DRONES

SURERUS MURPHY
A JOINT VENTURE COMPANY

Enabling Real-Time, Informed Decision Making

Surerus Murphy Joint Venture (SMJV) has invested significantly in using drones to provide accurate intelligence of an area, which is then used to inform project decisions that drive our ability to deliver quality, timely results. Drones offer visual and spatial information that advise construction schedules and priorities, procurement, safety and more.

DRONES ARE USED TO SUPPORT BETTER DECISION-MAKING:

- Drones fly over a project site at regular intervals to capture data (photos, videos, LiDAR) that yields information to the project team and the client.
- Drones provide data processed in-house to feed business intelligence tools that increase efficiencies, lowers project costs and improves safety.
- Drones provide photogrammetry for survey-grade flights, allowing for surface modelling that generates a fine level of detail of existing terrain.
- Drones generate data on same-day progress that are used to measure work status.

OUR DRONES ARE EQUIPPED TO CAPTURE CRITICAL INFORMATION:

- Drones are equipped with Real-time kinematic (RTK) process and record GPS information and geotags images as they're captured during flight.

DRONES ARE OPERATED BY EXPERIENCED IN-HOUSE PILOTS:

- Drone operators hold a Small Advanced Pilot License to qualify as a drone pilot and who have passed the Transport Canada Advanced Drone Exam and subsequent in-person Flight Review exam.

DRONES BY THE NUMBERS

- 1 dedicated drone pilot and 13 registered drone pilots from Surerus Murphy's survey and engineering teams
- Surerus Murphy owns 7 DJI Mavic 2 Pro's and 2 DJI Phantom 4 RTK drones, and rents a DJI Matrice 300 RTK and DJI Phantom 4 RTK
- a 3 km overflight is processed in 40 minutes
- a high-quality video production covering a 50km pipeline ROW can be as short as two days
- Surerus Murphy has invested significantly on drones over the last three years and plans more expenditures annually on new hardware
- State-of-the-art DJI Matrice 300 RTK:
  - max. flight time: 55 min
  - max. takeoff weight: 9 kg
  - max. transmitting distance: 8-15 km
  - RC built-in battery life: approx. 2.5h;
  - operating temperature: -20°C to 50°C
  - payload: DJI 445 MP P1 camera
  - ability to carry a multitude of payloads, including LiDAR scanners

DRIVING EFFICIENCY THROUGH INNOVATION AND INVESTMENT:

- ***Using drones sharpens business intelligence:***
  - digital elevation models provide enough detail to enable 70% of grade planning at the desktop level
  - captures how a project site changes over time
  - terrain models provide accurate accounts of a project's past and future earthworks
  - provides real-time earthworks production rates that inform daily reporting and increase accuracy of future proposals
  - assists with procurement in the pre-planning stage for accurate quantities of materials
  - feeds data into machine learning algorithm trained to detect certain objects
  - weekly flyover videos are used as a tool:
    - » for superintendents to pre-scout an area, review the site with the crews that will be working there, providing the foreman with a better understanding of the task at hand before stepping out into the field
    - » for equipment managers to locate equipment on site and better plan the staging of equipment for other tasks, without having to drive the ROW and track everything down
  - flyover videos for prospective projects:
    - » capture current conditions, at low altitude, for the estimating team on potential projects
    - » generate mutually beneficial visual data to share with the client
    - » allow a detailed scout of the terrain without placing anyone on private property and captures footage from areas that might be inaccessible
- **Drones increases transparency through monitoring and reporting:**
  - supports regulatory reporting of environmentally-sensitive areas
  - data confirms the location and status of project materials
  - weekly video overflight reports shared with project teams, corporate office, client give everyone a birds-eye view of progress and milestone reports
- **Drones strengthens partnerships with local and Indigenous communities:**
  - captures video footage to support environmental and cultural commitments to project neighbours
  - documents site conditions
  - reduces vehicular traffic in environmentally-sensitive areas

Stories from the Field

DRONES STEP-UP DURING A COVID-19 OUTBREAK

In the summer of 2021 at the peak of Covid-19's fourth wave, Surerus Murphy's Karr project, a 57-km long section of pipeline near Grande Prairie, had approximately 100 workers ill or identified as close contacts at any one time, causing a delay of more than two weeks to the work schedule. The Karr project team ensured construction was able to meet contract milestones in part by relying on drone footage to inform leadership of conditions in real-time, which helped to optimize the schedule and order of activities with limited human resources.

DRONES USED TO IDENTIFY COMMUNITIES IN NEED FOLLOWING B.C. FLOODS

In November 2021, British Columbia's interior experienced epic flooding, washing out roads, communications networks, and utility infrastructure. Surerus Murphy's team on the Trans Mountain expansion project put their drones to work, conducting flights that checked on the extent of the damage to the project ROW and also assisted local officials and communities by very quickly capturing data that looked at highway infrastructure, bridges, powerlines and railways to help make decisions quickly and assess the challenges ahead. Thanks in part to the drones, Surerus Murphy supported neighbouring communities in their time of need. Prior to the epic flooding were devastating forest fires that swept through the Coquihalla Valley, essentially spreading across a good portion of the project ROW. Surerus Murphy crews used drones to capture the conditions of the devastated forest and assess whether there was a need for crews to go ahead of construction and remove dangerous trees.

DRONES GIVE ENOUGH INFORMATION TO PLAN FOR ROAD REPAIR FOLLOWING A MUDSLIDE

Recently on the Elk River project, the team was installing pipe underneath a road. Unseasonably warm February weather led to a mudslide that caused a partial road collapse near the pipeline crossing. It was Surerus Murphy's task to assess the damage and restore the road to its original condition; getting a surveyor to the site to analyze the washout would have been time-consuming, expensive and potentially dangerous. Instead, the team flew a drone for a brief flight and with 10 minutes of data collection was able to plan the road restoration from the office, quickly, efficiently and safely.

OUR USE OF DRONES ENABLES US TO SERVE OUR CLIENTS WELL

Surerus Murphy's drone program is one way the organization demonstrates its commitment to being the contractor of choice for its people and its clients by delivering safe and quality work. Surerus Murphy's shared values: "Never Harm, Trust, Integrity and Assured Delivery" make the organization a staple in the pipeline industry and in every community in which it works.

For more information email:

- **General:**
  info@surerus-murphy.com
- **Engineering:**
  engineering@surerus-murphy.com
- **Media & Issues:**
  marketingcommunications@surerus-murphy.com

SURERUS MURPHY
A JOINT VENTURE COMPANY

www.surerus-murphy.com | 403.930.1358