

M2S2 – MMRP Tools

Geosoft Update

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Agenda



- Overview of existing toolsetsNew developments, and updates
- **Q** Overview of new underwater tools
- **Q** Summary of advanced classification tools
- Support to the UXO industry and future directions





UX-Process

Standardized QC/QA tools for UXO geophysical surveys





UX-Detect

Locate and analyze UXO targets



A complete tool suite for geophysical surveys

- Survey Planning
- QA/QC Tests
- Path and Data Correction
- Data Processing and Visualization
- Target Picking and Analysis
- Mapping and Reporting



New Developments

Capabilities

- New features to existing tools
- Addressing Customer Issues

Release Process

- More frequent releases
- Getting issues fixed and out faster

Business Model

- More flexible licensing options
 - Project based (Short-term)





Navigation Corrections



New Capabilities

- Ability to resume manual editing sessions
- Control map symbol sizes
- Individual Fill for automatic and manual corrections
- Improved dialog flow

Database			Automatic position correction o	ptions
* Name: Lines to correct: * X backup channel: * Y backup channel: @ Reset current X/Y wi	Name: APG_NavCorr2.gdb • Lines to correct: Selected lines • X backup channel: _X_Orig_NavCorr • Y backup channel: _Y_Orig_NavCorr • Y Backup channel: _Y_Orig_NavCorr • Y Backup channel: _Y_Orig_NavCorr •		 V Correct for zero position Correct for positional de Correct for time double hits Time channel: Correct for position quality: Outplity flag chappel; 	buble hits it time .
Output map * Output map name: Orig/corr line path thick Orig/corr symbol size (APG_NavCorr2.map kness (mm): (mm):	• 0.1 0.2	 Min. acceptable quality: Max. acceptable quality: Fill corrected points: 	3 5 Dummy out
Current (corrected) line Position quality symbo Enabled with quality flag ch Carbon Keep individual corr	thickness (mm): ol size (mm): annel selection rected line map grou	0.2 0.2 ps	Manual position correction opti Correction for jumps: Fill corrected points:	ons Straight line

Statistical Plotting tools

New Capabilities

- Histogram
- Scatterplot
- Triplot



New ways to view your data and targets!

Shortest Path

New Capabilities

- Select Start and End points
- Areas to avoid (Cultural Mask)

	ar maent)
Shortest Path	- ? -
* Target database:	APG_EM61mk2-Final_Blind_Targets. ▼
* Lines to process:	Displayed line 🔻
Mask channel:	MaskChannel 🔻
Cultural mask file:	Cultural Mask.ply
* Output index channel:	SPI
* Output index file:	SPI.csv
Map name:	APG.map 🔹 \cdots
	Sort index channel
	Pick start and end points
	OK Cancel

... Keeping the dig team happy







UXO Marine

Locate and analyze UXO, cables, pipelines, other targets

UXO Marine

Purpose-Built Workflows for:

- Marine Magnetic and
- Marine Gradient Magnetic Data



UXO Marine – Altitude Corrections



The sensor height above the sea floor varies, due to:

- Vessel speed
- Currents and waves









UX-Analyze

Analyze, Model and Classify UXO targets



Modelling - Polarizabilities \rightarrow Classification



<u>Intrinsic</u> responses (polarizabilities) along target's principal axis directions fully characterize EM signal.

Invariant to orientation and depth of burial (within limits).









High-level Classification Workflow





Processing Data - Simplified Workflow



ess Data Iulti-faceted GUI that sets u	p and initiates standard proces	ssing flows and/or seq	uences. Th	e Common Parameters	are passed to each	? n individual GX
IVS	Field QC	uts. Validate Librar	y	Classify and Rank	Custo	m
Ised to evaluate and manag elf matches. Generates fit re	e the library entries given a lis sults and graphics useful for i	t of expected munition dentifying the present	ns and limite e or absence	ed known truth. Perform e of unexpected muniti	s modeling, library ons.	matches, and
Common Parameters		Co	ommon Paran	neters		
Sensor name: MetalMapper		▼ - 5	ignature Libr	ary Database		
Target Database		*	Name: MN	1 library.gdb		•
Name: target odb			Group - T	OI Only		
Group - single object solve	er single		Group - A		/S	
Group - multiple object so	lver		Group - C	lutter		
Group - multiple object so	olver (2 crit)	*1	item descript	tion channel:	brary_id	•
ID channel:	UXA_TARGET_ID		ols			
Mask channel:	UXA_MASK	. .				I
Mask channel - all sources:	UXA_MASK_ALL	· ·	 Model targ 	gets	-	Settings
Survey Database			Aud Ilbrar	y nems	_	Settings
Name: data.odb			Calculate	IV5 statistics	-	Settings
Data channel:			Identify cl	usters		Settings
	Low High	Decay I	 Set thresh	olds and prioritize	_	Settings
Gates:	8 💌 49	▼ 36 ▼ *	Plot/map pre	fix:	/S	
Time of gates (ms):	0.078 7.884	1.978	Create plo	ts based on final ranking		
* More					ОК	Cancel

Working with Data: Interactive Views



Interactive review with multiple linked views

- Scatterplots with overlays
- Database(s)
- Polarizations Plot
- Images



Documentation: Decision Plot





Classification - Ranked Anomaly List

Initial Ranked Anomaly List

Anomaly ID	Dig on First Pass	Туре	Comment	
2498	Y		Unable to extract reliable parameters	
247	Y	105 mm		
1114	Y	4.2 in	High likelihood TOI	
69	Y	155 mm		
811	Y	81 mm		First
313	N		Unable to classify	Threshold
883	N			
	Ν			
	Ν			
	Ν		High likelihood not TOI	
	Ν			
944) -	Ν			
	Ν			
	Ν			



Anomaly ID	Dig	Туре	
2498	Y		
247	Y	105 mm	
1114	Y	4.2 in	
69	Y	155 mm	
811	Y	81 mm	
313	Y	105 mm	Final
883	Ν		Threshold
	Ν		
	Ν		
· · · · · · · · · · · · · · · · · · ·	Ν		
	Ν		
	Ν		
	Ν		
	N		
	N		

Classification - Performance Evaluation



Receiver Operating Characteristic (ROC) Curve



Performance Evaluation - Examples



from USACE and Production Geophysicists







Near Surface & Marine Group

Simple, powerful tools for your earth science & engineering data





Future Data Experience



Future geoscientists and technicians will use their internet-connected devices:

- ✓ anywhere in the Internet connected world
- ✓ view and access data and reports about a project
- ✓ use the right scientific tools to add value to the project
- collaborate with team members around project data
- ✓ have confidence that project data meets standards
- ✓ know that data and information is secure

Ian MacLeod, Chief Technologist





Questions?

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