TPF-5(372)
BIM for Bridges and Structures

Project Overview & Update
June 24, 2019

T-19 Committee Meeting at AASHTO Committee on Bridges and Structures Annual Meeting
INTRODUCTIONS

Connor Christian
• Transportation BIM Program Manager
• Internationally recognized BIM Thought Leader
• Project Technical Lead
• Connor.Christian@hdrinc.com
INTRODUCTIONS

Julie Rivera, PE, SE

- HDR Project Manager
- 15 years industry experience
- Bridge analysis & design
- 3D modeling experience
- Coordination/management role & bridge designer advisory role

Julie.Rivera@hdrinc.com
AGENDA

1. General Overview
2. Roadmap Update
3. Process Map Update
4. Software Vendor Engagement
5. Collaboration Forum
6. Coming Next
7. Getting Involved
Develop a National Standard for open exchange of modeled bridge and structure data to be used for design to construction and fabrication

Transportation Pooled Fund - TPF-5(372)
ACHIEVING THE VISION

- In coordination with International Standards –
- Governance and stewardship framework
- 5-year project, pooled fund effort
TRANSPORTATION POOLED FUND – TPF-5(372)

17 States Participating

01 California DOT
02 Delaware DOT
03 Illinois DOT
04 Iowa DOT
05 Kansas DOT
06 Michigan DOT
07 Mississippi DOT
08 North Carolina DOT
09 New Jersey
10 New York State DOT
11 Ohio DOT
12 Pennsylvania DOT
13 Texas DOT
14 Utah DOT
15 Wisconsin DOT
16 Florida DOT
17 Vermont VTRANS
+ FHWA
+ Roger Grant (NIBS)
KEY PROJECT ACTIVITIES
INVESTIGATION & EXPLORATION

Build On Previous Efforts
INVESTIGATION & EXPLORATION

• Review and document previous & ongoing efforts
• Aggregate terminology from various sources
  ▪ Brief industry survey to identify sources of terminology
  ▪ Creation of a database of terminology
  ▪ Useful for future development of bSI Data Dictionary (bSDD) for the US bridge industry
IFC DEVELOPMENT

Industry Foundation Classes (IFC)

A non-proprietary, open standard means of describing the built environment for freely exchanging and/or storing that information digitally.

buildingSMART International

ISO 16739
IFC DEVELOPMENT

More Than Just Buildings...

Alignment

Bridges

Railway

Roads

Ports & Harbors

Tunneling

Site & Landscape
BIM FOR BRIDGES AND STRUCTURES TPF-5(372)

IFC DEVELOPMENT

Bridges are Just the Beginning...

Source: André Borrmann
Model View Definition (MVD)

Entire IFC Schema

MVDs

Source: Mark Baldwin (Mensch & Maschine)
COLLABORATION & IMPLEMENTATION

Bridge Engineers  Fabricators  Consultants  Contractors

Developers  Software Vendors  Communicators
SOFTWARE VENDOR COLLABORATION

OBJECTIVE:
Incorporation of MVDs into commercial off-the-shelf software

Software vendor inclusion is paramount
Certification process through bSI
Training & effective communication
INDUSTRY INVOLVEMENT

Stakeholder Collaboration Forum

- Discussion threads
- Educational tools
- Videos
- Case studies
- Quick polling
- Stakeholder input
ECONOMIC ANALYSIS

- Improved productivity
- Faster project delivery
- Reduced asset management costs
- Reduced safety risks
- Lower construction costs

- Training
- Implementation costs
- Operations and maintenance
INDUSTRY OUTREACH
ROADMAP & SOFTWARE VENDOR ENGAGEMENT
ROADMAP UPDATE

**PHASE 1: Program**
Identify the data to be exchanged

**PHASE 2: Develop**
Develop data exchange formats and schemas

**PHASE 3: Implement**
Implement formats and certify software

**PHASE 4: Deploy**
Deploy certified software in bridge projects

**Year 1**
Create IDM

**Year 2**
Create MVD

**Year 3**
Test Software

**Year 4**
Collaboration forum, ROI study, workshops

**Year 5**
Software vendor coordination/certification
ROADMAP FUTURE PLANNING

• Establish an MVD Certification Program
• Develop Independent Validation Guidance and Tools
• Provide Ongoing Education and Support
• Establish a Standard Governance Body
• Establish a Data Governance Plan to Manage Data Dictionary
ROADMAP UPDATE

ROADMAP FUTURE PLANNING

• Conduct ROI studies for future MVDs
• Test more complex bridge types
• Streamline AASHTO process for MVD creation
• Create IFC Testing Tool
• Create Electronic Signature process/tool
SOFTWARE VENDOR COLLABORATION
ENGAGEMENT PLANNING

Software vendor inclusion is paramount

Certification process through BSI

Training & effective communication
Proposed Software Vendor Engagement Plan

Proposed buildingSMART Vendor Engagement - Overview

- **User Program**
  - Initiation: Activity proposal
  - Development: Project proposal, Project Team, Expert Panels
  - Approval: Software validation

- **Standards & Solutions Program**
  - Software Prototyping

- **Compliance Program**
  - Software certification

Vendor engagement
Proposed Software Vendor Engagement Plan

Proposed TPF-5(372) Vendor Participation - Overview

1. Investigation & Exploration
2. IFC Development & Verification
3. Economic Analysis
4. Industry Organization
5. Development & Implementation

Year 1
Year 2
Year 3
Year 4
Year 5

- Software Prototyping
- Software development & testing
- Software certification

Vendor engagement
Proposed Software Vendor Engagement Plan

Year 1  
2019
- Outreach & Recruitment
- Research
- Communications

Year 2  
2020
- Outreach & Recruitment
- Commitment
- Development Planning
- Test Files
- Communications

Year 3  
2021
- Development
- Beta testing
- Cert Platform Planning
- Communications

Year 4  
2022
- Development
- Beta Testing
- Deployment Planning
- Cert Platform Development
- Communications

Year 5  
2023
- Certification
- Deployment
- Communications
IFC DEVELOPMENT

REVIEW AND UPDATE PROCESS MAP

BIM FOR BRIDGES AND STRUCTURES
TPF-5(372)
EDUCATION & COMMUNICATION
EDUCATION AND COMMUNICATION

Collaboration Forum – Current State

- Setting up a landing page for interim use
- Mock-up ready for pooled fund review
Upcoming Coordination with Pooled Fund Members (WG4)

- Selection of URL
- Review of Landing Page message
- Review of mock-up site functionality
COMING NEXT
Information Delivery Manual (IDM) & Model View Definition (MVD)

Source: Mark Baldwin (Mensch & Maschine)
INVESTIGATION & EXPLORATION

CURRENTLY AGGREGATING RESOURCES
HOW TO GET INVOLVED
ALREADY A POOLED FUND MEMBER?

• Not too late to join a Working Group!
  ▪ Contact Julie Rivera or sign up now

<table>
<thead>
<tr>
<th>Additional Working Group Participation</th>
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<tr>
<td><strong>WG1: Research Working Group</strong></td>
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<td><strong>WG2: IFC Working Group</strong></td>
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<td><strong>WG3: Communications Working Group</strong></td>
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<td><strong>WG4: Education &amp; Outreach Working Group</strong></td>
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JOIN THE TEAM

• DOTs can join the Pooled Fund TPF-5(372)
  ➢ Contact: Ahmad.Abu-Hawash@Iowadot.us

• Software developers can participate in the advisory committee
  ➢ Contact: John.Reese@hdrinc.com

• Designers, Fabricators, and Contractors can participate by providing input on data exchange requirements
  ➢ Contact: Connor.Christian@hdrinc.com
QUESTIONS

For more information contact:

- Julie.Rivera@hdrinc.com
- Connor.Christian@hdrinc.com
- John.Reese@hdrinc.com