New technology; New opportunities

- Indoor/outdoor visual inspection
  - High resolution, Thermal

- Aerial imagery as survey data
  - Increasing accuracy makes it more appropriate for engineering projects

- Custom payload applications
Mining Specific Applications

- Visual Inspections
  - Ore Pass, vent raise, stopes, hazardous areas, confine spaces

- Open pit planning and management

- Tailings monitoring and Management
  - Seepage detection

- Stockpile surveying
Using a Drone Commercially (Outdoors)

- Requires a Special Flight Operation Certificate (SFOC) from Transport Canada

- Need to coordinate airspace with Nav Canada

- Typical SFOC Conditions
  - 100 feet from general public
  - < 400 feet Above Ground Level (AGL)
  - Visual line of sight only
  - Must have land owners permission
Using a Drone Commercially (Indoors)

– SFOC is not required when only the UAV crew and people directly participating are present.

– An SFOC is required when there are spectators or people who are not part of the UAV operation.
Indoor Inspection

– Eliminated work at heights.

– Challenging environment:
  – Tight area with limited space

– Completed inspection and data collection within 3 hrs vs. traditional 8+ hrs
Photogrammetry from a Drone

- Off-the-shelf survey grade results
- Relatively lower cost compared to manned aircraft for small projects.
- Autonomous flight planning and data capture
- Full integration with software suites
- Cloud computing options
Photos Used for 3D Model Processing
Stockpile Surveys

– Improves personnel safety by eliminating climbing stockpile

– Can be completed without interrupting operation

– Results within a few hours of processing
Irregular Slopes
Volumetric calculation

Measurements

- Coordinate
- Distance
- Surface
- Volume

Click on the model to define the base surface.
Double click to close the polygon. Backspace to delete the last point.

Method: Mean plane

Sampling distance: 1.96682 meters

- Perimeter: 183.95 m
- Area: 2436.12 m²
- Cut volume: 11360.60 m³
- Fill volume: 12.34 m³

Clear
Tailings monitoring and Management
Hatch UAV Water Sampling
Hatch UAV Water Sampling

- Eliminates personnel working on water and accessing the pit

- Can also profile the conductance and temperature

- Remotely collected water sample from a depth of 60 meters
New technology; New opportunities

Drones continue to disrupt industries providing cost effective and more importantly safer alternatives to many applications.
Thank you.
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