**SurfSeis**

**Surface Wave Processing Software**

for use with Microsoft® Windows™

**SurfSeis** software has developed as a product of our research at the Kansas Geological Survey (KGS). It was written to process both active and passive seismic data to obtain shear-wave velocity (Vs) models, using the multichannel analysis of surface waves (MASW) method, which was also originally conceived and developed at the KGS.

Surface waves have historically been the bane of near-surface reflection seismologists. With the development of MASW has come a global explosion in research and use of the MASW method for application to engineering, groundwater, and environmental problems. Our fourth generation (**SurfSeis** 4.0 / 4.2) provides industry-leading features and capabilities.

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**SurfSeis** Capabilities

**Active and Passive MASW**

**Dispersion Curve Imaging**
- Phase-shift method
- Advanced
- HLRT

**Inversion** of the surface waves for Vs
- Fundamental mode
- Higher modes

**2-D Vs Imaging**

**Research Tools**
- Modeling
  - Dispersion-curve estimations from layer models (check if Vp matters)
  - Comparison of calculated dispersion-curve values to dispersion-curve images
- Monte-Carlo Inversion
  - Maximum energy models

**Seismic Data General Processing**
- Bandpass filter
- Fk filter
- Mute
- AGC
- Trace-by-trace frequency spectra

**Seismic Data Utilities**
- Data conversion
  - SEG2 to KGS
  - SEGY to KGS
  - KGS to SEGY
- Geometry Assignment
- Extract/Resample records/traces
  - Roll-along from a fixed spread
- Assemble walkaway records into one
- Seismic data display (b/w & color)

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**Dispersion-curve estimations are phase velocity plotted against frequency**

**Inversion of dispersion curve yields a 1-D vertical profile**

**Using a continuous acquisition style, a series of 1-D vertical profiles can be gathered and interpolated**

**SurfSeis** uses active or passive seismic data recorded with vertical geophones
**SurfSeis© 4**

<table>
<thead>
<tr>
<th>Enhanced passive data dispersion-curve imaging</th>
<th>Friendly MASW a-priori information input</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Enhanced" /> vs <img src="image2" alt="Conventional" /></td>
<td><img src="image3" alt="Vp" /> &amp; <img src="image4" alt="Poisson’s Ratio" /></td>
</tr>
</tbody>
</table>

**High-resolution Linear Radon Transform (HLRT)**

![Conventional](image5) vs ![HRLRT](image6)

New to *SurfSeis© 4*

- Enhanced passive MASW data dispersion-curve imaging in the presence of passive multi-source environments such as road traffic and trains.
- Inversion using friendly 1-D and 2-D *a priori* information input.
- HLRT better (sharper) dispersion-curve imaging and mode separation (and interpretation) (optional in v4.2), can be useful with multi-mode inversion (available since v3.0).
- Ongoing-inversion 2-D Vs monitoring and 2-D imaging of final derivable from *a priori* information and Vs results (such as Vp or Poisson’s ratio).
- New menus and friendly dialogs complementing existing interface; smoother operation; faster code.
- Improved compatibility with other KGS seismic software (i.e., WinSeis, SeisUtil, seismodeler).


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**SurfSeis© 4.0 / SurfSeis© 4.2**

Contact us for pricing and visit our webpage for more information (email and web address below). Upgrade pricing available with current serial number.

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**SurfSeis 5 (coming soon)**

- varying Topography,
- passive-data HRLRT,
- Love-wave inversion,
- Scholte-wave inversion, and more

scheduled release — March 1, 2016

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