash data involving vulnerable road users and analyze road safety. NCDOT expects to invite the points of contact for these projects to a future TCC meeting to share updates and findings.

EDC is a State-based model that identifies and rapidly deploys proven, yet underutilized innovations to shorten the project delivery process, enhance roadway safety, reduce traffic congestion, and integrate automation. Proven innovations promoted through EDC facilitate greater efficiency at the State and local levels, saving time, money and resources that can be used to deliver more projects. NCDOT is supporting five EDC-7 innovations across multiple teams in the department to take the innovations from the development stage towards institutionalization: Nighttime Visibility for Safety, Next Generation Traffic Incident

Management (TIM), Integrating Greenhouse Gas (GHG) Assessment and Reduction Targets in Transportation Planning, Rethinking Disadvantaged Business Enterprise (DBE) for Design-Build, and Strategic Workforce Development. Like for the active STIC Incentive Program projects, NCDOT expects to invite the points of contact for these efforts to a future TCC meeting to share updates and findings from their work.

More information about the NC-TIC and NCDOT's participation in FHWA's incentive programs is provided on NCDOT's webpage. This webpage provides overview information, program guidance, the NC-TIC charter, the TCC membership roster, meeting minutes, incentive program reporting and final reports, and details on other innovation activities at NCDOT, including value management/engineering and research and development.

Guest Speaker: Caitlyn Mabry – NCDOT's AI Approach

After the NC-TIC updates, **Sarah Searcy** welcomed **Caitlyn Mabry**, the Data and Information Branch Manager in NCDOT's Office of Strategic Initiatives and Program Support (SIPS), to share information about Artificial Intelligence (AI) strategy and implementation at NCDOT.

Caityln shared that her role and branch are new to NCDOT as of summer 2024. Caitlyn has been working in some form of enterprise IT management for more than 15 years and understands how AI can feel overwhelming at times. NCDOT is pursuing a more holistic strategy for tackling AI where lessons learned can be captured as use cases are tested and applied to future projects. NCDOT is supported by the Department of Information Technology (DIT) and is dependent on the department for infrastructure and development needs for AI. DIT has published an AI Framework for Responsible Use that includes guidance on responsible use of AI, what government agencies in North Carolina should and should not do with AI, and how to work in the AI space, as well as training materials. NCDOT expects to develop training specific to the agency's end users and what the AI space means for them.

Caitlyn explained that NCDOT and DIT are working together to better understand off-the-shelf AI technologies such as Microsoft Copilot which is expected to be enabled and piloted in early 2025. DIT has published some guidance on the use of Microsoft Copilot that NCDOT is currently assessing to inform how the agency will use the software.

The Data and Information Branch in NCDOT's SIPS was created based on a recognized need to have a consolidated approach to how data technology and AI are handled by the agency. Historically, each of NCDOT's individual business units would initiate a data improvement or technology project on an as-needed basis. The Data and Information Branch will be the coordinated resource on how to do data improvement or technology projects across the agency and will support cross-departmental awareness. So, if any individual business unit desires to pursue an AI project, the branch will act as the central source for best practices

and lessons learned as gathered from past and ongoing projects. The branch will finalize a department-wide strategy and governance plan by the end of 2024 that includes a current state assessment to document which teams in the agency are already using AI and the challenges to accomplish AI projects. The branch continues in the planning stage with the goal of implementation in 2025 including literacy training about what to consider when using AI.

Caitlyn explained that one of the Data and Information Branch's goals is to become a centralized clearinghouse of knowledge about activities across the department and a resource to help business units navigate how to accomplish their projects and duplicate work. The branch is working on a structure that includes a data, technology, and AI integrated governance model and advisory committees to help identify a comprehensive set of use cases, prioritize those that are most impactful to NCDOT, and ensure the infrastructure is in place to accomplish the high-priority use cases.

Caitlyn shared that the Data and Information Branch will work in 2025 to establish an NCDOT-specific policy around AI that is accessible to all staff and stakeholders. The policy will be informed by existing state and federal policies. The branch will also work to identify risk in its compiled use cases and determine ways to mitigate the risk. Mitigations may include best practices like keeping a human in the loop in AI processes to check and verify results over time and ensuring high data quality for inputs into AI tools. The branch will determine if NCDOT's infrastructure is ready to mitigate the risk including addressing privacy and security concerns, if NCDOT's staff are ready to use AI tools including providing training and educational resources, and if NCDOT's development pipeline is ready to respond quickly to changes in technology.

NCDOT has some AI use cases in development or production, including AI chat bots for program FAQs and Help Desks, AI-powered data extraction and organization for traffic incidents, AI-assisted estimate generation for structures, AI-powered image classification, AI-assisted invoice processing, and AI public sentiment analysis. Themes include using AI to connect customers to information more quickly and to speed up repetitive business processes. Caitlyn shared NCDOT's current automation and AI capabilities and footprint, including Microsoft Copilot engines, the Azure environment, and integration with existing systems like Outlook and SAP, and the goal of establishing a foundation of infrastructure to enable NCDOT to move use cases forward more quickly.

Caitlyn recommends starting small with AI use cases, including projects that are internally facing and allow NCDOT to collect lessons learned toward adjusting the process for improved success. Components of success include governance, human in the loop, automation, and predictability with the ability to verify results by requiring AI to produce an audit trail. The Data and Information Branch expects to create a repeatable process throughout NCDOT to gather lessons learned and to determine what works well and what does not work well.

Guest Speaker: Nick Short – NCDOT Photogrammetry Unit's Response to Hurricane Helene

Sarah Searcy next introduced **Nick Short**, NCDOT's Assistant State Photogrammetric Engineer and interim Director of the Division of Aviation, to share how his team used photogrammetry and LiDAR for rapid damage evaluation in the post Hurricane Helene response.

Nick explained that NCDOT's Photogrammetry Unit is involved in projects from inception to construction. The unit's first mission was conducted in March 1955. The unit has since flown over 11,000 missions successfully. Photogrammetry is the art, science, and technology of deriving 3D information from 2D images. Mapping is the unit's core business product. For the period 2014-2024, the unit averaged 92,780 acres mapped per year. 95% of the unit's projects are NCDOT-related. The unit partners with other state agencies on occasion, including to produce orthophotography digital mosaics to support planning for the North Carolina State Fair.

The Photogrammetry Unit also provides LiDAR mapping, volumetric earthwork calculations, topographic mapping, shell plan sheets, digital terrain models, and support for emergency response. The unit creates these products with crewed and unmanned aircraft technology. In 2001, North Carolina was the first state in the nation to fly large-scale, statewide LiDAR data collection to produce statewide mapping. The unit has also been involved in quality assurance, quality control, and partnering with North Carolina Emergency Management who has led the statewide LiDAR data collection since 2001.

In response to Hurricane Helene, the Photogrammetry Unit completed reconnaissance missions using manned aircraft to capture 4,162 exposures across 11 flights to image 1,591,406 acres in Allegany, Ashe, Avery, Haywood (I-40), and Watauga counties, Asheville, Batcave, Burnett Reservoir, Lake Lure, and US-19/NC-17. The unit determined that doing big blocks of photography was cheaper, easier to process, and easier to fly than doing individual corridors. Challenges included clouds, fog, and weather during the first week that prevented the unit from capturing imagery and large file sizes and numbers of files to organize and process with slow upload speeds (i.e., terabytes of data across thousands of files and dozens of upload hours). The unit was able to process the data in about a week and captured lessons learned to improve efficiency for future responses.

The data that were captured during the reconnaissance missions were primarily used for damage assessment to analyze changes from pre-hurricane imagery and other geospatial data and to identify areas that required immediate attention. The data were also used to visualize potential solutions for restoring transportation networks, help with route optimization, and for reporting to public stakeholders, management, and executive leadership. The data were even used to help with compliance with environmental regulations.

NCDOT's Division of Aviation helped manage and coordinate over 6,500 Unmanned Aircraft Systems (UAS) missions and counting in response to Hurricane Helene. The Photogrammetry Unit went out with the Division of Aviation's crew, typically from 5:00 a.m. to 6:00 p.m. each day, to fly, take videos, and take pictures before processing imagery into the evening.

Nick reiterated the challenge that clouds posed to accomplishing work. The Photogrammetry Unit worked with Location and Surveys and their external partner to fly a heavy lift UAS with a LiDAR sensor manufactured by Sky Front to capture imagery along I-40 at the Pigeon River Gorge. The partnership enabled a quick turnaround of preliminary data that was faster than if conventional photogrammetry was used. The unit completed the quality assurance and quality control in collaboration with Location and Surveys. The unit made cross-sectional imagery from the LiDAR data for the NCDOT administrative divisions to inform the redesign and rebuild of the damaged roadway along the approximately six-mile-long corridor that was flown. In addition to the cross sections, the unit created heat maps that document ground elevation differences resulting from the hurricane damage for scoping meetings and to communicate with resident and assistant resident engineers on construction projects. The maps compare historic elevations captured in the statewide LiDAR program data to the elevations derived from the post-hurricane data collection.

The Photogrammetry Unit has been working with North Carolina Emergency Management on statewide orthoimagery and LiDAR for Hurricane Helene impacted counties and expects to have the data processed by late 2025. Nick pointed out the benefits of LiDAR data collection, including how the technology can remotely detect through openings in vegetation, like spaces between branches, to produce imagery in areas that traditionally would require staff to go onsite and conduct fieldwork potentially in dangerous terrain or environments. The unit is also exploring Artificial Intelligence (AI) for computer vision, LiDAR imagery classification, and building footprints in partnership with the Department of Information Technology (DIT). Additional potential use cases include pavement crack detection, power line classification, damage assessment, and 3D linework extraction.

Guest Speaker: Amit Armstrong – FHWA's Accelerated Market Readiness Program

Sarah Searcy next introduced **Amit Armstrong**, FHWA's Accelerated Market Readiness (AMR) Program Manager, to share information about the program.

Amit explained that the AMR Program is a precursor to FHWA's other incentive programs that were previously described in the meeting in terms of how ready the technology is before it can be brought into the other programs (AID Demo, STIC Incentive, and EDC). For its Accelerating Innovation Programs, FHWA uses the Technology Readiness Level (TRL) scale and any technology that scores below a 5 on the scale is considered research or

applied research and not eligible for funding under any programs. Any technology that scores a 5 through a 6 on the scale is eligible for AMR Program funding, any technology that scores a 7 through a 9 on the scale is eligible for AID Demo or STIC Incentive program funding, and any technology that scores a 9 on the scale is eligible for the EDC initiative. The AMR Program is intended to bridge the gap between research and practice, while the AID Demo and STIC Incentive programs are intended to support project-level innovation and market ready/proven technology. The EDC initiative focuses on market ready and proven technology.

The AMR Program is relatively new with the first call for projects published by FHWA as a Broad Agency Announcement in 2019. A subsequent Broad Agency Announcement was published in 2024 as a five-year open announcement with multiple calls. FHWA expects a call for projects every two years. The EMR Program's goals are to provide an assessment of emerging innovations in a shared-risk environment, provide sound, objective, detailed, and coordinated evaluation and reporting, provide marketing and communication of AMR project findings through the National STIC Network and other stakeholder partners, and feed the EDC pipeline or other deployment efforts. FHWA anticipates that the program will bridge research and practice, so researchers and practitioners better understand each other's needs. Anticipated benefits include a spotlight on a wider range of innovations available for the transportation community to deploy, enhanced connections between the research and practitioner communities, enhanced use of available resources to capture and share knowledge and information on innovative practices, stronger engagement with the National STIC Network, and stronger engagement with AASHTO Innovation Management.

The 2024 call for projects has six focus areas: safety, shortening project delivery, infrastructure performance, climate and sustainability, equity, and digital twins and advanced simulation techniques. The AMR Program funds field studies and evaluations, "trial runs" on transportation projects, data collection and analysis, and documenting findings. The AMR Program focuses on technology in the applied research and development stages of readiness. Eligible awardees include state departments of transportation, local public agencies, Indian tribes, universities, private sector organizations, or partnership or consortium of the aforementioned and are limited to United States businesses only. Funding is up to $3 million with anticipated award dates from FY 2025 through FY 2027. The anticipated period of performance for projects is 12 to 24 months depending on the AMR topic and the awardee's work plan. Questions are due from potential applicants to FHWA by December 16, 2024 with white papers under Phase 1 of the application process due January 15, 2025 and proposals under Phase 2 of the application process due at a later date. White papers will be evaluated by FHWA based on technical merit, including support of USDOT and FHWA strategic initiatives and national goals, advancement of the current state of practice, potential demand for the innovation after AMR program support, technical approach, potential for future inclusion in EDC, project team experience, and funding availability.

2025 STIC Schedule

Sarah Searcy concluded the meeting by reviewing the 2025 State Transportation Innovation Councils (STIC) Incentive Program schedule. In February, the STIC application window is expected to open and by March, NCDOT will hold the next NC-TIC TCC meeting for the committee to review and confirm the scoring criteria for the applications. In April, the STIC application window will close and by May, NCDOT will provide a summary of the applications to the committee. The committee reviewers can provide questions to the applicants, and then those applicants can provide responses back to the reviewers on those questions. In June, NCDOT will hold another TCC meeting where applicants will present, and the committee will vote on the projects.

Also in the new year, **Sarah Searcy** will reach out to each member of the TCC to learn more about their experience on the committee and to check in on what is working well and what could work better toward any improvements to the committee structure and process.

2025 STIC Incentive Program Schedule

February
- STIC application window opens

March
- NC-TIC TCC Meeting – committee reviews and confirms scoring criteria

April
- STIC application window closes

May
- Summary of STIC applications distributed to TCC
- TCC reviewers provide questions to applicants
- Applicants provide responses to questions from TCC reviewers

June
- NC-TIC TCC Meeting – applicants present and TCC votes on projects

Adjournment

Sarah Searcy adjourned the meeting.

Attendance and Voting Members

Name	Organization	Role	Voting Member
Amit Armstrong	FHWA	Guest Speaker	
Yolanda Jordan	FHWA	Guest Speaker	X
Curtis Bradley	NCDOT	Member	X
Amna Cameron	NCDOT	Member	
Terry Canales	NCDOT	Member	
Matt Clarke	NCDOT	Member	X
Caitlyn Mabry	NCDOT	Guest Speaker	
Emily Richards	NCDOT	Member	
Jason Schronce	NCDOT	Member	
Sarah Searcy	NCDOT	Facilitator/NC-TIC Lead	
Nick Short	NCDOT	Guest Speaker	
Tunya Smith	NCDOT	Member	X
Alyson Tamer	NCDOT	Member	X
Julie White	NCDOT	Member	X
Victor Barbour	Carolinas AGC	Member	X
Kate Davison	NC LTAP	Member	X
Jiana Brown	HDR	Support	
Clare Fullerton	Jacobs	Support	
Voting Members Not in Attendance			
Jamal Alavi	NCDOT	Member	X
Kristin Barnes	NCDOT	Member	X
Robert Barrier	NCDOT	Member	X
Sam Boswell	Cape Fear RPO	Member	X
Ryan Brumfield	NCDOT	Member	X
Greg Dean	Carolinas CPA	Member	X
Jed Dixon	NCDOT	Member	X
Becca Gallas	NCDOT	Member	X
Chris Lukasina	NC Association of MPOs	Member	X
Brian Mayhew	NCDOT	Member	X
Amanda Olive	NCDOT	Member	X
Jason Orthner	NCDOT	Member	X
Edward Parker	FHWA	Member	X
Catherine Peele	NCDOT	Member	X
Ellis Powell	Carolina APA	Member	X
Tara Robbins	ACEC NC	Member	X
Lamar Sylvester	NCDOT	Member	X

Attachment A: Meeting Slides

NORTH CAROLINA
Department of Transportation

North Carolina Transportation Innovation Council (NC-TIC)

Technical Coordinating Committee (TCC) Meeting

December 10, 2024

Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina

Meeting Agenda

10:00 am	Opening Remarks – FHWA Update	Yolonda Jordan
10:05 am	Opening Remarks – NC-TIC Update	Sarah Searcy
10:10 am	NCDOT's AI Approach	Caitlyn Mabry
10:20 am	NCDOT Photogrammetry Unit's Response to Hurricane Helene	Nick Short
10:35 am	FHWA's Accelerated Market Readiness Program	Amit Armstrong
10:45 am	2025 Schedule	Sarah Searcy
10:50 am	Open Discussion	

FHWA Update

NC-TIC Update

NC-TIC Overview

The purpose of the NC-TIC is to foster a collaborative culture within NCDOT for the rapid implementation of meaningful innovations to efficiently deliver to the public a modern, high quality transportation system.

NC-TIC's activities are focused on three primary areas – **internal innovation, academic partnerships, and industry partnerships** – and supported by stakeholders and committees.

FHWA has established several incentive programs to encourage the consideration and deployment of technology and innovation.

Through multi-discipline collaboration, the NC-TIC leads the consideration and approval of proposals for technical assistance and/or funding from such programs.

NC-TIC Incentive Programs

Accelerated Innovation Deployment (AID)

- Provides a maximum of $1,000,000.
- Covers the full cost of an innovation in a project.
- Eligible capital projects can be infrastructure, non-infrastructure strategies, and other activities, which incorporate proven innovative practices, or technologies intended to be adopted as a significant improvement from conventional practice.
- Notice of Funding Opportunity (NOFO) (Opportunity No. 693JJ324NF-AIDDP) closed on May 28, 2024 – **not currently accepting applications**.
- The NOFO covered FY 2024-2026.

NC-TIC Incentive Programs

State Transportation Innovation Councils (STIC)

- Provides technical assistance and up to $125,000 in total funds per state to offset the costs of standardizing innovative practices.
- Funds activities such as conducting internal assessments, initiating capacity building, developing guidance, drafting standards and specifications, organizing peer exchanges, implementing system process changes, etc.

Project Name	Funding Year	Point of Contact	Status
Creating Ladders of Opportunity	2022	Julie White; Nastasha Earl-Young	Completed
Pilot Debris Removal Systems	2023	Jennifer Portanova	Ongoing
Develop Data Governance for Rail Division	2023	Todd Meyer	Ongoing
Use of AI to Improve Vulnerable Road User Safety	2024	Daniel Carter	Ongoing

NC-TIC Incentive Programs

EDC-7 Innovations

Innovations	Where we are now?	Where do we want to be in two years?	Point of Contact
Nighttime Visibility for Safety	Development Stage	Assessment Stage	Greg Hall; Shawn Troy
Next Generation TIM: Technology for Saving Lives	Development Stage	Assessment Stage	Dom Ciaramitaro; Jennifer Portanova
Integrating Green House Gas Assessment and Reduction Targets in Transportation Planning	Demonstration Stage	Assessment Stage	Heather Hildebrandt
Rethinking DBE for Design-Build	Development Stage	Development Stage	Lisa Wilson; Tonya Marriott
Strategic Workforce Development	Development Stage	Institutionalized Stage	Dan DeMaioNewton; Ebony Pittman; Ayanna Wallace

NC-TIC Incentive Programs

For more information, please visit NCDOT's NC-TIC webpage.

https://connect.ncdot.gov/groups/NCSTIC/Pages/default.aspx

- Overview information
- Program guidance, NC-TIC charter, NC-TIC TCC membership
- TCC meeting minutes
- Incentive program reporting and final reports
- Other innovation activities at NCDOT, including value management/engineering and research & development

NCDOT's AI Approach

NORTH CAROLINA
Department of Transportation

AI Strategy and Implementation at NCDOT

NCDOT Office of Strategic Initiatives and Program Support (SIPS)

Data and Information Branch

December 10, 2024

Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina

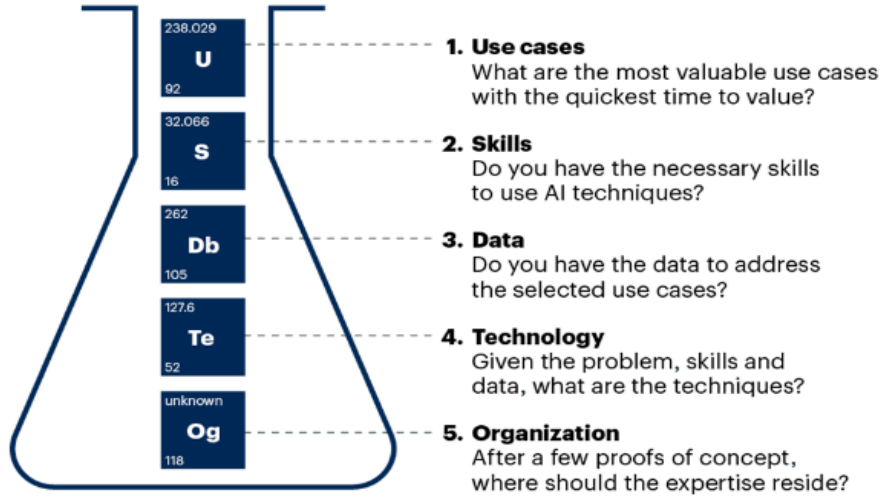
ncdot.gov

What is AI?

When do we use it?

How do we do it?

How do we go from disruptive to constructive?



Source: Gartner
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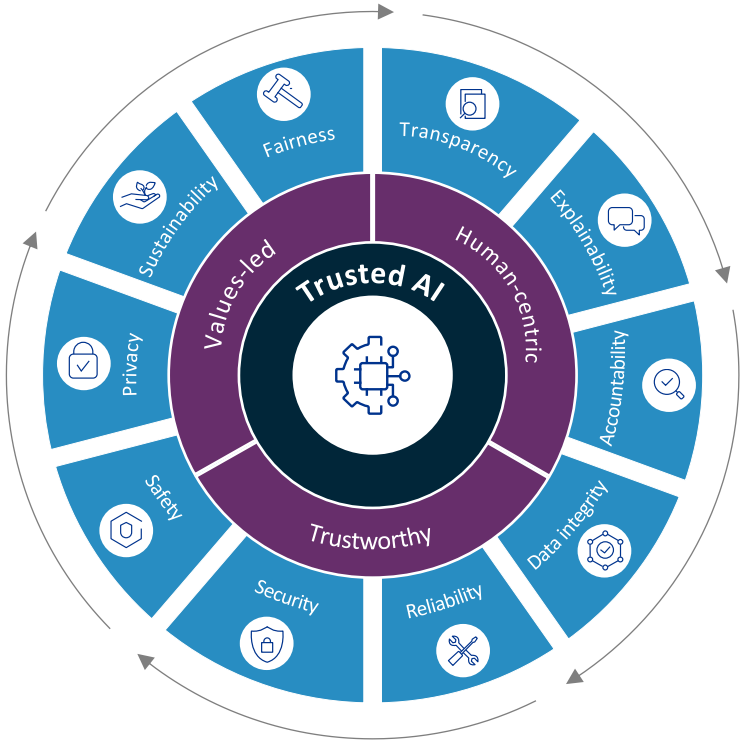
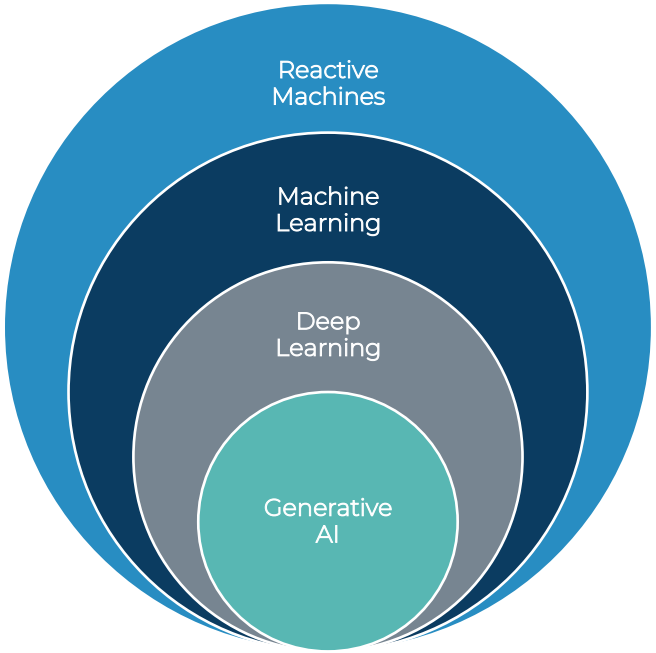
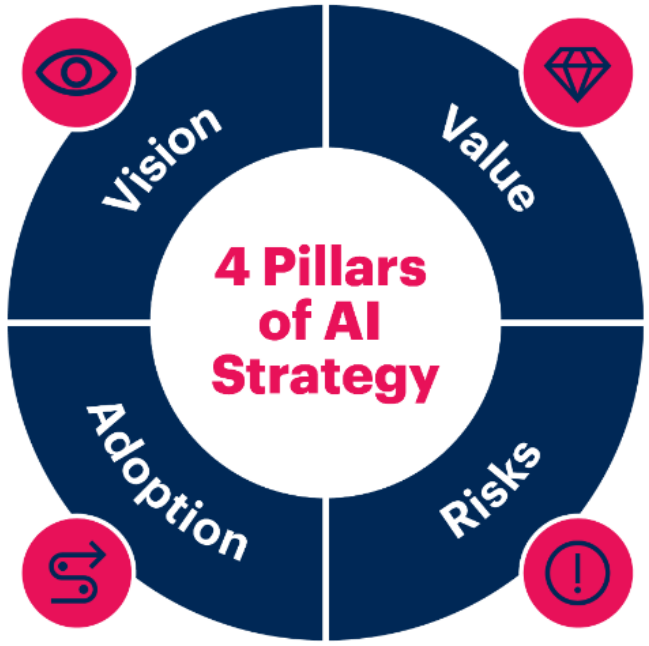
Gartner







Source: Gartner 2422900

AI in North Carolina State Government

Led by North Carolina Department of Information Technology (NCDIT)

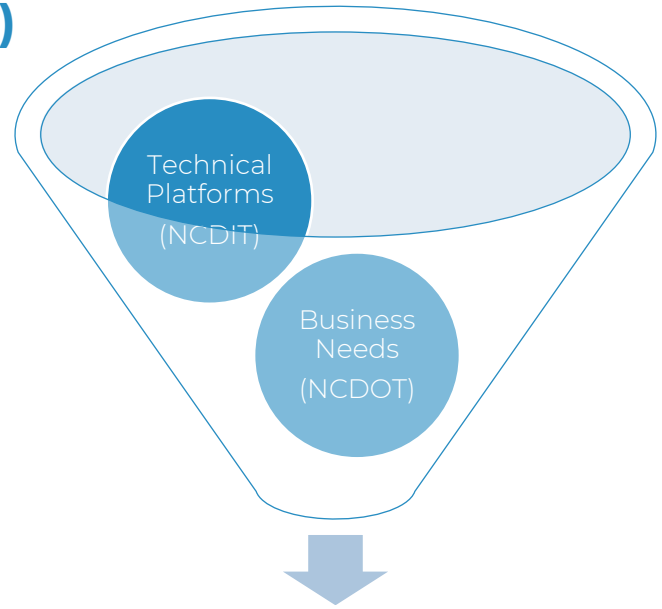
AI Framework for Responsible Use

- Principles for Responsible Use of AI
- Use of Publicly Available Generative AI
- Defining AI Terms & Definitions

AI Assessment Support

AI Training

Innovation Island

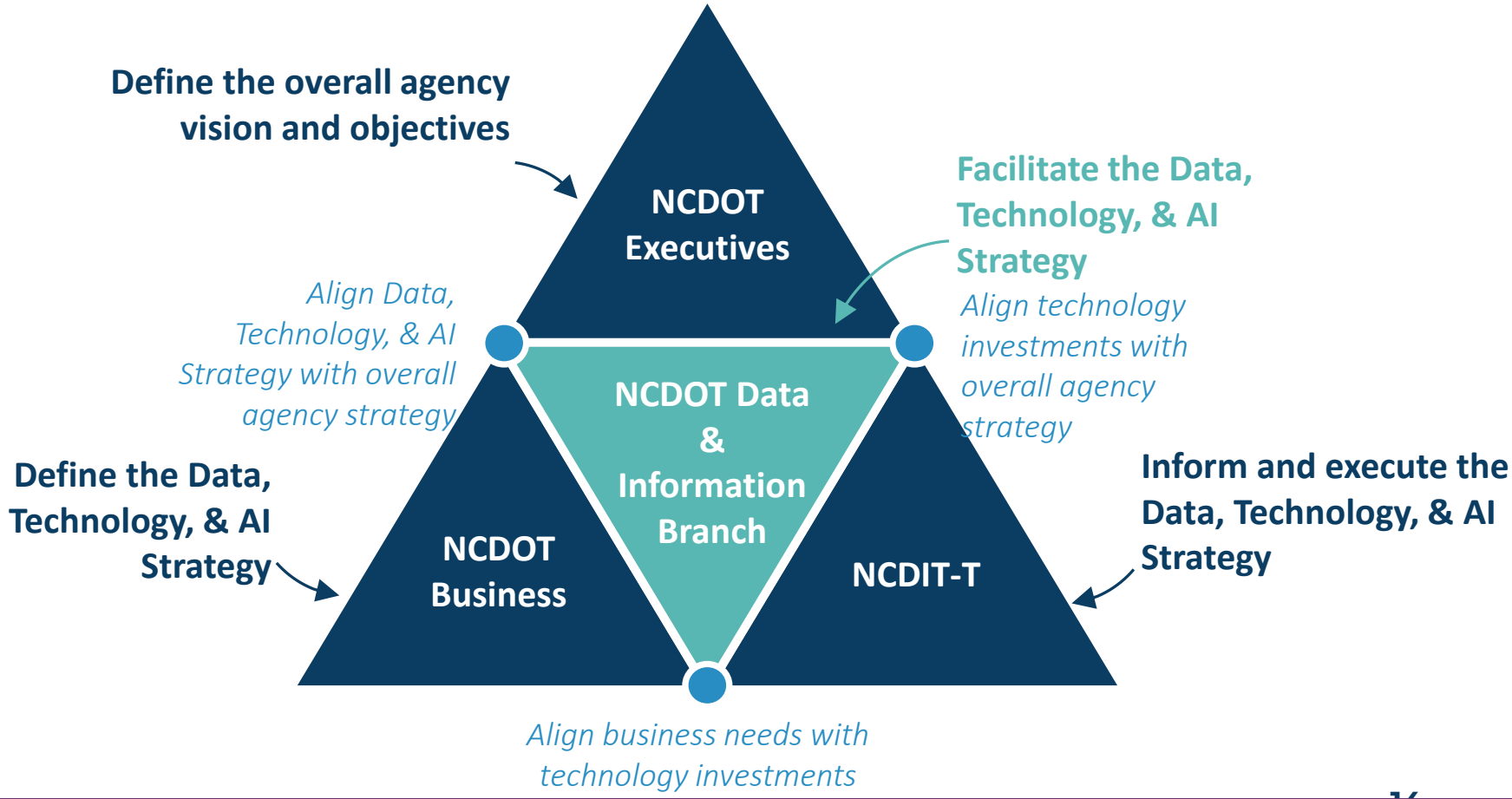


Planning and Piloting for Generative AI at NCDOT

Need for strategy and policy specific to your business needs

Data & Information Branch

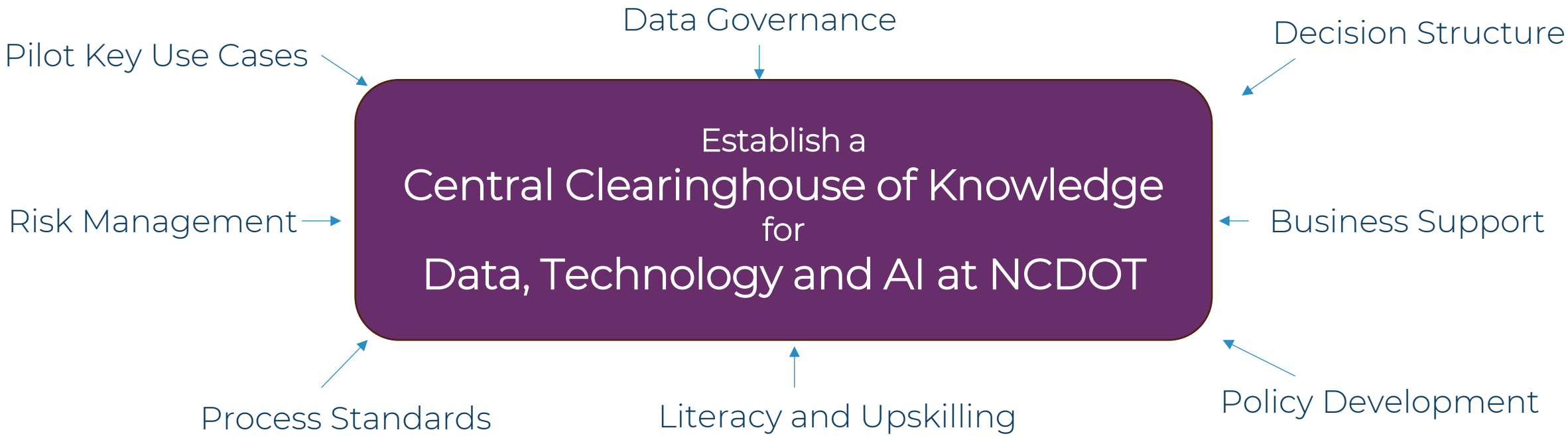
est. Summer 2024



NCDOT Data, Technology, and AI Strategy and Governance Plan to be completed by end of 2024

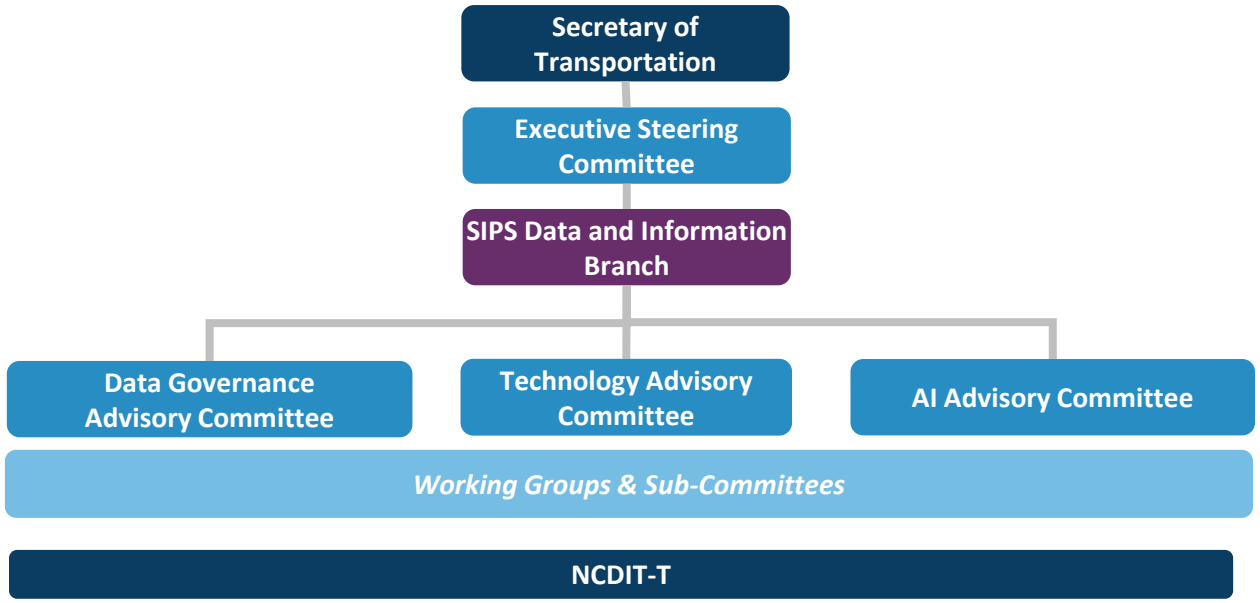
Near Term Priorities

Office of Strategic Initiatives and Program Support – Data and Information Branch



Structure

Proposed Data, Technology, & AI Integrated Governance Model



AI Advisory Committee

- **Committee Lead** — SIPS / DIB (NCDOT)
- **AI/ML Leader** (NCDIT)
- **Data Governance Committee Rep.** (NCDOT)
- **Information Security** (NCDIT)
- **Enterprise Architect / Infrastructure** (NCDIT)
- **DIT Leadership** (NCDIT)
- **Legal** (NCDOT)
- **Business Representative 1 (Rotational)** (NCDOT)
- **Business Representative 2 (Rotational)** (NCDOT)

= Embedded responsibilities in current roles

= Groups of cross-functional representatives from NCDOT & NCDIT-T

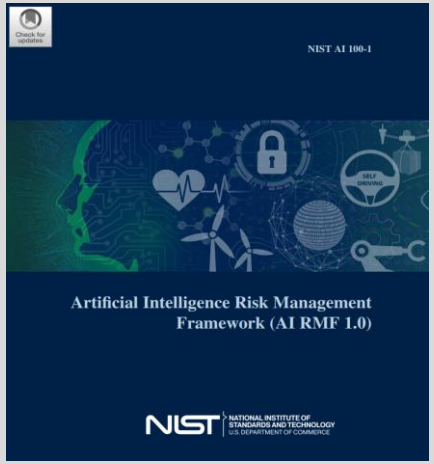
= SIPS

Policy & Risk Management

Example frameworks and emerging regulations to inform NCDOT's AI guideline / policy development

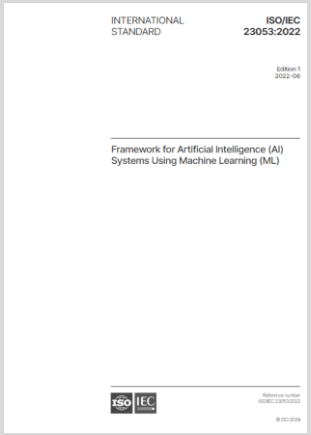
NIST AI RMF

A voluntary framework and guidance to manage the risks of AI



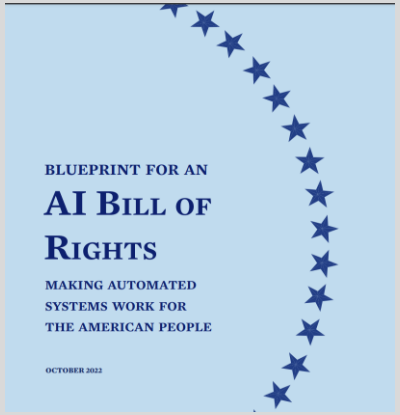
ISO-42001

The world's first international standard for establishing AI systems within organization, providing guidance for responsible development and use of AI systems



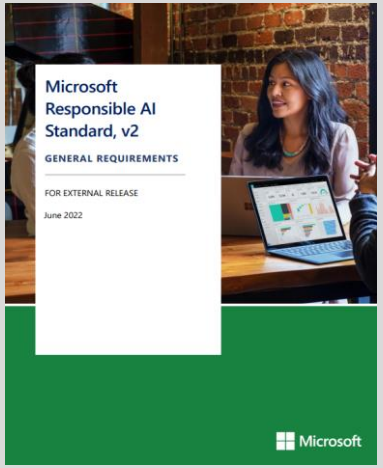
AI Bill of Rights

The US blueprint to protect the public from harmful AI systems



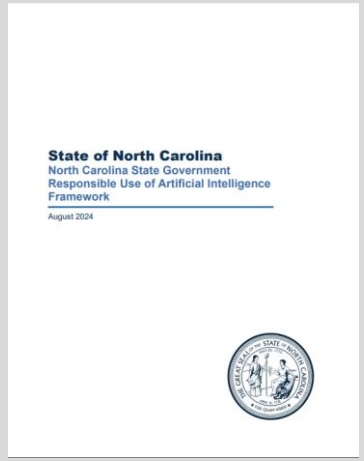
Microsoft Responsible AI Guidelines

Guidelines that provide actionable guidance to ensure AI solutions are ethical and responsible



NC State Government Responsible Use of AI Framework

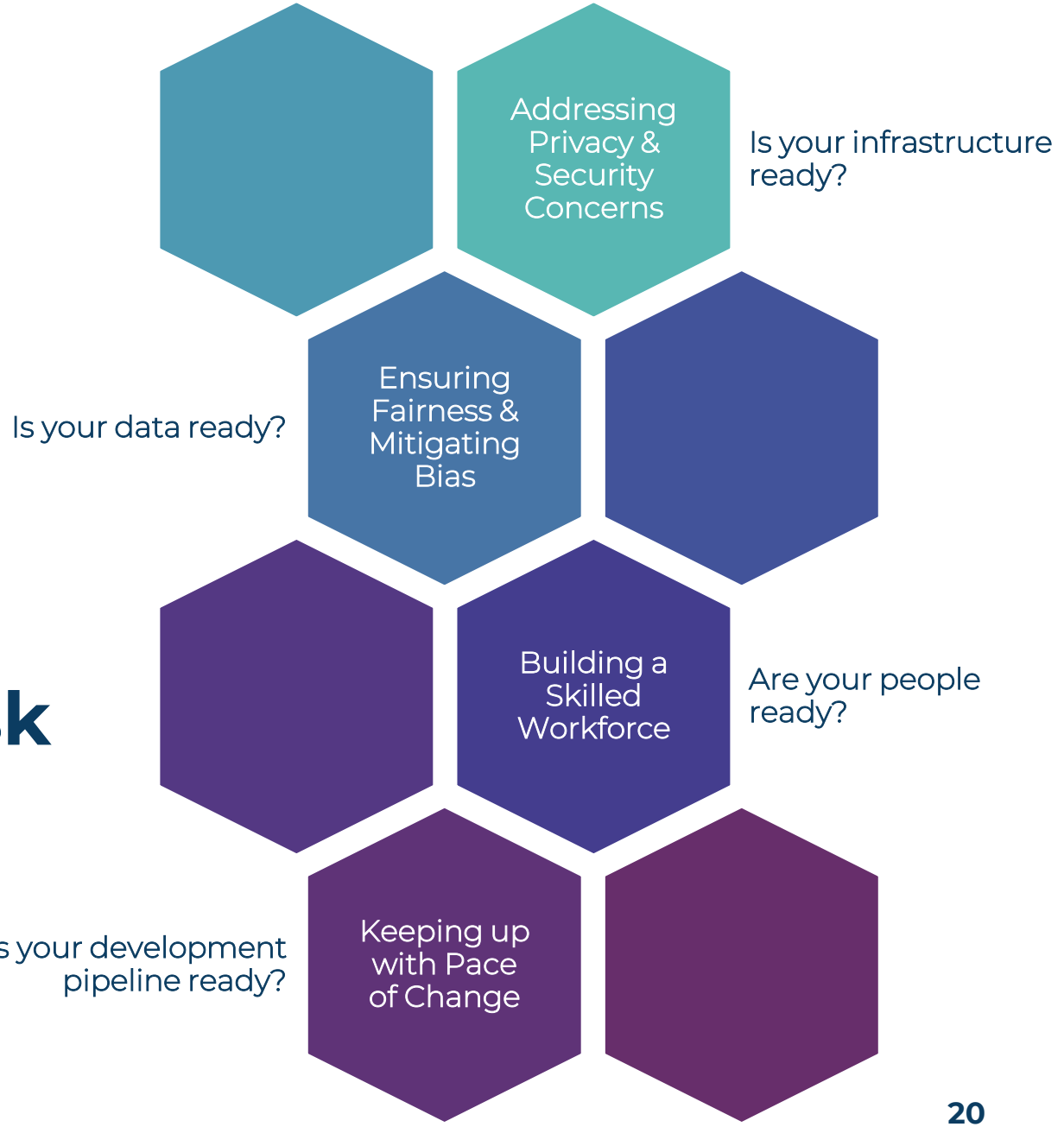
NCDIT Guidance



Identifying & Mitigating Risk

Where are your roadblocks?

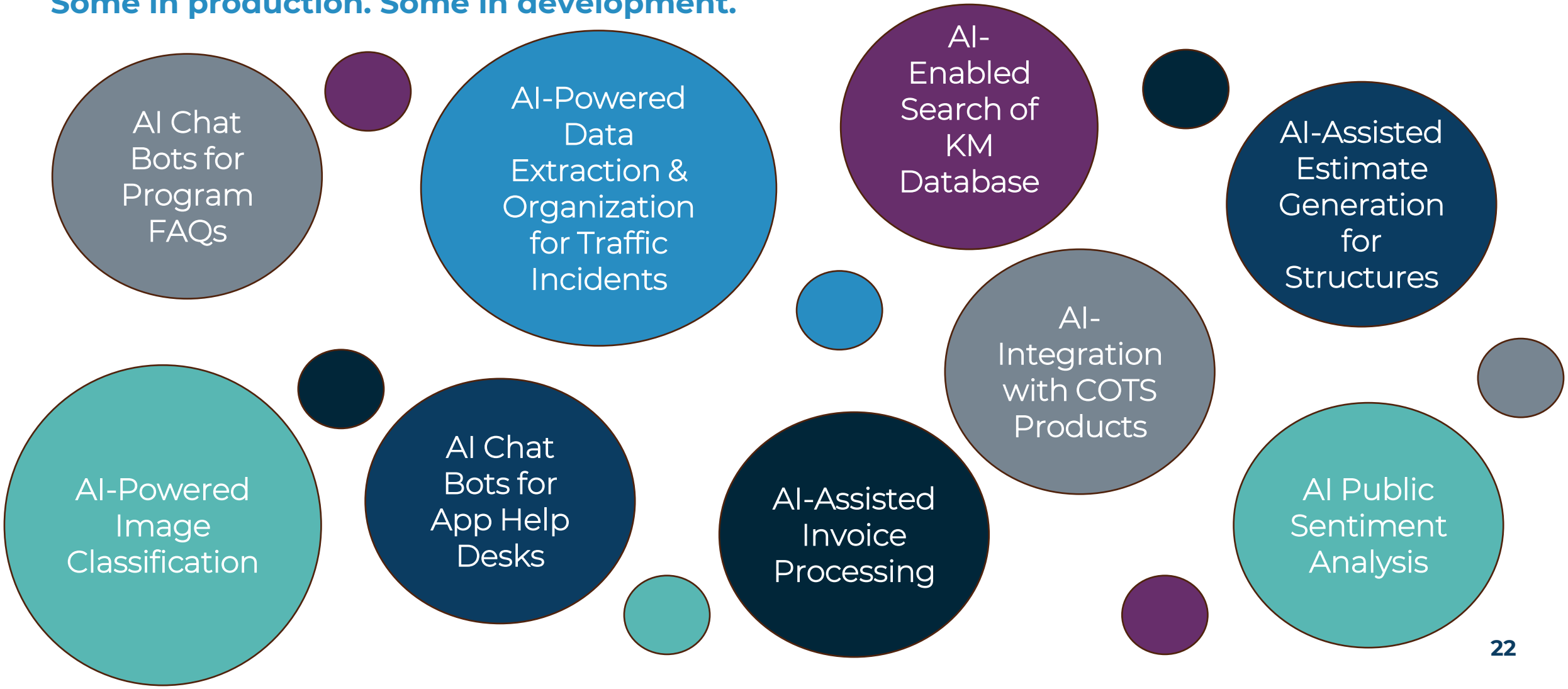
Where are your caution signs?



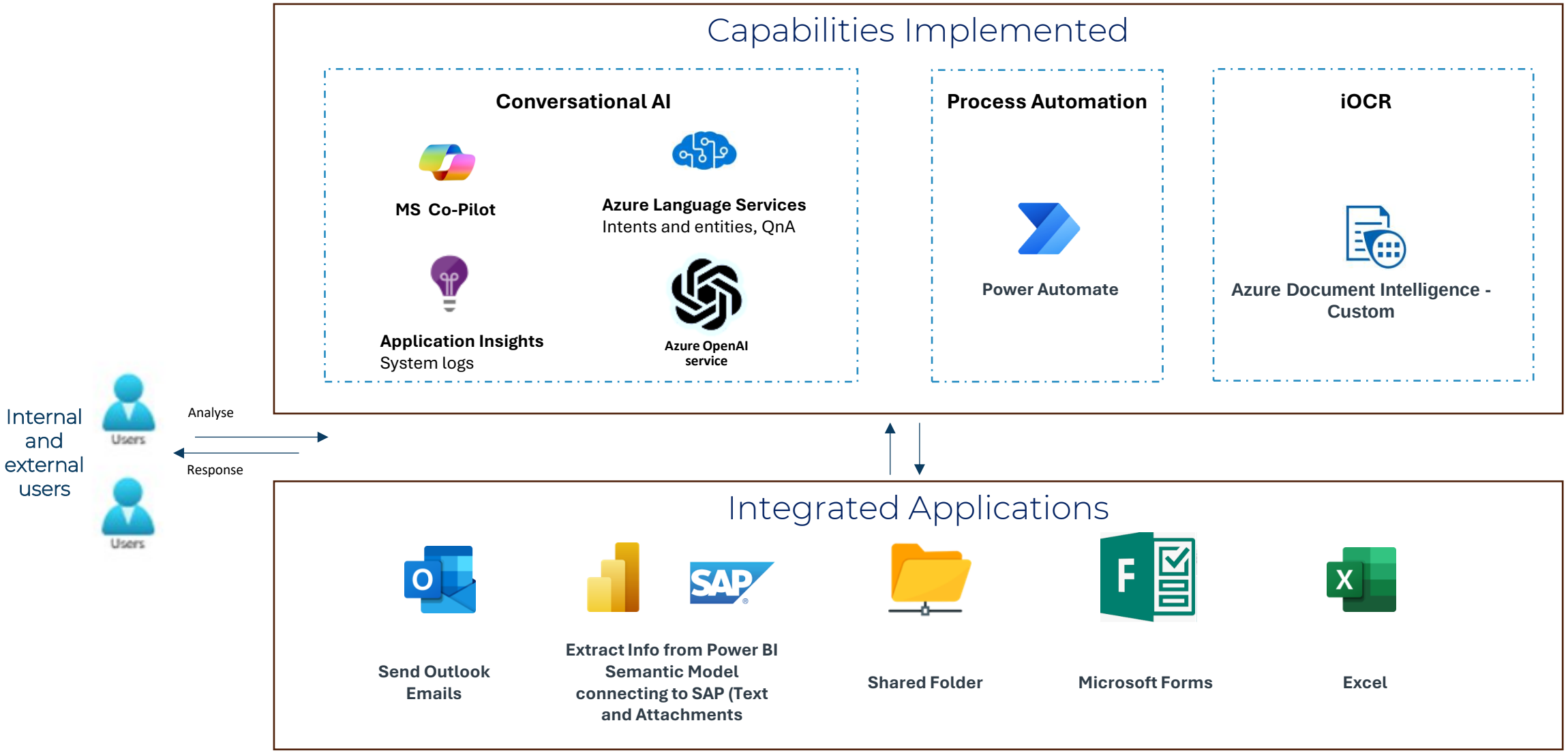
Pilot Key Use Cases

Current AI Use Cases

Some in production. Some in development.



Automation and AI Capabilities and Footprint



Considerations

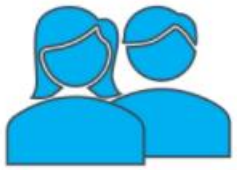
Gotta start somewhere…

Align your efforts with your organization's long-term vision and goals

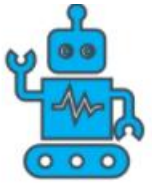
Start Small → Collect Lessons Learned → Adjust the Process

Components of Success

Governance



Human-in-the-Loop



Automation

Predictability

Contact Us

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NCDOT Photogrammetry Unit's Response to Hurricane Helene

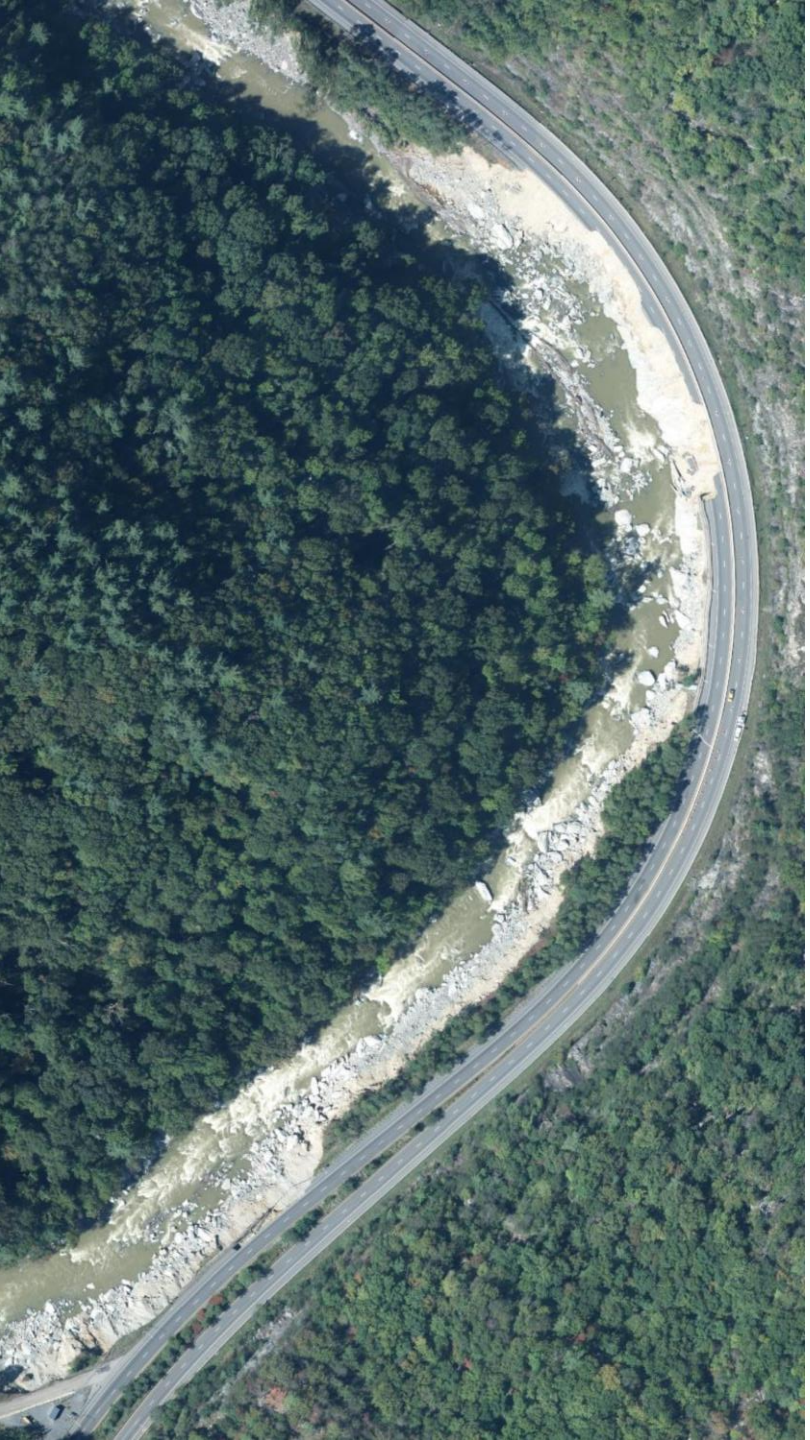
NORTH CAROLINA
Department of Transportation

Post-Hurricane Helene: Using Photogrammetry & Lidar for Rapid Damage Evaluation

Nick Short, PE, PLS

Assistant State Photogrammetric Engineer

December 10, 2024



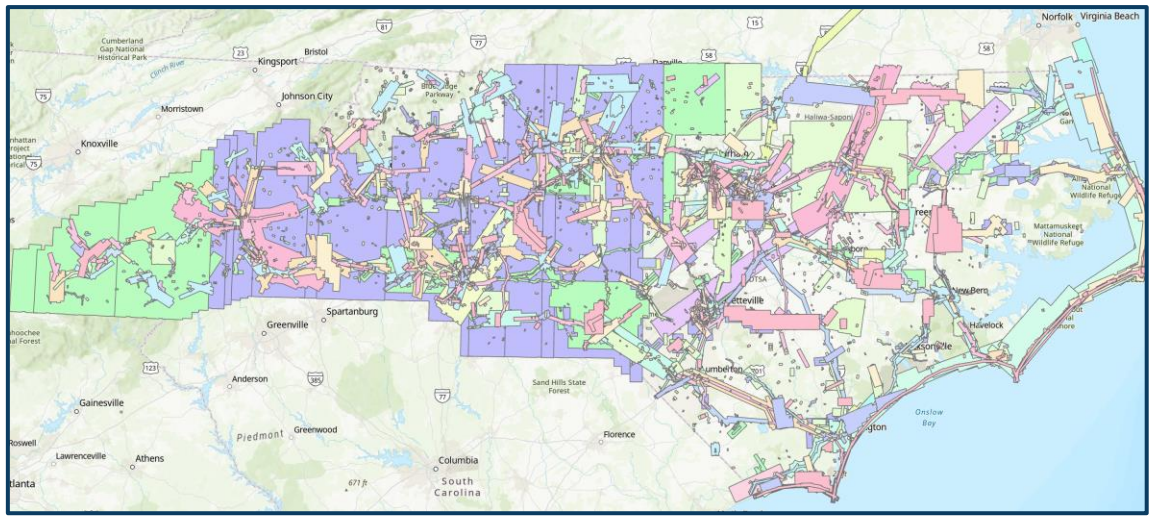
Topics For Today

- The Photogrammetry Unit – What do we do?

- Role in Helene
  - Reconnaissance Missions
  - UAS Mission Support
  - I-40 Pigeon River Gorge LiDAR
  - Statewide LiDAR

- Photogrammetry Innovations
  - Expanded LiDAR Mapping
  - Artificial Intelligence

NCDOT Photogrammetry Overview



Photogrammetry's first film mission

March 1955

Photogrammetry averages 92,780 acres / year

2014 - 2024

Photogrammetry has flown 11,000+ missions prior to Helene

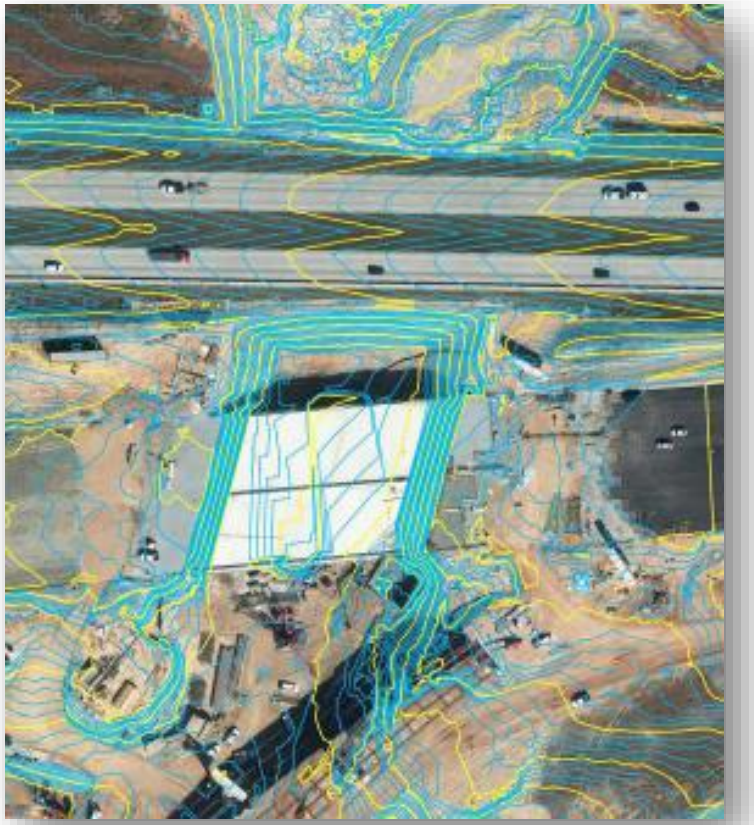
September 2024

Services and Products

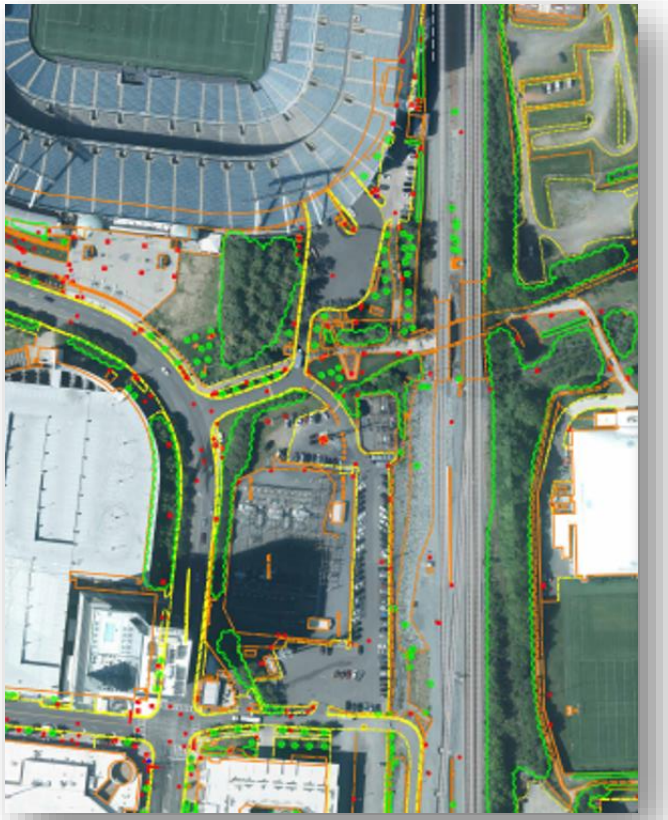
Orthophotography
Digital Mosaics

Lidar
Mapping

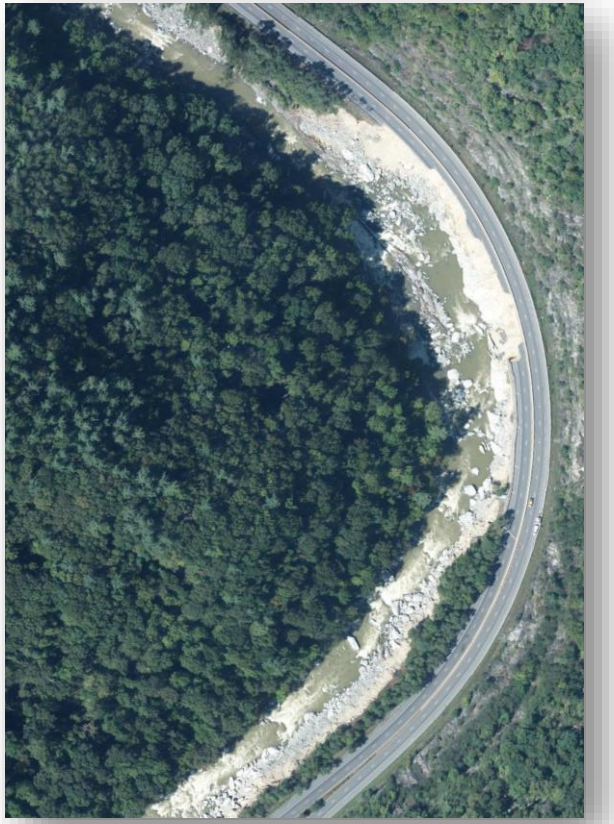
Services and Products



Volumetric
Earthwork
Calculations



Topographic Mapping
Shell Plan Sheets
Digital Terrain Models (DTM)

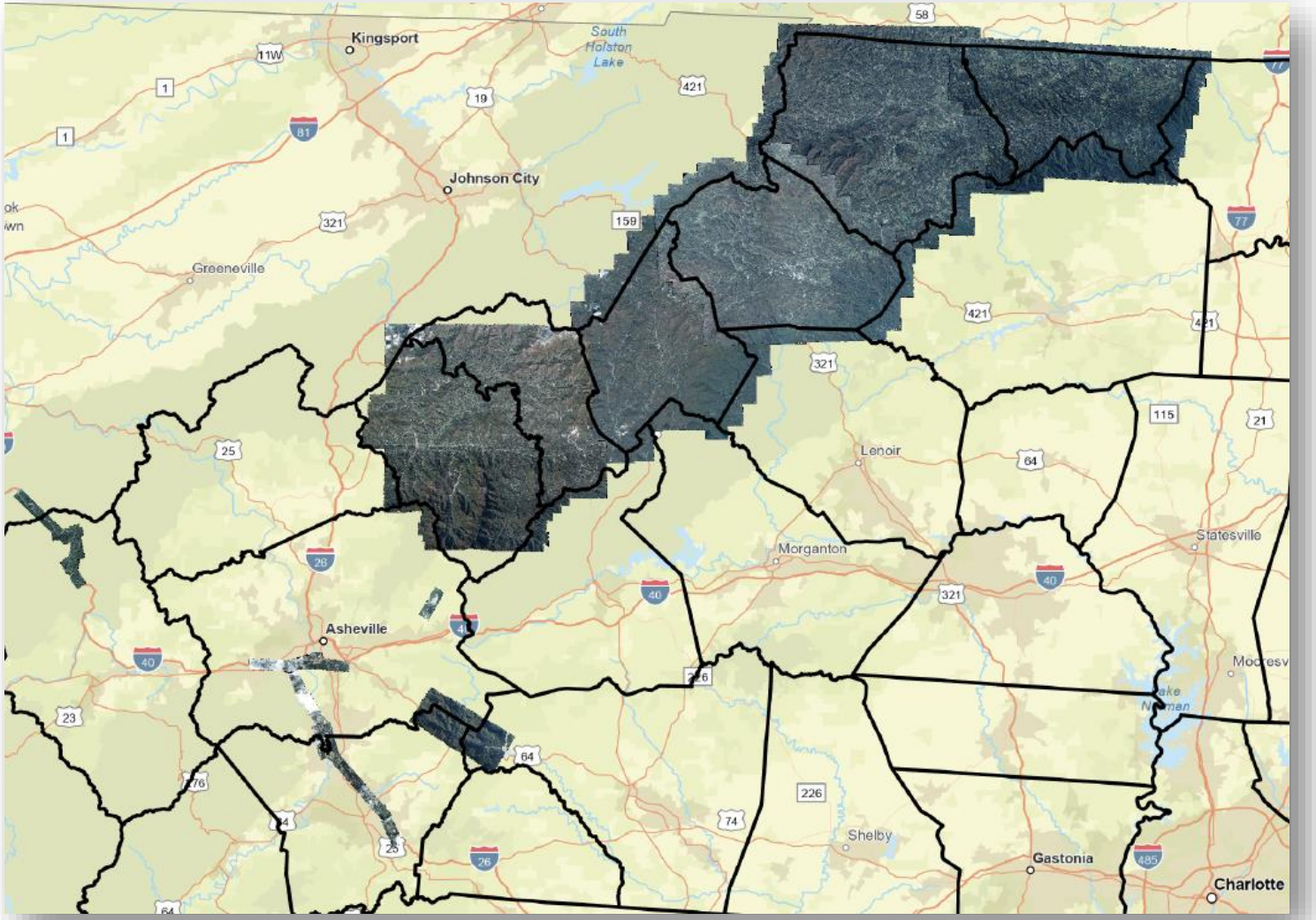


Emergency
Response

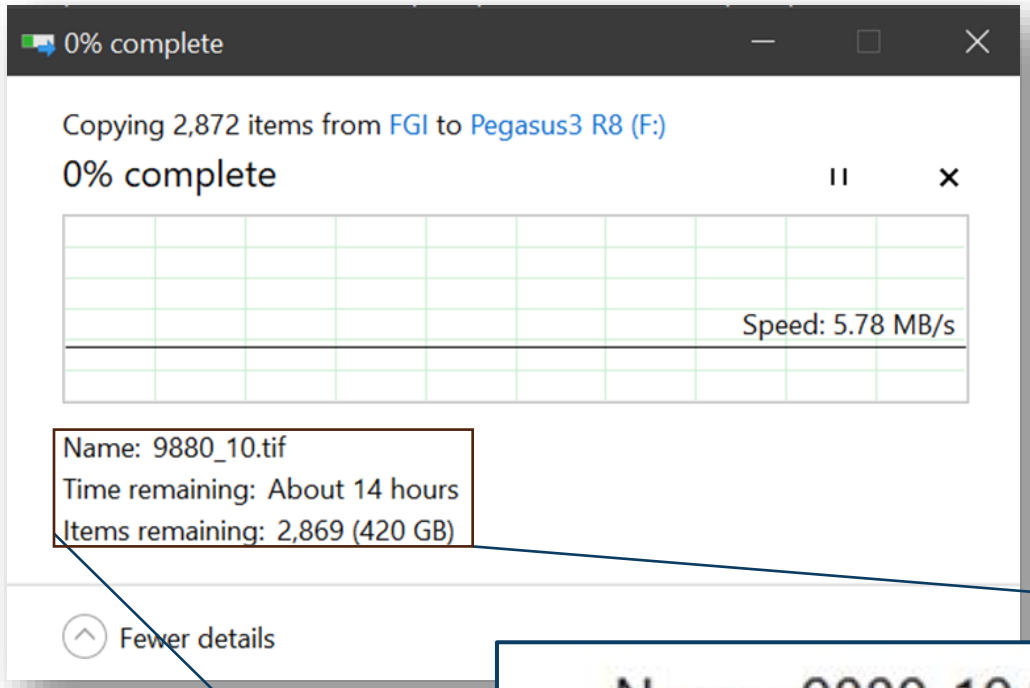
Photogrammetry & Remote Sensing in Helene

Helene Reconnaissance Missions – manned aircraft

Flight	Area (acres)	Exposures
Alleghany	241,606	373
Ashe	374,317	593
Asheville	38,331	142
Avery	252,391	389
Batcave	31,392	165
Burnett Reservoir	4,324	10
Haywood (I-40)	12,878	66
Lake Lure	3320	4
US 19 / NC 197	339,854	1963
Watauga	292,992	453
11 Flights	**1,591,406 acres**	**4,162 exposures**



Challenges



Local Workstation reading and writing from the C drive (NVME)

Dell Precision 7865 AMD Ryzen Threadripper Pro 5945wx 12-Cores Passmark: **single threaded speed 3356**

C drive has 300GB free of 943 GB

C:\z3\LASD_single\LA_37_10979614_BRIDGE_TorF_Polys.shp processed in 20.69 seconds
C:\z3\LASD_single\LA_37_10978520_BRIDGE_TorF_Polys.shp processed in 16.93 seconds
C:\z3\LASD_single\LA_37_10979607_BRIDGE_TorF_Polys.shp processed in 19.96 seconds
C:\z3\LASD_single\LA_37_10979208_BRIDGE_TorF_Polys.shp processed in 3.88 seconds
C:\z3\LASD_single\LA_37_10978616_BRIDGE_TorF_Polys.shp processed in 4.66 seconds
C:\z3\LASD_single\LA_37_10978620_BRIDGE_TorF_Polys.shp processed in 12.06 seconds
C:\z3\LASD_single\LA_37_10979415_BRIDGE_TorF_Polys.shp processed in 3.41 seconds
C:\z3\LASD_single\LA_37_10978508_BRIDGE_TorF_Polys.shp processed in 5.45 seconds
C:\z3\LASD_single\LA_37_20071612_BRIDGE_TorF_Polys.shp processed in 13.5 seconds
C:\z3\LASD_single\LA_37_20072509_BRIDGE_TorF_Polys.shp processed in 12.21 seconds
C:\z3\LASD_single\LA_37_20071509_BRIDGE_TorF_Polys.shp processed in 4.14 seconds
C:\z3\LASD_single\LA_37_10977509_BRIDGE_TorF_Polys.shp processed in 8.3 seconds
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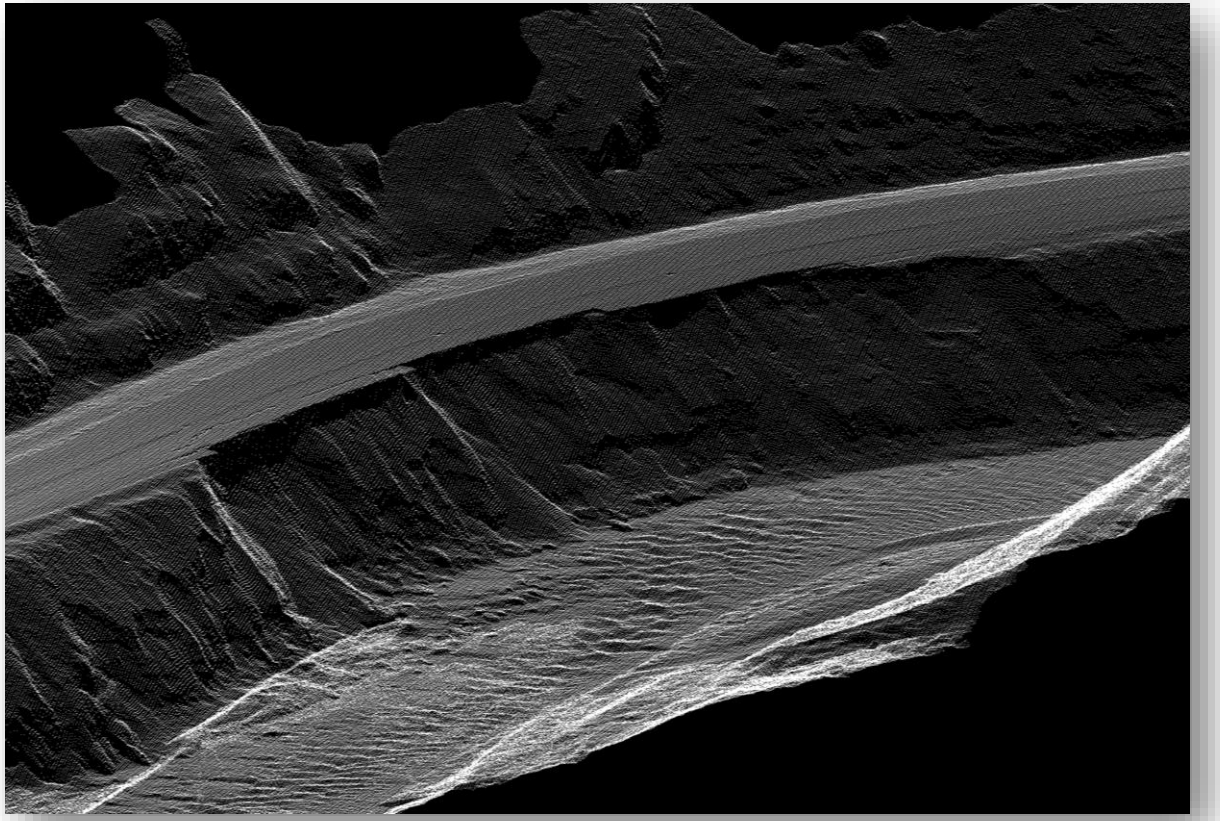
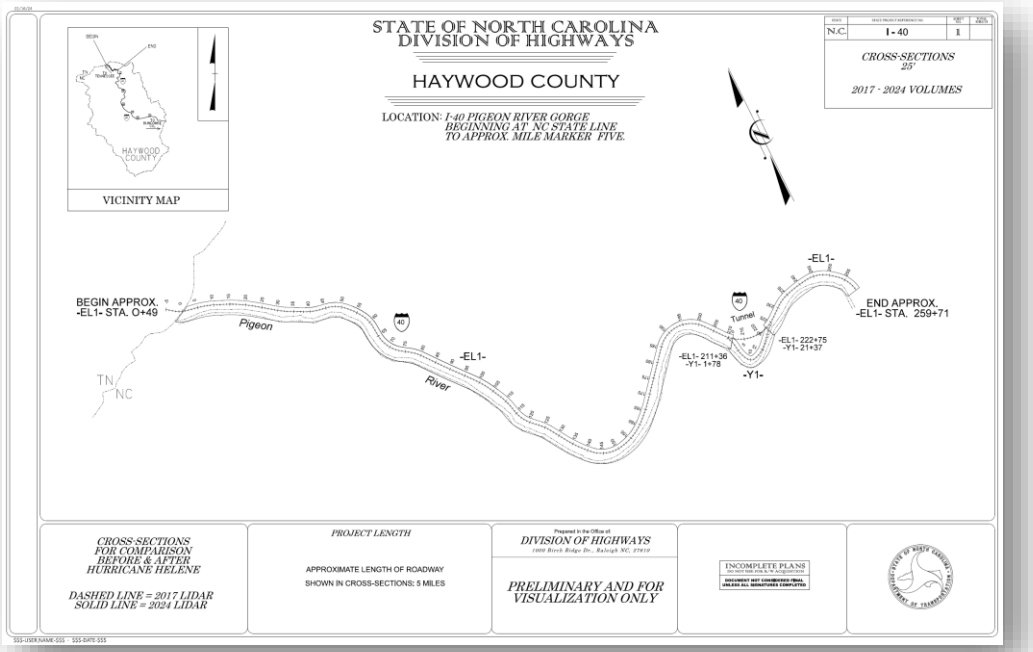
C:\z3\LASD_single\LA_37_20071205_BRIDGE_TorF_Polys.shp processed in 9.21 seconds

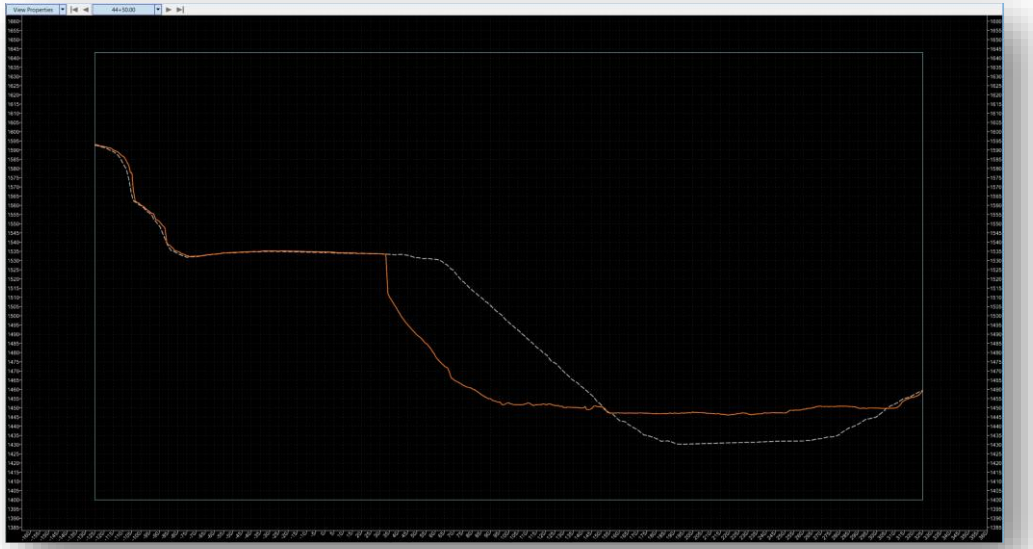
Name: 9880_10.tif
Time remaining: About 14 hours
Items remaining: 2,869 (420 GB)

UAS Mission Support

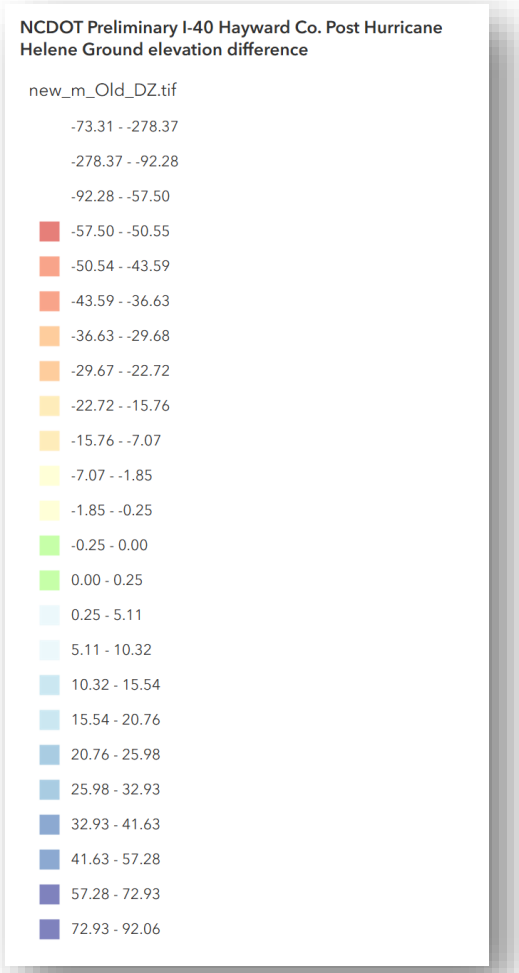
I-40 Pigeon River Gorge UAS LiDAR

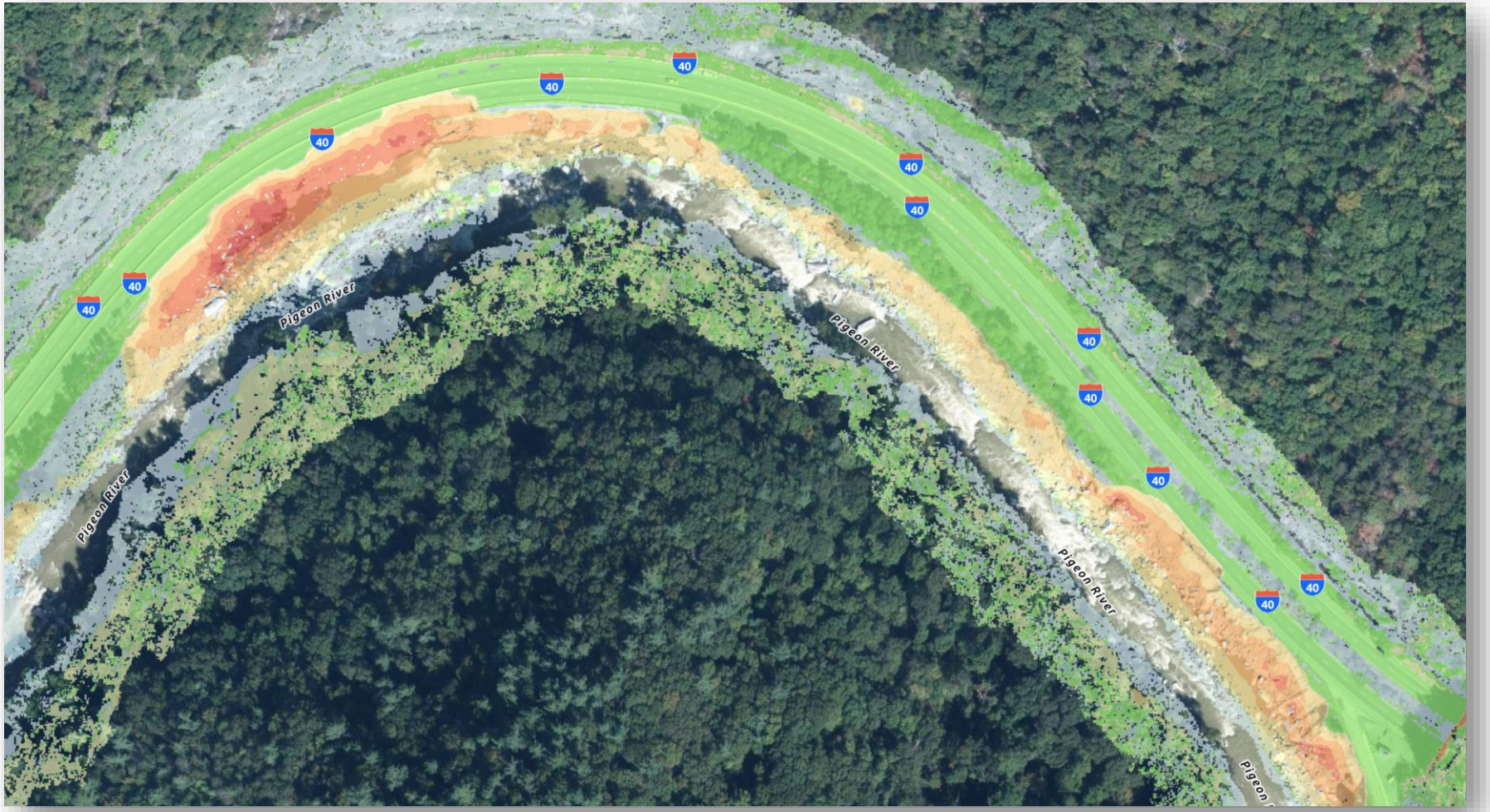




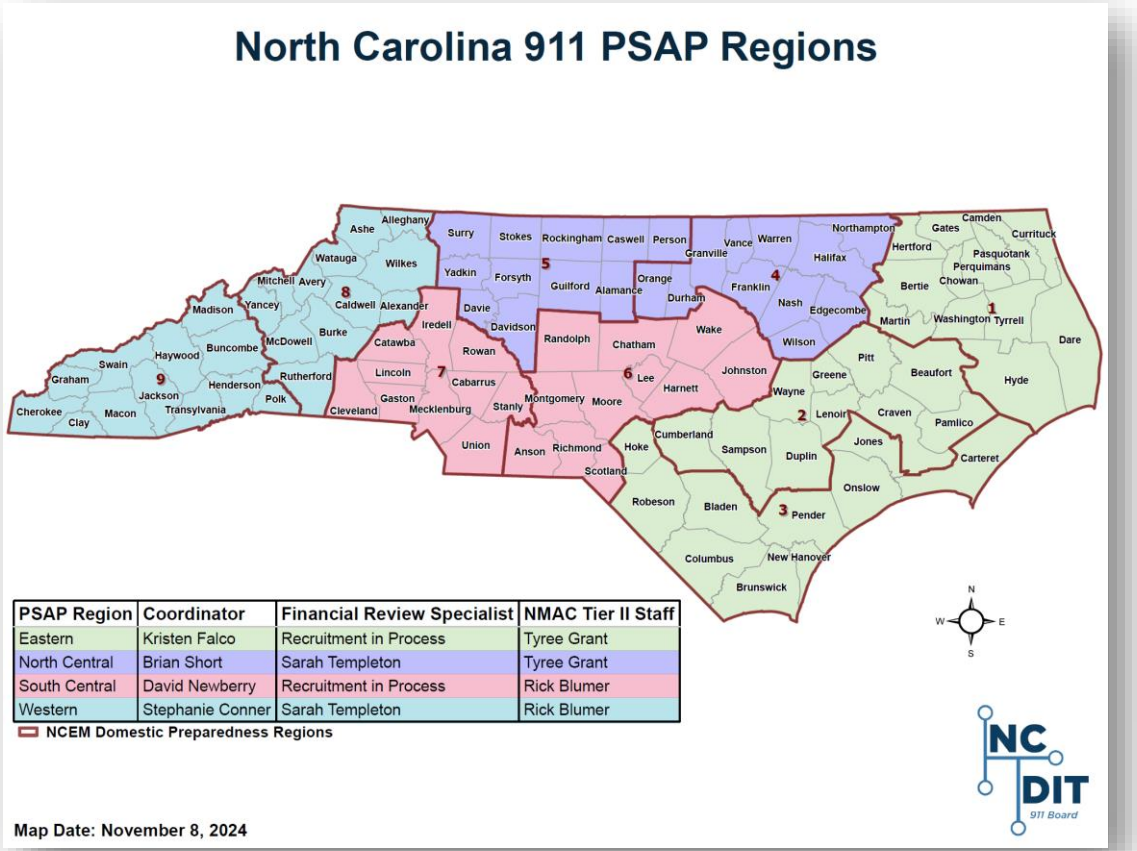


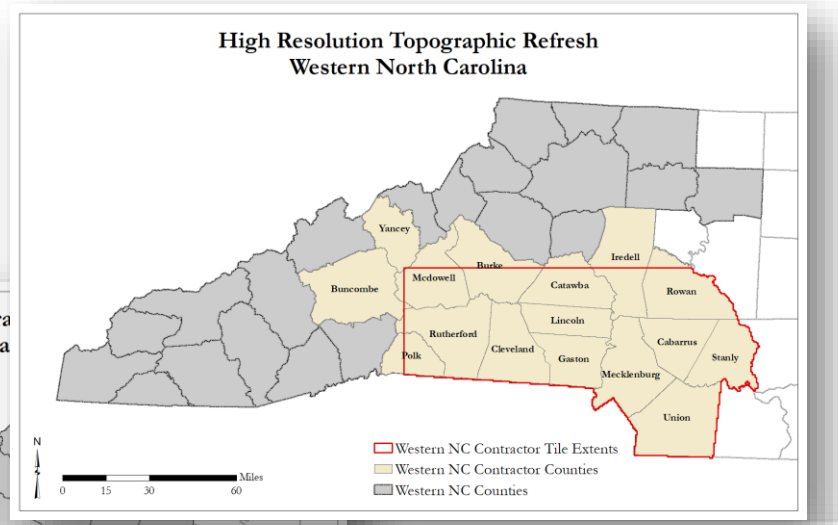
I-40 Pigeon River Gorge – Ground Elevation Difference

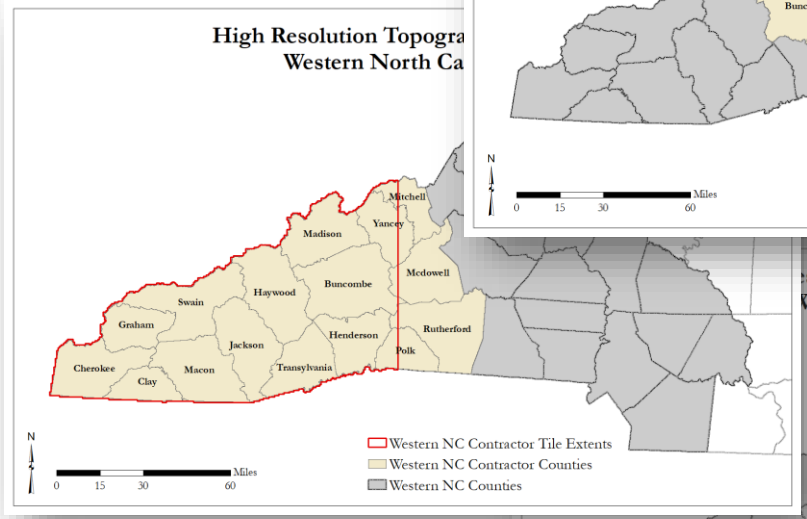


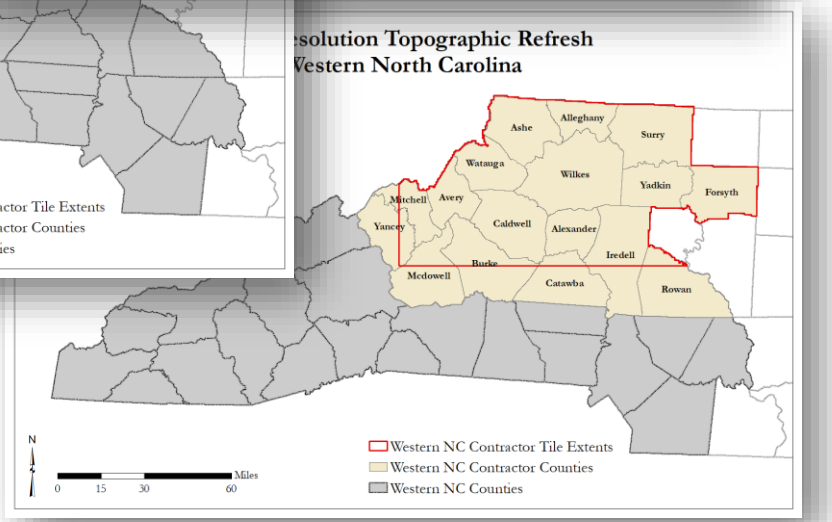


Statewide Orthoimagery and LiDAR for Helene Impacted Counties



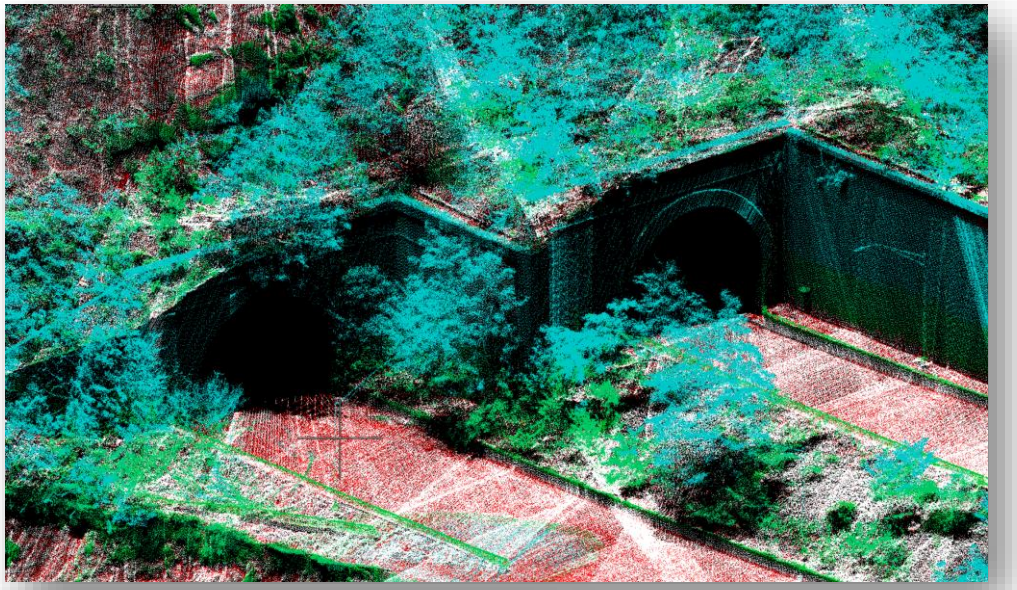


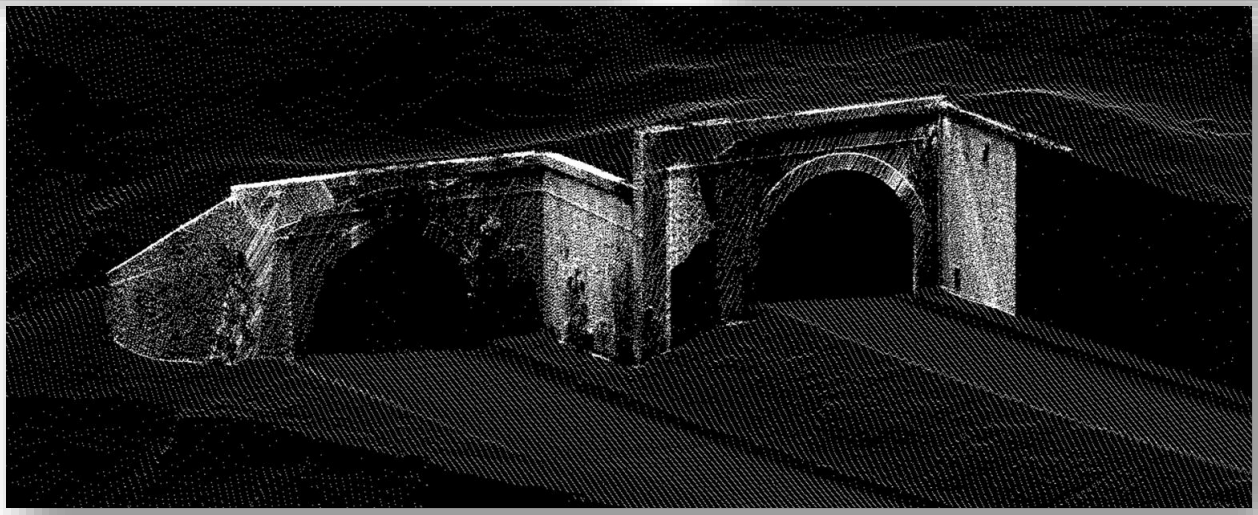




Photogrammetry & Remote Sensing Innovations

Expanded LiDAR Mapping

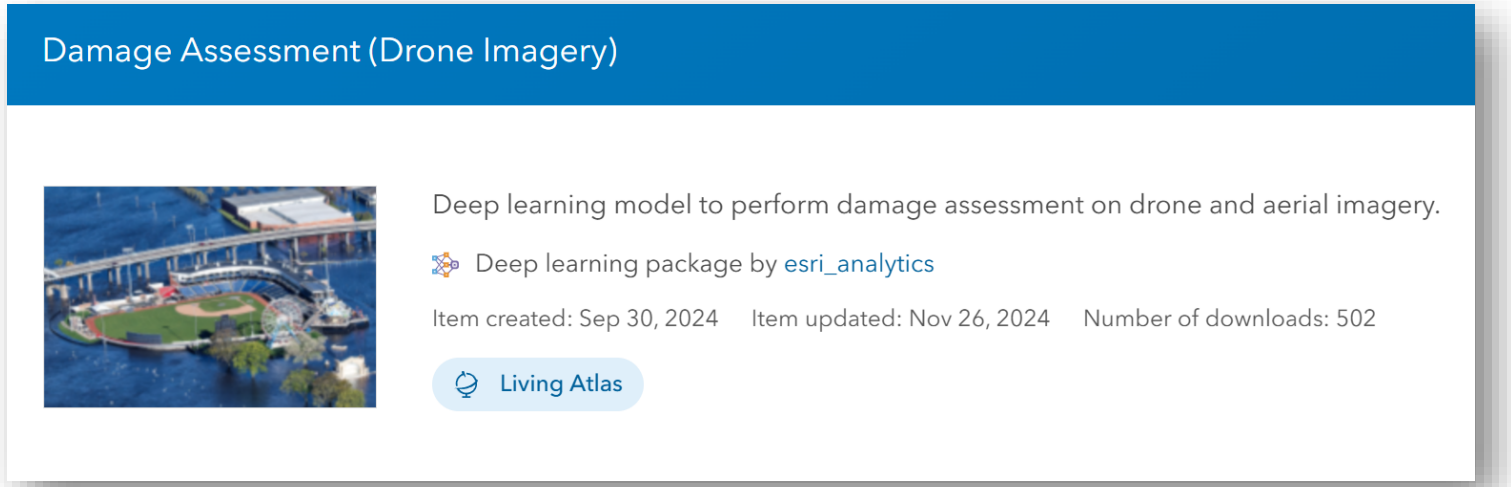




Artificial Intelligence

- Current AI uses:
- Computer Vision
- Lidar Classification
- Building Footprints (NCDIT-CGIA)

- Potential AI uses:
- Pavement Crack Detection
- Power Line Classification
- Damage Assessment
- 3D linework Extraction



Contact Us

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FHWA's Accelerated Market Readiness Program

2025 STIC Schedule

Upcoming STIC Schedule

Calendar Year 2025

February

- STIC application window opens

March

- NC-TIC TCC Meeting – committee reviews and confirms scoring criteria

April

- STIC application window closes

May

- Summary of STIC applications distributed to TCC
- TCC reviewers provide questions to applicants
- Applicants provide responses to questions from TCC reviewers

June

- NC-TIC TCC Meeting – applicants present and TCC votes on projects

Open Discussion

U.S. Department of Transportation
Federal Highway Administration

Accelerating Market Readiness Overview

FHWA Broad Agency Announcement # 693JJ3-25-BAA-001
Web Conference
November 20, 2024

Unless otherwise noted, FHWA is the source for the photos and images in this presentation.

Presenters

Kristen Hayes

Contracting Officer, Office of Acquisitions and Grants Management

Jeff Zaharewicz

Director, Center for Accelerating Innovation

Amit Armstrong

Program Manager, Accelerating Market Readiness

Industry Day Ground Rules

- Microsoft Forms Sign-In
- Silence electronic devices
- Please mute when not speaking
- Please do not record during event
- Please do not photograph speakers or audience
- Please drop questions in the Teams Chat
- Presentation and attendees list will be posted to SAM
- All information presented is subject to change – in the event of a conflict, official information is what is posted on SAM

Outline

- Introduction
- AMR Program Overview
- General Requirements
- Proposal Submission Instructions
- Proposal Evaluation and Award
- Questions and Answers

FHWA Center for Accelerating Innovation

Since 2012, CAI served as the focal point for internal and external coordination to identify and prioritize innovations.

Foster a *Culture of Innovation*

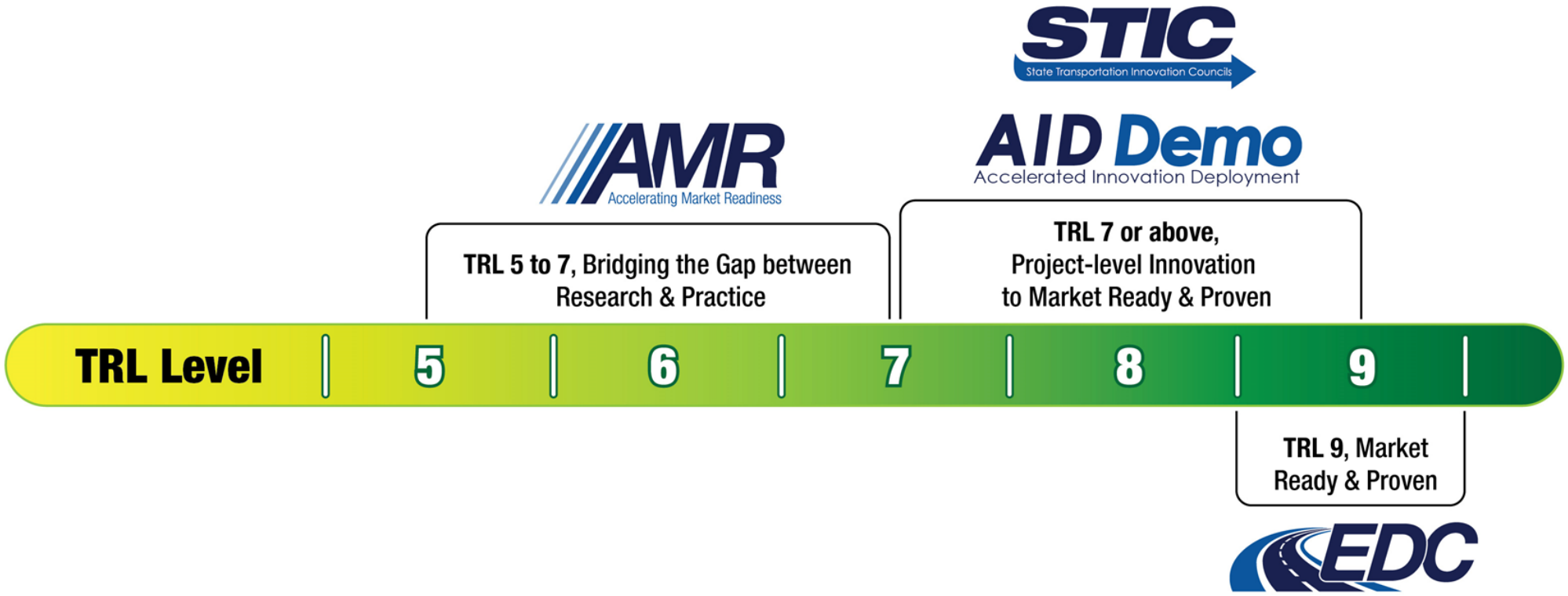
Technology and Innovation Deployment Program Goals

- **Accelerate adoption** of innovative technologies in all aspects of highway transportation
- Provide **leadership and incentives**
- Construct **longer-lasting** highways
- **Improve** highway efficiency, safety, mobility, reliability, service life, environmental protection, and sustainability
- **Develop and deploy new tools**, techniques, and practices to accelerate the adoption of innovation

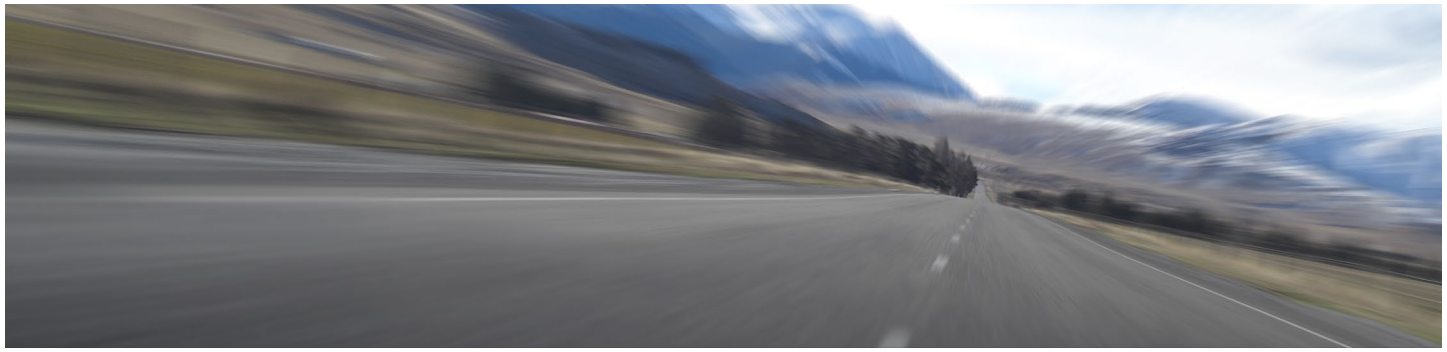
Technology Readiness Level: Frame of Reference

Basic Research TRL 1 to 3	Applied Research TRL 4 to 5	Development TRL 6 to 8	Implementation TRL of 9
1. Basic principles and research 2. Application formulated 3. Proof of Concept	4. Components validated in a laboratory environment **5.Integrated components demonstrated in a laboratory environment**	6. Prototype demonstrated in relevant environment 7. **Prototype demonstrated in operational environment** 8. Technology proven in operational environment	9. Technology refined and adopted - *Every Day Counts Innovations are a TRL of 9*

FHWA Accelerating Innovation Programs



U.S. Department of Transportation
Federal Highway Administration



AMR
Accelerating Market Readiness

Accelerating Market Readiness Program

AMR: A Bridge Between Research & Practice

Accelerating Market Readiness Goals

- ***Provide an assessment of emerging innovations*** in a **shared-risk environment**

- Provide sound, objective, detailed, and coordinated **evaluation and reporting**

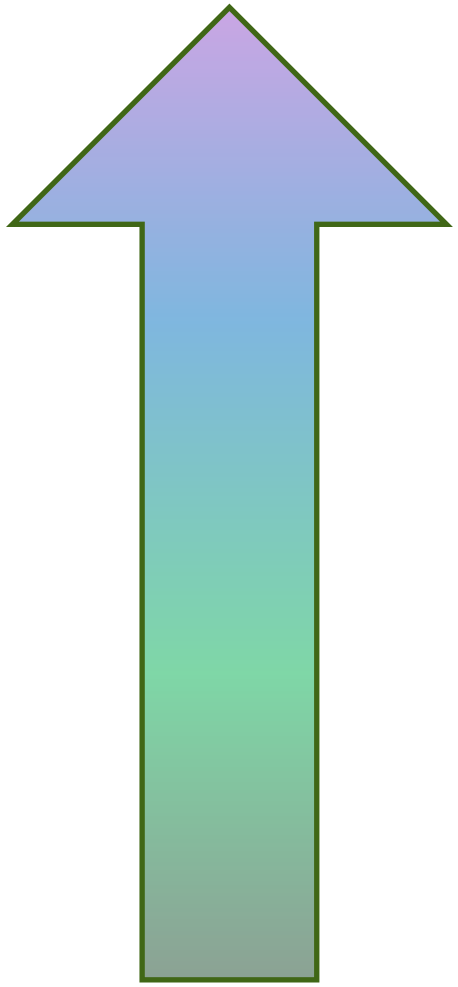
- Provide **marketing and communication** of AMR project findings through the National STIC Network and other Stakeholder Partners

- Feed the **EDC pipeline** (or other deployment efforts)

Anticipated Benefits

- Spotlight on a **wider range of innovations** available for the transportation community to deploy
- **Enhanced connections** between the research and practitioner communities
- Enhanced use of available resources to capture and **share knowledge and information** on innovative practices
- Stronger engagement with **National STIC Network**
- Stronger engagement with **AASHTO Innovation Management**

Program Scope



Disruptive ✓ *Game Changing*

Emerging ✓ *Gap Filling, significantly advance the state-of-the-art*

Noteworthy ✓ *Significantly advance conventional practice*

Incremental ✓ *Advance the state-of-the-practice*

TRANSFORMATIVE

AMR Version 1.0 (2012-2017)

FHWA Internal Program administered by FHWA-CAI

- 2012-2016: Project Selection by FHWA Executive Director
- 2017: Projects vetted through FHWA leadership

Mobile Solution for Assessment and Reporting (MSAR) for Emergency Relief

AMR Version 2.0 (2019-2024)

Broad Agency Announcement in 2019

- 2019: 7 projects were selected and funded

FHWA Internal Program

- 2019-2024: Several internal projects completed and ongoing

Ongoing Projects

Virginia Tech Transportation Institute

- implement a **fully adaptive highway lighting system** and monitor its performance in terms of light level, energy consumption, crash behavior, lighting quality, and security

Illinois Center for Transportation at the **University of Illinois at Urbana-Champaign**

- integration and field deployment of a **ground penetrating radar (GPR)-based compaction monitoring system** by retrofitting a conventional roller
- demonstrate the GPR-based tool for real-time continuous monitoring of density during asphalt concrete layer compaction

Ongoing Projects

ThermalStare, LLC

- advance a new technology for the **safety analysis and load rating of in-service bridges**
- field test and evaluate the capabilities of a nondestructive ultrasonic stress measurement technology with the ability to determine the total forces in steel bridge members and gusset plates in-situ

Drexel University

- increase the robustness, readiness, and ease of installation of **wireless sensors for bridge assessment**; allow cloud-based sensor data transmission and automated report generation to summarize conditions of bridges; and achieve several rigorous validations in the field

Ongoing Projects

Applied Research Associates

- conduct a project focusing on the **dynamic, viscoelastic back calculation of flexible pavement layer properties** to fine-tune a software tool for an open-source release available to highway agencies for routine usage
- tool's use will potentially lead to more reliable pavement rehabilitation design, thereby improving the service life of pavements and improving the planning of transportation infrastructure

Ongoing Projects

- iTrain project will build on early efforts to develop **virtual reality models for training work zone inspectors**

Missouri DOT

- deploy a **leader-follower truck mounted attenuator (TMA) system** in the State's two largest metropolitan areas and evaluate the system within a work zone setting
- ultimate goal for the project and deployment of the system is the elimination of worker

U.S. Department of Transportation

Federal Highway Administration

AMR Focus Areas

Safety

- How can **safety data analysis** be used in ways to guide transportation agencies' informed decision making, and work towards a future where transportation related **serious injuries and fatalities are eliminated**?

- How can the **disproportionate transportation safety risks** on State and locally owned roads in rural communities be **mitigated**?

- How should the infrastructure be changed to **facilitate faster deployment of automated vehicles**?

Shortening Project Delivery

- How can project development and delivery processes be improved or streamlined to **provide timely benefits to users** while **safeguarding our communities** and **maintaining a healthy environment**?

- How can Federal investments be better targeted toward transportation projects that address **high priority infrastructure needs**?

- How can State and local resources and **private sector engagement be better leveraged**?

Infrastructure Performance

- How can our transportation system's operations and performance be **improved through the entire life cycle of the infrastructure facilities**?

- How can the use of **innovative maintenance and preservation strategies** help restore the transportation infrastructure and assets to a state of good repair?

- How can the infrastructure be planned, constructed and maintained using best **operational and risk management practices**?

Climate and Sustainability

- How can our transportation system's operations and performance be improved through the **entire life cycle of the infrastructure facilities in the face of future weather extremes**? What can be done to ensure disrupted/damaged infrastructure is restored and adapted to future conditions quickly and economically.

- What are some **innovative maintenance and preservation strategies** that can help keep transportation infrastructure in a state of good repair even as the potential for impactful weather events increases?

Climate and Sustainability

- How can the infrastructure be **planned, constructed and maintained over its full life cycle (or service life) to minimize transportation-related greenhouse gas emissions** and costs to users and owners resulting from future extreme events and gradual change?

- How can we **design and build climate resilient infrastructure** that serves everyone today and in the decades to come?

Equity

- How can our transportation system **expand the meaning of access** to include populations historically ignored and neglected?

- How can our transportation system **integrate community engagement into decision making** to ensure a more inclusive and equitable infrastructure system?

- How can the transportation system **begin to produce economic vitality to underserved communities** that have been isolated from opportunities for wealth through obstacles in infrastructure?

Digital Twins and Advanced Simulation Techniques

- How can our transportation system's **operations and performance be improved through utilizing the digital twins at various scales and utilizing Artificial Intelligence/Machine Learning (AI/ML)** capabilities.

- How can the **transportation infrastructure be planned, designed, constructed, and maintained by utilizing advanced simulation techniques** using AI/ML to understand the interaction between built systems and natural systems.

- How can we **predict the future conditions/behaviors of transportation systems/assets** by combining Digital Twins and AI/ML techniques.

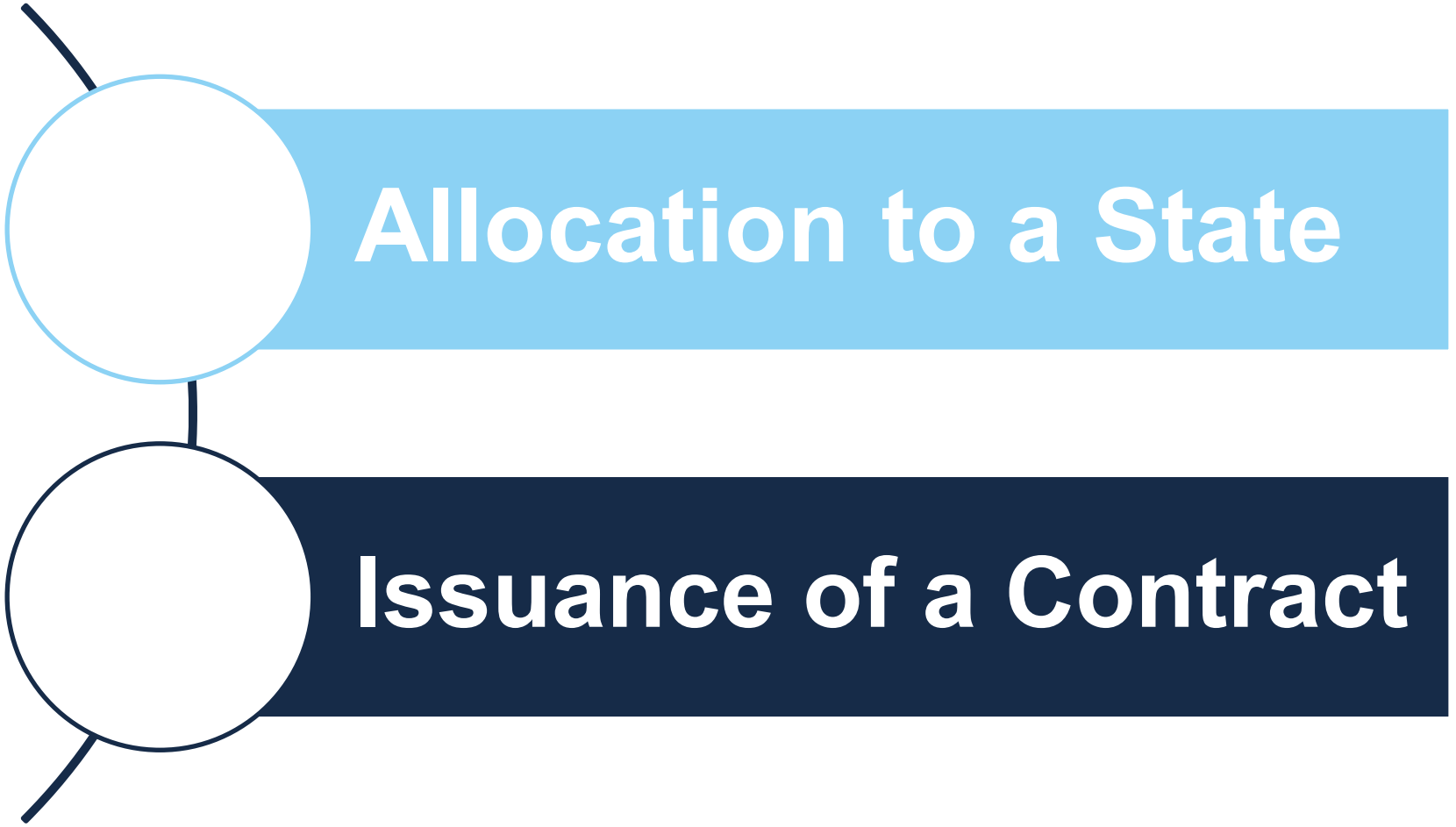
Activities Eligible for AMR Funding

- Field study/field evaluation
- "Trial runs" on transportation projects
- Data collection and data analysis
- Documenting the findings of the above

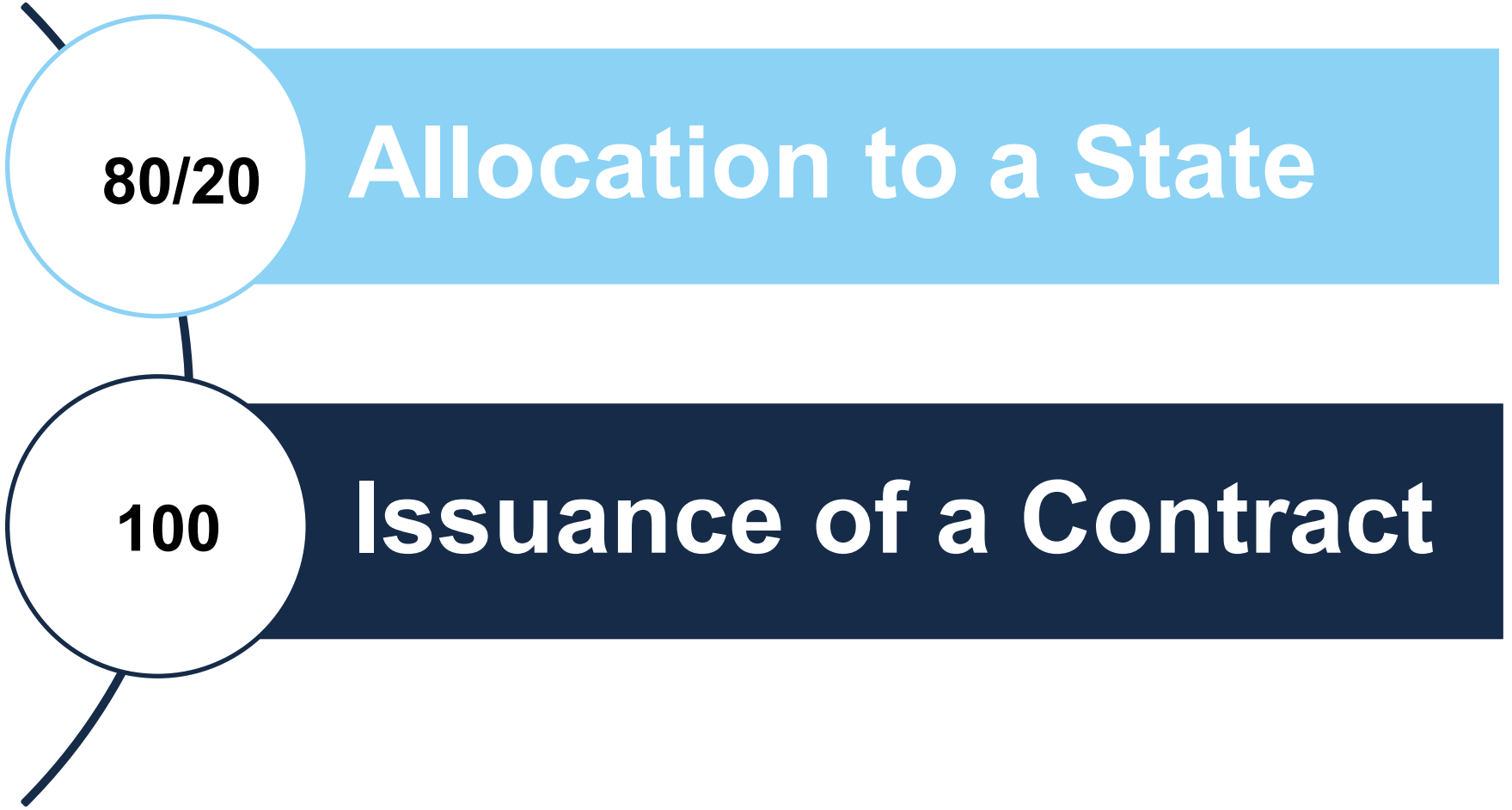
AMR Eligible Awardees

- State Departments of Transportation
- Local Public Agencies
- Indian tribes
- Universities
- Private sector organizations
- Partnership/consortium of the above
- Limited to US businesses only

Types of Awards



Cost Share Requirements



Other Details

- **Available funding:** Up to $3 million
- **Anticipated award dates:** FY 2025-FY 2027
- **Anticipated period of performance:** 12 to 24 months, depending on AMR topic and awardee's work plan

U.S. Department of Transportation

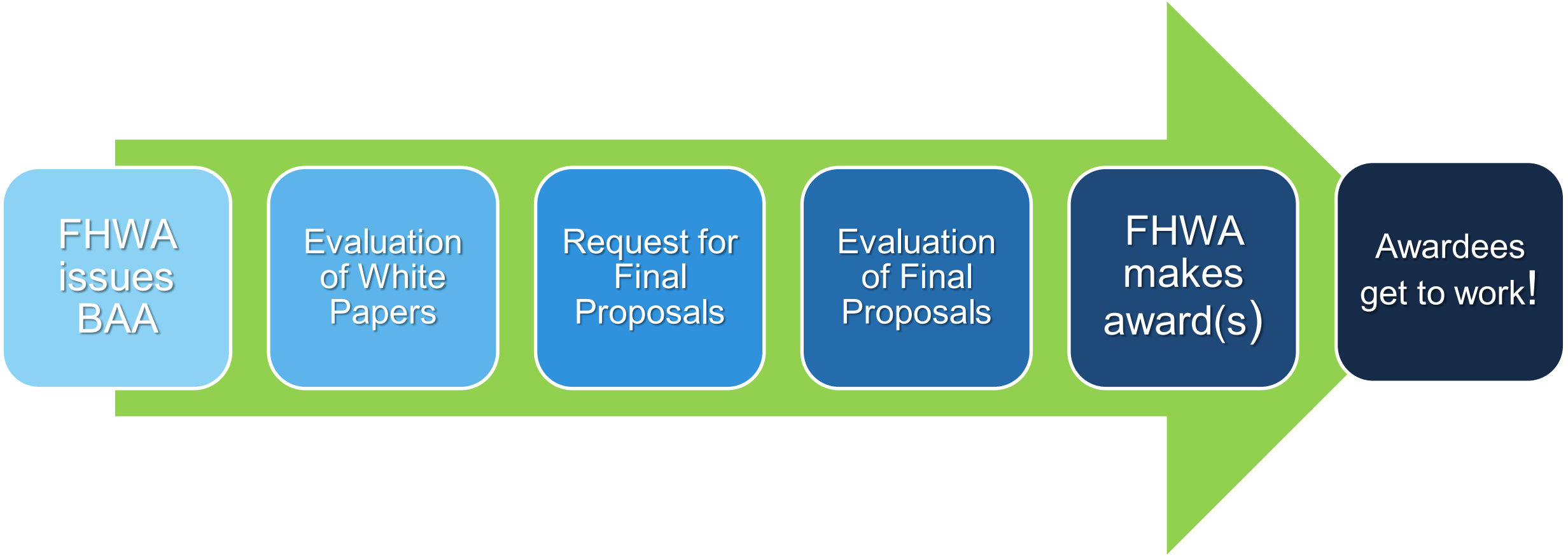
Federal Highway Administration

Proposal Submission Instructions

Important Dates

- **Questions Due Date:** December 16, 2024
- **White Paper (Phase 1) Due Date:** January 15, 2025
- **Proposal (Phase 2) Due Date:** To be Determined

Milestones from Solicitation to Award



White Paper Format and Content

White Paper Technical Approach

1. What is the transportation challenge being addressed?
2. Brief description of the innovation.
3. Describe how the innovation supports one of the innovation topic areas listed in Appendix C.
4. How does the innovation produce a significant advancement to conventional practice?

White Paper Technical Approach

5. What is the national demand for the innovation?
6. What is the current TRL for the innovation or technology? What TRL will the innovation or technology achieve after AMR activities? (with support for the answer)
7. What support has the innovation or technology received from other "research-to-practice" programs (e.g., Small Business Innovative Research (SBIR), National Cooperative Highway Research Program (NCHRP) Innovations Deserving Exploratory Analysis (IDEA), Exploratory Advanced Research(EAR)?

White Paper Technical Approach

8. What funding amount is being requested from the Accelerating Market Readiness Program? Provide a preliminary and summary level cost estimate to accomplish the technical approach described; identification of required non-Federal cost share (required for proposed allocations to a State);
9. Provide a brief outline of the activities to be completed with the funds and describe how these activities will advance the market readiness of the technology. Include an estimated timeline to complete the work.

White Paper Technical Approach

10. Provide a brief outline of the risks associated with this innovation/technology deployment in the current state of development.
11. If applicable – identify and describe any patented or proprietary items to be evaluated.

White Paper Evaluation Technical Merit

- **Technology Readiness Level**

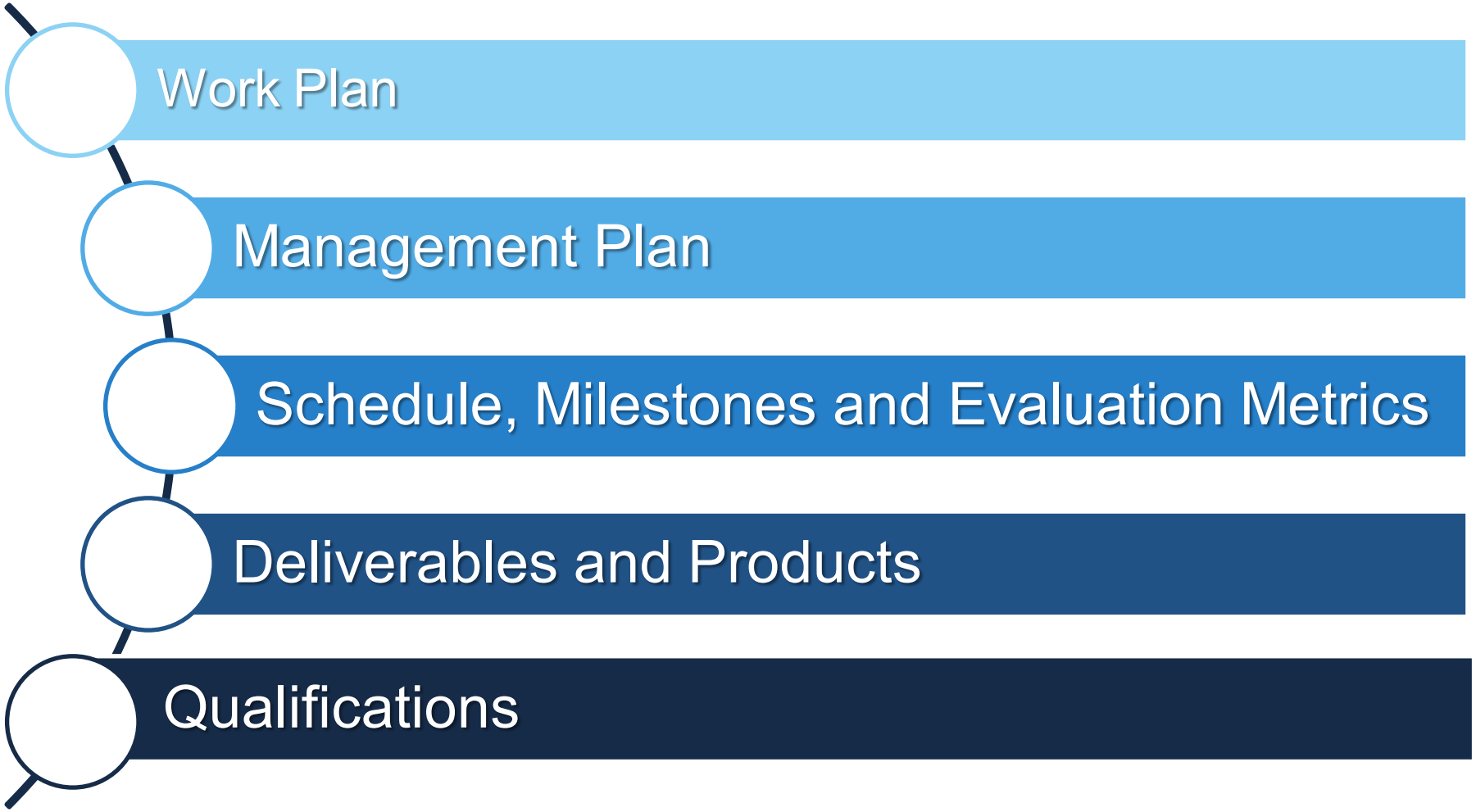
Basic Research TRL 1 to 3	Applied Research TRL 4 to 5	Development TRL 6 to 8	Implementation TRL of 9
1. Basic principles and research 2. Application formulated 3. Proof of Concept	4. Components validated in a laboratory environment 5. Integrated components demonstrated in a laboratory environment	6. Prototype demonstrated in relevant environment 7. Prototype demonstrated in operational environment 8. Technology proven in operational environment	9. Technology refined and adopted - *Every Day Counts Innovations are a TRL of 9*

White Paper Evaluation Technical Merit

- Support of USDOT and FHWA strategic initiatives/national goals
- The Government will consider overall availability of funding for allocations or awards

Phase 2 Project Proposal

Phase 2 Technical Proposal



Final Proposal Evaluation Technical Merit

- Advancement of the current state of practice
- Potential demand for the innovation after AMR program support
- Technical Approach
- Potential for future inclusion in EDC
- Project Team Experience
- Funding Availability

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Questions?