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Hunter Water joins space race: satellites monitor dams with millimetric accuracy

Hunter Water has deployed cutting-edge technology to monitor its two biggest assets.

Satellite data is now providing valuable insights at both Grahamstown Dam and Chichester Dam in a state-of-the-art safety upgrade, with Hunter Water engaging Australian company Detection Services in partnership with United Kingdom-based analytics experts Rezatec.

The three-year programs at the two dams will capitalise on Rezatec's Geospatial Artificial Intelligence (AI), increasing the frequency and accuracy of monitoring while also reducing inspection costs and risks to employees and contractors.

Hunter Water Dam Safety Engineer, Daniel Turnbull, said using this advanced technology was a game-changer for the organisation on several levels.

"We receive high-quality data showing any changes on a very fine scale, which gives us increased confidence in our dams' integrity and allows us to proactively manage the assets.

"Satellite monitoring minimises the fieldwork required, reducing the exposure of our people to potential hazards.

"This is particularly relevant when you realise Grahamstown Dam has a public road along its crest with an 80-kilometre-per-hour speed limit, and the terrain around Chichester Dam is steep and heavily forested.

"At Hunter Water, we are a frontrunner in adopting new digital technologies as we consider alternatives to traditional measurement surveys and visual inspections to improve resilience, deliver excellent value to customers, and protect the environment.

"We also wanted to establish a higher level of scrutiny than the minimum standard we're required to demonstrate under the regulations," said Mr Turnbull.

Mr Turnbull added Hunter Water had tried and tested other technologies, such as flying drones over the dams, but they were not able to offer the same level of insight.

"Drones just can't achieve the millimetric accuracy of satellite data.

"Our comparisons showed drones can pick up potential movement with sensitivity of 20 to 30 millimetres, whereas satellite data detects movement of one to two millimetres. For dams, that's hugely significant.

"We are utilising satellite monitoring to complement the traditional surveys undertaken at these sites as it can provide frequent updates on potential movement in a cost-effective manner between traditional survey cycles," said Mr Turnbull.

The dam monitoring product features an online portal, offering a dashboard view, while detailed reports provide early information and analysis of any potentially irregular ground movement and vegetation growth.

Rezatec Product Manager, Camilla Braithwaite, said metrics like dam water level and seasonality – regular and predictable changes that recur every calendar year – could affect vegetation, with higher growth occurring during warmer, wetter periods.

She said adding such data into the analytics would enable additional insights.

"Vegetation, particularly any vigorous growth, is a good indicator for seepage, which is a focus area for dam owners.

"It's not something they can spot immediately or easily. We provide dam operators with an understanding of what's normal through benchmarking, or setting a baseline, and then identifying potential anomalies," said Ms Braithwaite.

Rezatec first began monitoring Grahamstown Dam on a trial basis last year and, with the pilot deemed a success, Chichester Dam joined the program in recent months.

Given the success of the product so far, over time Hunter Water will look to apply Geospatial AI technology to other areas across its network. This includes potentially monitoring for leakage from remote trunk water mains.