October 2010
SJ Geophysics News

11966 - 95A Avenue
Delta, BC, Canada, V4C 3W2
(604) 582-1100
www.sjgeophysics.com

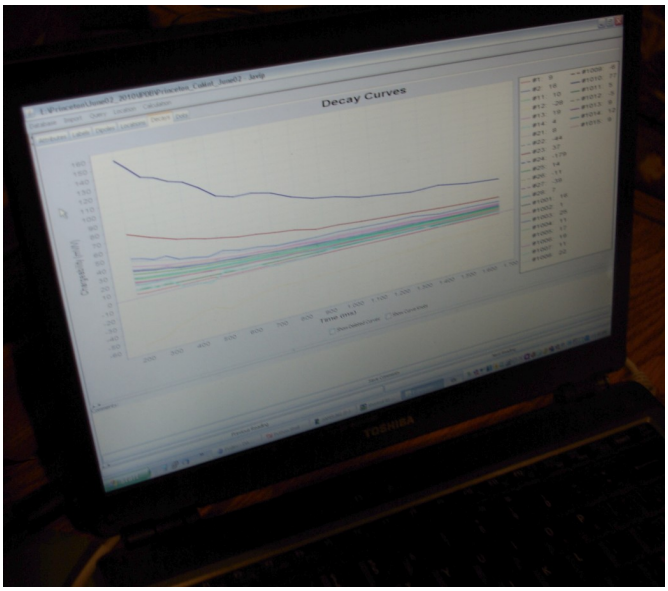
NEW DISTRIBUTED RECEIVER SYSTEM – DABSTIX

SJ Geophysics Ltd. is pleased to announce that our new digital receiver system for IP and MT surveys *is now available*. The **DabStix** system is a distributed system which means it is not restricted to line-based array geometries. By eliminating the need for long cable lines, the **DabStix** are significantly more flexible than other systems, with new array designs optimized for individual deposit types and challenging terrain and access conditions. This system also creates opportunities for reconnaissance surveys in areas that were previously inaccessible with a cable-based array geometry.

These units are light and robust and can be operated by a small field crew, providing cost savings to clients relative to other in-line distributed systems. New software tools improve spike rejection, reduce background noise and lower the minimum measurable voltage level. The improved data quality and increased data redundancy of the **DabStix** system will produce inversion models at higher confidence levels.

New DabStix System

The **DabStix** digitizer is a single channel unit with internal memory and GPS synchronized timing. Communication is via USB with the potential to add Ethernet, WiFi and Bluetooth connectivity in the future. The input connections are generic so the unit can measure the voltage potential from a dipole or the magnetic field from a coil sensor.



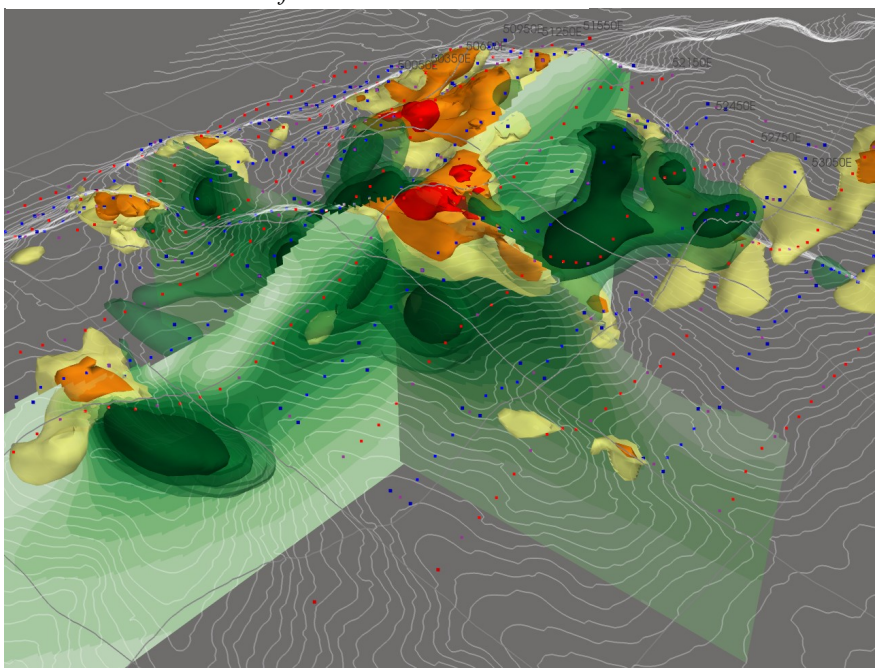
Decay curves from first day's data at Copper Mountain test survey with 29 DabStix receivers. Phew, it worked...

The first prototype was assembled in late 2009 and 100 units were built by early Summer 2010. A test survey was completed over the Copper Mountain mine outside of Princeton, BC, in early June 2010. The survey was shorter than desired because of

DabStix units at an MT reference site in Alaska.

the time constraints of the mine's planned reopening. Even with these limited results, a 3D inversion of the **DabStix** data reproduced the same chargeability features as a previous IP survey on the site. These tests also indicated that minor modifications to the **DabStix** design were necessary for proper MT sampling.

With the modifications completed, the first full IP/MT survey with the **DabStix** system was conducted in Alaska from June to August 2010. An average of 40 **DabStix** units were set out each day, 6 for MT and 34 for IP.



3D inversion model of chargeability (greens) and resistivity (reds/oranges) at Grubstake in Alaska (used with permission from Talon Gold Alaska Inc.)

Coupled to the hardware advances of the **DabStix** system, we have developed new software tools to handle all the data measured with 40 **DabStix** units (with research grants from IRAP). With the assistance of consultants, we recently completed a thorough characterization of the **DabStix** units so that any instrumental effects can be properly calibrated.

History

In the late 1990s, SJ Geophysics Ltd., along with its consulting research company S.J.V. Consultants Ltd., started working with 2D then 3D IP inversions. In 2001, we parallelized the UBC GIF inversion codes to significantly speed up processing time so that 3D IP inversions

became a viable option. This work was partially funded by IRAP and Placer Dome Inc. (now part of Barrick Gold Corp.).

Dave Muir with our present rack of quad core computers.

The big advantage of 3D inversions was that surveys were no longer restricted to collecting the 2D in-line IP that has been the standard technique since the 1960s. Along with a number of clients, we started designing 3D style surveys which consisted of what we call an "off-line modified pole dipole survey". It did not take long to realize that the commercial receivers available at the time were not well suited for this type of array design.

SJ Geophysics thus started developing its own full waveform digital receiver. Our first two models were prototypes and saw limited field use. Version 3 included a larger buffer, more modern electronics and smaller, more robust packaging. Each unit was a 4 dipole receiver with a 24 bit analog to digital converter (ADC) capable of sampling at 1000 samples per second. There was no memory on board but USB communication allowed the units to be controlled from an external computer.

A set of four SJ-24 digital receivers in the field with decay curves visible on the computer screen.

This Version 3 model, called the SJ-24, proved very successful and has been in use worldwide since 2004. Surveys with the SJ-24 receivers provide higher quality data and are faster, more efficient and more flexible. But even with all these advances, this system is still largely restricted to a cable-based in-line array geometry. In late 2006, we received a

small grant from IRAP for the development of a new distributed array digitizer system. Work was started with an outside electronic design firm.

The main goal was to design and build a multipurpose digitizer that could be used in a distributed array configuration for a variety of geophysical surveys, including IP, MT, CSAMT and possibly low frequency TDEM. After two years we realized our design was too advanced and complex with too many bells, whistles and wishes. Although we had a working prototype we shelved the design and went back to the drawing board. Version 5, the **DabStix**, was the result of this redesign.

Future Directions

We are presently working on version 6 of our digitizers, which will be even smaller, consume less power and sample at higher frequencies. With this new system, we will be able to collect IP, MT, CSAMT and TDEM. The first prototypes should be ready in 2011. Software research for this digitizer will include new and improved filtering techniques and telluric cancellation to increase the signal to noise ratio. We feel it is more cost effective, safer and more environmentally friendly to improve signal to noise through the combination of better receivers, survey techniques and software instead of using larger transmitters.

Equally important as our digitizer research, we are currently developing new 3D inversion model software tools. One component of our research focuses on utilizing the computational power of Graphical Processing Units (GPUs). Our research group is also working on improvements to the 3DIP, 3DMAG and 3DGRAV inversion codes. Most importantly, we are working with other consultants on implementing 3DEM forward modelling and inversion routines.

Company Information

S.J.V. Consultants Ltd. has an extensive and experienced research group that is actively looking for funding for its numerous projects which are presently funded in-house with some support from IRAP. Where necessary, we also work with outside consultants to enhance the work of our research team.

Feel free to call or email us at anytime to discuss our new acquisition systems and accompanying software along with our future research projects.