

## **Using Drone and GIS Technology to Support Condition Assessment and Maintenance Planning for a Rockfill Dam**

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Modern geomatics tools such as Unmanned Aerial Vehicles (UAV) and Geographic Information Systems (GIS) offer the potential to gather high-quality, detailed three-dimensional (3D) point cloud and imagery datasets that can support: routine and condition-based inspections, condition assessment, and maintenance planning for dam facilities. This paper provides a general overview of BC Hydro's use of multi-rotor aerial drones to fly hundreds of missions between 2015 and 2020 to inspect dam facilities in the utility's portfolio. Also discussed are specific lessons learned from the use of drone technology to gather data about the condition of the upstream face of a rockfill dam, and the use of GIS to post-process the data to support maintenance planning, work verification, and data sharing with maintenance crews, other engineers and managers. To ensure effectiveness and data quality, this initiative has developed reusable workflows that can be used for future assessments and work planning including: mission planning, field data acquisition, post-processing, data management, and output/sharing with others using a webGIS interface. The derived datasets and views must in turn support specific asset management activities that include: consideration of past dam inspections and repair history, current condition assessments, work planning and repairs, work completion, and outstanding work / future repairs. A specific example of the use of GIS to support the comparison of multi-year condition assessment and work plans, and to share this information using a web-based GIS interface, is also provided. The paper concludes with a discussion of lessons learned and operational insights, including: situations where the technology can be most effective, challenges faced when sharing large digital point cloud and imagery datasets using web-based tools, and data security requirements. Trade-offs of between insourcing and outsourcing ('buy versus contract') to provide value, responsiveness and in-house skills development are also discussed.