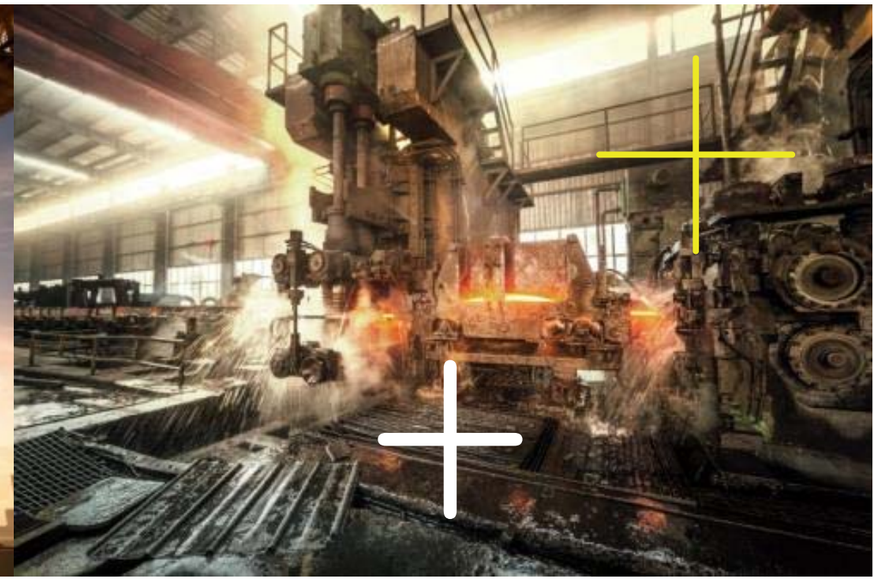
Unmanned Aerial Vehicles (UAV) Applications in Mining



April, 2017

Pierre Filiatreault

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

HATCH

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

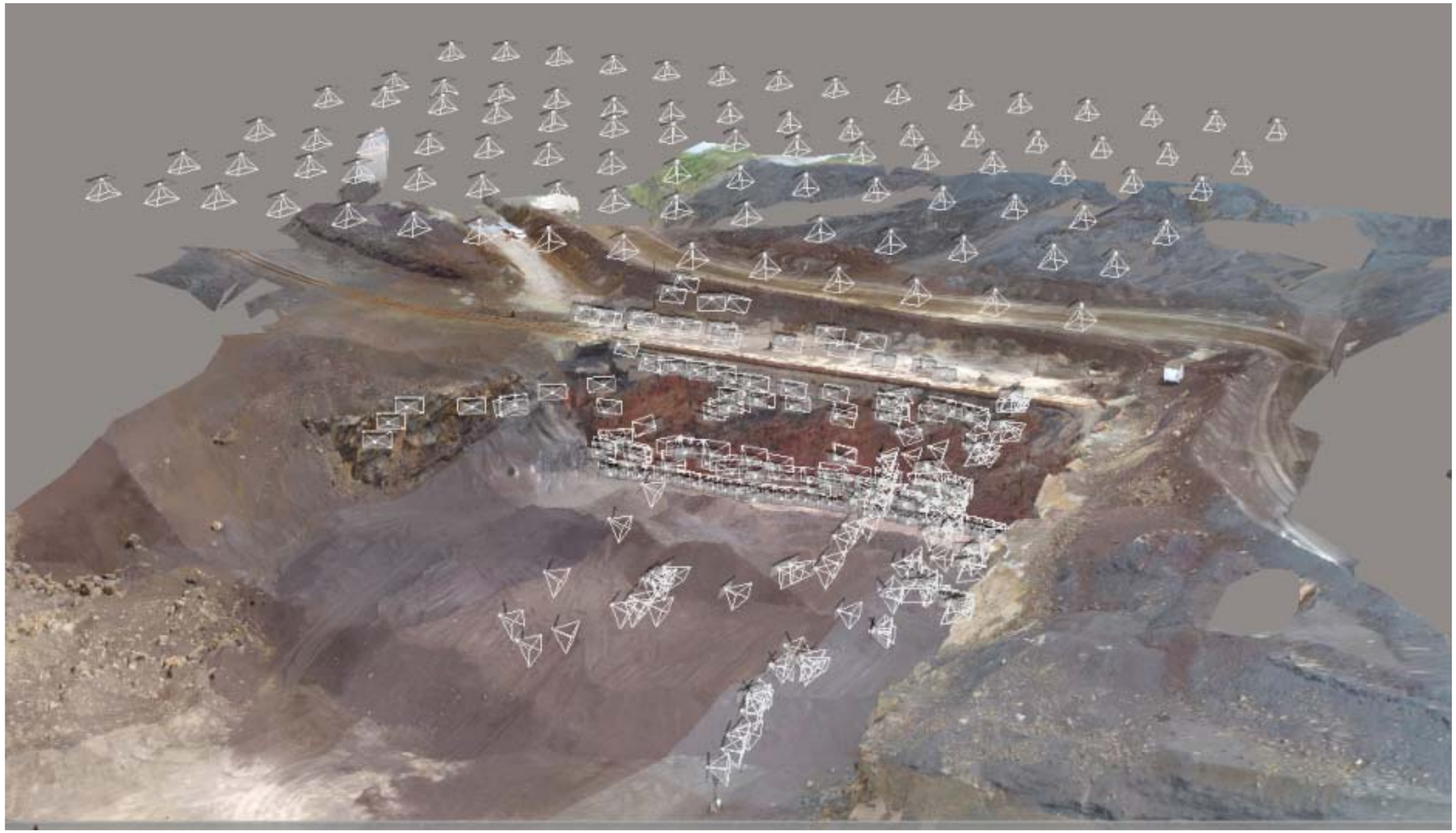
HATCH

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

HATCH

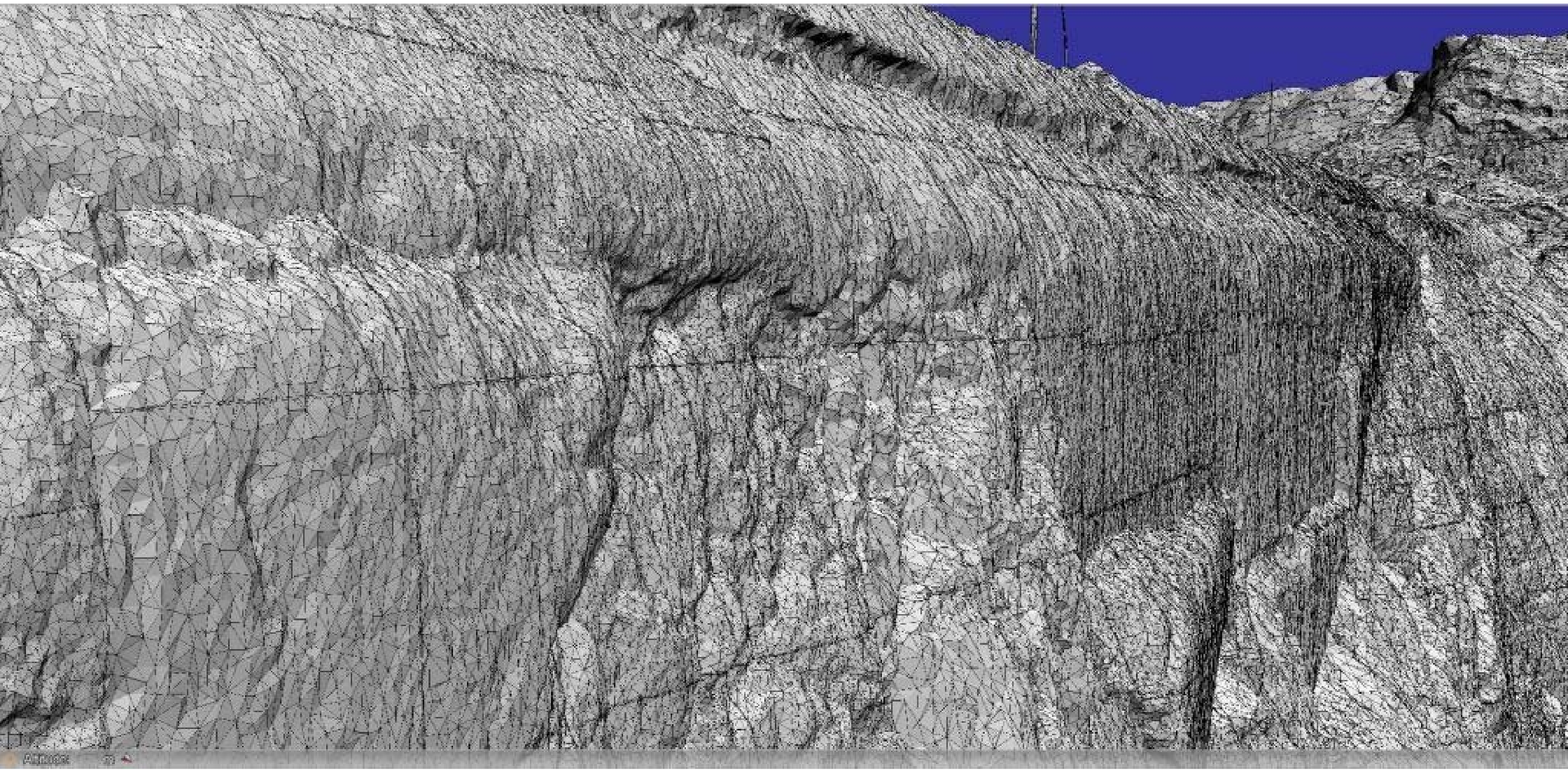
Photos Used for 3D Model Processing



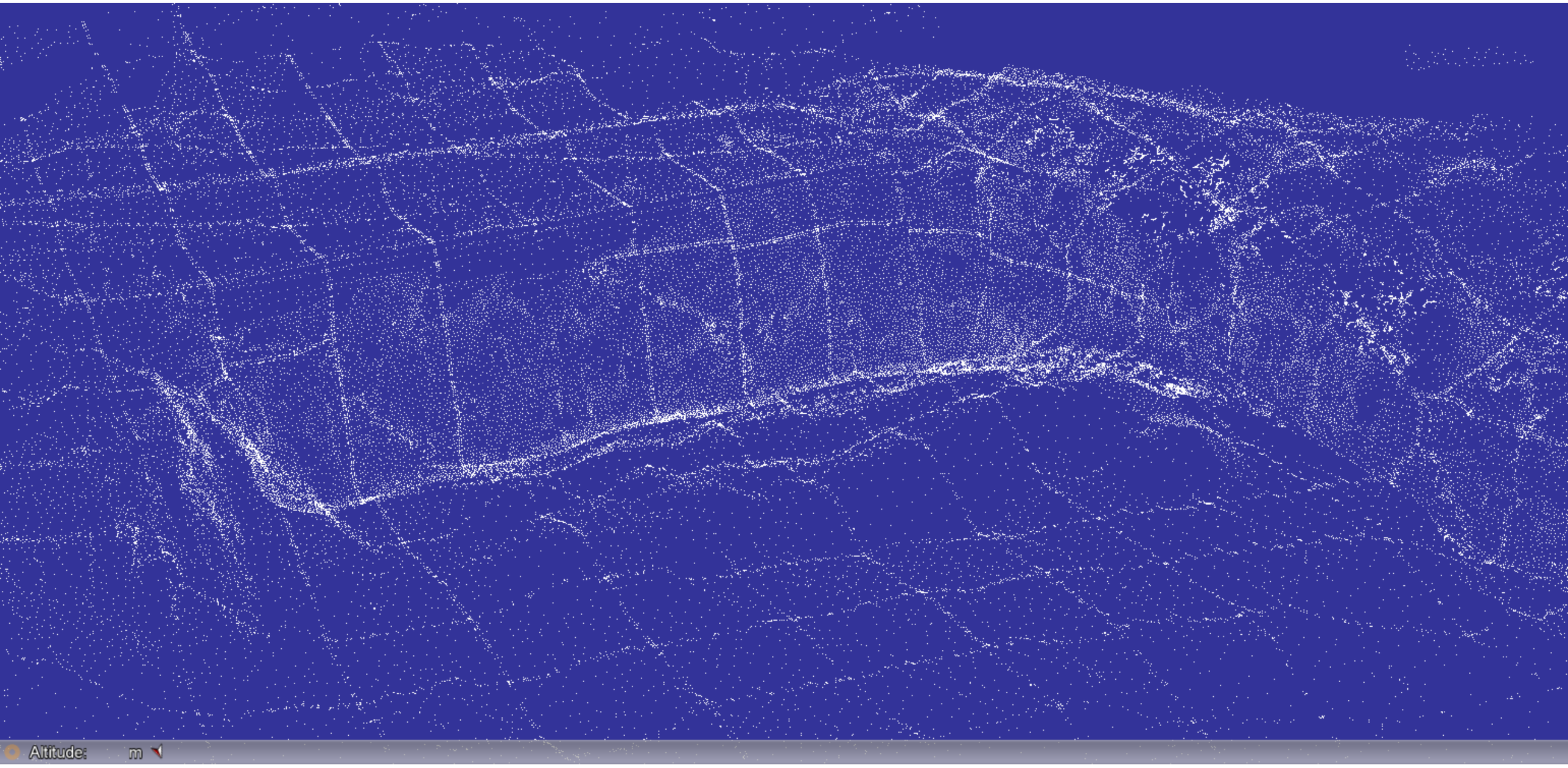
HATCH

HATCH

HATCH



HATCH



HATCH

Stockpile Surveys

- Improves personnel safety by eliminating climbing stockpile

- Can be completed without interrupting operation

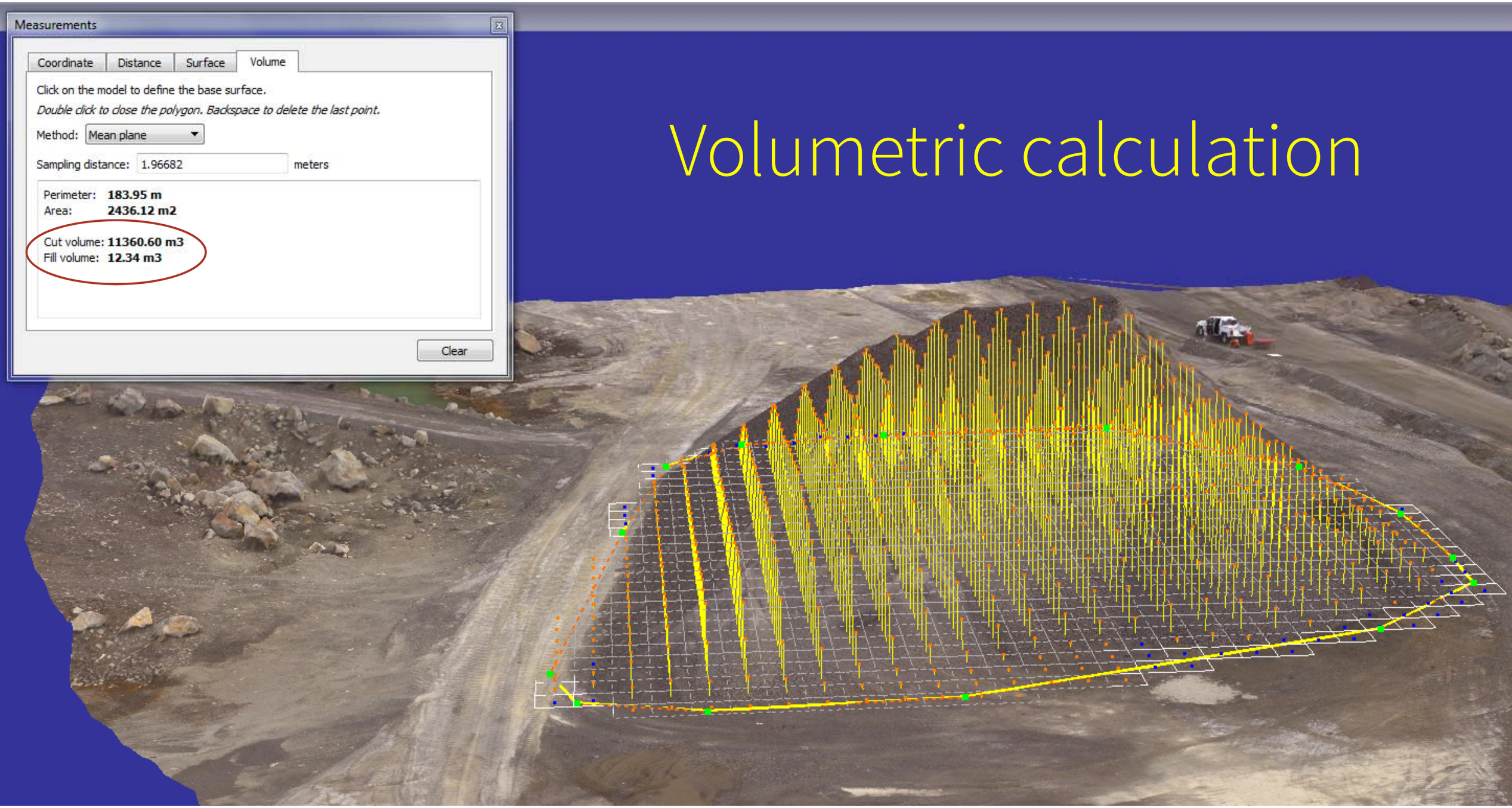
- Results within a few hours of processing

HATCH

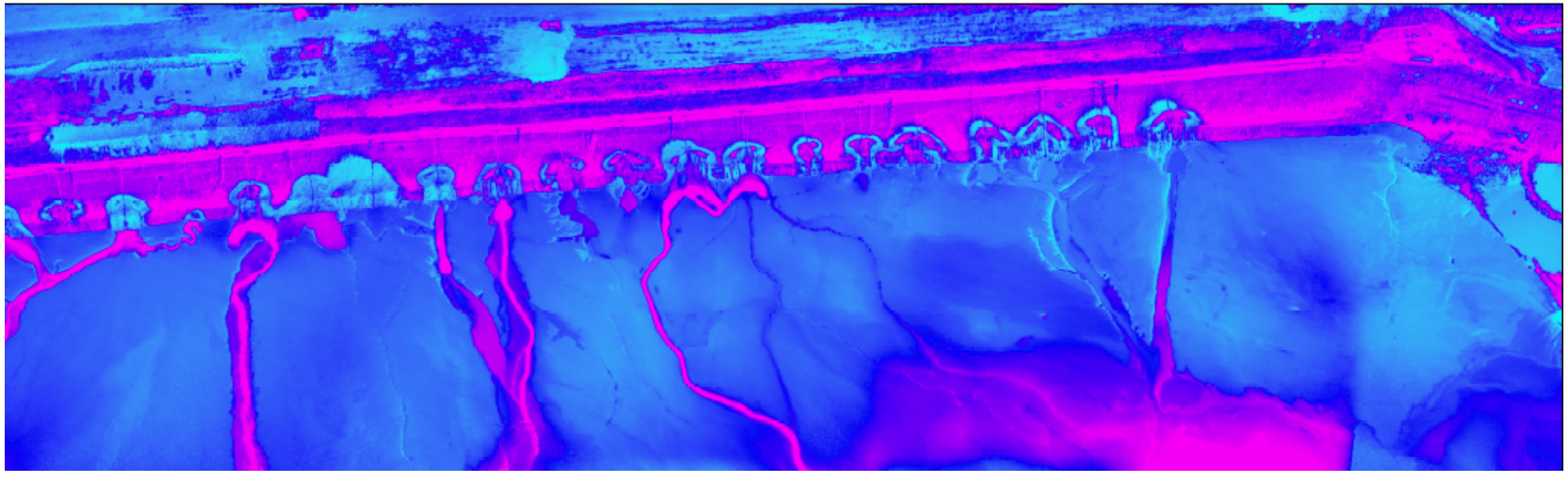
Irregular Slopes

HATCH

Volumetric calculation



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**

HATCH

New technology; New opportunities

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

Thank you.

Pierre.Filiatreault@Hatch.com
705-688-0250 ext.5304