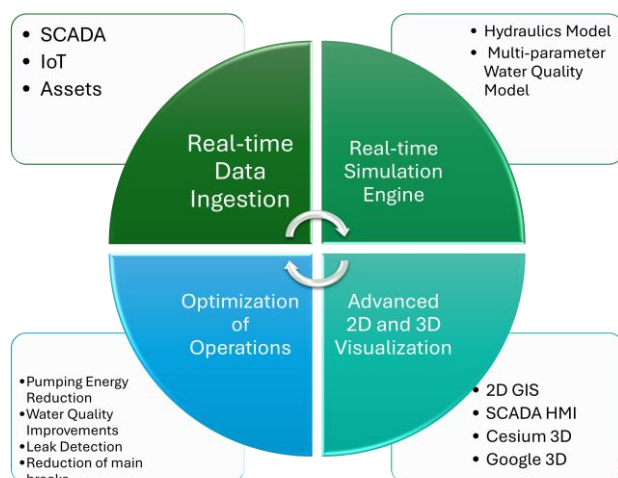# Drinking Water Distribution System (DWDS) Digital Twin (DT)

Overview

The HydroTrek DWDS DT is a leading software-as-a-service (SaaS) browser-based software platform that has been developed with a total of $1.5 M Small Business Innovative Research (SBIR) funding from the US Army and from the State of Kentucky. It has been successfully utilized in several utilities to reduce pumping costs, improve water quality, detect leaks and reduce main breaks. It can be used to avoid boil-water advisories for the entire system by pin-pointing specific contaminated areas. The DT uses the information from the SCADA and IoT systems to continuously calibrate the model in real-time and accurately calculates the system pressures in a variety of conditions including main breaks.

Features

- Changes the demand values to reflect the actual flows from the pumps and the tanks, and then calculates the systemwide pressures with the improved representation.
- Leverages SCADA data and IoT telemetry to change settings in the models. For example, the DT changes a PRV downstream pressure setting or a valve setting to match the SCADA values.
- Shows the impacts of leaks and breaks to improve the determination of resiliency
- Calculates the concentration of multiple water quality parameters at each time step.

Figure 1. An Elevated Tank and Its Model in 3D

Advantages

- Provides insights into the complex interrelationships between the pressures, the flows, the water quality and the incidents such as leaks and breaks.
- The 3D visualization improves the spatial understanding and highlights the any asset geographic data discrepancies compared to the ground truth.
- Lowers operations energy costs and shows opportunities for improving water quality
- Increases the resilience through the modeling of the impact of what-if catastrophic events

Figure 2. Advanced Real-time Charts