



## **Yuba Water Agency Establishes a Near Real-time Monitoring System to Detect Cracks and Ensure the Resiliency of a Dam**

*Uniting Sensor Data on a Single Platform Helps Detect Damage Immediately after Storms and Earthquakes*

### **Improving Knowledge of an Older Dam**

After Yuba County, California endured a major flood in 1955, the state created the New Bullards Bar Dam to provide flood control in the area. The dam also generates 340 megawatts of clean energy and provides a reliable supply of water for both residents, including several disadvantaged communities, and the ecosystem. Over 50 years after its construction, extreme weather events have become more frequent and intense, increasing the risk to the structural integrity of infrastructure. As part of its core commitment to dam safety and resilience, as well as improving the efficiency and reliability of its operations, Yuba Water recently implemented a project to collect continuous, near real-time data on the facility. To obtain the level of detail that Yuba Water required to keep the dam operating smoothly as weather conditions worsen, the team had to go beyond traditional surveying techniques.

### **Advanced but Siloed Sensors**

Yuba Water realized that they needed a combination of drone surveys and automated sensors. With this advanced, artificial intelligence-driven technology, they could detect tiny cracks and minor deflections along the dam's surface, and monitor changes over time, to undertake maintenance and repairs when needed. However, their initial deployment still required the survey team to manually collect data from individual sensors, which exposed workers to steep, difficult-to-access terrain and fall hazards, as well as made the data less timely. To fully realize the potential of drone and sensor data and ensure the resilience of the dam for decades to come, Yuba Water needed a system that could automatically collect and report all dam data.

### **Visualizing Dam Data in 3D**

After examining their options, Yuba Water realized that they could unify the data and establish continual condition monitoring by using iTwin applications. They first used iTwin Capture Modeler to process thousands of drone images into a high-fidelity 3D model. By integrating all dam sensors into iTwin, the team can monitor the data remotely, track any deformation, and generate alerts based on conditions that exceed specific thresholds. Their system then visualizes sensor data on the 3D model, which incorporates artificial intelligence to detect cracks. Additionally, since active monitoring only occurs four hours each day, the survey team can secure the dam's data by locking access to the monitoring system in the off-hours.

### **Keeping the Dam Safe for Decades**

With the 3D digital monitoring system in place, Yuba Water has gained a deeper understanding of the dam's performance. The survey team can now obtain new data in minutes, compared to one week with their previous methods, at a greatly lowered cost. Yuba Water has enhanced the

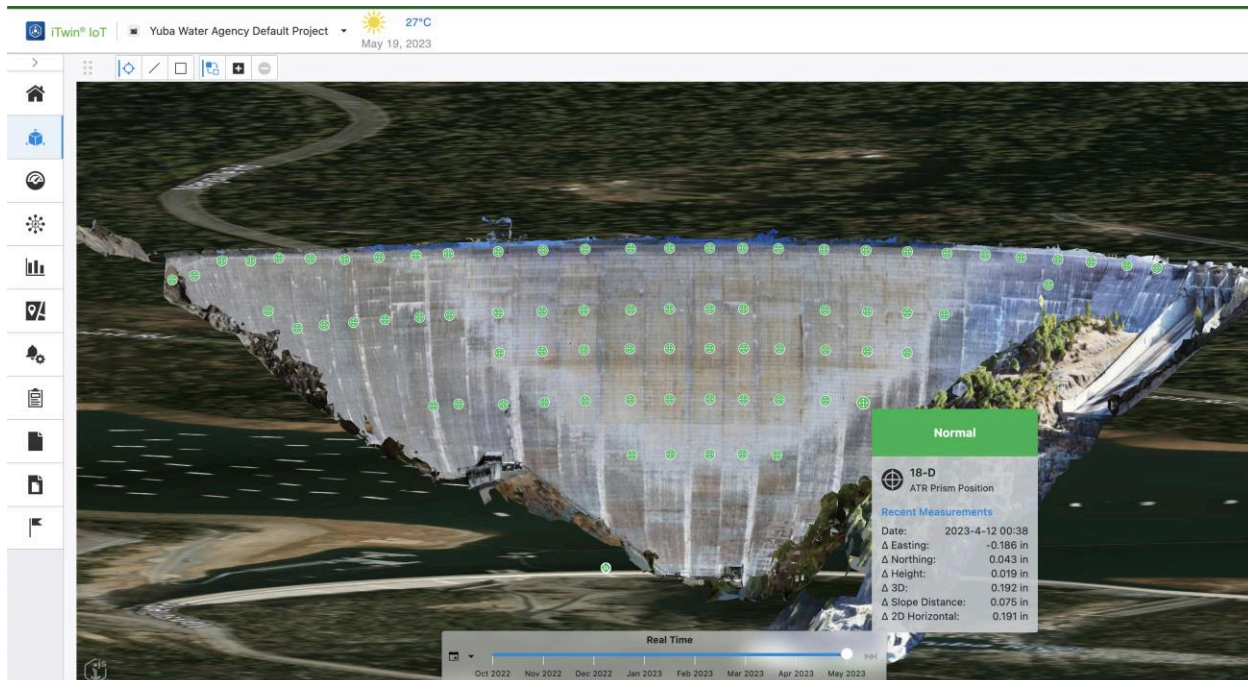
number of data points they can gather in one week by one thousand-fold while improving accuracy by 50%. In the event of heavy rainfall or earthquakes, they can quickly evaluate conditions and determine if emergency measures are needed. Their monitoring system recently confirmed the dam did not sustain damage immediately after a magnitude 5.4 earthquake occurred near Lassen Volcanic National Park. If the dam takes damage in a future disaster, teams can quickly take action to avoid potential loss of life and billions of dollars of damage in Northern Sacramento Valley. Yuba Water now has renewed confidence that New Bullards Bar Dam will remain safe and resilient, even with climate change.

**Project Playbook:** iTwin Capture Modeler, iTwin IoT, sensemetrics

### Outcome/Facts:

- The survey team can now obtain dam data in minutes, compared to one week with their previous methods, at a greatly lowered cost.
- Yuba Water has enhanced the number of data points they can gather in one week by one thousand-fold while improving accuracy by 50%.
- During heavy rainfall or earthquakes, the survey team can quickly evaluate conditions and determine if emergency measures are needed.

**Quote:** “For Yuba Water Agency, there is nothing more important than public safety. Investing in a real-time, automated total monitoring station at New Bullards Bar Dam significantly improves our monitoring capabilities and is testament to our continued commitment to public safety and infrastructure resilience.” – Tim Truong, Chief Dam Safety Engineer, Yuba Water



[Image Link](#)

**Image caption/courtesy 1 (header image):** The survey team can now obtain dam data in minutes, compared to one week with their previous methods, at a greatly lowered cost. *Image courtesy of Yuba Water.*

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