SENSORS & SOFTWARE®
from RADIODETECTION

IceMap™

Accurate, real-time ice thickness measurements for mapping and ice management

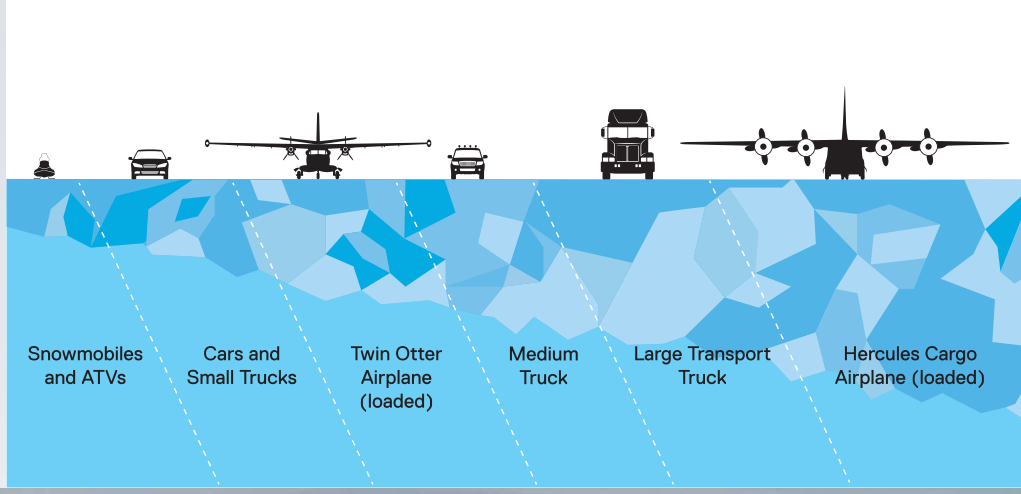
SPX TECHNOLOGIES

IceMap™ measures ice thickness at driving speeds to provide real-time, continuous ice thickness measurements along the route.

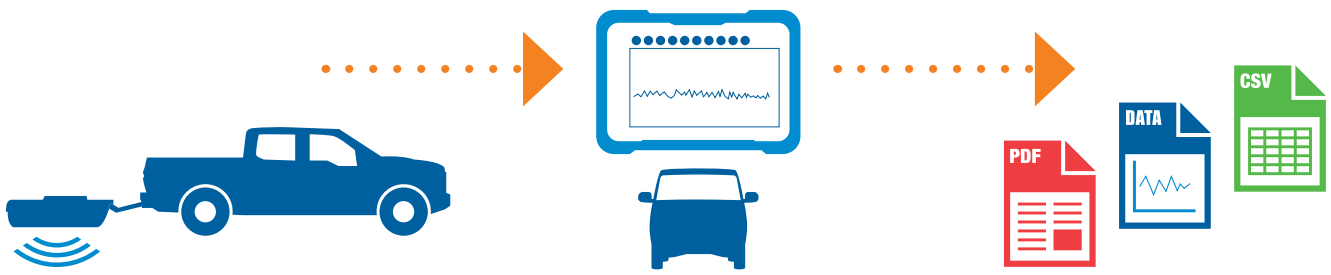
Data is visible in real-time and saved for review, reporting and archiving.

IceMap effectively integrates into safe ice construction and monitoring procedures to enhance ice road safety.

In northern Canada and Alaska, winter ice roads and bridges across frozen lakes and rivers are common transportation links. The thickness of ice is an important measure for calculating the maximum weight capacity of the ice road.



COLLECT, CALIBRATE, AND DOCUMENT ICE THICKNESS AS PART OF ICE ROAD MANAGEMENT SAFETY PRACTICES



IceMap is towed behind vehicle to gather continuous ice measurements, and results are calibrated against ice cores.

Data is sent wirelessly to the in-vehicle IceMap display, allowing the operator to view the ice thickness profile in real time.

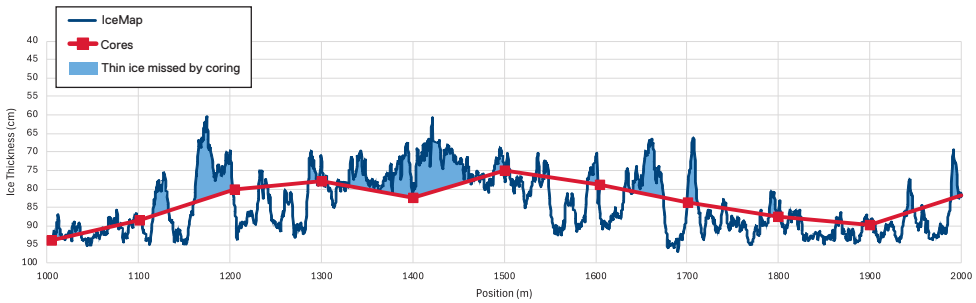
Export PDF reports of ice survey and plot results on Google Earth™. Save data for ice road monitoring and management.

Why use IceMap?

IceMap is a turn-key ground penetrating radar (GPR) system designed to measure and map ice thickness on winter ice roads and identify areas of thin or problematic ice as part of ice safety programs.

The traditional practice of coring ice at large intervals increases the risk that a thin area of ice is undetected, reducing the accuracy of ice road capacity calculations.

CONTINUOUS MEASUREMENTS HELP IDENTIFY AREAS OF THIN ICE



IceMap measures ice thickness at intervals as low as 5 cm/2 in. These high-density measurements help ensure that the thinnest areas of ice have been detected.

Benefits of IceMap

Continuous Measurements
IceMap measures ice thickness continuously, reducing gaps that occur with standard ice coring procedures.

Real-Time Display
IceMap displays the ice thickness profile in real-time and sounds an alarm when the user-defined, thin-ice threshold is crossed.

Simple On-Ice Calibration
Enter ice thickness measurements from ice cores to calibrate IceMap thickness during the survey, improving the accuracy of your results.

Georeferenced Data
IceMap data is georeferenced, allowing problematic areas to be precisely located for further investigation or corrective action (flooding, changing route, etc.).

Standardized Reporting
Produce standard reports from IceMap surveys, allowing easy integration of results into your ice safety protocols. Reports include ice calibration locations, thickness statistics, and survey information.

Visualize Ice Profiles
Plot ice thickness profiles in Google Earth™ with a click of a button, quickly identifying areas to survey further, or generate time lapse views of the ice road thickness to aid in ice management.

Archive
Document & archive ice surveys to meet regulatory protocols and use to gain insights and improvements for ice management processes.

IceMap Software

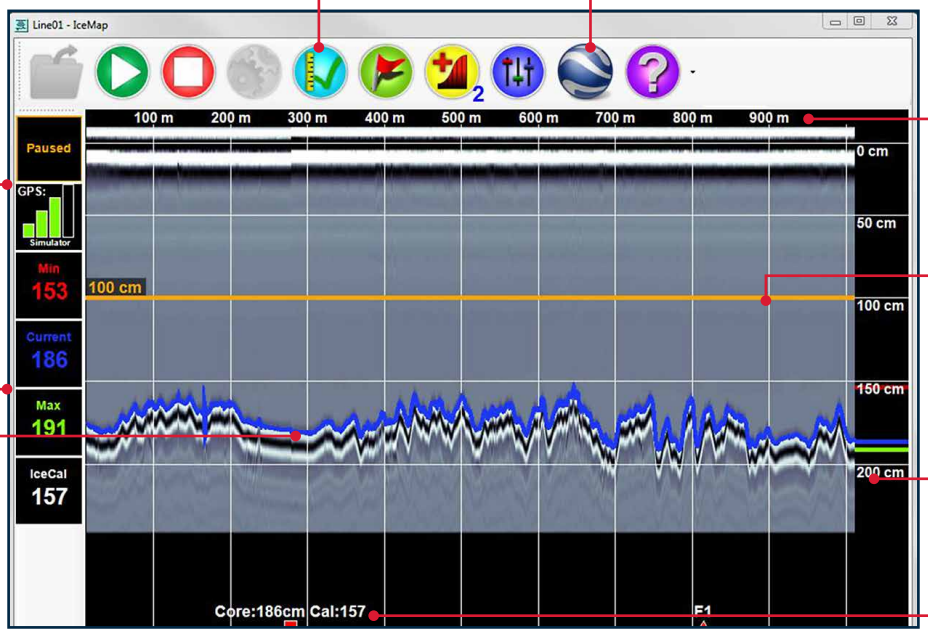
Data Collection

IceMap data collection software simplifies field operation for ice thickness mapping by automatically picking and displaying ice thickness in real time.

The user simply sets the desired vehicle speed, scan depth and distance interval, and all other parameters are automatically optimized for best quality data.

Enter the measured ice core thickness to calibrate the system and update all ice thicknesses in the survey

Open Google Earth™ to display a real-time overlay of the survey path and current position



Minimum, maximum and current ice thickness are displayed numerically

Ice thickness indicator

Position scale uses cumulative GPS distance

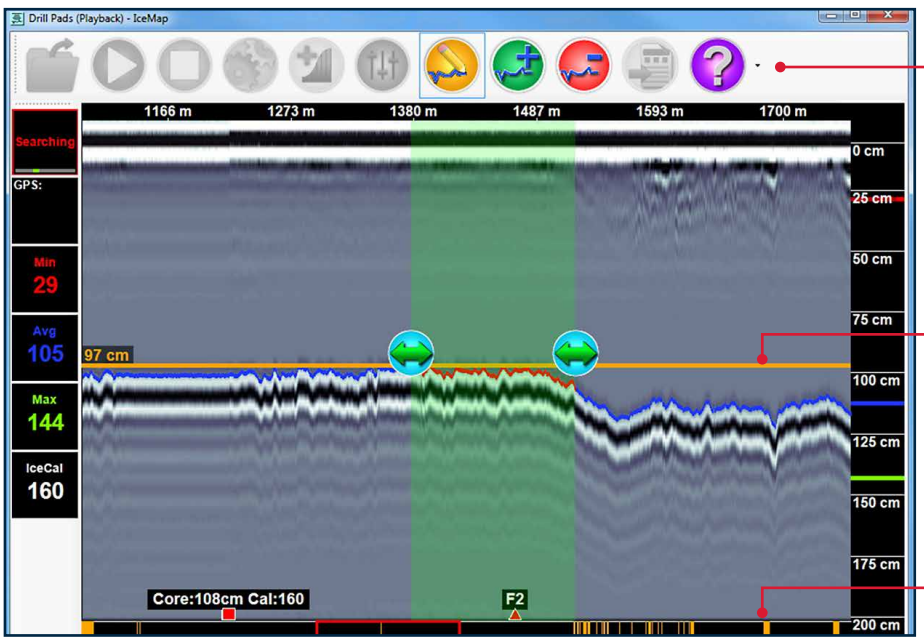
User-defined threshold line sounds an alarm when thin ice is encountered

Thickness scale

Ice calibration indicator shows where cores were taken and used to calibrate ice thickness

Edit Mode

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 summary reports.



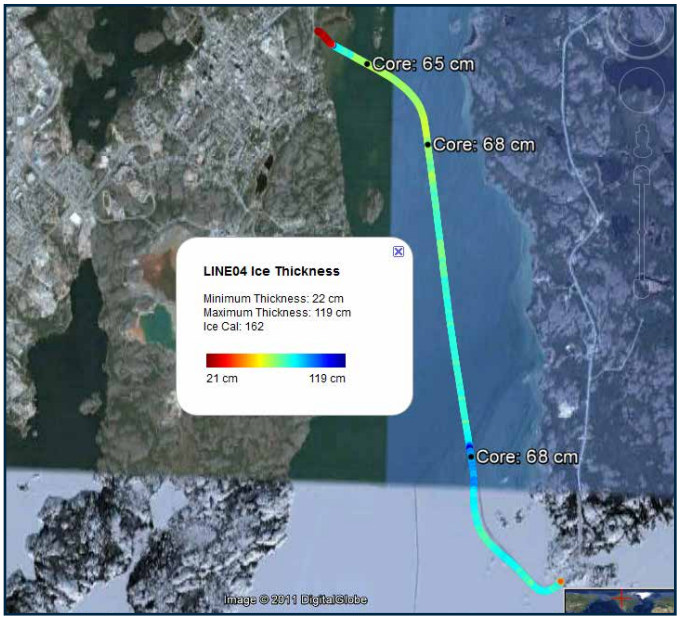
Use toolbar options to enable simple editing in the field

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

Playback bar plots all the areas of ice thinner than the user-defined threshold value

Map

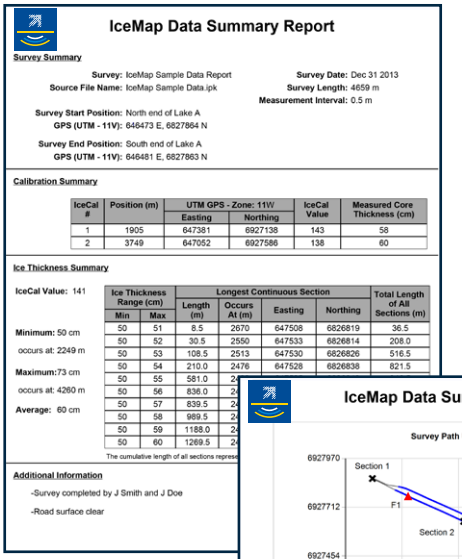
Visualize the complete IceMap survey in Google Earth™, color coded to show ice thickness.



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

Report

Produce tabulated reports to meet regulatory health & safety requirements.


IceMap Data Summary Report

Survey Summary

Survey: IceMap Sample Data Report
Source File Name: IceMap Sample Data.ipk
Survey Date: Dec 31 2013
Survey Length: 4659 m
Measurement Interval: 0.5 m
Survey Start Position: North end of Lake A
GPS (UTM - 11V): 646473 E, 6827864 N
Survey End Position: South end of Lake A
GPS (UTM - 11V): 646481 E, 6827863 N

Calibration Summary

IceCal #	Position (m)	UTM GPS - Zone: 11W Easting	UTM GPS - Zone: 11W Northing	IceCal Value	Measured Core Thickness (cm)
1	1905	647381	6927138	143	58
2	3749	647052	6927586	138	60

Ice Thickness Summary

IceCal Value: 141

Minimum: 50 cm
occurs at: 2249 m
Maximum: 73 cm
occurs at: 4260 m
Average: 60 cm

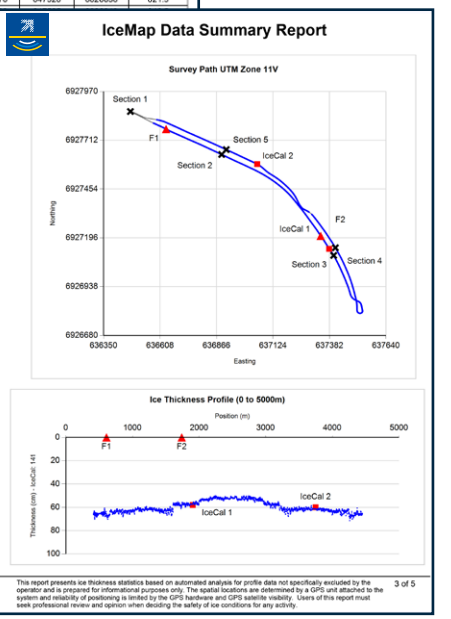
Ice Thickness Range (cm) Min	Ice Thickness Range (cm) Max	Longest Continuous Section Length (m)	Longest Continuous Section Occurs At (m)	Longest Continuous Section Easting	Longest Continuous Section Northing	Total Length of All Sections (m)
50	51	8.5	2670	647508	6826819	36.5
50	52	30.5	2550	647533	6826814	208.0
50	53	108.5	2513	647530	6826826	516.5
50	54	210.0	2476	647528	6826838	821.5
50	55	581.0	24			
50	56	836.0	24			
50	57	839.5	24			
50	58	989.5	24			
50	59	1188.0	24			
50	60	1269.5	24			

The cumulative length of all sections represe

Additional Information

-Survey completed by J Smith and J Doe
-Road surface clear

- Survey Name
- Location
- Total Length
- Measurement Interval
- Comments
- Ice Calibrations
- 10 Thinnest areas (including lengths)


IceMap Data Summary Report

Survey Path UTM Zone 11V

6927970
6927712
6927454
6927196
6926938
6926680
Northing
636350
636608
636866
637124
637382
637640
Easting
Section 1
F1
Section 5
IceCal 2
Section 2
IceCal 1
F2
Section 3
Section 4

Ice Thickness Profile (0 to 5000m)

Position (m)
0
1000
2000
3000
4000
5000
20
40
60
80
100
Thickness (cm) - IceCal: 141
F1
F2
IceCal 2
IceCal 1

This report presents ice thickness statistics based on automated analysis for profile data not specifically excluded by the operator and is prepared for informational purposes only. The spatial locations are determined by a GPS unit attached to the system and reliability of positioning is limited by the GPS hardware and GPS satellite visibility. Users of this report must seek professional review and opinion when deciding the safety of ice conditions for any activity.

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- Map View of Survey
- Ice Calibration Locations
- Ice Thickness Profiles

IceMap Specifications

IceMap Electronics	Size: 78 x 53 x 38 cm (31 x 21 x 15 in) Weight: 30 kg (65 lbs.)
IceMap Toboggan	Toboggan only: 191 x 79 x 30 cm (75 x 31 x 12 in), 16 kg (36 lbs.) With tow hitch: 310 x 79 x 30 cm (95 x 31 x 12 in), 20 kg (45 lbs.)
GPR Center Frequency	500 MHz
Maximum Depth Setting	10 meters (33 feet)
Maximum Towing Speed	80 kph (50 mph)
Operating Modes	Free Run at constant speed, Odometer
Battery	Capacity: 18 Ah, Life: 6 hrs. Charger input: 110-240V
Lowest Ambient Operating Temperature – electronics	-40°C (-40°F)
Environmental	IP66
Integrated GNSS	Continuous NMEA string logging
Ultra Wide Bandwidth (UWB) Compliance	Industry Canada FCC – USA

The IceMap system includes:

- IceMap electronics consisting of the Noggin GPR sensor, battery, GPS, and wireless communications link in a rugged, environmentally-sealed field case
- Non-metallic tow sled
- TOUGHBOOK™ PC (for in-vehicle control & display)
- IceMap software for data acquisition, editing and reporting

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SPX TECHNOLOGIES

Our Mission

Provide best in class equipment and solutions, to prevent damage to critical infrastructure, manage assets and protect lives.

Our Vision

To be the world's leader in the management of critical infrastructure and utilities.

Our Locations

USA

Raymond, ME
Kearneysville, WV

Canada

Mississauga, ON

Europe

United Kingdom **HQ**
France
Germany
The Netherlands

Asia Pacific

India
China
Hong Kong
Indonesia
Australia

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