



# FT Wind Sensor: Winter Testing



Five months at the TechnoCentre Éolien, Quebec



# Introduction

FT Technologies' ultrasonic acoustic resonance wind sensors are well known for their toughness and reliability and are used all over the world. They are particularly popular for wind turbine control but are also used in defence, marine, research and general meteorology applications.

Key to our success is the reliability of our products. Our customers demand high levels of performance and data availability in a sensor which does not require regular maintenance or calibration.

The small size of the sensor and its powerful heaters results in great anti-icing performance. Our customers often tell us how well the sensor performs in ice and snow. In the winter of 2013 we decided to put that to the test and get confirmation of our customers' reports from some real performance data in an independent measurement campaign.

## TechnoCentre Éolien Test Centre

We selected the TechnoCentre Éolien in Gaspé, Quebec as our independent test partner. They have a good location, excellent infrastructure and specialist knowledge. Operating as a not-for-profit organisation, the TechnoCentre helps companies to test and adapt technology to the hostile northern climate.

The test site near Rivière-au-Renard, Quebec is coastal; considered complex with mountainous topography and complies with GL Technical Note 067 for Cold Climate definition. This states: "If minimum temperatures of below  $-20^{\circ}\text{C}$  have been observed during long term measurements on an average of more than nine days a year, the site is defined as a cold climate site".<sup>1</sup>

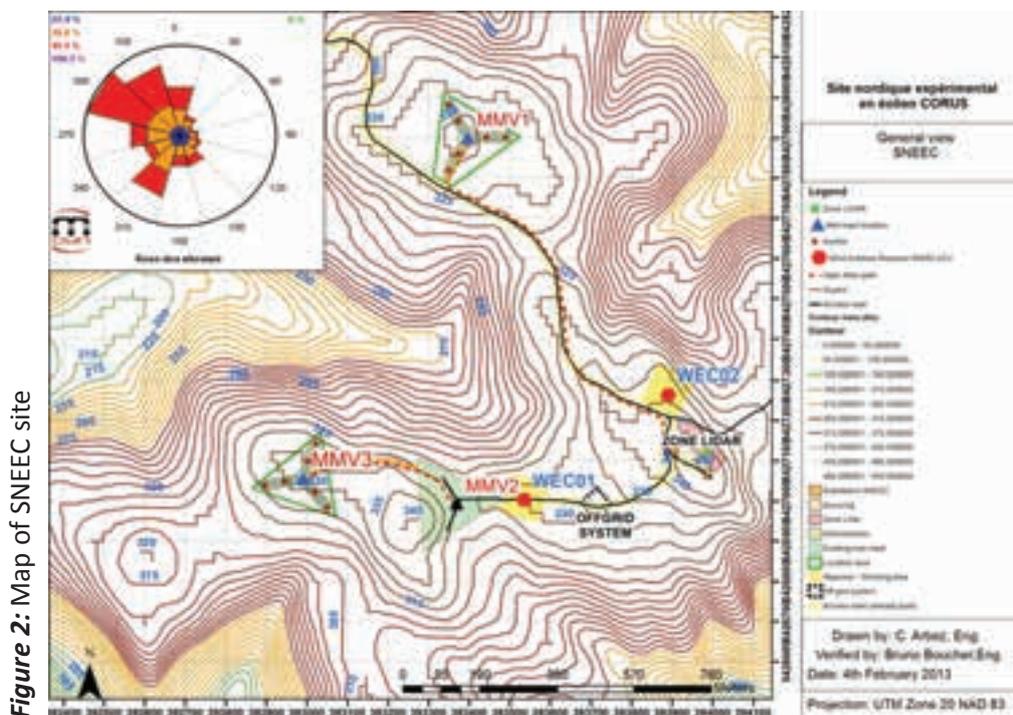


Figure 2: Map of SNEEC site

# The Test

The site features a 126m (416ft) meteorology mast equipped with various types of sensors for weather-related measurements. Two heated FT702LT wind sensors were installed on the mast shown in Figure 2 as MMV2; one at 84m (277ft) and the other at 122m (402ft) above ground level (AGL). The sensor outputs and power consumption were monitored continuously throughout the campaign from January 5th until May 24th 2013.

Performance comparisons were provided by unheated and heated mechanical cup anemometers in addition to a conventional “time-of-flight” ultrasonic wind sensor.

Over the test period there were nine significant heavy icing events reported at the meteorology mast: Figure 3 shows a summary of conditions at the site.

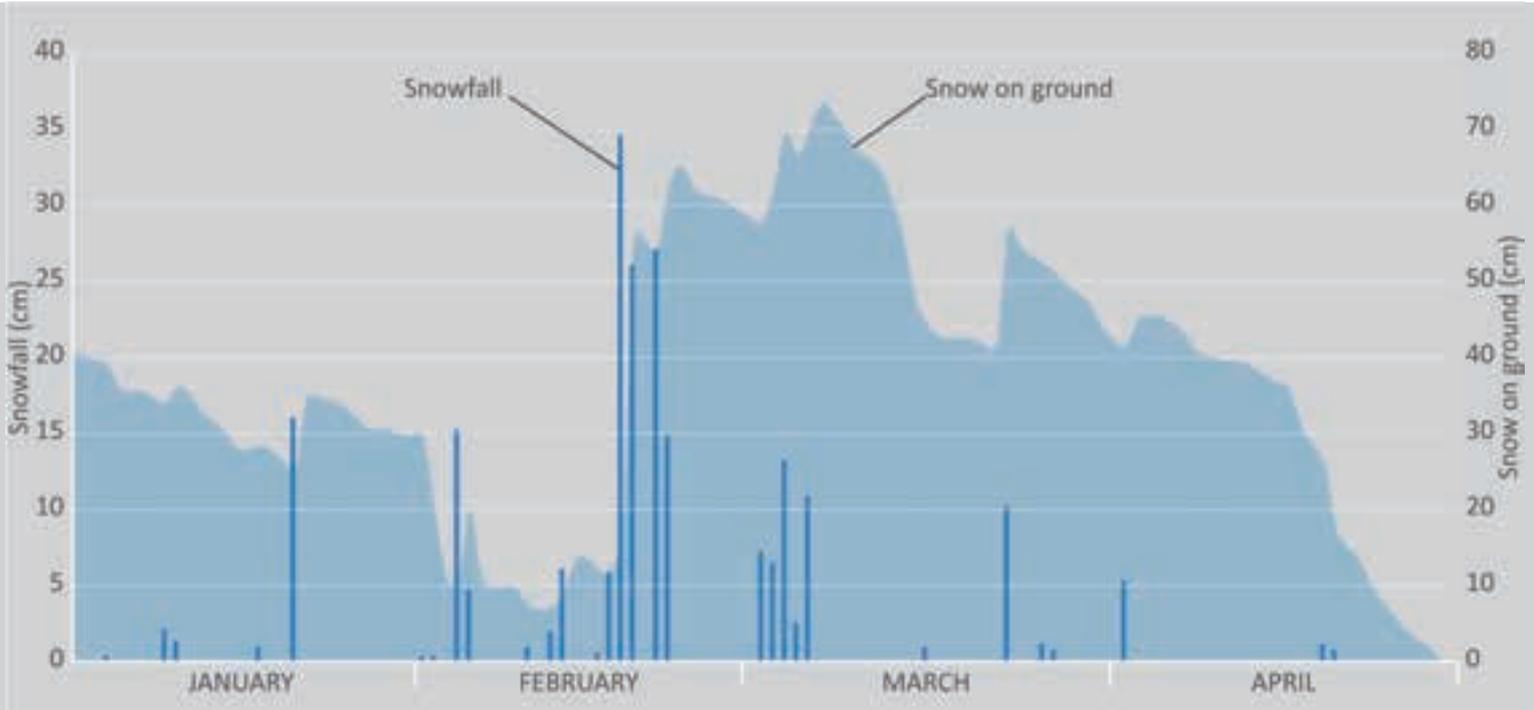
Characteristics	Description
Lowest temperature at the 80m a.g.l.	-26.2 C (-15.16F)
Average wind speed at 122m a.g.l.	8.8 m/s
Maximum wind speed at 122m a.g.l.	30.3 m/s
Number of days below -20 C (-4F)	10.2 days

**Figure 3:** Summary of winter conditions 2012-2013

Figure 4 shows the actual max and min temperatures recorded at 84m above ground level at the TechnoCentre Éolien site and Figure 5 shows the amount of daily snowfall at the nearby Gaspé airport, which is close to sea level.



**Figure 4:** Daily temperatures at the TechnoCentre site

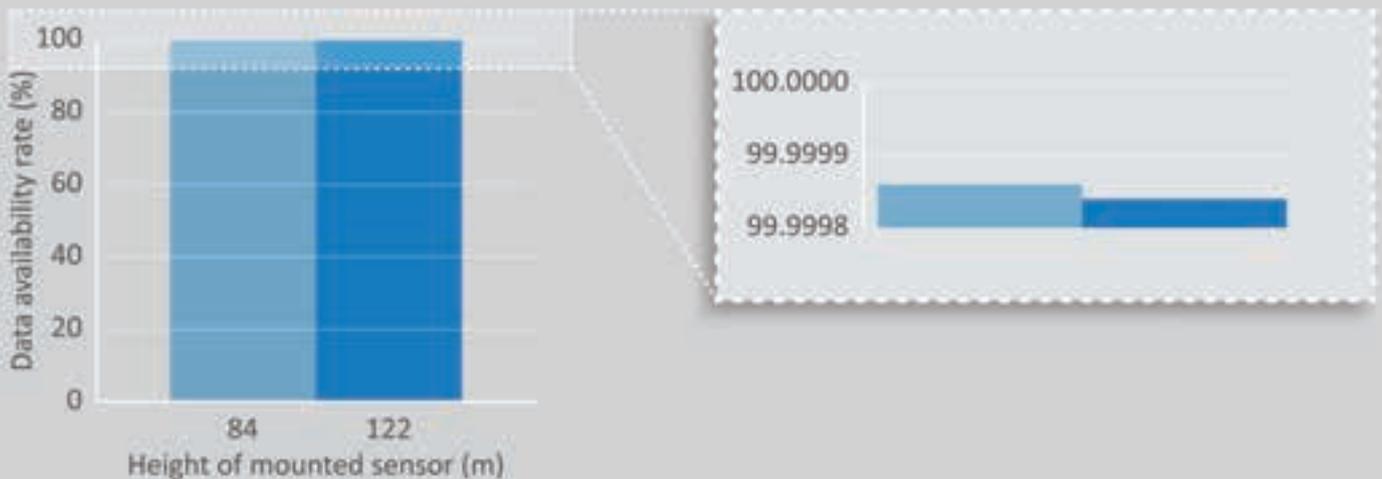


**Figure 5:** The daily snowfall total at Gaspé Airport

## The Results

The FT sensors remained ice-free during the tests. The heated and unheated cup anemometers experienced icing rates of 3.4% and 13.8% respectively and the competitor ultrasonic wind sensor was destroyed by an ice impact after 30 days in operation.

The TechnoCentre Éolien reported that both FT Technologies FT702LT sensors achieved >99.9998% data availability.<sup>2</sup>



**Figure 6:** Data availability rate of each FT wind sensor



These results exceeded even our expectations and shows why the FT702LT wind sensor is being adopted by more and more turbine OEM's for cold weather operations.

Tested to 28 international, environmental standards and UL/CSA 61010 certified, each sensor is rigorously checked and calibrated before despatch to customers. To learn how FT Technologies can help keep your turbine operating in icing climates, please contact us. Copies of the TechnoCentre Éolien report will be made available upon request.

1. GL, Technical Note 067 Certification of Wind Turbines for Extreme Temperatures (here: Cold Climate), Scope of Assessment, Rev 4, Edition 2011
2. Arbez C, Data Availability Memo For Winter 2013, TEC-2013-018



Dimensions in mm

Please Contact:

**FT Americas LLC**

Gordon Bease  
Director - North American Operations  
Office: 512-329-2622  
Mobile: 337-254-6336  
Email: gordon.bease@fttech.co.uk

**FT Technologies Ltd**

Fred Squire  
Director of Business Development  
Tel: +44 (0)20 8943 0801  
Email: fred.squire@fttech.co.uk

Church Lane  
Teddington  
TW11 8PA  
England

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