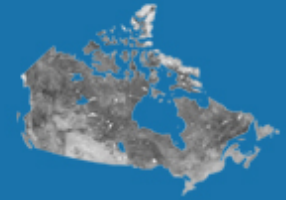


The following was presented at DMT'12  
(May 20-23, 2012).

The contents are provisional and will be  
superseded by a paper in the  
DMT'12 Proceedings.

See also earlier Proceedings (1997-2011)

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



# Ganfled supporting TOOLS for Field Data Management

Pierre Brouillette, Étienne Girard, Kaz Shimamura, Gabriel Huot-Vézina, Stephen Williams and Patty Zhao



Natural Resources  
Canada

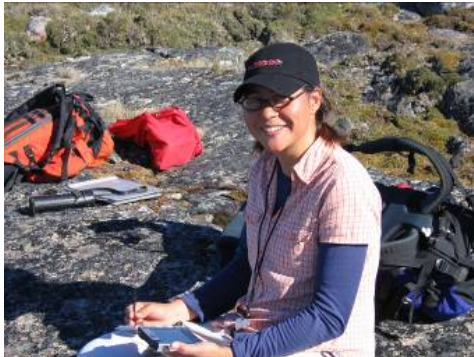
Ressources naturelles  
Canada

Geological Survey of Canada

Canada

## GanFeld - What is it?

- A map-based field data collection tool for geology
- Customized application built on top of ArcPad (ESRI's mobile GIS)
- GanFeld is an evolutionary use of technology in field data capture



“Gan” = open / traverse “Feld” = field



# GanFeld - What you need (cont'd)

## Hardware

- **Computer**
  - Desktop or laptop
- **Windows Mobile Device**, including cradle and extra batteries
  - GETAC, HP iPAQ 210, Trimble, Toshiba, Dell, etc ...
- **Memory Cards**
  - Depends on the device, typically **Secure Digital (SD)** or **Compact Flash (CF)**
- **Global Positioning System**
  - Wireless, wired or handheld
    - **GlobalSat BT-338, GlobalSat BT-359**
- **External Power**
  - Standalone source of power capable of charging both the Mobile Device and GPS
    - Generator, Power Inverter, Solar Panel, Battery Pack



# Hardware - Options



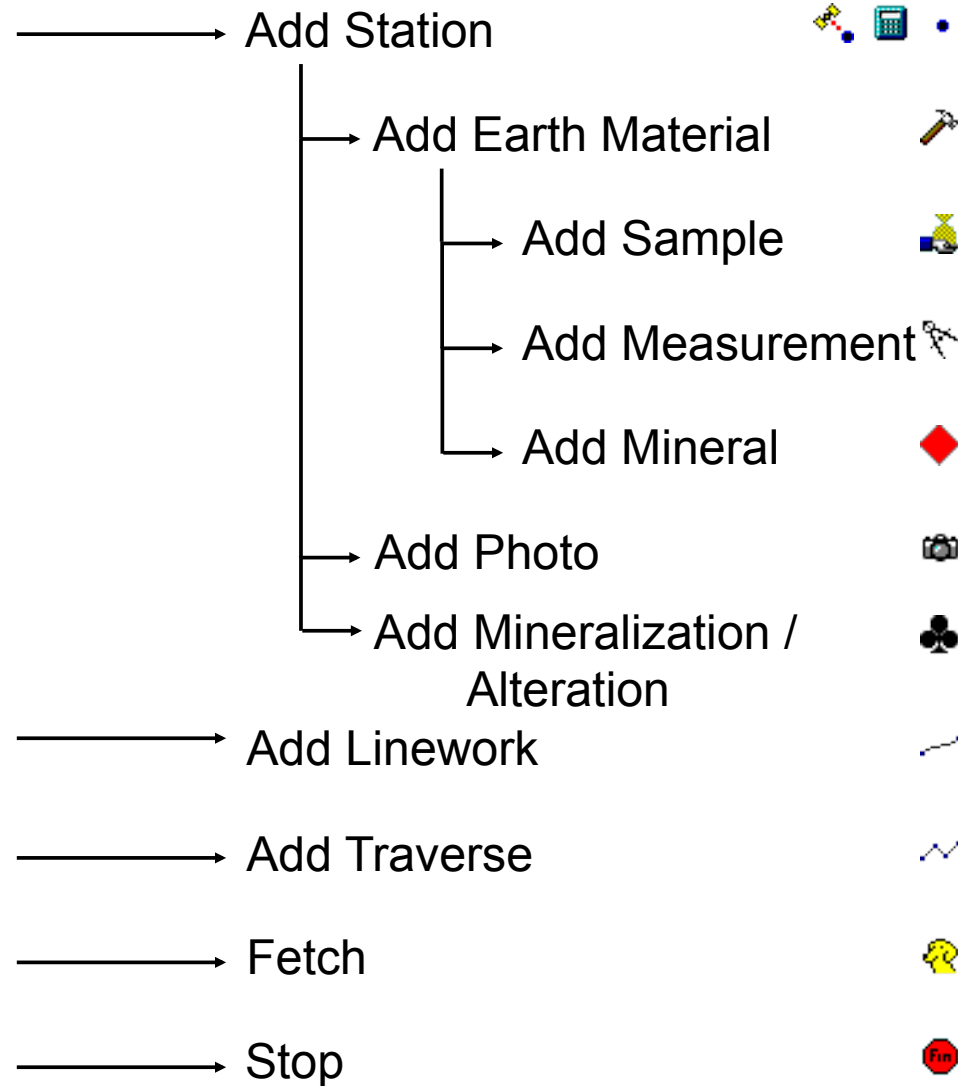
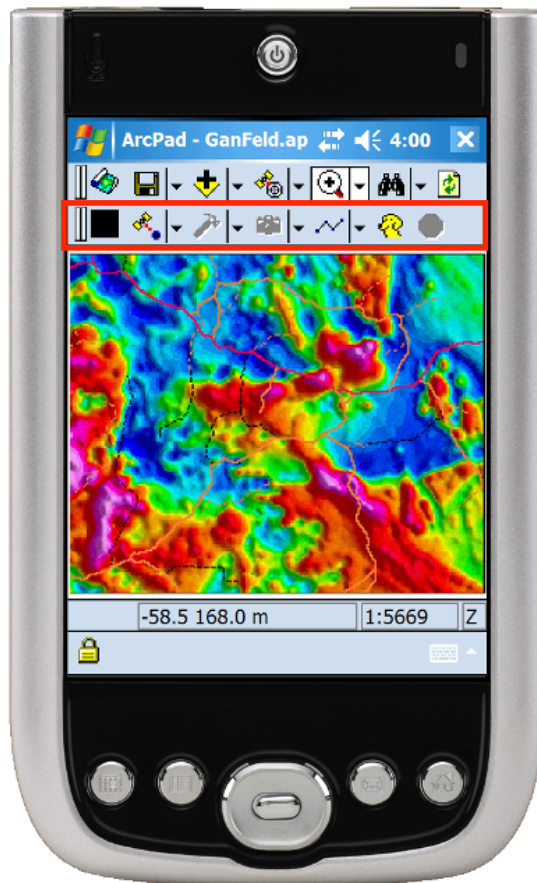
# GanFeld - What you need

## Software

- **ArcPad**
  - Environmental Systems Research Institute (ESRI)
  - Version 7.1 or higher
  
- **ActiveSync 4.5 (XP) or Windows Mobile Device Center (Vista, 7)**
  - Microsoft
  - Free
  
- **GanFeld**
  - Geological Survey of Canada (Open File 5912)
  - Free



# GanFeld - Toolbar



# GEM Projects using GanFeld



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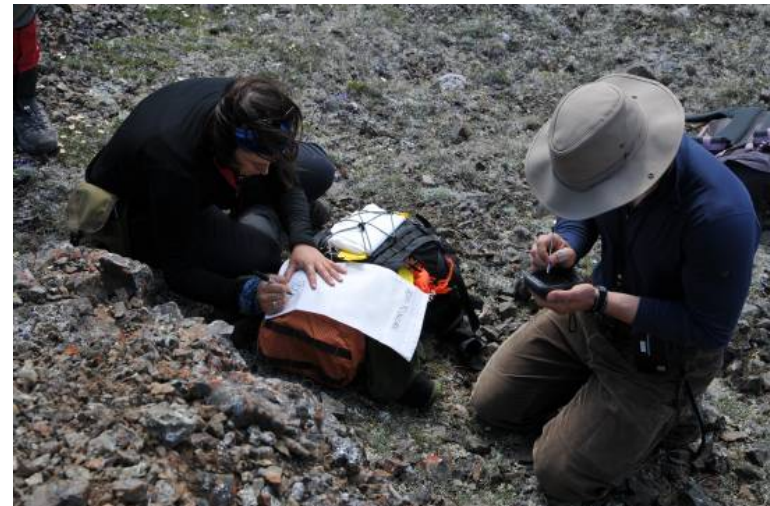
Canada 



# Today's presentation

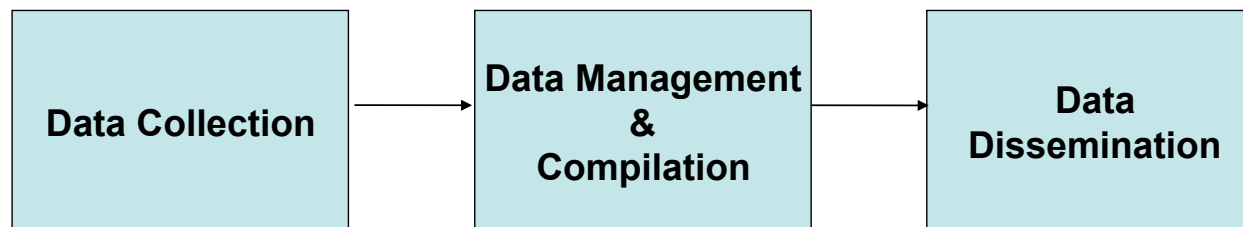
Focus on the processes and tools developed to support field data management

- Context
- Requirements
- Field Data Management Tools
- Conclusion



## Context

- This project was initiated in 2009 to meet the objectives of GMF (Geological Map Flow)
  - Robust procedures and tools for a more efficient collection and management of field data
  - A streamlined dissemination process which will enable quicker delivery of print-ready and GIS-ready geological map products



- The integrated data management process of GMF begins in the field, when the field data is *acquired using GanFeld*



# Requirements

- Ganfeld centric
  - Tools supports the Ganfeld system and not the other way around
- Workflow development must be carried out in ESRI's environment
- User friendly
  - Few clicks
- Facilitate day-to-day Field Data Management
  - Minimizes the amount of files to manage
  - Eliminate the "copy/paste" type of backup process
  - Minimizes the lost and/or corruption of field data
  - Speeds up the backup process especially for large field crew
- Facilitate day-to-day traverse planning



## Requirements (cont'd)

- Provide quick and easy access to field data
  - Overview of fieldwork progress in ArcMAP
  - Access to Field Reports
- Allow geological interpretation by providing tools needed to start creating geological features (contacts, faults, etc...)
- Accelerate migration process to various corporate database
  - Data migration for cartographic dissemination
  - Data migration to corporate repository



# Field Data Management TOOLS :

## Introduction

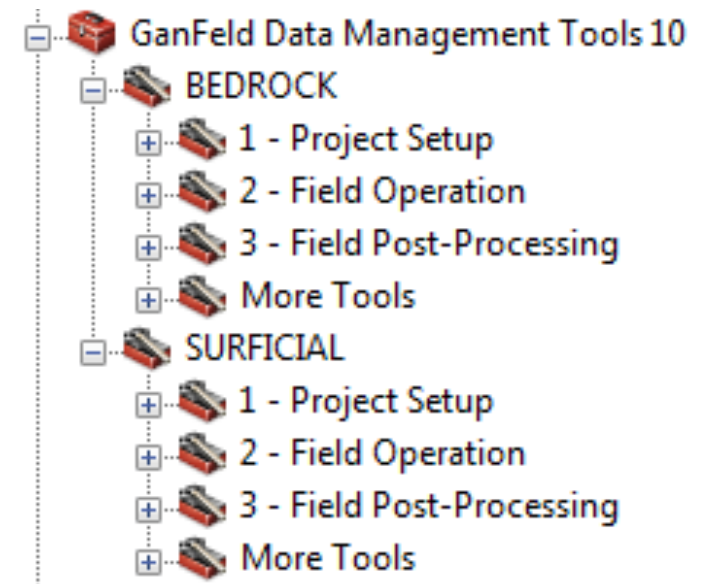
- All tools are integrated into Toolboxes and available in ArcCatalog
- Tools are available for both Bedrock and Surficial mapping projects
- Tools were designed and coded using Model Builder and Python scripts
- ActiveSync or Windows Mobile are required to enable communication between handheld device and desktop / laptop PC



# Field Data Management TOOLS :

## Getting started – Install GanFeld Data Management Toolboxes

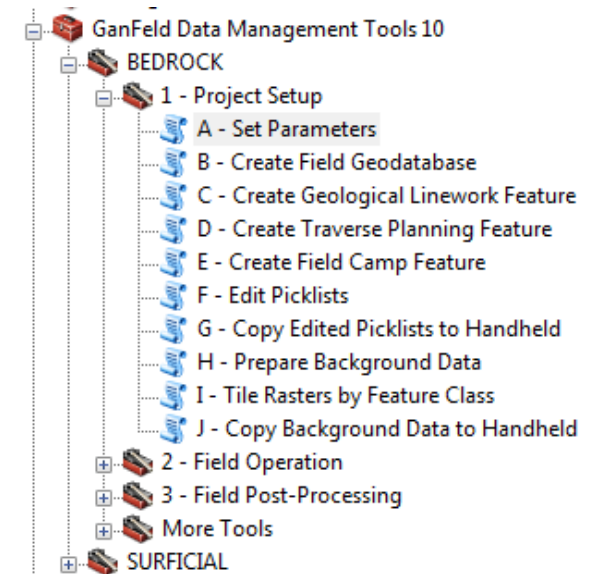
- Add Toolbox in ArcCatalog
- Tools are grouped into four individual Toolboxes :
  - **1- Project Setup**
    - preparation of a GanFeld working environment
  - **2- Field Operation**
    - daily management of field data
  - **3- Field Post-Processing**
    - migration to various corporate databases
  - More Tools (manage Ganfeld field data from computer)



# Field Data Management TOOLS :

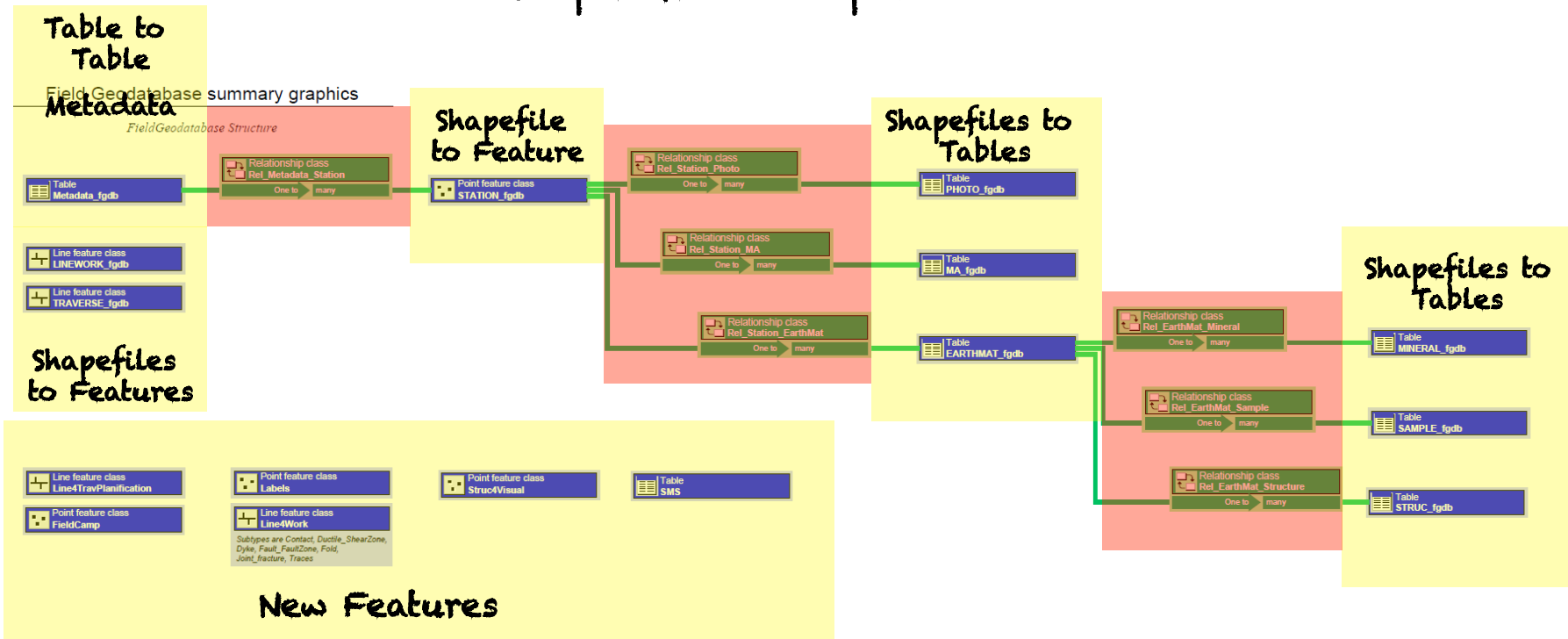
## 1 – Project Setup

- Project Setup Toolbox will mainly be used by the IM specialist before field work
- Tools were designed to facilitate the setup of a functional GanFeld Data Management process :
  - Create a complete and workable FieldGeodatabase (ESRI Personal or File Geodatabase)
  - Allow access and editing to all GanFeld picklist
  - Facilitate the management of background datasets used in Ganfeld
  - Etc...



# Fieldgeodatabase structure (based on the GanFeld files structure of shapefiles and DBF)

## Simple Relationship Class

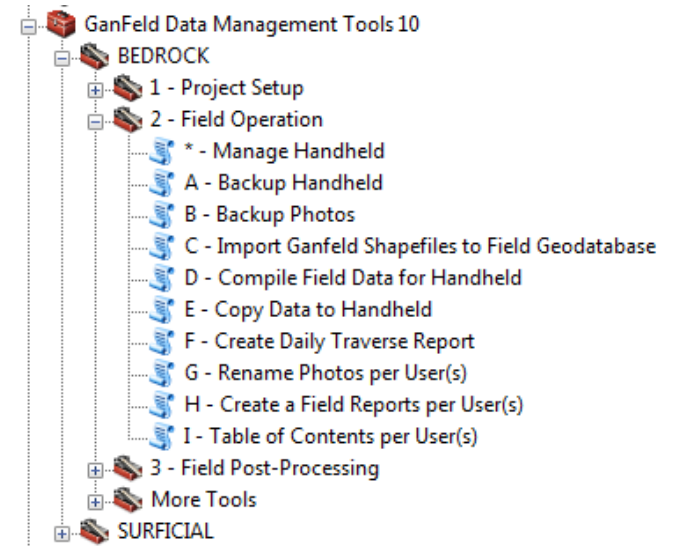




# Field Data Management TOOLS :

## 2 – Field Operation

- The Field Operation Toolbox contains tools sorted in a sequential order that reflects the daily data management of a geological mapping project
- Tools were designed to facilitate some of the following processes :
  - Backup of handheld devices
  - Backup of photos
  - Integration of Ganfeld shapefiles into the FieldGeodatabase
  - Daily traverses planning
  - Preparation of a web page report form for each station (i.e outcrop) accessible in ArcMAP through an active link



# Field Data Management TOOLS :

## 2 – Field Operation

### I – Create a Field Report per User(s)

- This tool will generate a colour-coded structured report for each station in the FieldGeodatabase
- Quick and easy summary view of the collected field data presented as an XML web page document
- Accessible in ArcMAP through an active link

Station: 10CXAB149			
Station Id	10CXAB149		
Date	02-08-2010	Time	3:56:36 PM
Easting	698972.9 m	Northing	7403046.14 m
Latitude	66.68130563°	Longitude	-82.49235561°
Obs Type	visited outcrop	Environ	open ground
Oc quality	excellent outcrop	Oc size	
Entry type	GPS	PDOP	5
		No. Sats	8


  

Earth Material			
Earthmat Id	10CXAB149A		
Group	metasedimentary	Type	siliclastic (ms)
Interpretation		Detail	semi-pelite
		Confidence	


  

Structure			
Struc Id	10CXAB149A01		
Class	planar	Type	foliation
Format	RHR	Azimuth	100°
		Detail	foliation
		Dip/Plunge	55°


  

Photograph			
Photo Id	10CXAB149P01		
Category	ithology	Filename	IMG_0166.JPG
		Azimuth	0°
Caption	No previous caption.		
			

Photograph			
Photo Id	10CXAB149P02		
Category	ithology	Filename	IMG_0167.JPG
		Azimuth	0°
Caption	No previous caption.		
			

Photograph			
Photo Id	10CXAB149P03		
Category	ithology	Filename	IMG_0168.JPG
		Azimuth	0°
Caption	No previous caption.		
			



# Field Data Management TOOLS :

## 2 – Field Operation

### I – Create a Field Report per User(s)

Firefox

Station: 10CXAB206

file:///C:/Users/laptop/Documents/Melville/GEODATABASES/report

Station - 10CXAB206

Station Id	10CXAB206		
Date	12-08-2010	Time	12:37:25 PM
Easting	660499.27 m	Northing	7471260.75 m
Latitude	67.31447°	Longitude	-83.26895°
Obs Type	visited outcrop	Environ	open ground
Oc quality	excellent outcrop	Oc size	
Since last	no outcrop		
Entry type	manual	PDOP	0
		No. Sats	0

**Earth Material**

Earthmat Id	10CXAB206A		
Group	metasedimentary	Type	carbonate (ms)
Detail	calcsilicate		
Interpretation	calcsilicate sequence comprising cm to dcm beds of marble		Confidence
Mapunit	Occurs as main lithology		

**Sample**

Sample Id	10CXAB206A01		
Type	hand, single	Purpose	representative lithology

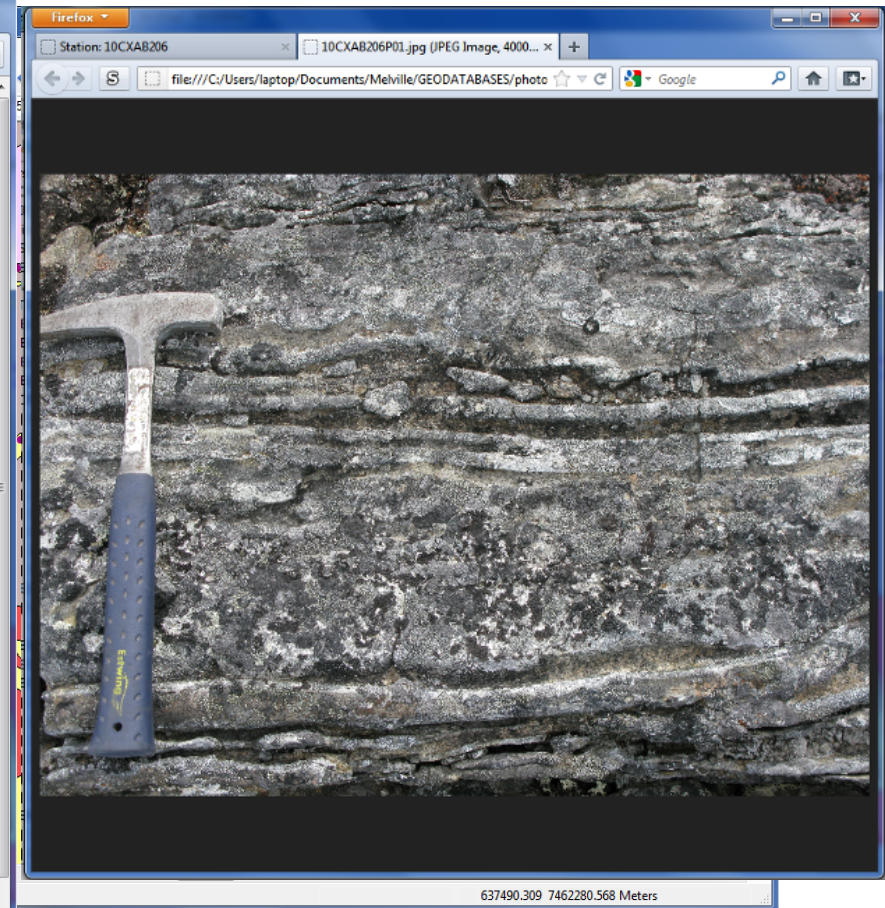
**Structure**

Struc Id	10CXAB206A01		
Class	planar	Type	foliation
Detail	foliation		
Format	RHR	Azimuth	245°
Dip/Plunge	85°		
Note	subcrop, seems rotated		

**Photograph**

Photo Id	10CXAB206P01		
Category	lithology	Filename	IMG_0267.JPG
Azimuth			
Caption	calcsilicate + beds of marble		

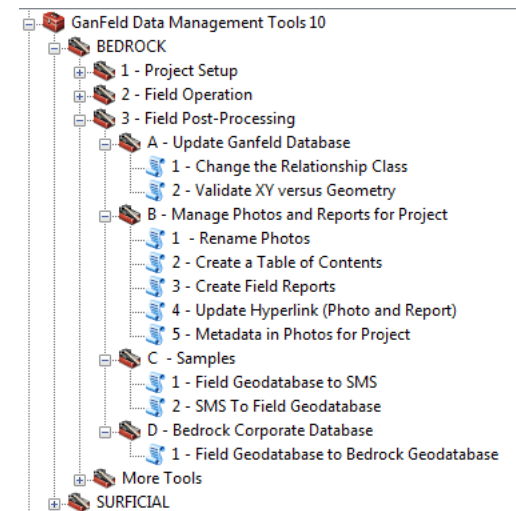
14-12-2010 14:00:39



# Field Data Management TOOLS :

## 2 – Field Post-Processing

- Tools in the Field Post-Processing toolbox were designed to automate some of the processes that IM specialist would possibly need to perform after the field work :
  - Integrity checks
  - Export field data to corporate databases
  - Etc...



# Conclusions

## Benefits for field geologists

- Allows quick overview of fieldwork progress in ArcMap
- Gives access to a single page report of field observation with associated photos for each station (hotlink on station location)
- Facilitate day-to-day traverse planning

## Benefits for data managers

- Enforce a standardized procedure
- Eases the process of day-to-day field data management (handheld and photos backup, validation, detection of inconsistencies, etc...)
- Preserve field data integrity throughout the GMF workflow
- Facilitate field data migration to various corporate database



# Conclusions

## Benefits for project managers

- Allows to fully integrate the process of field data acquisition with the GMF workflow
- Reduce cost of field data management
- Facilitate promoting other integrated corporate development



# Field Data Management TOOLS :

## Example from GEM–Victoria Island Project

- Fieldwork facts
  - 20 geologists
  - 35 days of fieldwork
  - 1 database manager in camp
- Data Management
  - 2431 stations
  - 67 Gig of data
  - 556 folders, including
    - 8818 photos
    - 3244 reports



# Field Data Management TOOLS :

## Example from GEM–Victoria Island Project

- Data Manager workload for 35 days of fieldwork
  - Setup working environment, approximately 40 clicks
  - Backup handhelds, 250 clicks
  - Backup photos, 250 clicks
  - Integrating shapefiles into the FieldGeodatabase, 35 clicks
  - Creating reports, 35 clicks
- Summary
  - No file or folder created by the user
  - No copy/paste
  - No drag and drop, and
  - .....less than 650 clicks!!!

