Today’s Presentation

• The Big Picture – BIM (for Infrastructure)
• The Federal/FHWA Role
• Resources

BIM is a transformative approach to digital program and project delivery – e-Everything

BIM for Infrastructure is a collaborative work method for structuring, managing, and using digital data and information about transportation assets throughout their lifecycle.

Source: Dr. David Jeong, Iowa State University, Presentation August 17, 2016

Profound Changes for Program and Project Delivery

Federal/FHWA Role
MAP-21 – 23 USC 106 (j)
Use of Advanced Modeling Technologies

... the Secretary shall encourage the use of advanced modeling technologies during environmental, planning, financial management, design, simulation, and construction processes of the projects.

... compile information/best practices ... disseminate ... and promote use

... develop and publish on the public website ... a detailed and comprehensive plan for the implementation...

EDC 2 - 3D Engineered Models for Construction

Moving from Analog to Digital 3D Models

Image: Wisconsin DOT

EDC 3 – 3/4/5D Engineered Models & Post-Construction

- As-found Survey Data (e.g., Lidar for Asset Management)
- Schedule (4D) and Cost (5D) Modeling
- Post-construction Survey Data (as built including utilities)

EDC 3 & 4 - e-Construction

- Electronically capturing construction data
- Electronic submission of all construction documentation
- Increased use of mobile devices
- Increased automation of document review & approval
- Use of electronic signatures by all parties throughout process
- Secure document and workflow management accessible to all stakeholders on any device

FHWA national ‘BIM roadmap’ under construction

- Contract to produce BIM implementation roadmap and refine 'What BIM is for Transportation'
- Build on EDC and industry efforts
- International efforts
- FedBIM
- IHEEP focus group in September

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Vision, Goal & Objective (DRAFT)

VISION
Transform the way we deliver infrastructure projects – Digitalize the nation’s infrastructure project throughout the asset lifecycle (from design to construction to operations to asset management and maintenance)

GOAL
The States adopt BIM for Infrastructure as standard practice

OBJECTIVE
The States implement a set of roadmap activities to achieve a progressively higher degree of BIM maturity over time.

...directly supports FHWA FY 2019-2022 Strategic Plan Infrastructure & Innovation Goals
FHWA’s BIM-Enabling Research

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FHWA BIM-Enabling Research

• Utilizing 3D Digital Design Data in Highway Construction – Case Studies
• Automation in Highway Construction
• Return on Investment for Paperless Project Delivery (e-Construction)
• Effective Use of Geospatial Tools in Highway Construction
• Determination of Improved Pavement Ride Quality when Utilizing 3D Modeling and Automatic Machine Guidance

FHWA BIM Research

• Integrating 3D Digital Models and other Building Information Management Data into Asset Management
• Construction Inspection for Digital Project Delivery
• Identifying Data Frameworks and Governance for Establishing Future BIM for Infrastructure Standards
• Establishing common exchange language/schema for bridges
• Considering BuildingSmart Industry Foundation Classes (IFC)
• Ongoing work to ‘translate’ NBI data to 3D models

Ongoing: Unmanned Aerial Systems (UAS): Bridge Inspection - Data Quality and Handling

Brief Scope: Document effective use of UAS in bridge inspection and best practices for how the collected data should be assessed, presented, and stored to provide reliable and actionable information to owners.
Project Schedule: Awarded February 2018
Project Status: 20 month project.
Key Engagement Opportunities: Agency participation in upcoming interviews
Key Deliverables To Date: None

Ongoing: Leveraging Augmented Reality (AR) for Highway Construction

Brief Scope: Investigate the availability, accessibility, and reliability of using AR for construction inspection and review, QA, training, and improved project management. Document potential advantages, limitations and cost of using AR.
Project Schedule: November 2018 completion
Project Status: On-going. Completed Market Review.
Key Engagement Opportunities: Augmented Reality in Highway Construction Workshop (held May 9, 2018) & Webinar in November 2018
Key Deliverables To Date: None

Resources
Available FHWA Innovation Deployment Funding

- Accelerated Innovation Deployment (AID) Funding
  - Up to $1M per award
  - Project initiates within 6 mo

- State Transportation Innovation Council (STIC) Incentive Funds
  - Up to $100,000 per year
  - contact your FHWA state office
  - [https://www.fhwa.dot.gov/innovation/stic/guidance.cfm](https://www.fhwa.dot.gov/innovation/stic/guidance.cfm)

- MAP-21 Section 1304 Innovative Project Delivery Funding
  - Up to 5% increased federal share
  - [http://www.fhwa.dot.gov/map21/qandas/qaipdf.cfm](http://www.fhwa.dot.gov/map21/qandas/qaipdf.cfm)

EDC3 ‘How to’ Guidance Briefs

- Lidar data collection and management
- Standards based data collection and exchange based on business requirements
- Updating or maintaining 4D models as schedules evolve
- Project selection guidance for 4D modeling by usage case
- Guide specifications for capturing digital as-builts for subsurface utilities.
- Dealing with legacy survey data in the design, construction, and asset management phases
- Framework for digital asset management
- Estimating return-on-investment for technology implementation at the project and program level