

Autonomous LiDAR-equipped Inspection of a Multi-Billion Dollar Underground Power Station

The Challenge

A client approached Draganfly with a challenge - create a high-resolution 3D model of a 500m long, **half-full tailrace tunnel for an underground and continuously operating 800MW power station**. There was no known way to safely inspect the tailrace or outlet of the tunnel due to its length, restricted access at both ends, rapid water speed, and unknown conditions in the tunnel. Inspections have not been possible since it was constructed several decades ago. McElhanney's Mopping Division **contracted the Dragonfly's service team to plan, execute, and deliver LiDAR data collection of the tunnel**.

The Mission

The underground power station is situated in a remote part of British Columbia, and has been continuously running since its commissioning in the 1950's. The owners have long wanted to inspect the tailrace tunnel to plan pre-emptive maintenance, however until now there has been no safe way to do this. **The tunnel is 8m wide, goes 500m into the mountain, is up to ½ full of rapidly flowing water, and has a bend 150m from the outlet, making the final 350m stretch to the turbines beyond line of sight, and outside radio range**. Furthermore, the only viewpoint to the tunnel entrance was **200m downstream at a bridge, with a 300KV transmission line in between, and low hanging trees covering the entrance to the tunnel**. Planning missions from the office often presents a different reality when you get on site. We often bring out a "scout" drone when flying in unfamiliar environments. This enables our team to scope out the scene for unforeseen obstacles and hazards without risking our expensive equipment.

The Outcome

Using HoverMap system to autonomously navigate and map in a GPS denied environment, the mission took approximately **20 minutes** to complete and a **half-hour of data processing to generate a point cloud of the tunnel**. Dragonfly provided stakeholders, **for the first time in over 7 decades**, with a tool into the tunnel which enabled the McElhanney's Mopping Division to make immediate data-driven decisions on current and future maintenance.

