WTU-508 in extreme working conditions

INTRODUCTION

Being home to a significant portion of Russia’s oil reserves the high latitude Siberian Taiga is an active region for seismic exploration and a very challenging one.

Soft ground conditions in the summer mean that exploration activity is generally restricted to the winter months forcing crews to deal with deep snow and very low temperatures. In addition, increasing environmental restrictions call for limited line cutting and make vehicle access much more difficult.

In February 2018 BNG carried out a commercial survey with the Sercel 508XT system, and including WTU-508 units.

THE CHALLENGE

Acquiring seismic data successfully requires equipment that can operate reliably at low temperatures with good battery autonomy. Client specifications are demanding with two consecutive dead traces resulting in the rejection of a record. Real-time QC monitoring of the spread is therefore essential.

TECHNICAL CHALLENGES
- Battery autonomy at low ambient temperatures
- GPS lock when the units are buried in snow
- Real-time QC monitoring when the units are buried in snow

OPERATIONAL CHALLENGES
- Ease of deployment where access is restricted
- Efficient seismic data retrieval
- Environmentally friendly operation – Green Seismic

THE SERCEL SOLUTION

The proprietary XT-Pathfinder radio network employed by WTUs forms a self-organizing, dynamic, multi-hop communications network. This permits each WTU-508 to transmit status and alerts to a central monitoring station. In addition, the broadband wireless connectivity offered by the WTU-508 allows seismic data to be rapidly harvested from the WTU-508 from distances up to 800m, allowing data to be secured & safe-guarded even in areas difficult to access.

The goal was to evaluate the wireless unit’s performance in Siberian winter conditions and to assess the benefits that wireless acquisition with real-time QC could bring to the crew.
**REMOTE SEISMIC DATA HARVESTING**

In order to test the remote seismic data harvesting capability, a Data Harvester was transported inside a vehicle along the line of WTUs at the maximum permitted speed of 20km/hr. At this speed, the Data Harvester was able to communicate with WTUs up to 200m ahead, and harvested all of the seismic data recorded in the preceding day’s production from all of the deployed WTUs.

**OPERATION BURIED IN SNOW**

In a test to demonstrate operation in deep snow, a WTU was buried at a depth of 40cm in snow that was deliberately compacted, and left to run for several days. During this time the GPS lock status and the XT-Pathfinder connection status were monitored and both were found to perform faultlessly. This confirms that the WTU GPS reception and the XT-Pathfinder transmission are sufficiently robust as to be not affected by snow cover.

A section of the test line passed through a heavily forested area. The WTUs deployed there also experienced no issues at all with GPS or XT-Pathfinder during operations.

**BATTERY AUTONOMY**

The ambient temperature and remaining capacity of the WTU-508’s internal battery was recorded during the 24 hour operations in order to demonstrate its performance at low temperature.

The results plotted in the graph below show that temperatures during the test ranged between about -20 deg C to -35 deg C. In the worst case the WTU’s battery had only discharged by 33% after 10 days (240hrs). Extrapolating we can therefore expect a battery autonomy of between 30 and 38 days even under conditions of extreme cold.

**REMARKABLE RESULTS**

We were very satisfied by the results of the tests on this product. It successfully fulfilled its specification in harsh Siberian conditions, and its monitoring feature and self-positioning through the XT-Pathfinder showed that real benefits can be expected during operations.

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