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frequency-wavenumber analysis in the Geophysical Monitoring System

Sandia National Laboratories is developing the Geophysical Monitoring System (GMS) for modernization of the United States National Data Centre waveform processing system, now focused on development of interactive analysis capabilities (IAN). The United States provides open source releases of GMS software to support International Data Centre (IDC) Re-engineering. The latest GMS release includes a new advanced frequency-wavenumber computation capability and user interface that enhances analyst efficiency and accuracy for measurement of azimuth and slowness of a signal detection. The analyst can view thumbnail images to make a quick decision about which detections need review. GMS computes multiple frequency-wavenumber spectra over a time interval near the detection, allowing the analyst to quickly see how the signal evolves. To help assess the quality of the signal detection and best arrival time, the IAN display shows an frequency-wavenumber beam segment computed with the current azimuth/slowness measurement, as well as traces of the maximum frequency-wavenumber spectrum power, azimuth and slowness over time. For best performance in the IAN environment, all computations are performed locally in the user interface, using C/C++ code compiled to web assembly. This presentation describes the GMS frequency-wavenumber software and user interfaces.

E-mail

kaaur@sandia.gov

In-person or online preference

Primary author: AUR, Katherine (Sandia National Laboratories (SNL))

Co-author: Mr HARRIS, James Mark (Sandia National Laboratories (SNL))

Presenter: AUR, Katherine (Sandia National Laboratories (SNL))

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