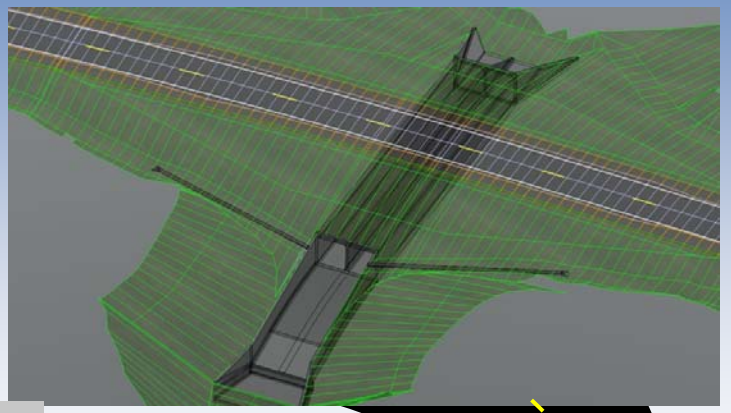
FHWA Research Project on 3D Design to Construction

PLANNING

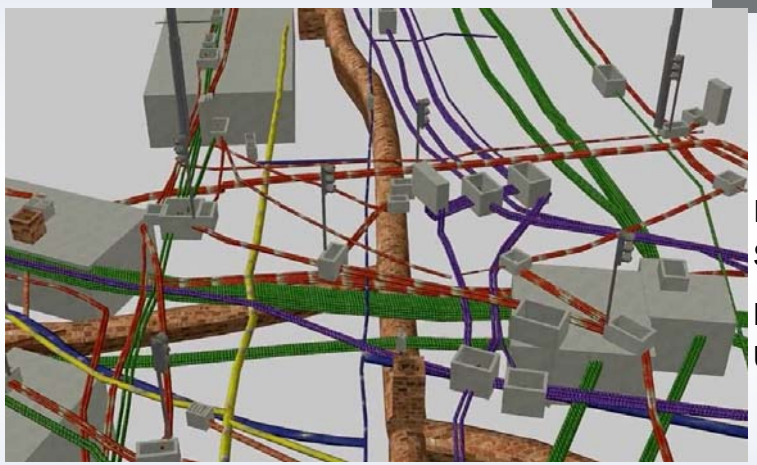
Integrating 3D Digital Models into Asset Management



DESIGN

Robotic Subsurface Utility Relocation System

Feasibility of Mapping and Marking Underground Utilities by SHA



CONSTRUCTION—QA

Utilizing 3D Digital Design Data in Highway Construction—A Case Study

Intelligent Construction Systems and Technology (ICST) Research

Addressing the Challenges and the Return on Investment for Paperless Project Delivery (e-Construction)

Construction Peer Network

PERFORMANCE

Integrating 3D Digital Models into Asset Management

Snowplow Visual Guidance Systems

U.S. Department of Transportation
Federal Highway Administration

FHWA's Office of Infrastructure R&D
Infrastructure Analysis and Construction Team (HRDI-20)
Ongoing and Planned Research

Contact: Richard Duval, Richard.Duval@dot.gov, 202-493-3365 on the following projects:

Feasibility of Mapping and Marking Underground Utilities by State Highway Agencies
Objective: Project will build off of the utility work done in SHRP2 and will focus on the feasibility of having SHAs be the central repository for 2D/3D utility information within their right-of-way (ROW).
Status: 2 year project awarded to Texas A&M in Sept 2012 (PI: Quiroga)

Intelligent Construction Systems and Technology (ICST) Research
Objectives: This project is conducting research to further develop Intelligent Construction priorities identified at the ICST workshop held in September 2011, at subsequent CIM workshops, and by the TRB Intelligent Construction Expert Task Group. Compliment Iowa DOT/FHWA EDC2 effort on documenting 3D+ modeling from design to construction. The project emphasis is on methods to improve data transfer among designers, agencies and contractors to expand the use of Civil Information Management (CIM) and automated machine guidance.. One focus is developing design procedures, design manuals, applications, etc. for highway agencies to properly generate accurate 3/4/5 D models for downstream uses in construction and other phases of project delivery standardized base
Status: 2 year Project awarded September 2013 to Transtec (PI: Chang).

Construction Peer Network - Synthesis of Findings
Objectives: The synthesis will identify research needs as well as summarize best practices in state construction programs that are captured during the Construction Peer Network (CPN) workshops. Topics vary from Project supervision and staffing to 3D Digital Jobsite.
Status: Draft report has been submitted and is under review. (FHWA/SAIC)

Projects Not Yet Awarded

Addressing the Challenges and the Return on Investment for Paperless Project Delivery (e-Construction)
Objectives: Assess what State and local highway agencies are doing to transition to a more paperless project delivery system including 3D and the benefits on moving to digital project delivery.
Status: Request for Proposals (RFP) currently located at the following address and anticipate award in July 2014.
https://www.fbo.gov/index?s=opportunity&mode=form&id=2cbd6022d67fd099efa415a7ad0d04aa&tab=core&_cview=1

Utilizing 3D Digital Design Data in Highway Construction – A Case Study
Objectives: Select a representative highway project to showcase the successful utilization of 3D digital design data and use the information gathered from that project to develop broader guidance that can be used by highway agencies. Through the conduct of a comprehensive case study a representative highway construction project that successfully transitioned digital data from design to construction. Particular emphasis will be put on data and software interoperability issues.
Status: RFP posted anticipate award August 2014. Proposals are due 7/3/14 by 3:00pm Eastern time.
https://www.fbo.gov/index?s=opportunity&mode=form&id=1227ed5087c056eab4cc40da16ef2697&tab=core&_cview=1

Contact: Morgan Kessler, Morgan.Kessler@dot.gov, 202-493-3187 on the following projects:

Integrating 3D Digital Models into Asset Management
Objective: Building Information Modeling (BIM) has transformed the way that engineering design is performed, representing a vertical (such as a structure) construction project as a true three-dimensional (3D) entity. Similarly, Civil Integrated Management (CIM) extends this concept into the highway engineering realm, where there are substantial horizontal components (roadway, utilities, etc.) to a project in addition to vertical. This project will examine the state of the art of 6D BIM/CIM technology, both domestically and abroad and its application to highway asset management
Status: This project has had an RFP issued, and proposals are due 6/10/2014.

Robotic Subsurface Utility Relocation System
Objective: The most significant issue in underground relocation of utilities beyond the cost is avoiding existing subsurface utilities and other obstructions. This will determine the feasibility of integrating the identified subsurface sensing/mapping (3D) methods with the robotic technology to form a complete, automated subsurface utility relocation system.
Status: RFP has been issued, and proposals have been received. Award of two contracts for Phase I.

Snowplow Guidance Systems
Objective: Highway snowplowing operations, especially under blizzard and white-out conditions, is dangerous work that involves high risk to the operator, equipment and highway users. This effort will focus on examining recent and current research, and identify proven GPS, 3-D imaging, mapping and user display technologies that may be integrated to provide snowplow operators with a computer-generated (Augmented Reality) view of the road in front of them despite zero-visibility conditions.
Status:. A synopsis has been issued, and an RFP is expected to be issued during 6/2014.