

# Fiber Sensor Based Transportable Active Seismic Survey System Solution to On-Site Inspection

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Active seismic survey, together with aftershock seismic survey, magnetic and gravitational field mapping and electrical conductivity measurements (Protocol to the CTBT, Part II), are geophysical detection technology which can contribute jointly to the search logic for the detection of on-site inspection (OSI) anomalies or artifacts underground. This work presents a system solution to active seismic survey based on optical fiber geophone arrays, which meets with the technical requirements of OSI ACT. The system consists of 800 channels (up to 1000 channels) that include three component seismic geophone working in the frequency band 1-500 Hz (up to 1000Hz). The vehicle engine driven power system can support several days of operations and storage capacity can support several days of measurement. Deep learning for denoising based on Fast and Flexible Convolutional Neural Network (FFCNN) has been applied to weak signal recognition. A user friendly 2-D/3-D human-machine interactive data interpretation software platform has been developed for data visualization and analysis. This system is adaptable to any seismic sources, such as explosives, vibroseis, weight drop and sledgehammers. This system has been tested and verified in field and can be suitable for future OSI Integrated Field Exercise.

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## Promotional text

In this work, deep learning for denoising based on Fast and Flexible Convolutional Neural Network (FFCNN) has been applied to weak signal recognition. A user friendly 2-D/3-D interactive data interpretation software platform has been developed for data visualization and analysis.

## Oral preference format

in-person

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