# ICEMAP

**REAL-TIME, HIGH-ACCURACY ICE THICKNESS MEASUREMENTS**

# ICEMAP

## IceMap measures ice thickness at driving speeds and saves data to provide a continuous record along the route



## KEY BENEFITS

Monitor and record minimum, maximum and current ice thickness

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Quickly determine areas of thin ice using the threshold line

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Continuosly record GPS position. Thin or problem ice areas can be precisely located

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Plot ice thickness map on Google Earth™

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Simple ice calibration procedure ensures ice thickness accuracy

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Playback and review previously collected data

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View survey path, markers and ice calibrations on Google Earth™ in real-time

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**W**inter ice roads and bridges across frozen lakes and rivers are common transportation links in northern regions of Canada, Alaska, Europe and Russia.

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Safety is the primary concern

when using these roads to haul goods, equipment and people. The conventional method is to core at intervals along the route and measure the ice thickness to estimate the load bearing capacity of the ice. However, ice conditions can change rapidly and coring at large distance intervals results in imprecise information.
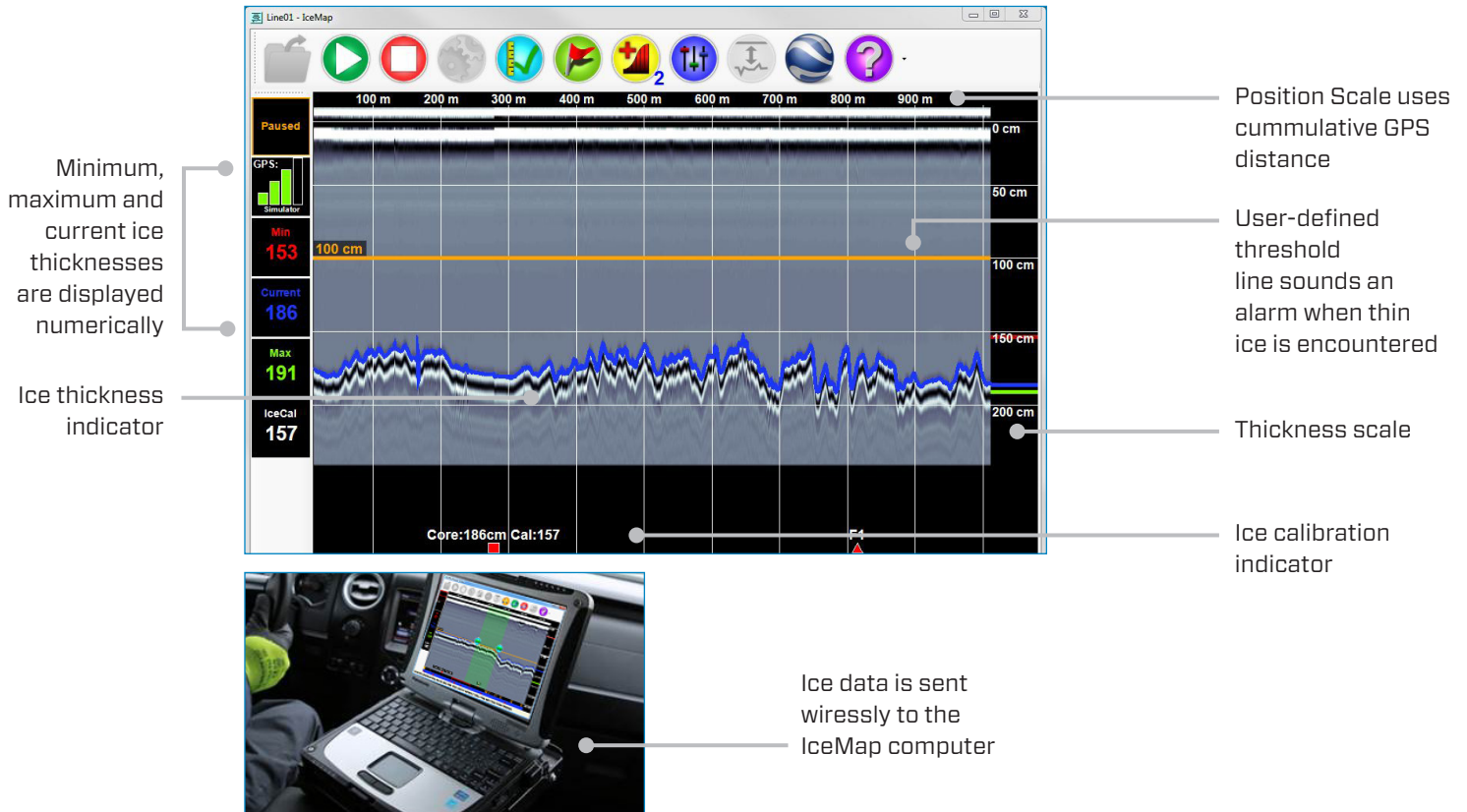
Sensors & Software's IceMap system uses Ground Penetrating Radar (GPR) technology to continuosly measure the ice thickness and ensure the safety of all travelers. The GPR sensor is towed at speeds up to 80 km per hour across the ice surface behind a truck or snowmobile. The ice thickness data is sent wirelessly to the IceMap computer positioned near the operator and displayed as a cross sectional image.
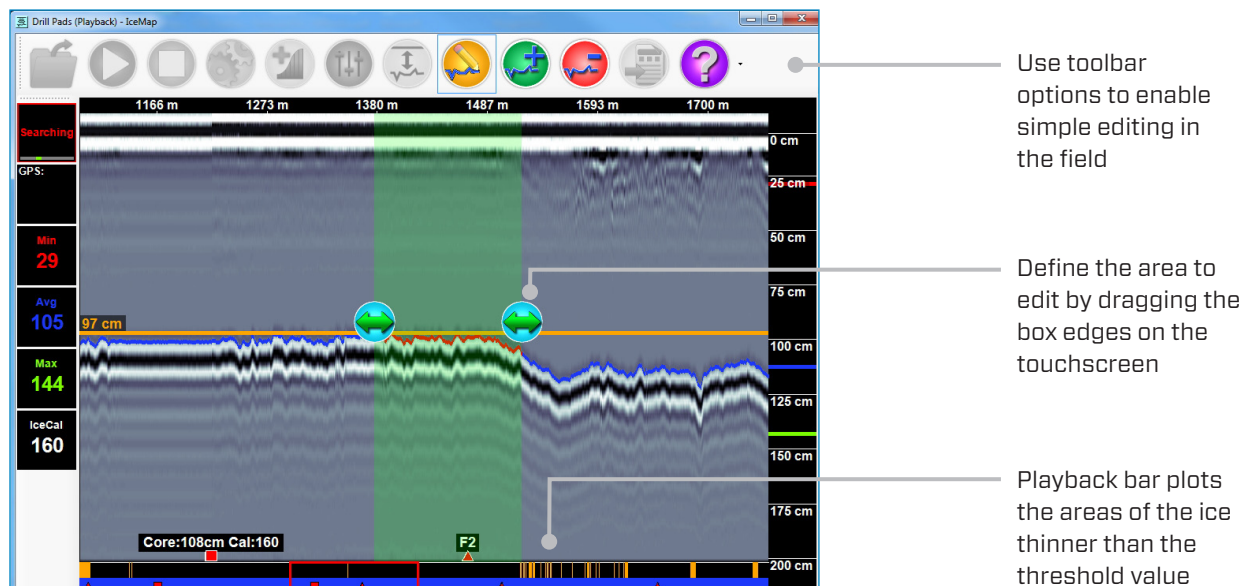
# 1 DATA COLLECTION SOFTWARE

Ice thicknesses are automatically picked and displayed in real time

IceMap data collection software simplifies field operation for ice thickness mapping. The user simply sets the desired vehicle speed, scan depth and step size. All other parameters are automatically optimized for best quality data.



Minimum, maximum and current ice thicknesses are displayed numerically

Ice thickness indicator

Position Scale uses cummulative GPS distance

User-defined threshold line sounds an alarm when thin ice is encountered

Thickness scale

Ice calibration indicator
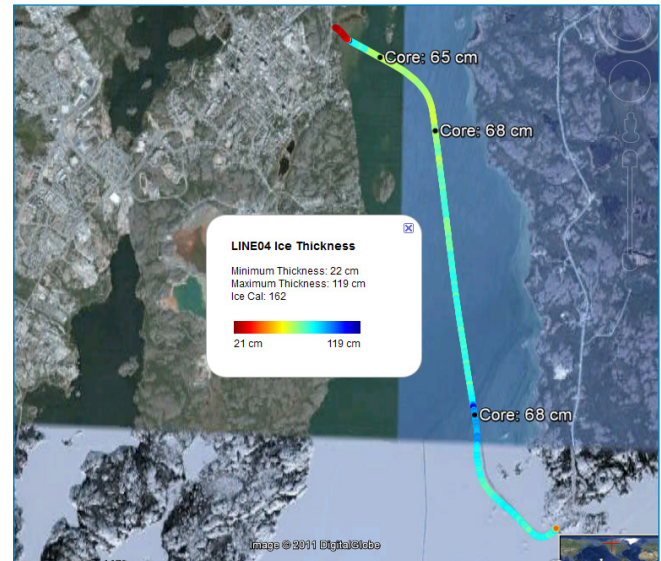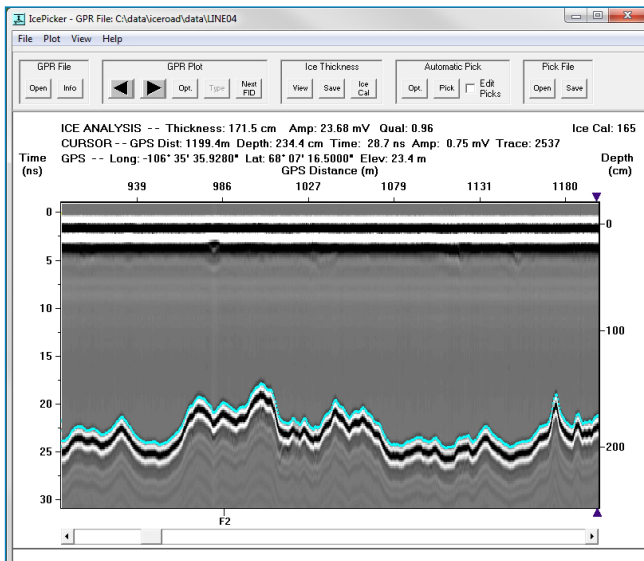


Ice data is sent wiressly to the IceMap computer

# 2 EDITING & REPORTING SOFTWARE

After the IceMap survey is finished, switch to Edit mode and use the IceMap editor to modify the display, fix or delete bad picks, and generate a Summary Report.



Use toolbar options to enable simple editing in the field

Define the area to edit by dragging the box edges on the touchscreen

Playback bar plots the areas of the ice thinner than the threshold value

## **3** DATA ANALYSIS SOFTWARE

### IcePicker





For advanced data processing, the IcePicker software automatically picks the ice bottom reflector and extracts the ice thickness at every point.

Output data in a variety of formats: CSV, GIS and Google Earth™

## **4** REPORTING



Map image of IceMap Survey

Ice thickness plot

Produce tabulated reports to meet regulatory health and safety requirements

Define the survey name, start and end location and include additional comments

List the ice calibrations performed, their location, and the measured thickness of ice

Display ice sections, including the total length and the longest continuous section of thin ice

Plot the areas where picks were manually removed; these areas might indicate grounded ice

Print reports or export them to PDF

**IceMap monitors the ice thickness in real time. The display is mounted beside the driver of the tow vehicle so a view of ice thickness is available at all times.**

**IceMap provides a complete turnkey solution for busy project managers who have to meet ice safety requirements.**

The system includes the Noggin GPR sensor, battery, GPS and wireless communications link components in a rugged, environmentally-sealed field case with a non-metallic tow sled. A Toughbook™ PC mounted in the tow vehicle receives the data from the sensor package over the dedicated wireless communications channel.

The IceMap data collection software features a simple user interface for monitoring ice thickness while surveying. The software allows entry of ice core information to calibrate the system for ice velocity and update all ice thicknesses in the survey. In addition, real-time overlays of the survey path and current position can be placed onto Google Earth™ maps. For post-processing of IceMap data, the IcePicker software is included.

This full-featured solution is ready to go as soon as you are on site. Hook it to your tow vehicle, turn on the power, and you are ready to work.

# Applications






Ice thickness measurements of winter roads and runways over water bodies

Ice thickness measurement on muskeg

Ice/snow thickness measurements for melt water volume estimates

## Product specifications

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|---|---|
| Electronics | Size: 78 × 53 × 38 cm (31 × 21 × 15 in)<br>Weight: 30 kg (65 lbs) |
| Toboggan | Size: 191 × 79 × 30 cm (75 × 31 × 12 in)<br>Weight: without tow hitch: 16 kg (36 lbs)<br>with tow hitch: 310 cm (122 in) long 20 kg (45 lbs) |
| Center Frequency<br>-3 dB Bandwidth | 500 MHz<br>250-750 Mhz |
| Maximum Depth Setting | 10 meters (33 feet) |
| Maximum Tow Speed | 80 kph (50 mph) |
| Operating Modes | Free Run at constant speed, Odometer |
| Power | 8 Watts - 0.7 A @ 12 V |
| Performance Factor | 160 dB + 10 $\log_{10}$N ex: for 2048 stacks are 193 dB |
| DynaQ | Yes |
| Battery | Life: 4 - 6 hrs, Capacity: 9 Ah,<br>Charger Input: 110-240V |
| Acquisition Rate | Up to 100,000 samples per second |
| Operating Temperature | -50ºC to +40ºC |
| Environmental | IP66 |
| Integrated GPS | Continuous NMEA string logging |

IceMap complies with the Industry Canada (IC), United States Federal Communications Commission (FCC), and European Technical Standards Institute (ETSI) Regulations for ultra-wide bandwidth (UWB) devices.

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