DIGITAL MAPPING TECHNIQUES 2019

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from the DMT Meetings (1997-2019)

http://ngmdb.usgs.gov/info/dmt/

A new field data acquisition tool

By Étienne Girard
Commission géologique du Canada / Geological Survey of Canada
Natural Resources Canada / Government of Canada
Telephone: 418-654-2659
Email: etienne.girard@canada.ca

Geologist's field work for the Geological Survey of Canada often occurs in isolated environments, with no internet access, and with field parties up to 30 geologists in the same camp. Hence, there is a need to collect data efficiently, backup at the end of each day, and manage a large number of photos.

We decided to develop a new tool for collecting data, to replace our old data collection system because Esri's ArcPad would not be supported in the future. In addition, our team had another look at new hardware and software technologies that have improved over time. This presentation is an overview of our development.

Government of Canada | Gouvernement du Canada

A new field data acquisition tool

An overview

Étienne Girard, Gabriel Huot-Vézina, Stephen Williams and Kaz Shimamura
Geological Survey of Canada

Canada

Context

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We decide to develop a new tools for collecting data to replace our old data collection system as ArcPad from Esri was nearing it's end. In addition, our team had another look at new hardware and software technologies that have improved over time. This presentation is an overview of our development.

Presentation

- How did it comes to this ? ;-)
- Constrain and choice
- Hardware
- Three components
- Conclusion

Why

- Ending of ArcPad
  - Development of GanFeld and Shapefile was close to the end
- No internet connection in the field
  - Esri Collector need to have internet connection when we start development
- New hardware
  - Tablet are more efficient than ever but…

Constrain and Choice

CONSTRAIN

- Must be not to different than our previous acquisition tool
- Must have a GIS part
- Must be fast
- Must control scientific language
- Must work offline

CHOICE

- Choose Windows 10 instead of Android because we thought it's easier to develop and have less maintenance with OS update
- No cost
- Manage multi project
- Manage multi device

Hardware choice

Panasonic Toughpad FZ-M1 and FZ-G1

- I5 core, 128 gig, swappable batteries (large battery is good for 8 hours, small battery, 3 hours of work)
- Ruggedized
- Gps included
- Camera included but and maybe…

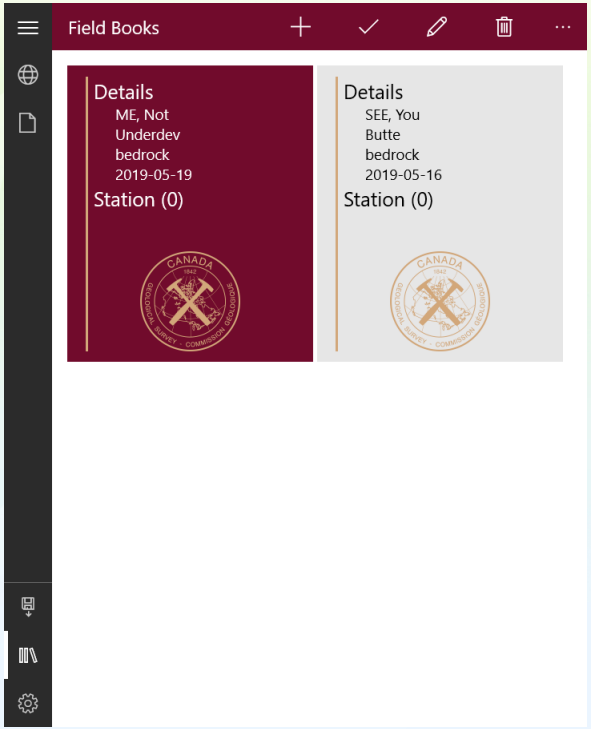
Behind the software

- Database: Sqlite
- Language: C#
- ArcGIS Runtime SDK for .NET
- Super programmer

Software

- Easy to install but must be in Dev environment
- Managing multi-project inside of it

Also a series of tools to manage data

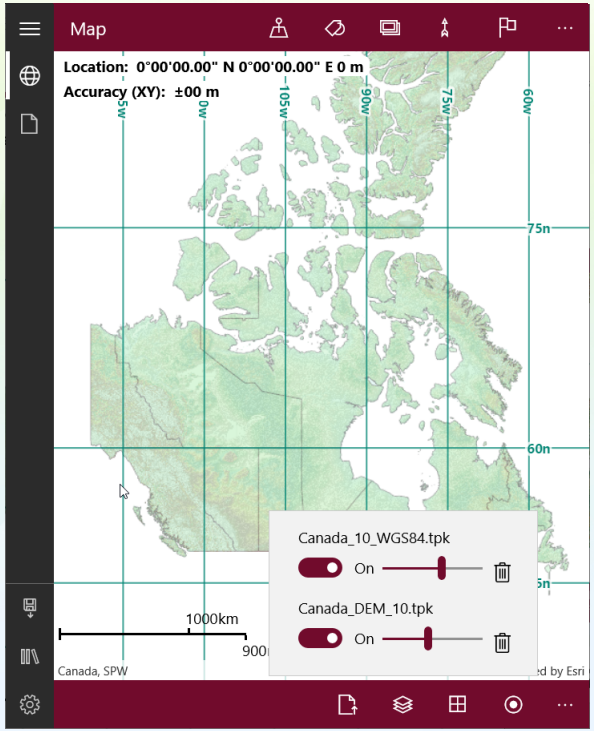


Software: 3 components

1. **GIS** to have the possibilities to see background data
2. **Data collection** with picklist to maintain integrity of the data
3. **Management**

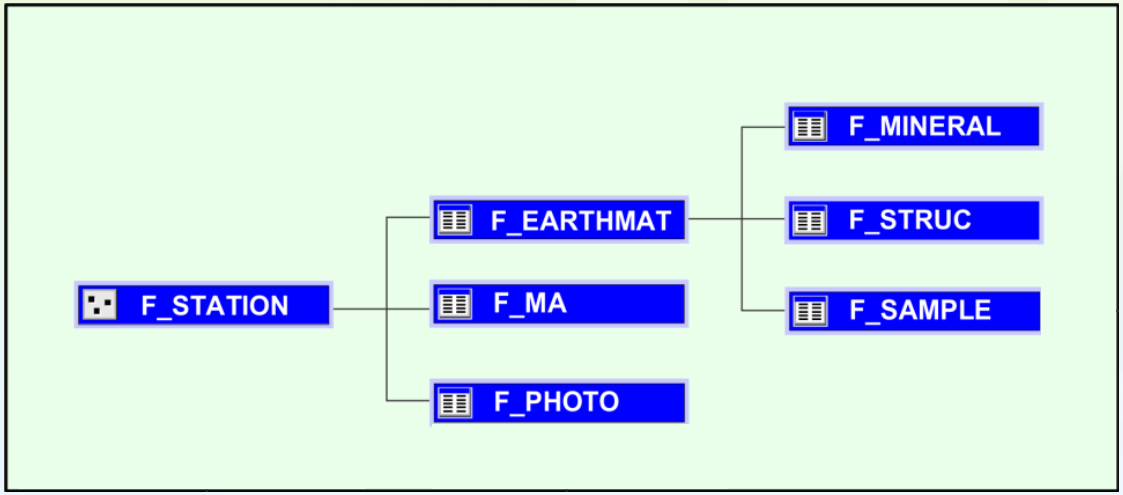
Software: GIS

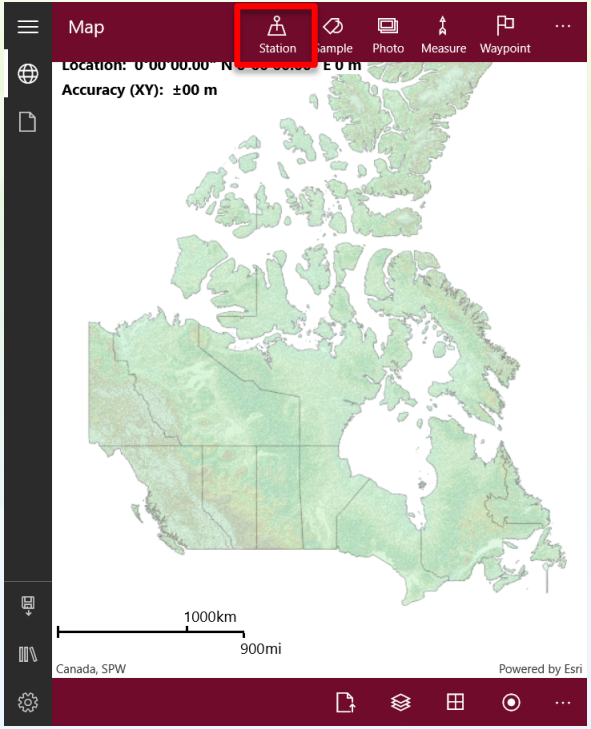
- TPK format
  - Very efficient
  - Support scale dependencies
  - Esri properties only
- Mininum capabilities
- Layers transparency



Software: Collecting Data

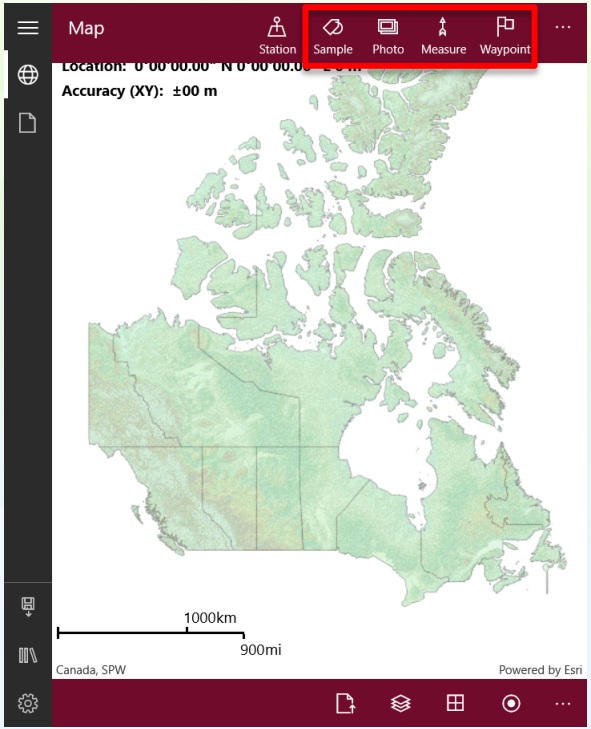
- Flow base



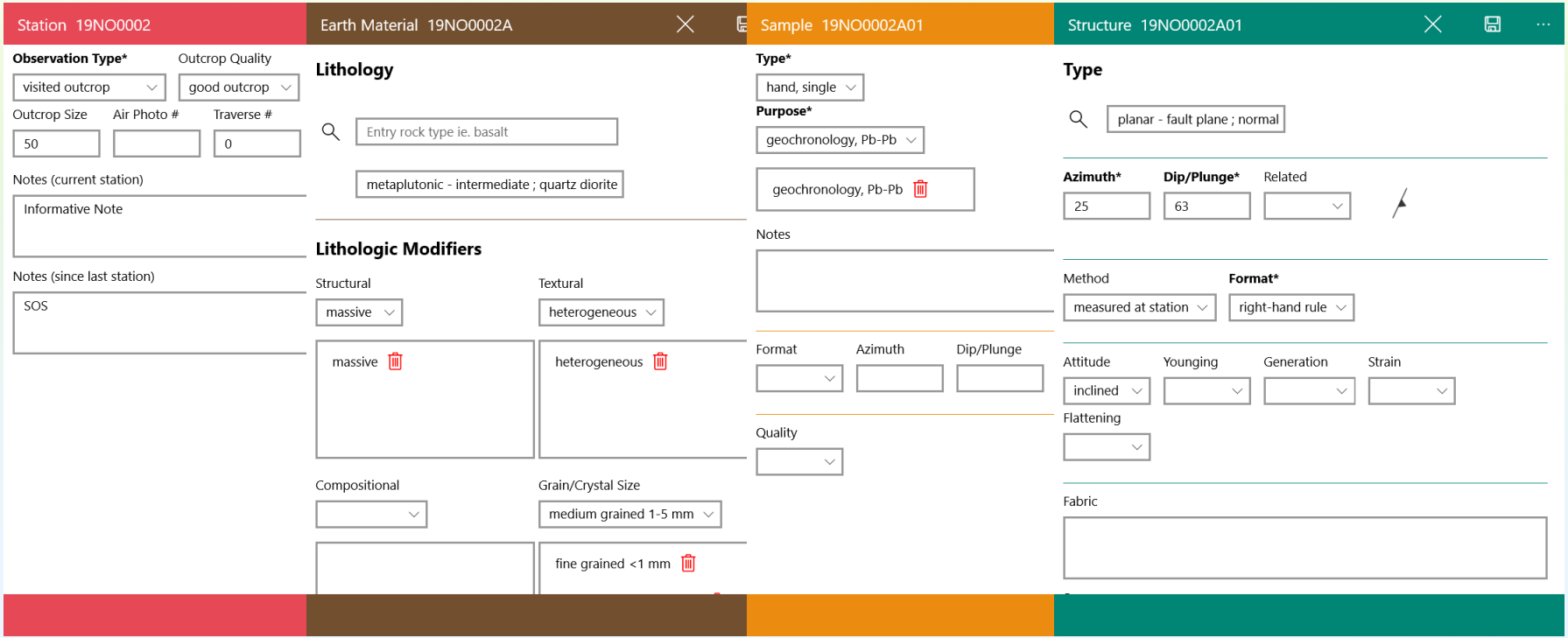


Software: Collecting Data

- Flow base
- Or specific feature (Quick)
  - Sample
  - Photo
  - Measure
  - Waypoint



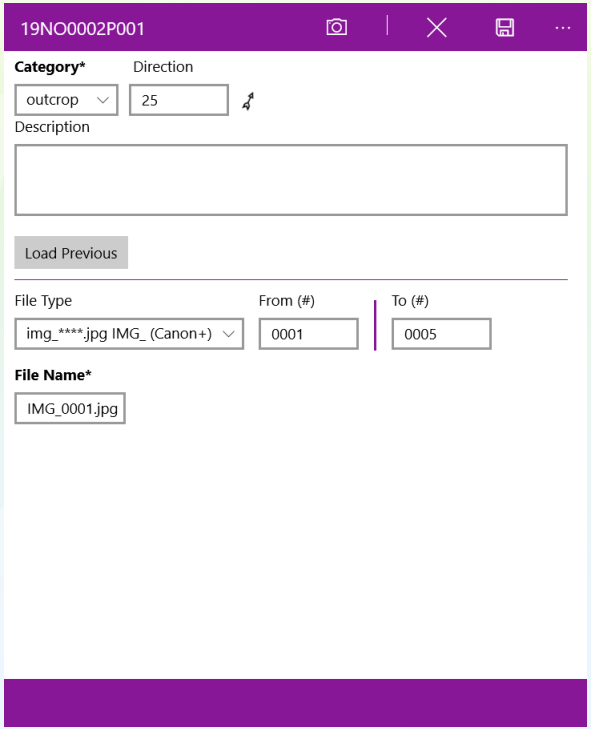
Software: Flow base



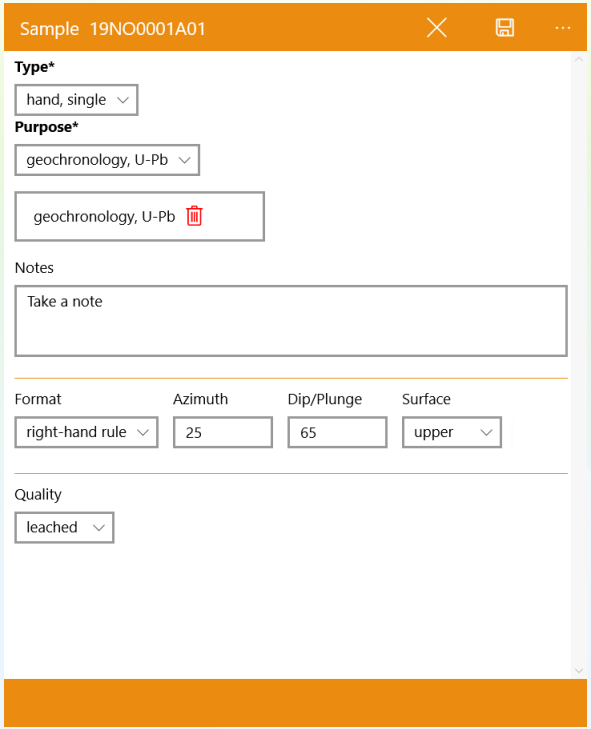
Software: Flow base

For Photo

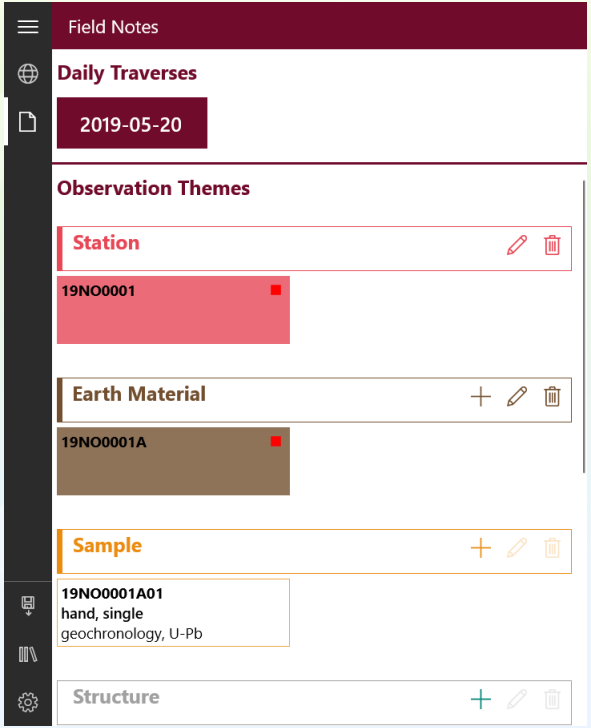
- One or more
- If you want to describe you must add 1 by 1 or later



Software: Quick info

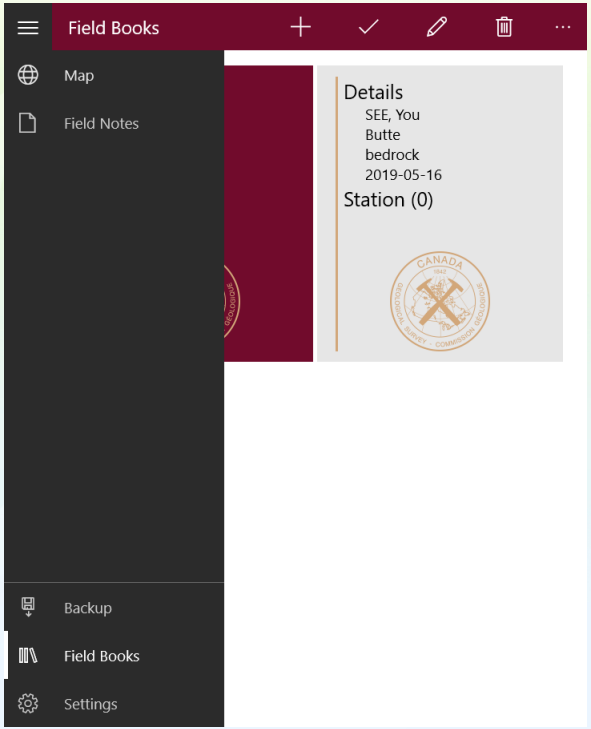


Warning to indicates incompleteness



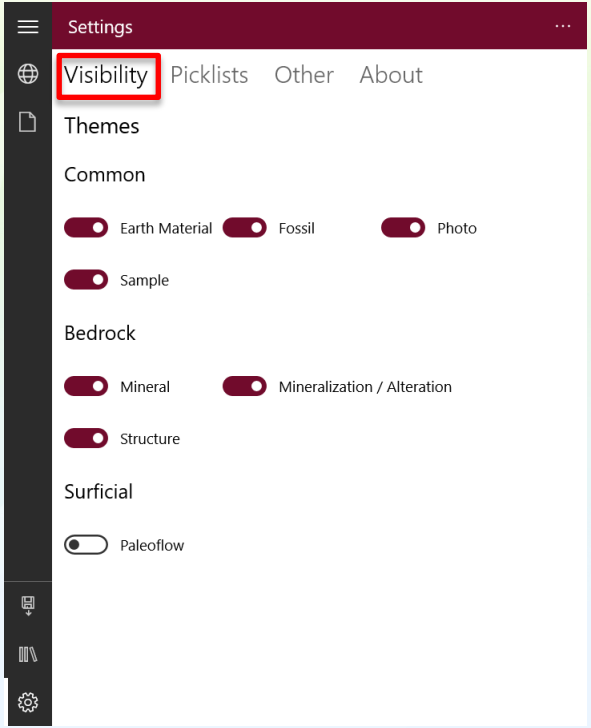
Software: general management

- Switch between Map and Field Notes
- Backup Data
- Select Field Books
- Setting



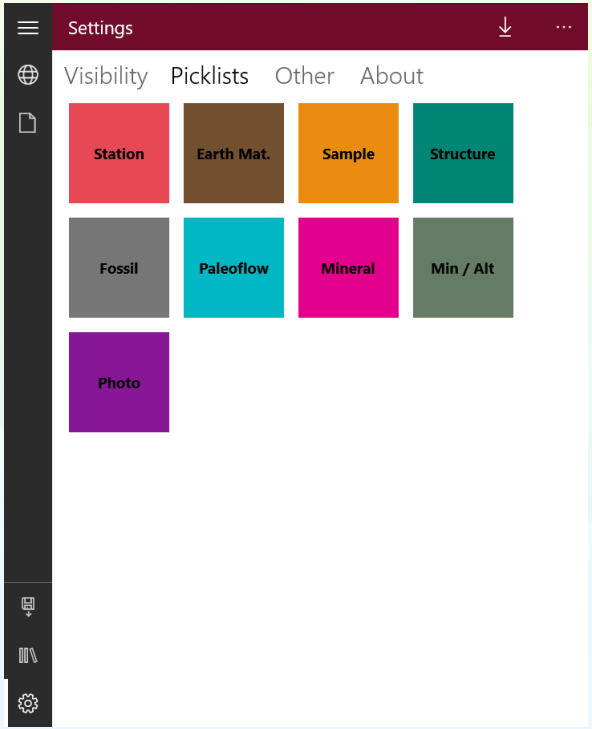
Software: Setting

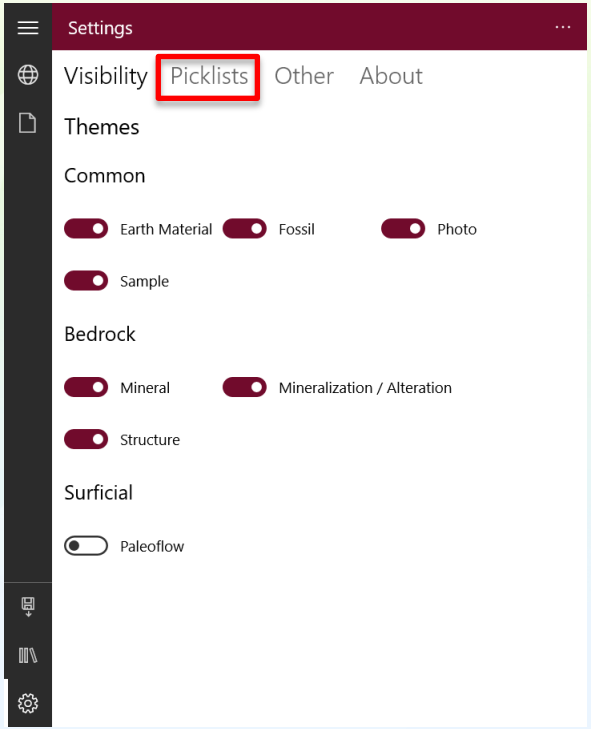
- Visibility



Software: Setting

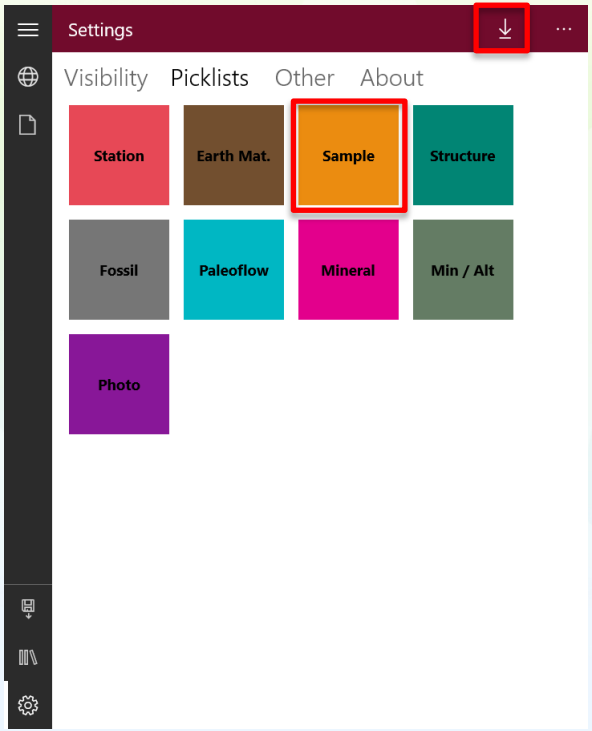
- Visibility
- Picklist

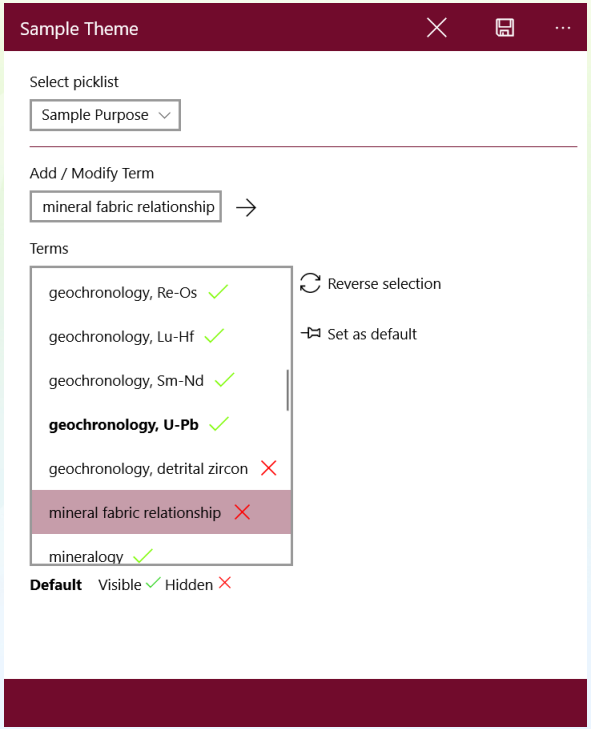




Software: Setting

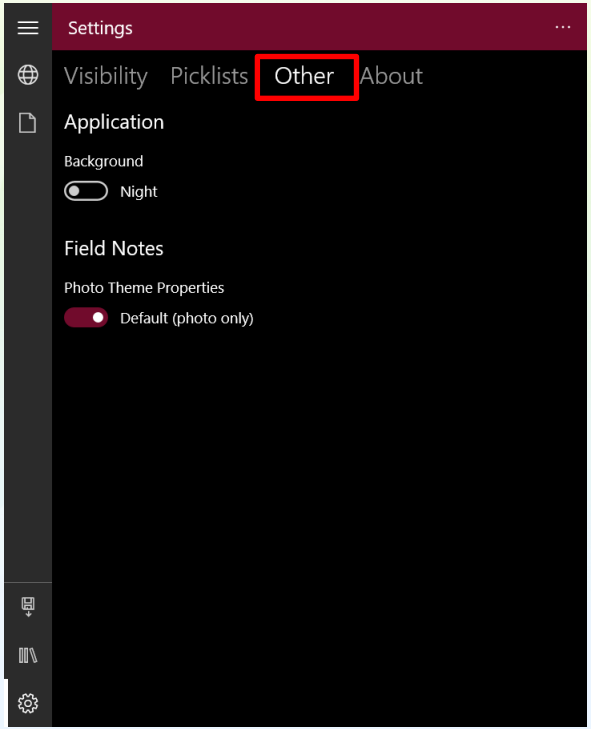
- Visibility
- Picklist





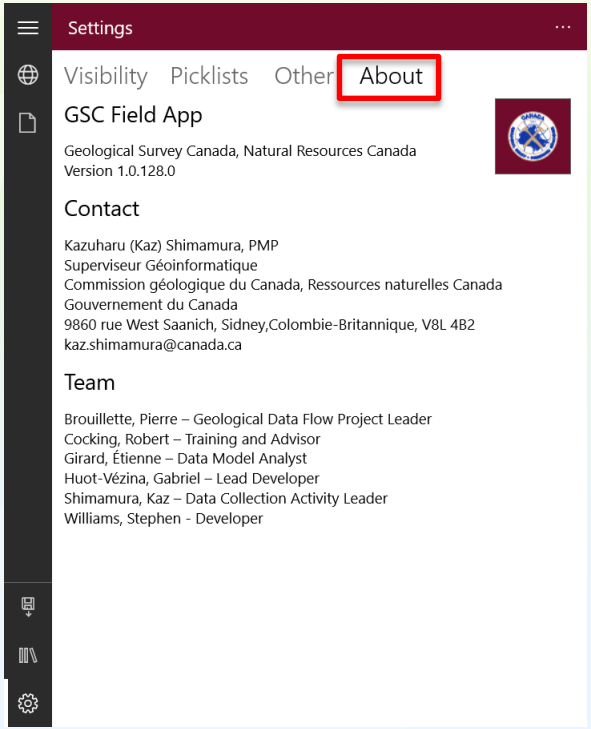
Software: Setting

- Visibility
- Picklist
- Other



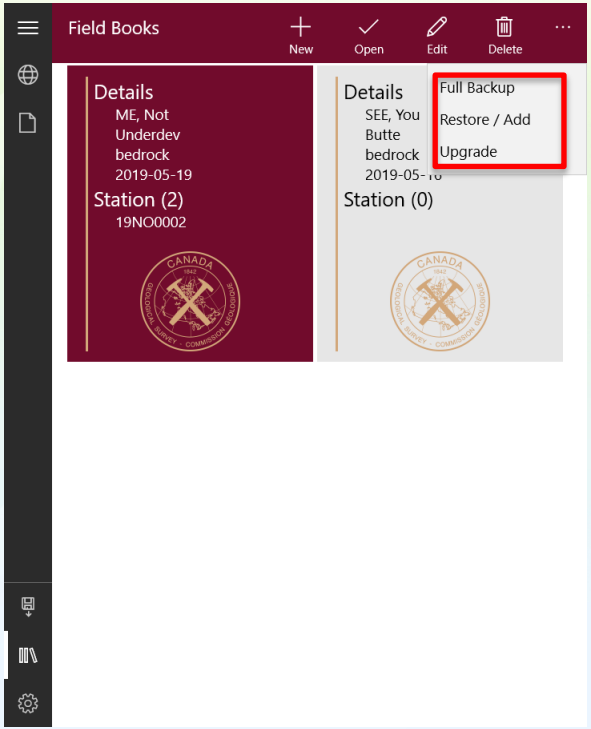
Software: Setting

- Visibility
- Picklist
- Other
- About

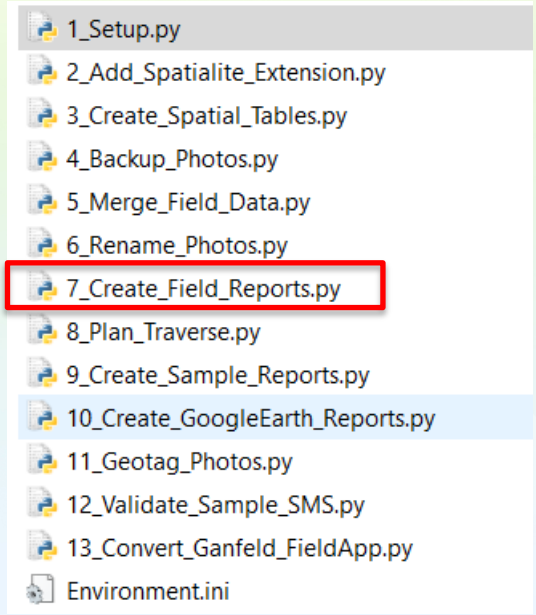


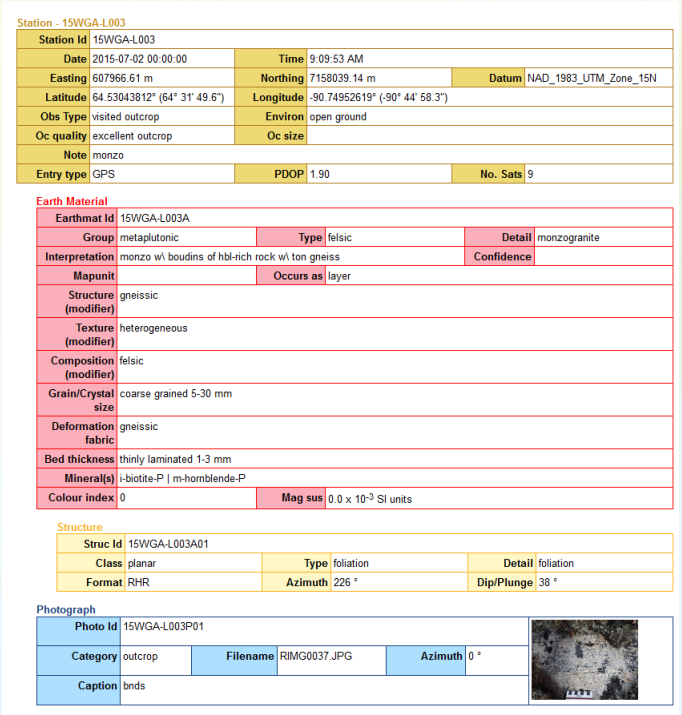
Software: project

- Full backup
- Restore / Add
- Upgrade



Tools to manage data outside





Station - 15WGA-L003

Station Id	15WGA-L003				
Date	2015-07-02 00:00:00	Time	9:09:53 AM		
Easting	607966.61 m	Northing	7158039.14 m	Datum	NAD_1983_UTM_Zone_15N
Latitude	64.53043812° (64° 31' 49.6")	Longitude	-90.74952619° (-90° 44' 58.3")		
Obs Type	visited outcrop	Environ	open ground		
Oc quality	excellent outcrop	Oc size			
Note	monzo				
Entry type	GPS	PDOP	1.90	No. Sats	9

Earth Material

Earthmat Id	15WGA-L003A				
Group	metaplutonic	Type	felsic	Detail	monzogranite
Interpretation	monzo w\ boudins of hbl-rich rock w\ ton gneiss			Confidence	
Mapunit		Occurs as	layer		
Structure (modifier)	gneissic				
Texture (modifier)	heterogeneous				
Composition (modifier)	felsic				
Grain/Crystal size	coarse grained 5-30 mm				
Deformation fabric	gneissic				
Bed thickness	thinly laminated 1-3 mm				
Mineral(s)	i-biotite-P | m-hornblende-P				
Colour index	0	Mag sus	0.0 x 10^{-3} SI units		

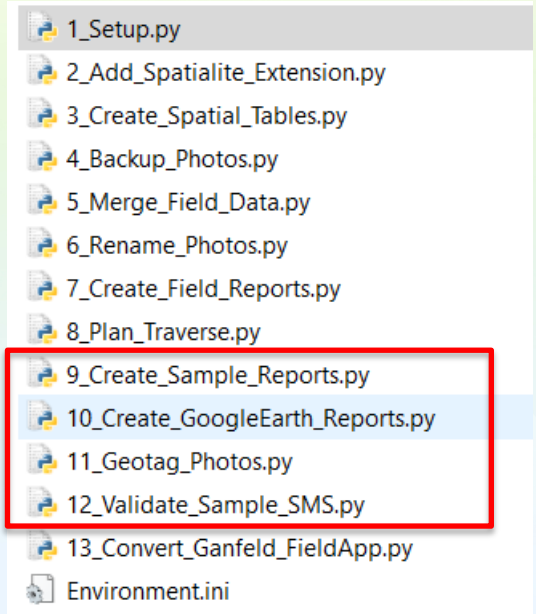
Structure

Struc Id	15WGA-L003A01				
Class	planar	Type	foliation	Detail	foliation
Format	RHR	Azimuth	226 °	Dip/Plunge	38 °

Photograph

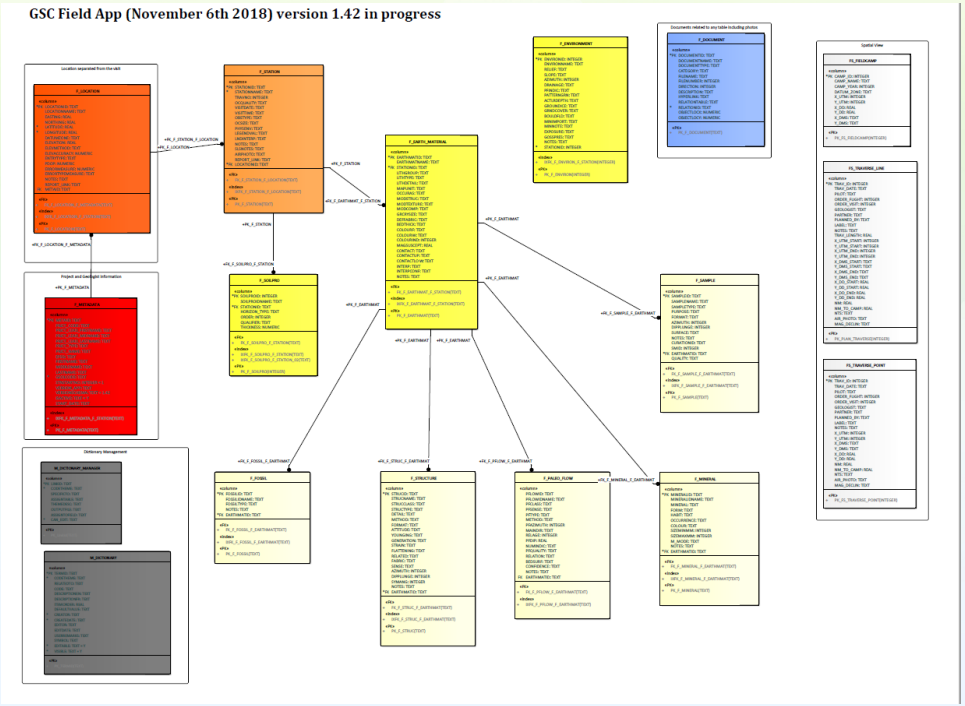
Photo Id	15WGA-L003P01				
Category	outcrop	Filename	RIMG0037.JPG	Azimuth	0 °
Caption	bnds				

Tools to manage data outside



- 9. Make a sample reports for each geologist to check if there is some mistake
- 10. Google Earth kml to look at the data without ArcGis or our software
- 11. Geotag to include xy coordinates to the photo and some metadata (geologist, description of the photo)
- 12. Prepare Excel sample template to upload data in our corporate system

Data Model



Conclusion: Positive

- Managing dictionaries is a main enhancement
  - (adding new terms, control order of the pick list, shown not shown, default value)
- TPK is very efficient but specific to Esri
- More control on validation (structure measurement)
- Use real view due to Sqlite instead of Shapefile
- Multi project
- Windows 10 on different hardware

Conclusion: Negative

- Windows 10 is under development
  - Newer version give us problems
    - Windows version vs esri extension
    - Windows version vs Panasonic tools (pen)
- Esri extension is under development
  - We have to adjust code to newer version
- Sqlite was suppose to be editable in ArcGis but still not. Editable in QGIS, and you can directly edit in our app.

More for field…

- Managing photos
- UAV and cliff
- Power in the field

More

- New unified data model
- Tools for compilation in ArcMap