

Project Proposal: 3D Model Specification - Foundation for the digital twin

Objectives

To create a practical specification for 3D models to be used by Owner Operators in the contracts with EPCs, to optimize the return on the investment in a 3D model. The specification captures current best practice of owner-operators to optimize the value of the 3D model throughout the execution of a capital project and subsequently in the operate phase. The specification shall enable the creation of a digital twin, allowing real time data to be projected upon the 3D model. The specification will in the first instance be applicable to proprietary 3D modelling systems, but may evolve into a neutral format over time.

Benefits

1. Reduce the cost of the 3D model and optimise its value across the project & asset lifecycle by standardising the way in which 3D models are structured and labelled; to enable the development of digital twins that combine real time data and 3D model data.
2. Enable use of 3D model to raise construction productivity from the current 35% hands-on-tool time by using it to validate the construction plan logic and (installation) work package completeness virtually before physical release to site.
3. Speed up data acquisition and reduce cost of engineering / site validation efforts by leveraging laser scanning and digital photography technology for 3rd parties doing such work.
4. Enable federation of data and analytics by linking different information sets (Geographical Information Systems, Control systems, real time data historians, Enterprise Resource Planning systems etc. through common identifiers).
5. Enable creation of industry 3D catalogues, to accelerate and standardise design, and to reduce IP issues when handing over 3D models between parties.

Scope, Deliverables & Timeline

The Project will be run in a number of sprints that will be further defined by the working team, likely to address the below topics in the following sequence

- **Release 1.0.** Compile current 3D model specifications of participating companies. Review and identify best practices for inclusion in common specification. Publish the integrated set of requirements for use in FEED, EPC and Asset Mgt contracts.
- **Release 2.0.** Integration of real time data signals in 3D model. A specification of how real-time data should be linked to 3D model data to enable business processes to be optimised, e.g. via consistent tagging across different domains, e.g. to improve insight in availability and equipment failure data to identify and address root causes of failures.
- **Release 3.0.** Specify requirements for structuring and identifying 3D model (meta-) data to support design, procurement, construction management and corrosion management and other asset management purposes. Identification of Advanced Work Packaging (AWP) requirements such as construction and installation work packages within the 3D model.
- **Release 4.0.** Definition of methodology for managing 3D scans in 3D model. Specification for 3D scans of assets e.g. to validate As Build data and documents to ensure that the resolution of 3D

laser point cloud scans and digital photos are of sufficient resolution and quality to support operational and brownfield project activities including generation of asset registers, planning for scaffolding, projects etc.

- **Release 5.0.** Integration of Civil engineering BIM data in 3D model. A specification of how civil objects such as roads and buildings should be linked to 3D model data to enable business processes to be optimised, e.g. via consistent tagging across different domains. For example to enable monitoring of progress of civil works activities via 3D scans, and maintenance of civil infrastructure via maintenance management processes.
- **Release 6.0.** Integration of GIS data and underground systems in 3D model; to enable integration of 3D models and GIS systems and ensure that underground infrastructure is adequately identified and managed in the relevant systems; particularly within the perimeter fences of the owner-operators. This would help prevent damage to infrastructure from digging activities, and to ensure adequate capacity and corrosion management in underground infrastructure.
- **Release 7.0.** Specification for the structuring and identification of 3D catalogue data, including the specification of piping specifications to be used, and shapes of equipment. Would serve as foundation for the creation of company- or industry 3D catalogues.

Target audience & participants

- **Project Manager** – USPI Director Martin te Lintel
- **Expert group participants**
 - **3D Specification** – 3D specialists from Owner Operators, and any EPC contractors wishing to participate. All participants are expected to contribute by sharing their company's current 3D specification. Any reference data should align with CFIHOS.
 - **Data Model** – Data modelling experts of participating companies. The data model should align with CFIHOS.
 - **Additional expert teams will be established if/when required** E.g. Construction.

Ways of working

- **Weekly team meetings of 90 minutes** to progress work and align on content by teleconference, hosted by USPI.
- **Off-line work** on content by individual contributors, ad hoc as required
- **Half-yearly Face to Face** meeting for 2-3 days, hosted by USPI

Relevant dependencies, standards & activities of sister organisations / MOUs

- **IOGP JIP36 / CFIHOS** For identification of asset register objects, attributes and reference data
- **Building Information Model standard ISO 19650 / PAS 1192**

Expected contribution of participants

- **Current company specifications and standards** – baseline for common specification
- **Manhours** – 2-3 hours per week
- **Costs** – EUR 7000 per participating company per year (provided 12 companies participate).

- **USPI membership** - is prerequisite for participation.

Note

The content of this ToR has to be regarded as an initial guideline for the project. The project team may decide to make amendments to what is stated in this ToR in order to have the project and its deliverables better serve the objectives of the project and have them better fit with other standards and projects developed by USPI's MoU partners or other standardization bodies of which the project team feels their activities are appropriate as reference.

The results of these changes will become apparent through the MoMs created for the meetings organized as part of this project, which are accessible to all project participants.