ID: Type: **Poster**

Evaluation of the New Equipment Solution for Improvement of Single Component Elements of PS09, Yellowknife Array in Canada

The IMS primary seismic network consists of 50 monitoring facilities where several certified stations are facing equipment obsolescence issues. The search for engineering solutions to replace obsolete hardware components is guided by two primary goals: 1) be compliant with IMS minimum technical requirements and 2) be able to be integrated with the existing system.

In context of technical specifications for seismic stations it was earlier stressed that verification seismology is concerned with searching for reliable methods of signal detections at high frequencies. Special attention was taken in redesign of short period vertical components of PS09, Yellowknife teleseismic array in Canada.

Array elements at PS09 comprise S13 seismometers designed by Geotech USA, connected to 24-bit CMGDM24EAM digitizer through the low-noise preamplifier both designed by Guralp Systems Ltd., UK.

The Sandia National Laboratories (SNL), USA have played a key role in the system integration testing of this system, assuring the PTS and Station Operator received a high-quality solution for the array.

The equipment was evaluated at SNL for performance characteristics of bit-weight accuracy, self-noise level, clip point, dynamic range, cross-talk, and harmonic distortion. The capability of full frequency calibration of the seismometer using white noise and sinusoidal signals as stimulus was confirmed.

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Track Classification: Theme 3: Advances in Sensors, Networks and Processing