

Continuous innovation

Conquest Updates

In response to customer feedback, Sensors & Software has improved the functionality and ease of use of the Conquest concrete imaging systems.

Users now benefit from:

- ◆ **More Grids:** The system can now collect and store up to 99 grids, a five-fold increase.
- ◆ **Image Enhanced Processing (IEP):** IEP uses data adaptive processing to produce clearer, crisper images.
- ◆ **Filtering:** Local responses from rebar and conduits are often subject to masking by horizontal responses like the transmit pulse or the reflection from the bottom of concrete. User selectable filtering removes flat-lying responses to make local targets more visible.
- ◆ **DynaQ:** A patented advance on GPR signal processing, enhances the data, based on the traverse speed of the sensor. A continuous indication of data quality is visible to the operator.
- ◆ **Automated calibration:** Conquest automatically tests for proper calibration during operation. If the system is not within factory specifications,

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From construction to monitoring:

Ice Roads and GPR

Each year at this time the Polar Regions start to buzz with activity as people prepare for the winter road season. As trucking costs are about 1/10th of air freight, winter roads (created

in winter and quickly erodes it dangerously thin in the spring.

Ice Profiling GPR systems are used early in the process because they can be deployed from lightweight



Sun rising over an ice road in Yellowknife, Northwest Territories, Canada

across frozen ground, lakes, and/or rivers) are important transportation links for oil and natural gas exploration, diamond mining and remote communities.

The first part of construction is determining the route. The ice road needs to be routed around areas with known difficult ice conditions. For example, narrow areas in lakes or rivers may be associated with fast current flow, that inhibits ice formation

vehicles like snowmobiles after just a few inches of ice have formed. As the ice thickens, heavier vehicles

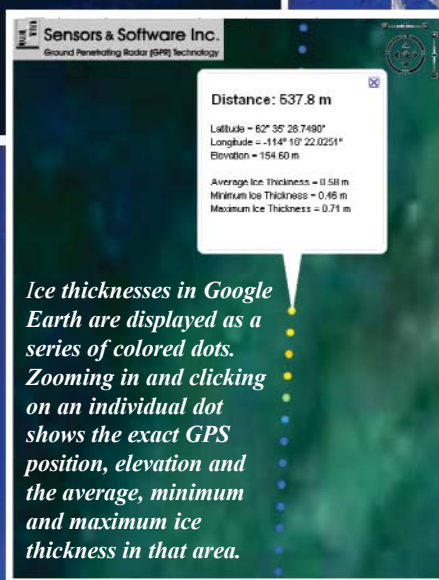
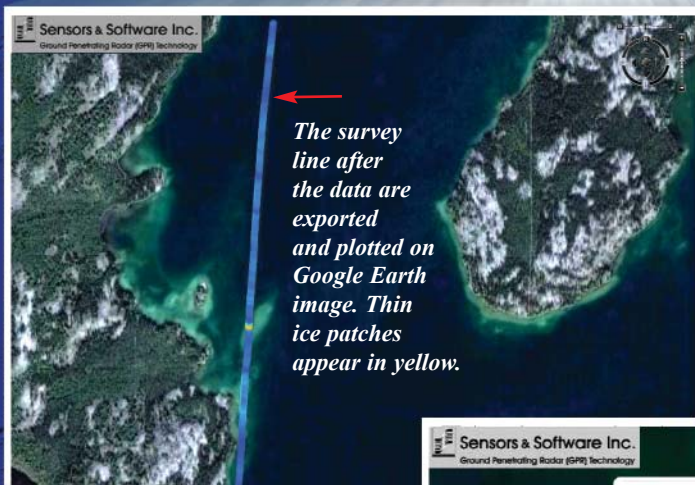
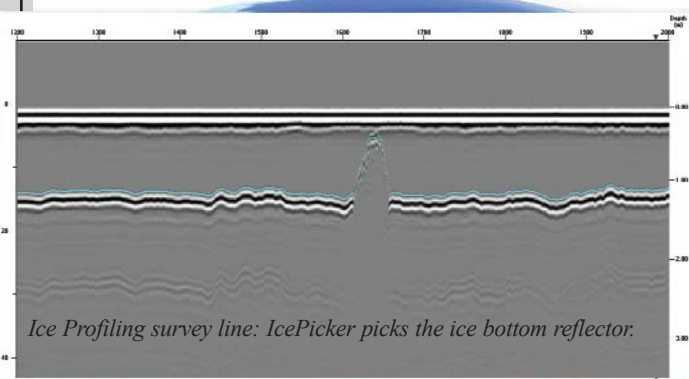
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Ice Roads and GPR

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format. In the past, the ice data were often imported into Geographical Information System (GIS) software for plotting, but recently, ice profilers have taken advantage of IcePicker's ability to export directly into a Google Earth-compatible KMZ file.

Our example illustrates the advantages of plotting ice profiling data in Google Earth. There is an obvious area of poor data on the ice profiling survey line. Experienced ice profilers will recognize that this is often caused by grounded ice (ice frozen to the bottom of the lake or river rather than floating) but there may be other reasons.

The survey line was exported and plotted on a Google Earth image. Thick ice is shown in shades of blue while thin ice patches appear in yellow-orange.

Zooming into the area of thin ice confirms the grounded ice theory. A submerged island is visible in the Google Earth image corresponding exactly with the thin ice.

Since grounded ice is thinner and usually weaker than floating ice, the ice road builders may change the road direction to avoid any potential problems. If the ice is just thin, plowing off the insulating layer of snow will allow it to thicken faster. Drilling through the ice and flooding the area will also build up the ice thickness.

Within a few days or weeks from initial construction, the ice road will be thick enough to support heavy truck traffic. GPR technology is invaluable in monitoring these roads to ensure that they will remain safe enough to carry supplies to the people who rely on them. ■

transferred to a computer for further analysis with Sensors & Software's IcePicker program.

like pickup trucks can be used to monitor the route.

Ice road builders can interpret the ice profiling data in real time to identify areas of thin or problem ice. For long-term ice thickness monitoring, data are

Ice Profiling data are typically collected with GPS for positioning. IcePicker integrates the GPS data, picks the ice bottom reflector and outputs the ice thickness data in a spreadsheet

Conquest Updates

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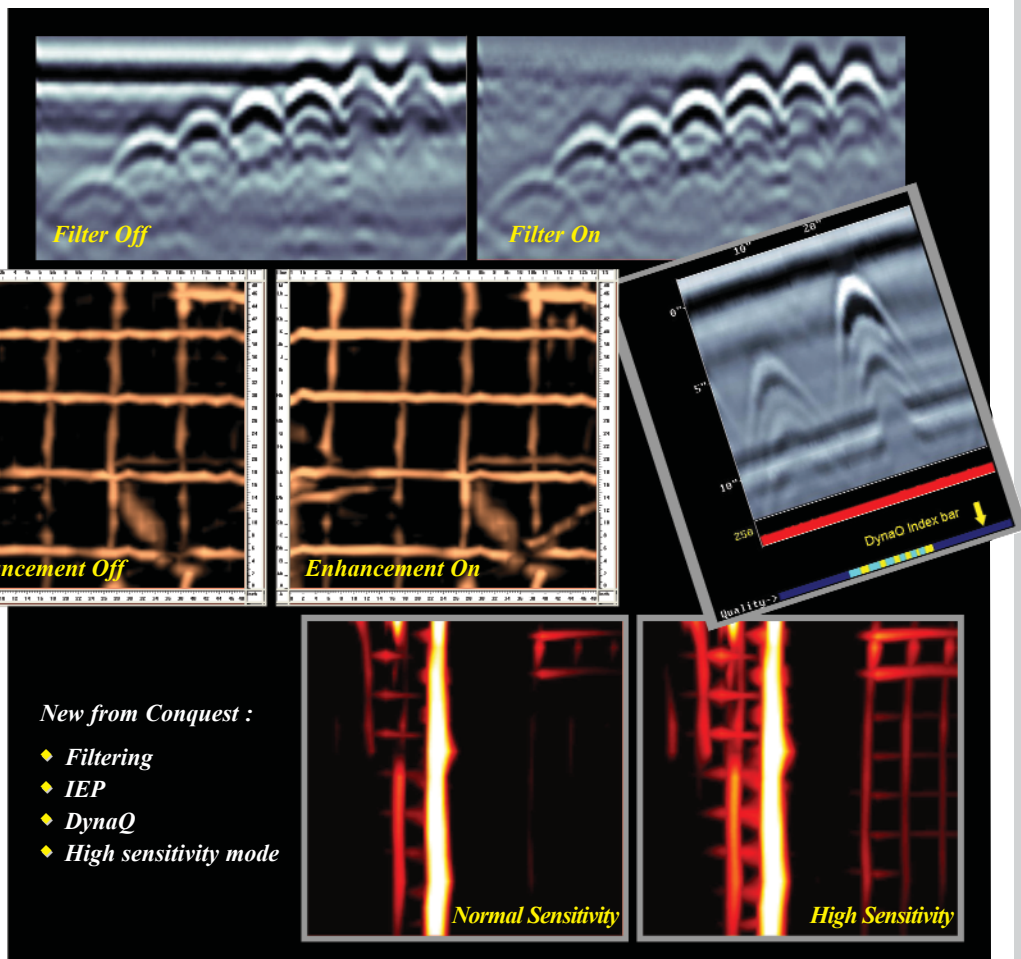
the user is immediately prompted to re-calibrate. This ensures that Conquest always collects the highest quality data for accurate image displays.

♦ High sensitivity mode:

Changing the display to high sensitivity mode enhances weak, subtle targets.

ConquestView, the PC based software that provides extended 3D visualization, has been upgraded to take advantage of the latest Conquest features.

These enhancements are now shipping in all Conquest systems. Existing users should contact our application specialists about upgrading their systems. ■



Ask-the-Expert

Can the GPR results be certified for court cases?

We get this question in various forms such as "Can GPR be used to assign legal liability?" or "Can GPR data be used as evidence in a judicial case?". Answers obviously depend on the jurisdiction but several key factors must be understood.

GPR, like many other measurement techniques such as X-ray, MRI, etc, acquires raw data which are factual, reproducible, and based on solid science. There are caveats, such as the instrument must be in a state of proper



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Recent Technical Papers

1. Creating an Isosurface Image with Voxler using Exported HDF Files from ConquestView 3 / EKKO_Mapper 3, 2008

By: Adam Fazzari

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Upcoming GPR courses

One Day Noggin® Short Course November 3, 2008

Our Noggin® short courses are offered throughout the year to anyone interested in learning more about GPR and subsurface imaging.

One Day Conquest™ Course November 4, 2008

Our Conquest™ courses are offered to anyone interested in learning more about our concrete imaging instrument.

Imaging Concrete with GPR - October 7, 2008 - New York, NY
- November 18, 2008 - Chicago, IL
- December 2, 2008 - Calgary, AB
- December 4, 2008 - Vancouver, BC

Information Request

Please check off information required below and fax or Email back:

- | | |
|---|---|
| <input type="checkbox"/> pulseEKKO® PRO | <input type="checkbox"/> EKKO_View |
| <input type="checkbox"/> Conquest™ | <input type="checkbox"/> Rental Information |
| <input type="checkbox"/> ConquestView | <input type="checkbox"/> 3 Day GPR Short Course |
| <input type="checkbox"/> Noggin® Systems | <input type="checkbox"/> 1 Day Noggin® Short Course |
| <input type="checkbox"/> OEM Noggin ^{plus} | <input type="checkbox"/> Image Concrete with GPR |
| <input type="checkbox"/> EKKO_Mapper | <input type="checkbox"/> Other (please specify) |

See us at ...

NRWA

Reno, NV
October 5 - 8, 2008
www.nrwa.org

Virginia Pipeline Safety Conference

Virginia Beach, VA
October 7 - 9, 2008
http://www.scc.virginia.gov/urs/conf_ps.aspx

WEFTEC 2008

Chicago, IL
October 19 - 22, 2008
www.weftec.org/home.htm

OSP Expo 2008

Baltimore, MD
October 22 - 23, 2008
www.ospmag.com/expo

SEG 2008

Las Vegas, NV
November 9 - 12, 2008
www.seg.org

ASNT

Charleston, SC
November 10 - 14, 2008
www.asnt.org

Ask-the-Expert

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repair, be calibrated and be operated properly.

The instrument must be deployed correctly to examine the problem and ancillary information such as sensor position must be accurately recorded. Standard measurement practice has to be followed. For example, spatial sampling density must be adequate to ensure the desired signal can be accurately reproduced (i.e. not aliased). These factors are controlled

by the person acquiring the data, and hence, can have subjective aspects.

Data must be translated into information for the purpose at hand. This entails compiling and displaying data in a format that enables an experienced person to apply their skills and use accepted practice to draw conclusions. Wherever possible, the conclusions gain substantive credence if corroborated by independent observations (i.e. drill-hole results at selected locations).

"Certifiable results" ultimately rest on the skill, experience and credibility of

the persons involved. In a court of law, the expert witness who has trusted credentials is used to confirm that the results were obtained and treated in a manner that is consistent with the standard practices of the community at the time.

In summary, GPR data are hard and factual but the conclusions drawn are subject to human bias. Training, experience and adherence to best practices are of paramount importance for acceptability in a legal setting. ■



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