ASC

InSite™

Commercial software for seismic processing, analysis and interpretation

ACQUISITION

Real-time data acquisition and processing with customisable triggering parameter settings.
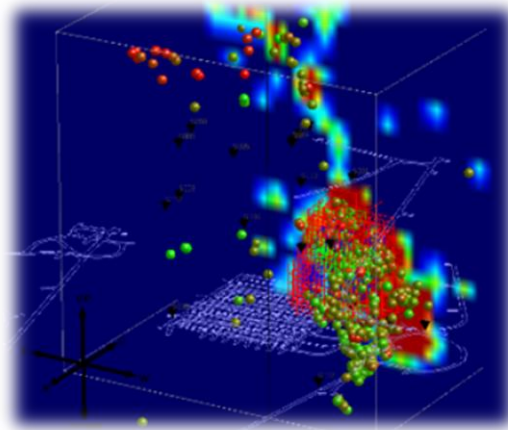
PROCESSING

Manual and automated waveform processing with efficient workflows. Complex velocity models and sophisticated algorithms for seismic event location.

INTERPRETATION

Enhanced interpretation of microseismic clouds. Characterise stimulated fracture network geometry and the microseismic geomechanical response to an injection.

UNDERSTANDING

Interpretation tools for post-analysis of completion objectives and stimulation effectiveness.


- Natural and induced seismicity, geological storage integrity and safety, acoustic emission. monitoring, tunneling, engineering and other applications.

- Image, investigate and understand.

- Optimise workflows.

- Quality control of processing results.

InSite™ is an integrated data acquisition, management, processing, visualisation and interpretation software suite developed for seismological studies. InSite™ provides a solution for all seismology applications, ranging in scale from acoustic emissions in the laboratory, to microseismics around geological repositories, mines and hydrocarbon reservoirs, up to local and regional-scale earthquakes.

Manage your data using InSite's comprehensive range of supported data formats, for the import and export of raw and processed event data. Locate events using simple and complex velocity models. Perform manual and automated waveform processing. Visualise seismic events, field objects, geological structures and analysis objects.

InSite™ is developed in a version-controlled environment within a quality management system. It has been available as a commercial product for two decades and has been used by both academic and commercial clients worldwide, for the processing, advanced analysis and interpretation of seismic data.
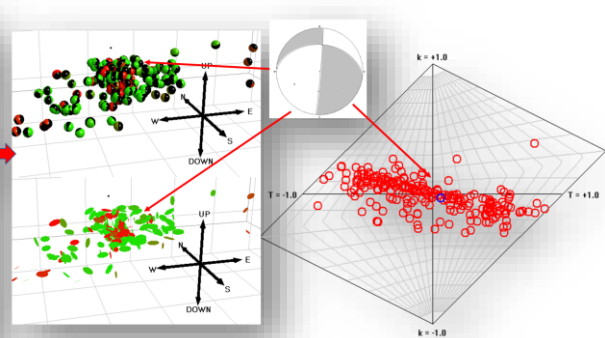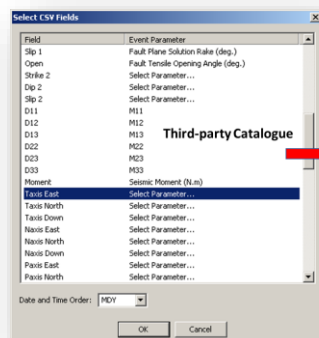
InSite Modules and Functionality

- **Data Management**:
  - Import data from a range of common formats including SEGY, SEG2, SEGD, SEISAN, SEED, Mini-SEED, GCF, SAC, MIRF, DTA and other client-proprietary formats;
  - Classify events as noise, shots, events or flexible user-defined types. Group events in folders, copy, delete, or move between folders;
  - Filter events (enabling or disabling automatically) by location, time or a range of source parameters;
  - Export waveforms processing parameters for quick setup of similar projects;
  - Export of processing results as customizable ASCII seismic catalogues and individual waveform information;
  - Export of waveforms in SEGY, ASCII, SEG2 and Mini-SEED formats.

- **Leach**: Event detection and triggering tool:
  - Real-time or offline event detection and triggering from data streams, including amplitude threshold, STA/LTA comparison, user-defined trigger points (external file) and a "matched filter" technique to look for small events based on a template;
  - Automatic processing and data sorting;
  - Customisable e-mail alerts based on event rate, magnitude, PPV, or PPA thresholds.

- **Waveform Processing and Visualisation**:
  - Manual or automatic arrival-picking, with customisable picking functions;
  - Automatically optimise picking parameters using template events;
  - Rotation of waveforms from triaxial or quadriaxial instruments into ray coordinate systems and display of particle motions on hodogram plots;
  - Automatic batch processing of events;
  - Customisable waveform visualisation: per instrument, channel, raw, rotated;
  - Customisable waveform filter: combine two filters, bandstop, bandpass, high-pass, low-pass, user-defined;
  - FFT of entire waveforms and customizable windows around picks;
  - Calculation of source parameters including: seismic moment, moment magnitude, location magnitude, instrument magnitude, source radius, apparent stress drop, radiated energy and S:P ratio. Option to use spectral fitting.

- **Advanced Waveform Processing options**:
  - Optimised moveout-based picking;
  - AIC and spectral picking;
  - Display of colour-density sonograms and polarisograms.

- **Event Location**:
  - Locate events using P- and/or S-wave arrival times and source vectors;
  - Inversion algorithms: Collapsing grid-search only;
  - Velocity models: homogeneous isotropic.

- **Advanced Location options**:
  - Option to locate events not relying on phase picking using migration algorithms;
  - Inversion algorithms: Collapsing grid-search, Simplex, Geiger, Source Scan;
  - Velocity models: homogeneous, layered and voxelated 3D velocity model, with options for isotropic, VTI, transversely isotropic and fully anisotropic media depending on the inversion algorithm;
  - Time dependent velocity models;
  - Option for parallel processing to maximise the use of available CPU processing power.
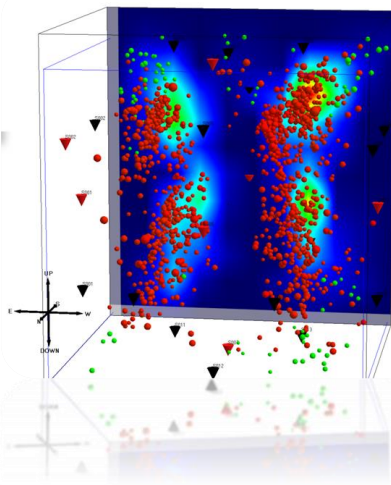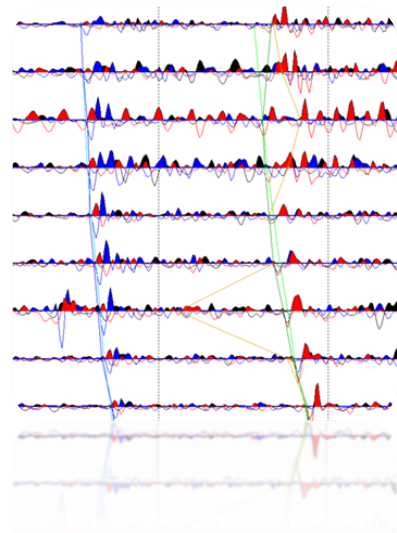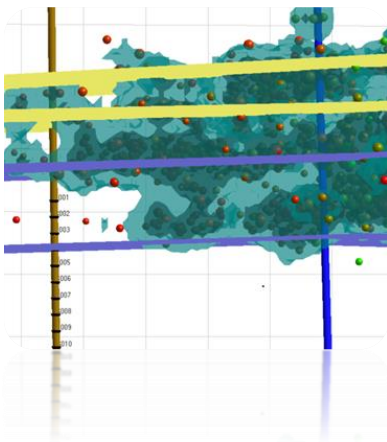
- **Source Mechanism:** Source mechanism inversion and visualisation of fault plane solutions.
  - Moment tensor inversion from P-wave amplitudes or rotated P, SH and SV amplitudes;
  - Fault plane solution inversion;
  - Display of Focal Sphere and T-k plots.
- **3D Visualiser**: Display of the event locations in a 3D scene, allowing rotating, panning, magnifying and flying through the scene.
  - Insertion of drawing objects from library or user-created files in dxf and stl formats
  - Display of density planes
  - Insertion of bmp images in the scene
  - Display events colour and size- scaled or as source mechanism beach-balls
  - Replay events in customizable time-lapse display
  - Calculation and display of stimulated volumes
- **InSite Database**: Storage and management of event parameters and waveforms on a shared remote PC for easy access by multiple users managed with Microsoft's SQL server.
- **Parameter Visualiser**: Analysis and interpretation tools including customisable charting of event parameters (e.g. b-values, magnitudes),
- **Fracture Statistic Tools**: display of preferential orientation described by events through statistical analysis of spatial distribution, uncertainty volumes, and cluster analysis.
- **Array Design**: Design and analysis of array performance through the calculation of misfit, magnitude sensitivity, error space, Monte Carlo simulation of location performance and creation and propagation of synthetic waveforms.
- **Frac Manager**: graphical interface to guide users through the project setup, data acquisition and processing flow of a microseismic hydraulic fracturing project.
  - Import well tracks, sonic logs, formation tops and well objects
  - Tool orientation using multiple calibration shots
  - Automatic velocity model calibration from sonic logs fitting multiple calibration shots
  - MS DFN calculation with optimised search in the azimuth and dip space
  - Customisable automatic noise detection tool
  - Option for combining events acquired on multiple independent arrays
  - QC of microseismic monitoring jobs
- **Stream Visualiser**: display of full streaming files as amplitude time series or frequency space sonograms
- **Survey Processing**:
  - Velocity analysis for 'active' data for velocity and amplitude information including waveform cross-correlation algorithm for repeated surveys.
  - Option for real-time update of velocity model
- **AE Dashboard**: integrated visualisation of survey results, event locations and statistics for real-time control of AE monitoring experiments
- **Stream Dashboard**: Real- time control and visualisation of data acquisition from ASC's AE monitoring systems
- **Auto Processing**: Automatic batch processing of a range of calculations and waveform functions, including auto-picking, event location, cross-correlation, mechanisms and waveform export.
- **Error analysis**: Customisable visual display of event location uncertainty.

InSite Products

Modules and functionality	InSite-HF	InSite-Lab	InSite-Geo	InSite-Edu	InSite-Lite
Data management	●	●	●	●	●
Leach	●	●	●		
Waveform Processing & Visualisation	●	●	●	●	●
Advanced Waveform Processing	●	●	●		
Event Location	●	●	●	●	●
Advanced Location	●	●	●	Collapsing grid-search & layered anisotropic velocity models ONLY	
Source Mechanism	●	●	●	●	
3D Visualiser	●	●	●	●	●
InSite Database	●				
Parameter Visualiser	●	●	●		
Fracture Statistics Tools	●				
Array Design	●				
Frac Manager	●				
Stream Visualiser		●			
Survey Processing		●			
AE Dashboard		●			
Stream Dashboard		●			
Auto Processing	●	●	●	Auto-picking, Event location, cross-correlation ONLY	
Error Analysis	●				
Licence Type	Commercial Academic	Commercial Academic	Commercial Academic	Academic only	Commercial Academic