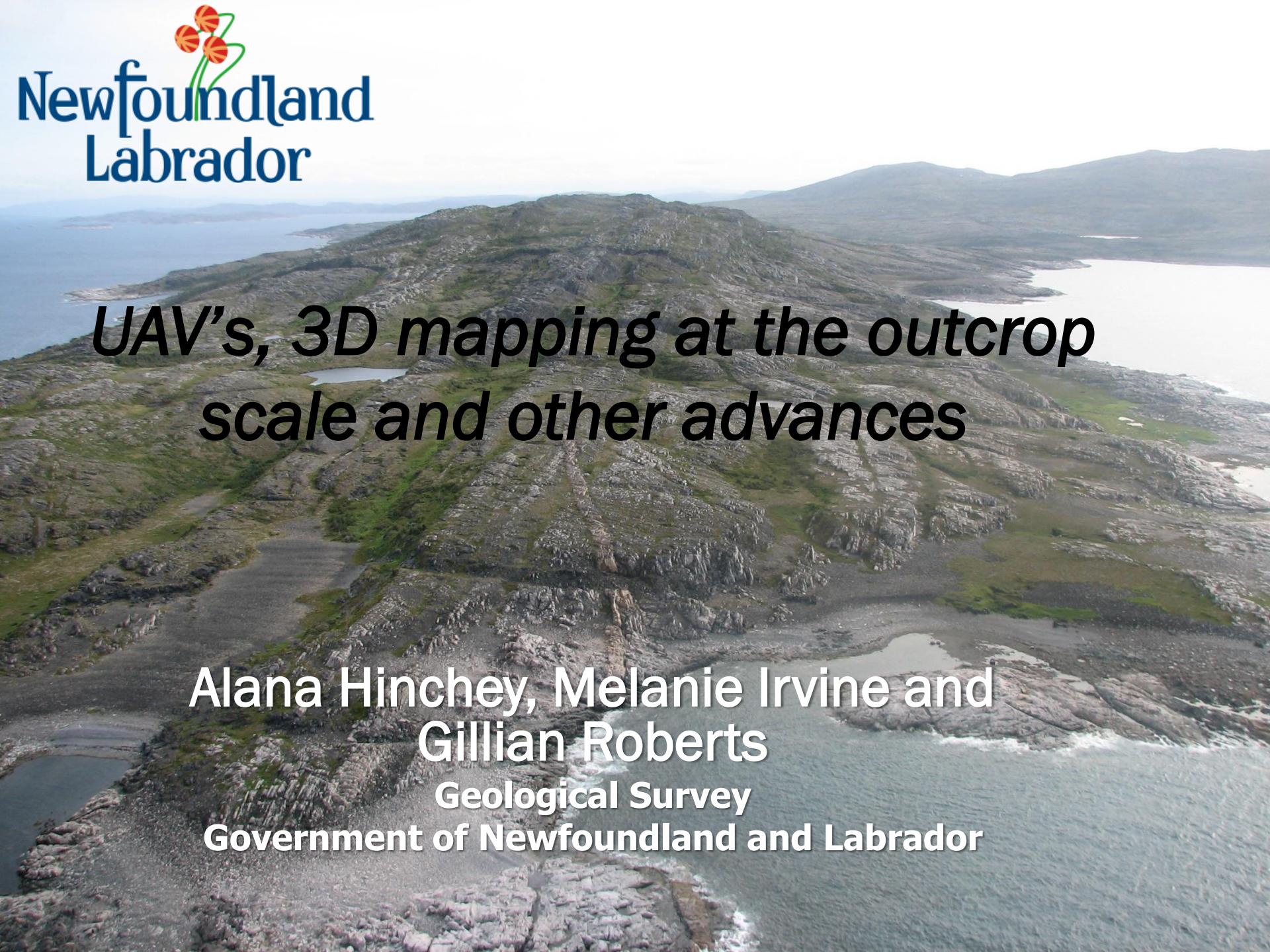




Newfoundland
Labrador



UAV's, 3D mapping at the outcrop scale and other advances

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Gillian Roberts

Geological Survey
Government of Newfoundland and Labrador

UAV's – Detailed 3d mapping

- Two projects
 - Bedrock Mapping Program
 - Environmental Monitoring Program
- Parameters are often the same

Bedrock Mapping Program

- Use
 - Mapping trenches (exploration and active mining areas)
 - Rugged coastline
 - Inaccessible areas

Bonavista



Light house Island



LightHouselsalnd2

[https://sketchfab.com/3d-models/bonavista-light-house-island-
2b43ea10792b4b73911eef8a796825c2](https://sketchfab.com/3d-models/bonavista-light-house-island-2b43ea10792b4b73911eef8a796825c2)

Active fluorite mine in St. Lawrence (Burin Peninsula)

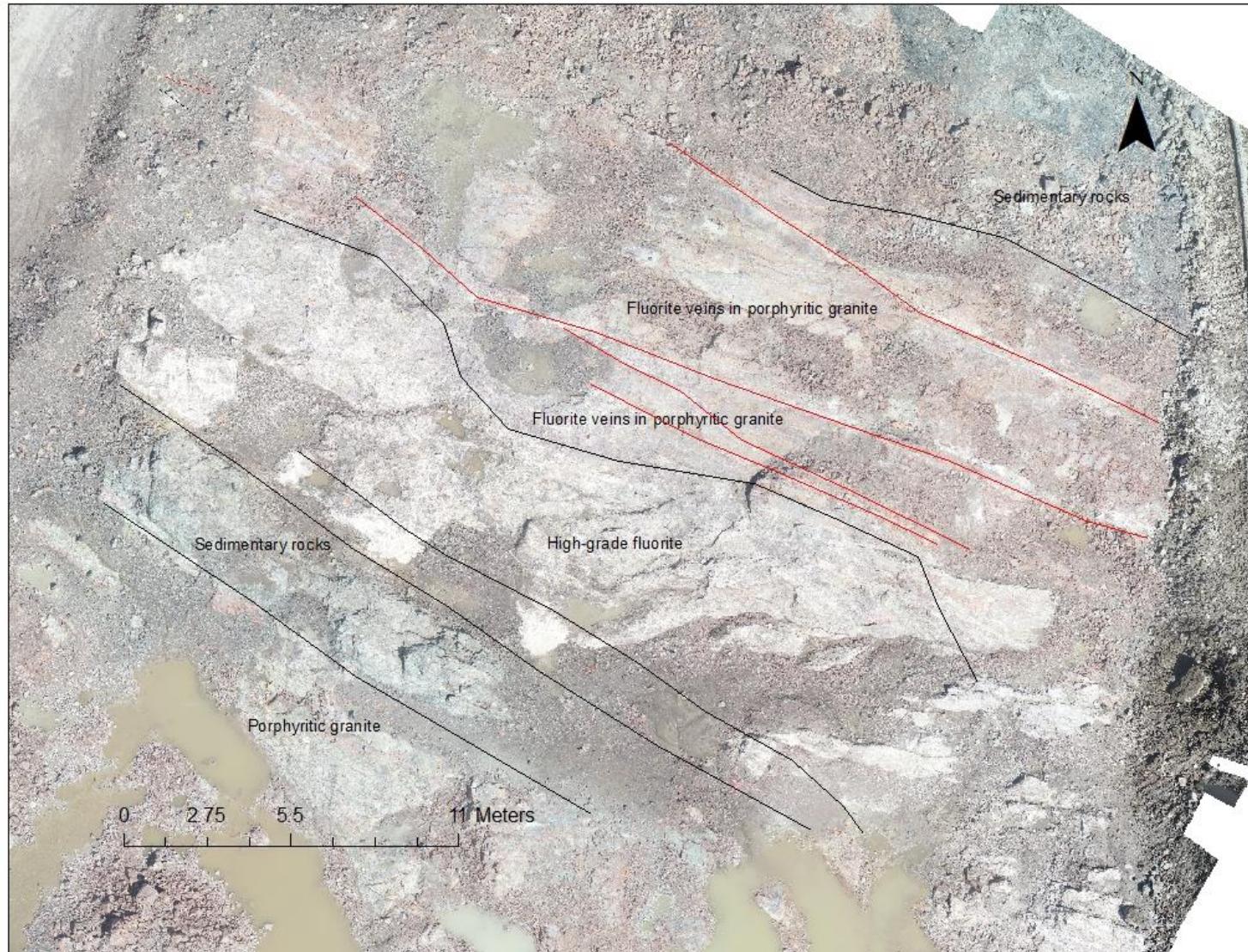
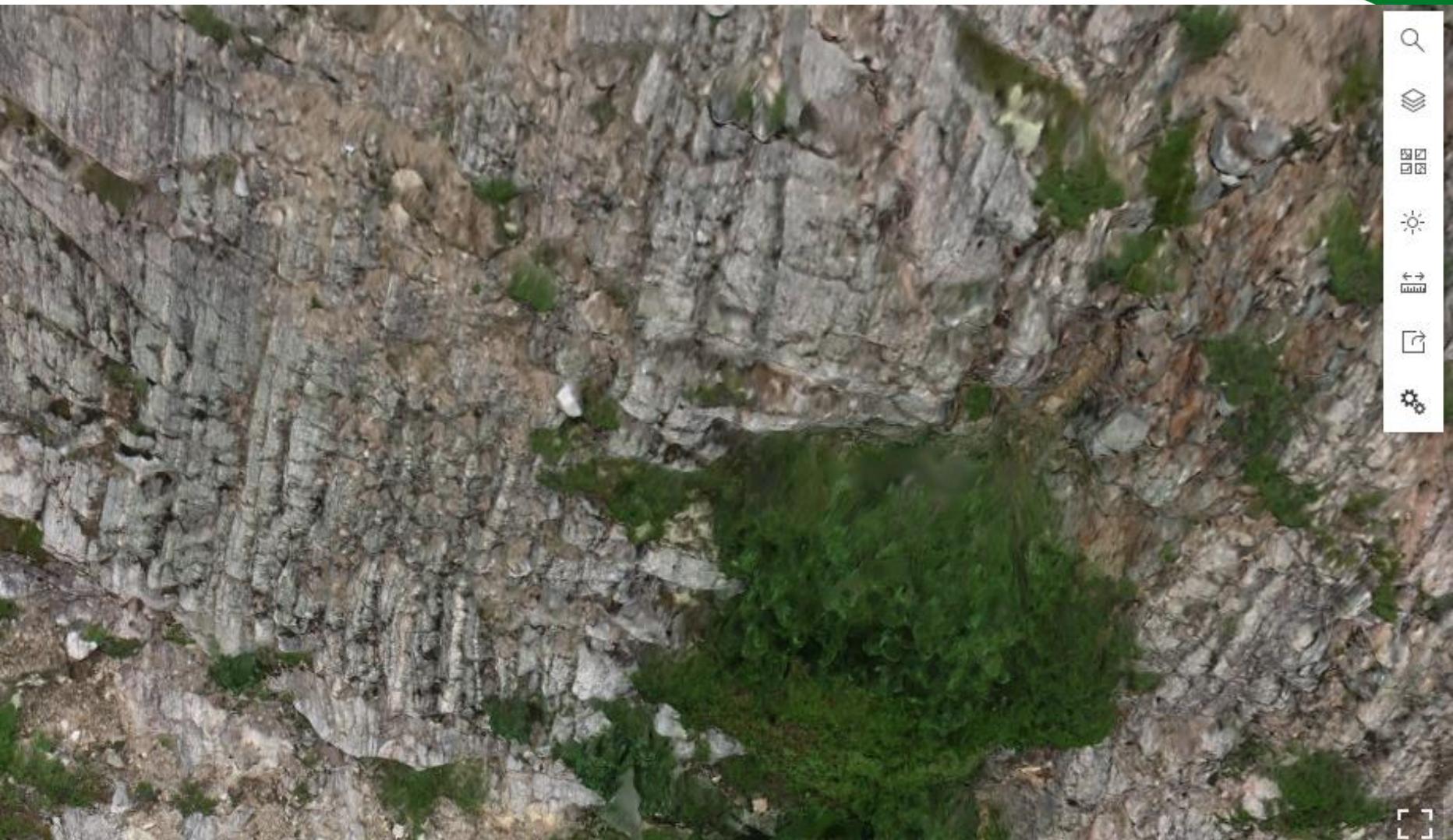


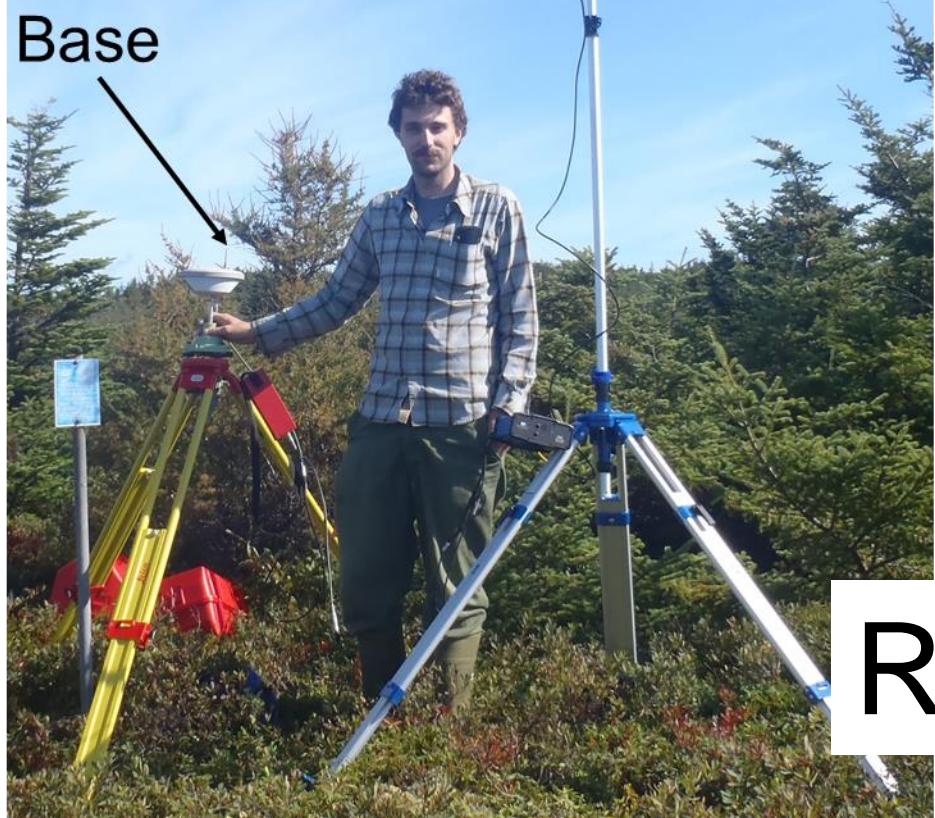
Photo: Z. Magyarosi

Hopedale, Labrador – Mapping



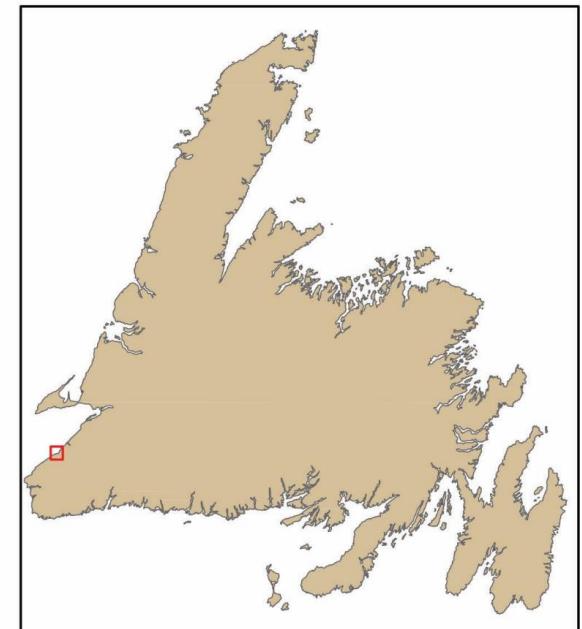
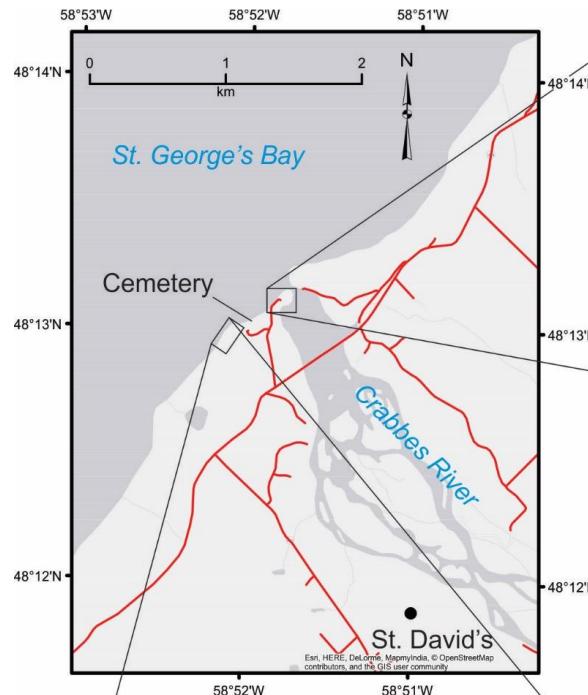
Environmental Monitoring Program

- Measuring changes along the coastline; such as
 - Erosion
 - Flooding
 - Sinks
- Precision and accuracy is more important as you are measuring, mm to sub-mm changes in the coast line.

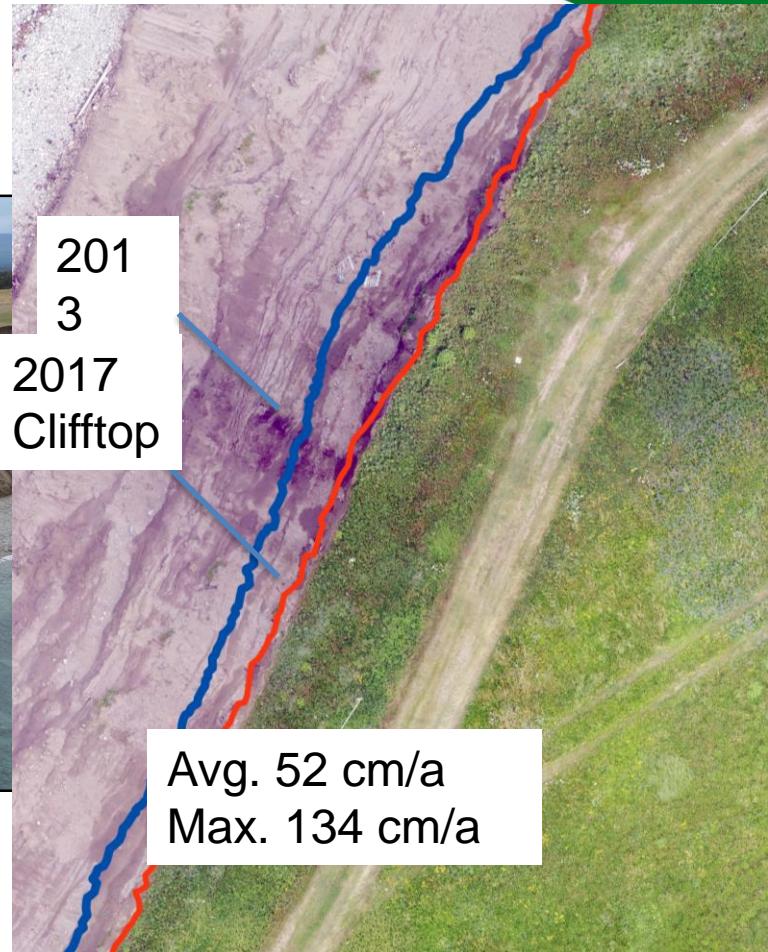


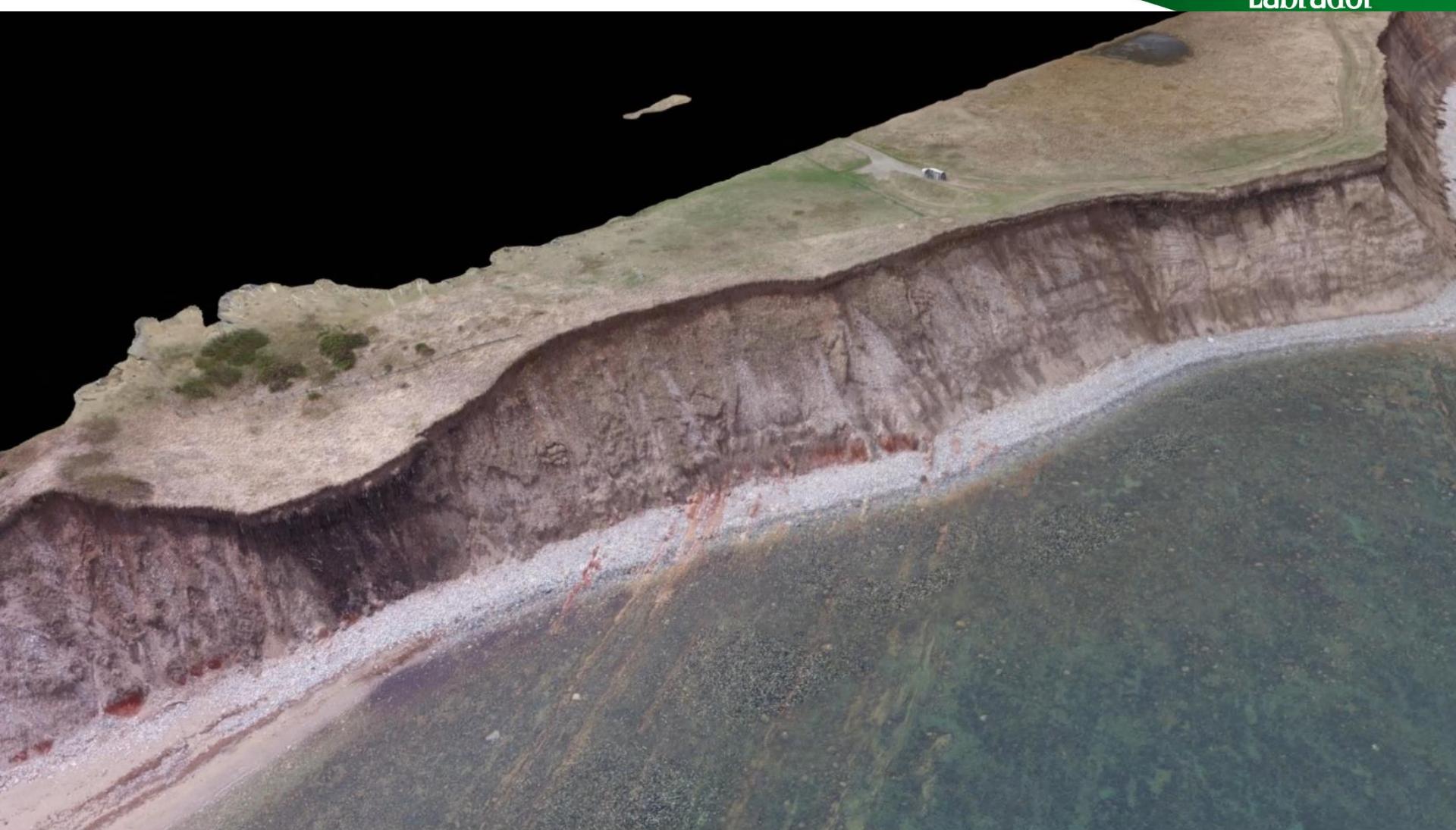
Crabbes River, St. David's, Western Newfoundland

- Erosion
 - ATV track
 - Graveyard
- Flooding
 - Wharf area



Clifftop erosion

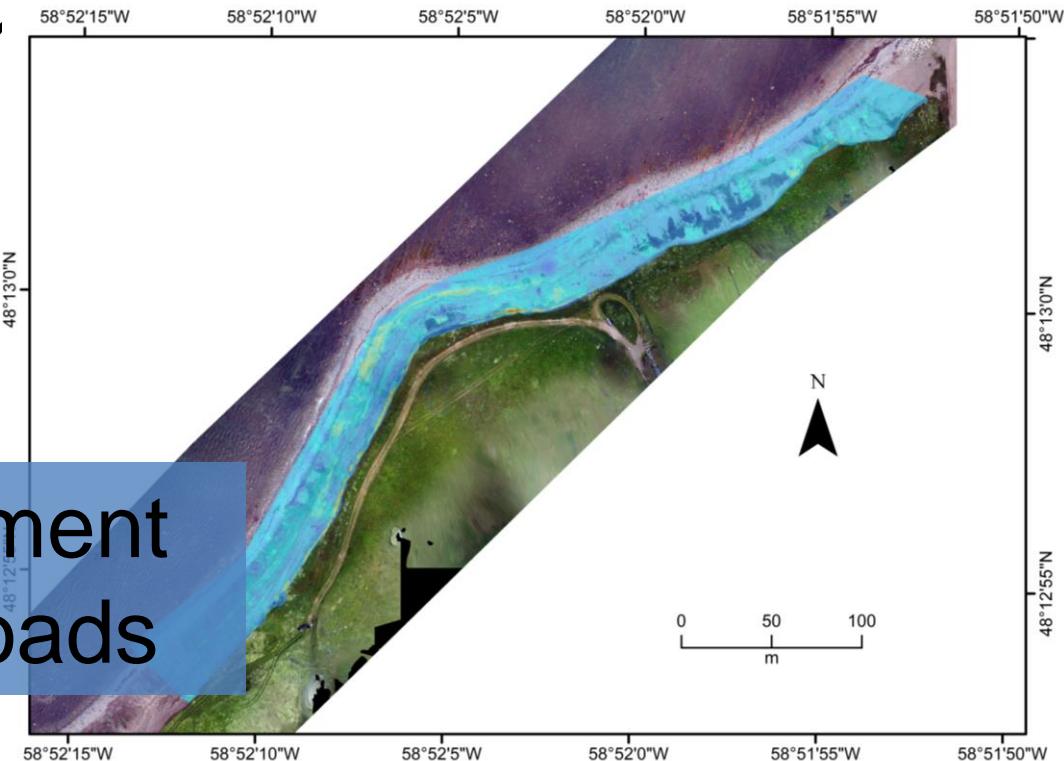




Volume char



- 11034 m³ of sediment
- 405 school bus loads



UAV-fixed wing

Trimble UX5

- Rover, launcher and ground control station
- 50 min. flight time
- Speed: 80 km/h
- Covers large area
- Pre-planned, automated flights
- Long range
- Withstand high (65 km/h) wind
- Requires take-off/landing area



UX5

UAV-Quadcopter



DJI Inspire 1

DJI Inspire

- Rover and ground control station
- 27 min. flight time
- Maneuverability
- Hover and descend
- Camera tilt
- Automated and manual flights
- Real time display
- Video

	Fixed wing	Quadcopter
Coverage	X	
Weather	X	
Camera	X	
Price		X
Maneuverability		X
Terrain		X
Apps		X
Video capability		X
Camera tilt		X
Flight plan setup		X



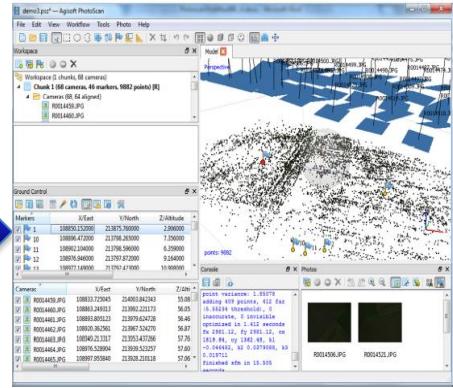
Work Flow



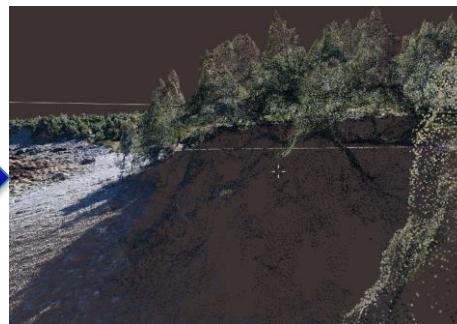
UAVs – Work Flow



Aerial photos



Data processing



Point cloud

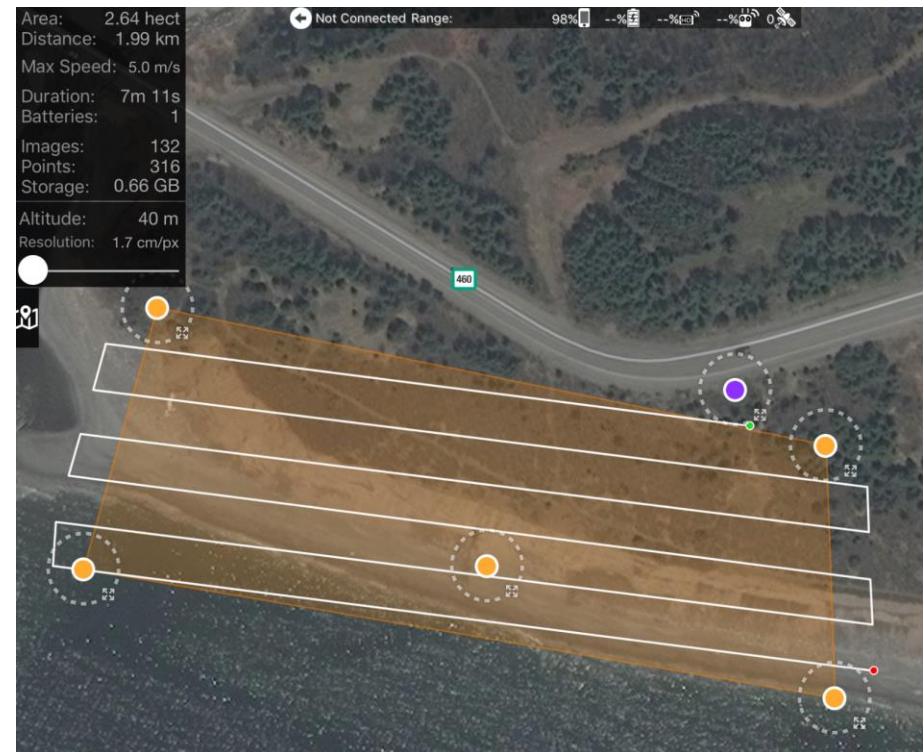


3 D model

Large quantity of accurate data, time efficient, non-intrusive

Set-up project

- Create a mission using Map Pilot
- Define boundary
- Flight details
- Download map



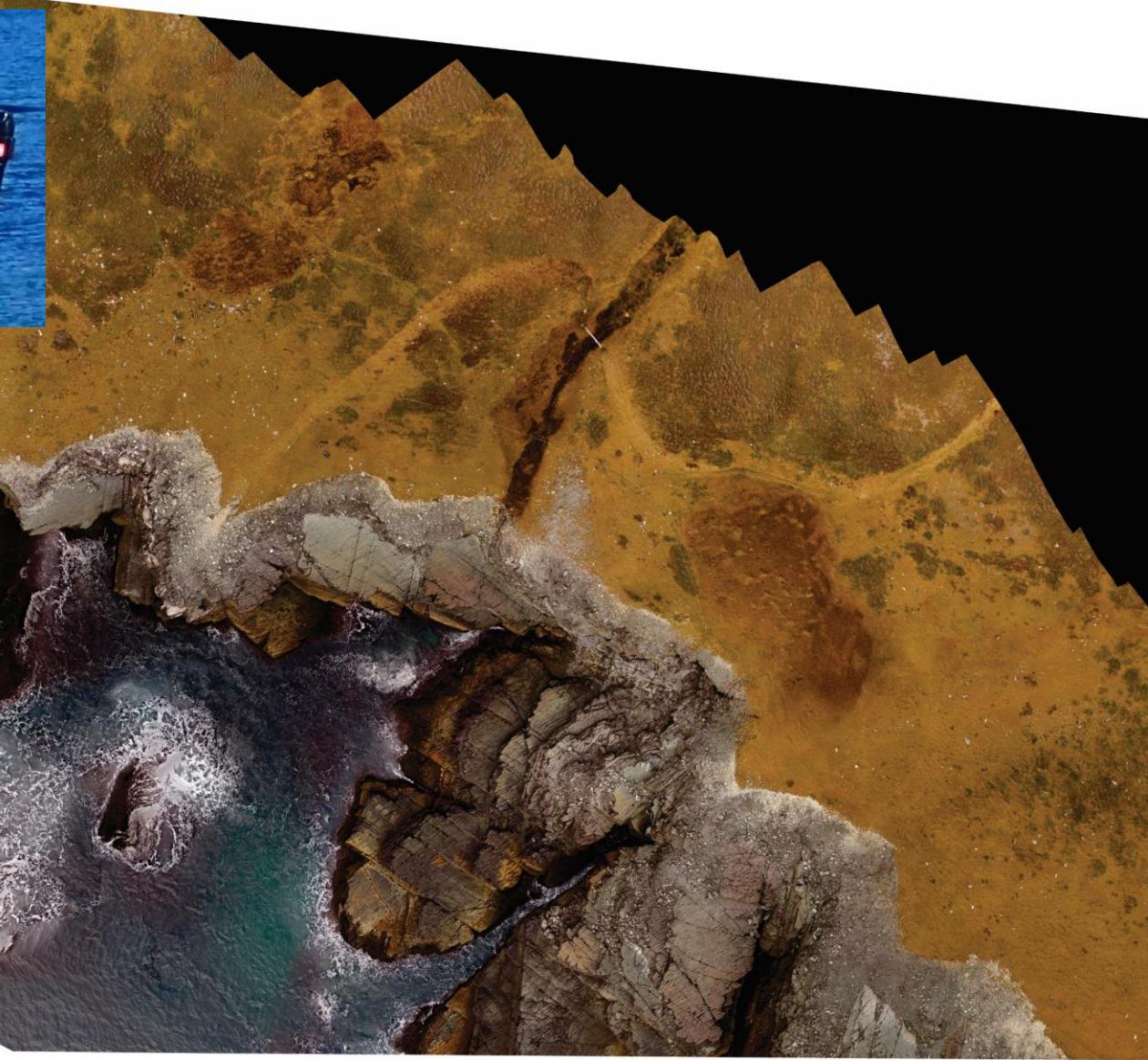
Romaines Brook
20

Ground control points



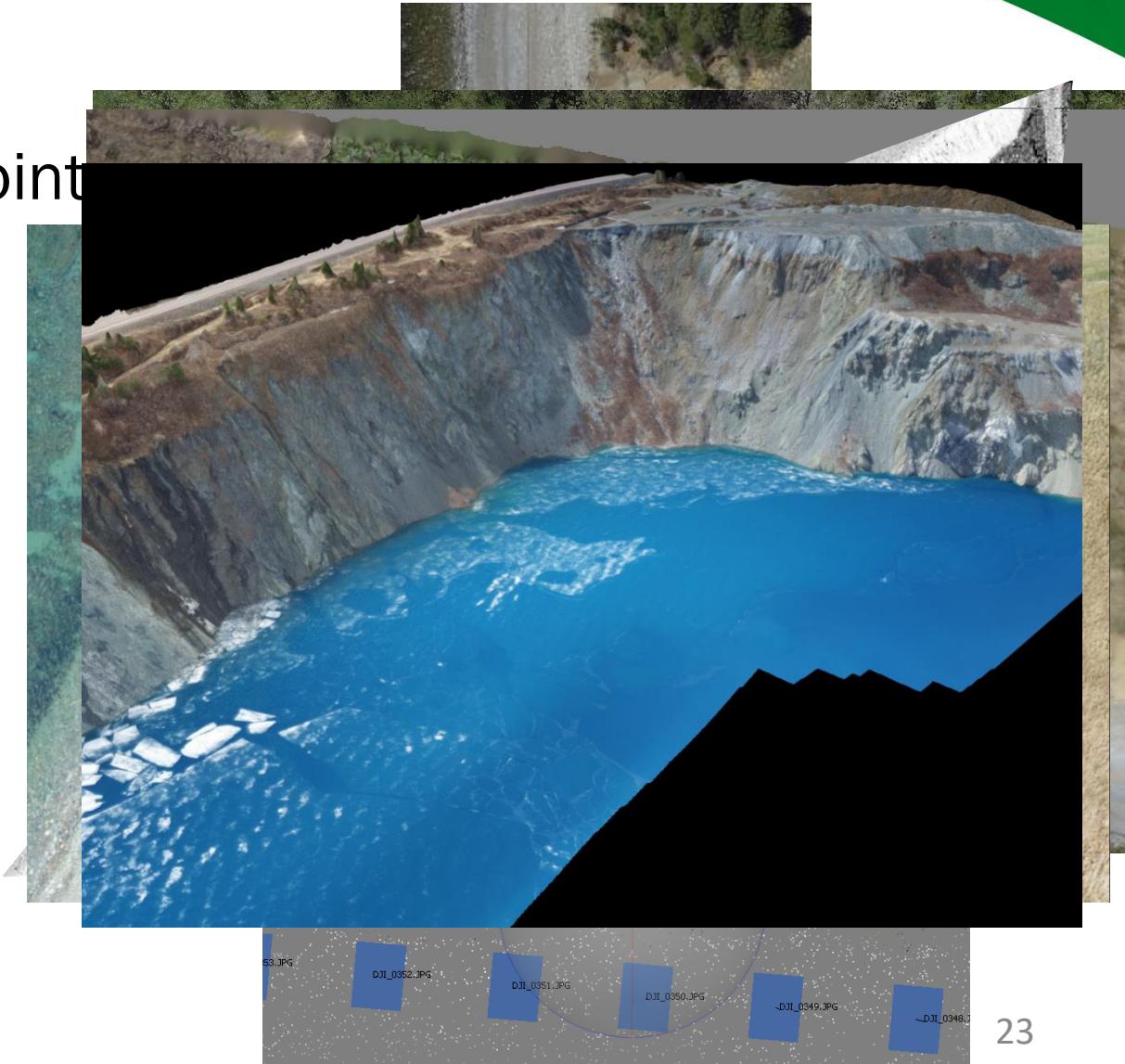
- Set up RTK
- Lay out & survey targets





Post processing workflow

- Align Photos
- Ground control point
- Point Cloud
- Mesh/Texture
- DEM
- Orthophoto
- 3 D model



UAVs

- Positives
 - Access
 - Price/data quality
 - Visuals
 - Efficiency
- Negatives
 - Processing time
 - Equipment/technical skills



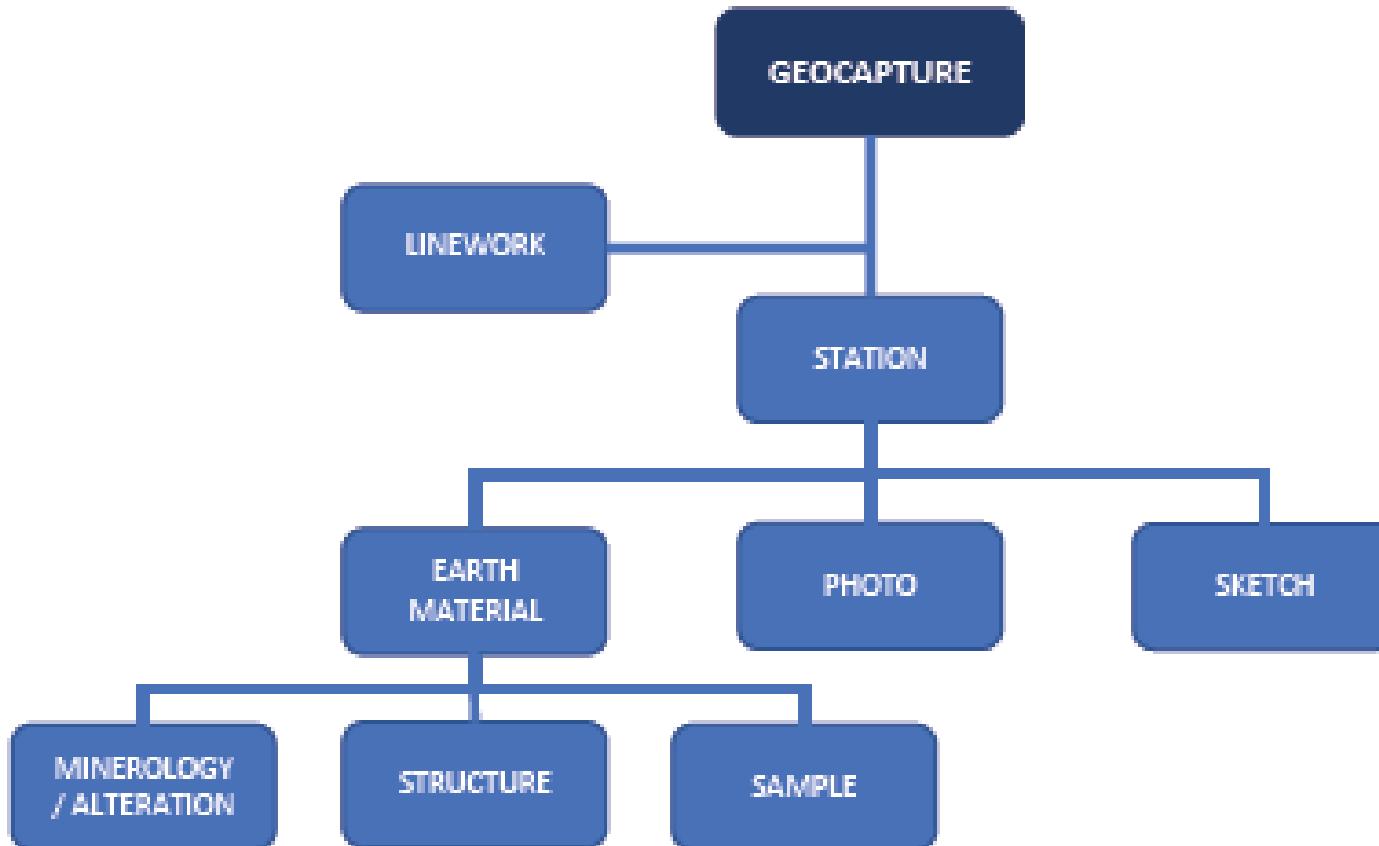
Other Projects

- Continually moving our data to AGOL.

Issues

- original data on http, requires data to be hosted on https
- NAD27

Field Data Capture



GeoCapture



- 1 Create a Domain Template Excel File
 - Edit Domain Template to Add/Remove Domains
- 2 Load Domain Template onto Tablet
- 3 Compile Field Data from Tablet
- 4 Generate Base Map Tiles

GeoCapture

A	B	C	D	
1	GEODATABASE BedrockField.gdb			
2	Short Name	Table	Fields	Domains
3	Rocktype	EARTHMAT	LITHGROUP, LITHTYPE, LITHDETAIL	LITHGROUP, LITHTYPE, LITHDETAIL
4	Occurs	EARTHMAT	LITHGROUP, OCCURSAS	LITHGROUP, OCCURSAS
5	Structural	EARTHMAT	LITHGROUP, MODSTRUCT	LITHGROUP, MODSTRUCT
6	Textural	EARTHMAT	LITHGROUP, MODTEXTURE	LITHGROUP, MODTEXTURE
7	Compositional	EARTHMAT	LITHGROUP, MODCOMP	LITHGROUP, MODCOMP
8	GCSIZE	EARTHMAT	LITHGROUP, GCRYSIZE	LITHGROUP, GCRYSIZE
9	DefFabric	EARTHMAT	DEFFABRIC	DEFFABRIC
10	BedThick	EARTHMAT	BEDTHICK	BEDTHICK
11	Colour	EARTHMAT	COLOUR&COLOURW	
12	Fossil	EARTHMAT	FOSSILS	
13	Contact	EARTHMAT	CONTACTUP&CONTACTLOW	
14	MINMineralsogr	MA	MA, MINERALOGY	
15	MAODistribute	MA	MA, DISTRIBUTE	
16	MAUnit	MA	UNIT	
17	SampleType	SAMPLE	SAMPLETYPE	
18	SamplePurpose	SAMPLE	PURPOSE	
19	StrucTypes	STRUC	STRUCLASS, STRUCTYPE, STRU	
20	StrucMethod	STRUC	METHOD	
21	StrucAltitude	STRUC	ATTITUDE	
22	StrucYounging	STRUC	YOUNGING	

A

1	lutEarthmatBedThick.dbf	Back
2	BEDTHICK	
3	thinly laminated 1-3 mm	
4	thickly laminated 3-10 mm	
5	very thin bedded 1-3 cm	
6	thin bedded 3-10 cm	
7	medium bedded 10-30 cm	
8	thick bedded 30-100 cm	
9	very thick bedded >100 cm	

10 [Back](#)

GeoCapture



Settings Menu

- Geologist Data
- Clear All Data

Functions Buttons

- **Zoom To** – Zoom to current location.
- **Linework (Optional)** – Add linework to the map. When the option is turned ON, this button will appear here.
- **Add Station at GPS Location** – Adds a new station.

Map Viewer

- **Zoom In** – Tap with two fingers, pinch in.
- **Zoom Out** – Tap with two fingers, push out.
- **Pan** – Tap and drag. Map centers on user location.

Other

- **Scale Bar** – Measurements shown in km/m. Scale automatically adjusts based on zoom functionality.

Thank you

