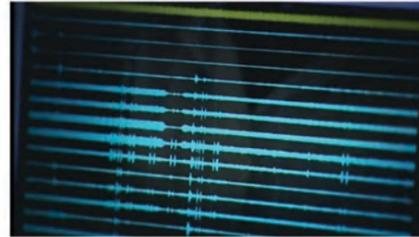


## Surface Panels & Ancillary Tools



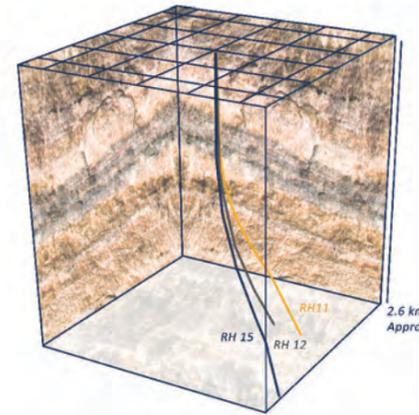
All ASL downhole tools are fully compatible with our standalone surface power and recording panels, and all are operated by our in house built ACQ software suite. In addition ASL offers source synchronizers for multiple offset sources, and a wide range of surface test and service ancillaries such as a Downhole Sparker Source, Gamma Logging tools, Tractor tools, Sinker Bars, Inter-tool connectors, as well as various Cross-over Tools.

## ACQ Acquisition Software



ACQ provides powerful data quality control tools including flexible trace display, comparative spectral analysis, particle motion hodogram, trace plotting and time/depth profile display. The software suite is required for operation of all ASL tools which require a GSP recording panel, and so can also display traces recorded on GSP surface analogue channels.

## Avalon Borehole Test Facility



Avalon Sciences has acquired the ABB Offshore System borehole facility at Rosemanowes Quarry, Penryn, in Cornwall, UK. The acquisition of the 20 acre quarry allows testing of borehole equipment within a controlled environment. This provides ASL with an improved method of testing products in real site conditions, and allows problems that may arise in the real world to be addressed. Facilities and wells on the site are available for hire along with field crew. The facility can also be used as part of our ATC field engineer training course.

## Avalon Sciences Ltd

Avalon Sciences Ltd (ASL) designs and manufactures advanced borehole seismic equipment for Vertical Seismic Profiling (VSP), permanent/passive seismic monitoring, well/reservoir characterisation and hydraulic fracture event detection.

ASL has been at the cutting edge of borehole seismic technology innovation, design and manufacturing for nearly 30 years. A household name in VSP and downhole microseismic equipment, ASL is dedicated to providing the best bespoke solution to meet the client needs whilst providing the greatest possible customer service and support both remotely and on-site.

[www.avalonsciences.com](http://www.avalonsciences.com)

Avalon House, Somerton Business Park, Somerton, Somerset, United Kingdom TA11 6SB  
sales@avalonsciences.com TEL +44 (0) 1458270000



SLIM

## X-SERIES

THE LATEST EVOLUTION TO THE  
GEOCHAIN SLIM<sup>(TM)</sup> BOREHOLE SEISMIC SYSTEM

## LEADERS IN BOREHOLE SEISMIC TECHNOLOGY

### GeochainSlim™ X-Series Slim Seismic System



GeochainSlim™ is established as the complete VSP digital seismic system, operating up to 62 satellites for maximum logging and recording efficiency. The system is made up of individual satellites from our tried and tested GSR-1 borehole geophone. The GeochainSlim™ is the next development of the field proven Geochain™ system.

The established extra high sensitivity Geochain™ Quad geophone sensor pack has been integrated into the compact GSR design and is now available as a standard configuration.

All Geochain/Slim/EHP™ arrays have been designed for use in open or cased holes with fast arm locking times to reduce survey time. A maximum bandwidth of 1600Hz, very low electronic noise levels and new gapless recording functionality\* make the system ideal for VSP, Microseismic and Hydraulic Fracturing Surveys.



Slim Quad Sensor

#### Main Features

- Up to 62 satellites
- Real time data transmission
- 3 Component quad sensor pack
- Unique active cooling system for continuous operation at 385°F (195°C)
- Up to 200m (>600') between satellites

	Geochain	Geochain EHP	Geochain Slim
Max No Receivers	62 @ 1ms Sample / 16 @ 0.25ms Sample		
Length	35" / 884mm		
Diameter	3" / 76.2mm	3.25" / 82.55mm	1 11/16" / 46.87mm
Dynamic Range	>112dB @ 0dB pre-gain		
A/D Converter	24 bit Delta-sigma		
Distortion	<0.02%		
DC Offset	Self-Calibration		
Max Temp	400°F (204°C) Analogue or 356°F (180°C)		
Max Pressure	25,000 psi / 1750 bar	35,000 psi / 2100 bar	20,000 psi / 1400 bar
Wireline	7 Conductor Heptacable		
Surface Panel	GPP/GMP & GSP-1 (Digital)		
GSP Min Requirements	LRX-2b, USB-2b USB PC Interface		

#### X-Series 2016+ Geochain Electronics

- Increased robustness for higher temperature digital operation
  - Integrated High Side Indicator for tool orientation
  - Gapless Recording Functionality for improved microseismic application\*
  - Doubles number of tools 16@250us sample rate\*
- \*requires DFU and X-TAS

### GeochainSlim™ X-Series AS251 Module



The X-series digitizer upgrade for the Geochain system, provides higher operating temperatures and higher telemetry rates, allowing continuous monitoring in the most hostile well conditions.

This is the compact slim development of the industry acclaimed AS272 low noise high gain digital module, which now introduces upgraded active cooling technology and thermal insulation components for increased robustness in addition to facilitating new operational functionality of your Geochain string.

Compatible with all Geochain Slim Tools.

The new X-Series digitizer electronics have been recently implemented with a 3C solid state inclinometer system called a High Side Indicator (HSI), which measures the direction of the pull of gravity and calculates the angles of roll and vertical inclination in each shuttle of the Geochain™ toolstring.

The integrated system denotes tool inclination from vertical (DEV Angle 0-90°) and clockwise roll looking downhole (Relative Bearing RB angle +/-180°).

Roll and inclination angles are determined from an accelerometer subsystem measuring the direction of the pull of gravity.

If combined with a well deviation listing giving well azimuth trajectory (HAZI 0-360°), full 3-C processing can be achieved for all 3 components delivering a Vertical Up and Horizontal North/West field orientated dataset.

### High Side Indicator



#### HSI for Tool QC

- The high side indicator can be monitored in real time during well deployment to allow field engineer to QC tool vector fidelity and receiver-receiver roll move out.
- Measures tool roll and inclination for every tool for full 3-C geophone orientation
- Real time monitor read out and manual capture utility
- Automatic addition of HSI data to MIRF header for each individual record



GSR-1

Light and compact design allows for speedy well deployment and rig out.

### X-System Configuration

