

SWAN Digital Twin Work Group

GOAL

To develop a common strategy for developing Digital Twin technology for global water utilities, providing a means for managing operations and assets in real-time for greater operational efficiency, enhanced lifecycle asset management, and reduced costs.

OBJECTIVES

- ✓ Identify key challenges for utilities utilising an operational hydraulic model
- ✓ Identify key challenges with data accuracy and normalisation across multiple systems
- ✓ Develop a holistic view of a water system via the culmination of digital solutions: IoT, VR/AR, mobility, machine learning, cloud computing, drones, etc.
- ✓ Identify and develop best practices for hydraulic model calibration, including utilisation of real-time data from consumption meters, GIS, SCADA, CMMS, and other IoT sensors
- ✓ Identify and develop best practices for aggregating digital twin subsystems (i.e. a pump digital twin) and for utilising machine learning to help accurately model the water system
- ✓ Develop best practices for accessing data from the various silos of systems, applications, and IoT
- ✓ Develop best practices for application integration and application mobility, as well as the collaboration of IT and OT in utilities

JOIN A SUBGROUP

We welcome all SWAN Members to collaborate and contribute their knowledge by volunteering in one of the four subgroups, outlined below. We plan to have around four meetings a year, as well as one in-person meeting a year in the form of a workshop.

(1) Holistic Digital Twin Technology Architecture Subgroup – *Chengzi Chew, Chief Entrepreneur (Grundfos), Satish Tripathi, Managing Engineer, Infrastructure Planning (Houston Water), & Youri Amerlinck, Researcher (Aquafin NV)*

Objectives:

- Define the core technology components of a digital twin
- Identify best practices for migrating an existing batch-mode hydraulic/other model to a continuous-mode model
- Identify useful data sets for both the input parameters and calibration of model
- Identify areas for integration with existing systems, i.e. SCADA, CMMS, GIS, etc.
- Identify and define key interfaces between the sub-systems
- Identify if there is a need for middleware/glue-code in the development of a digital twin, if so outline best practices

- Find commonalities and differences with models for 1) DW, 2) WW, 3) Storm Water, 4) Source Water
- Develop a high-level architectural diagram, as well as a diagram demonstrating digital twin types and levels throughout a full asset lifecycle
- Gather and share case studies within each area of an asset lifecycle

(2) Outcomes & Applications Subgroup – Led by Andrew Smith (Smart Water Strategy Manager - Anglian Water), Agnethe Pedersen, Industrial PhD Student (VandCenter Syd), & Joukje Keuning, Program Manager Infra 2025 (Vitens)

Objectives:

- Identify the most common desired outcomes that drive digital twin adoption, creation, usage – answering the question of “Why implement a digital twin?”
- Share best practices for organisational stakeholder engagement (operations, engineering, management, etc.) in setting goals and outcomes of digital twin implementation
- Rationalise “effort vs. ROI” around the creation and usage of a digital twin, pointing to real-world experiences from organisations who can share outlines of the required effort
- Identify the different users of digital twin for the range of outcomes (i.e customer experience dept. vs. operational, vs. business and revenue, etc.)
- Identify the UI for retrieving an outcome - answering the question “What will the operation staff see vs. what will the other users use for obtaining that outcome?”
- Develop educational concepts and examples of digital twins to bring the best operational experiences to all phases of an asset

(3) BIM & Asset Management Subgroup – Led by Jamie Mills, Global BIM Manager (Xylem) & Nick Turner, Digital Twin Engineer Lead (GHD)

Objectives:

- Bring Awareness and Education to ISO 19650
- Demonstrate Usefulness of a BIM Model within a Digital Twin primarily through case studies, focusing on the design phase
- Consolidate existing information and focus on identification of priorities
- Identify the Authority and Sources of Asset Data

If you are interested in joining the Work Group as an “Active” or “Observer” Member, please reach out to Shayna Ramboz - shayna@swan-forum.com