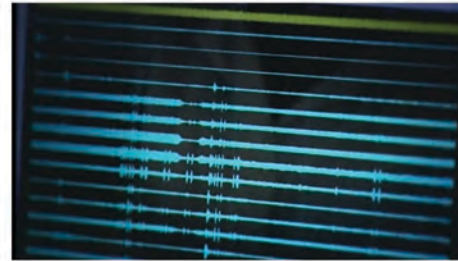


## Surface Panels & Ancillary Tools



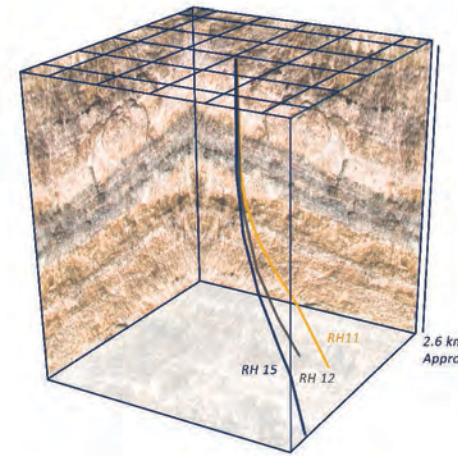
All ASL downhole tools are fully compatible with our standalone surface power and recording panels, and all are operated by our in house built ACQ software suite. In addition ASL offers source synchronizers for multiple offset sources, and a wide range of surface test and service ancillaries such as Gamma Logging tools, Tractor tools, Sinkers 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

# MULTI LEVEL HIGH TEMPERATURE BOREHOLE SEISMIC SYSTEMS





## LEADERS IN BOREHOLE SEISMIC TECHNOLOGY

### Geochain™ Multi-Level System



Geochain™ is established as the complete VSP digital seismic system, operating up to 62 satellites for maximum logging and recording efficiency and is the result of over five years of research and development. The system is made up of individual satellites from our tried and tested ASR1 borehole geophone of which thousands are now in use worldwide. The ASR 1 tools can be configured with a variety of sensor packs (fixed and gimballed) in order to provide the optimum solution in a multitude of different survey conditions.

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.

Quick and easy conversion from Analogue to Digital operation

#### 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

#### 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 @ 250us sample rate\*

\*requires DFU

### Geochain™ Slim



The GeochainSlim™ is the next development of the field proven Geochain™ system. The established extra high sensitivity integrated into the GSR design and is now available as a standard configuration.

Geochain™ Quad geophone sensor pack has been



#### Main Features

- Up to 62 Satellites
- Slim 1 11/16" (43mm) Outside Diameter
- 3 Component quad sensor pack
- Active cooling system for continuous operation at 385°F (195°C)
- Up to 200m (>600') between satellites
- High side indicator to determine tool orientation

- Ideal for both VSP and Microseismic surveys



### Geochain™ EHP Multi-Level System

	Geochain	Geochain EHP	Geochain Slim
Max No Receivers	62 Satellites		
Length	35" / 884mm		44" / 1135mm
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 385°F (195°C) Digital		
Max Pressure	25,000 psi / 1750 bar	30,000 psi / 2100 bar	20,000 psi / 1400 bar
Wireline	7 Conductor Heptacable		
Surface Panel	GPP or GMP & GSP-1 (Digital) DCP-2 & GSP-1 (Analogue)		
Sensor	OMNI directional 15 Hz, 2400 Ω		

Geochain™ Extra High Pressure (EHP) is one of the latest evolutionary branches of the established Geochain™ VSP digital seismic system, operating with up to 62 satellites within the most hostile of high pressure environments.

The Geochain™ EHP system is fully compatible with all standard Geochain™ electronics and sensor modules in addition to all standard surface control panels.

#### Main Features

- 30,000psi (2100 bar) pressure rating
- Up to 200m (>600') between 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)
- Quick and easy conversion from analogue to digital operation
- Gapless recording for passive monitoring surveys\*



### Advanced Sparker Tool

The Advanced Sparker Tool (AST) has been developed to provide a high energy repeatable downhole seismic source. The primary use of the AST would be with seismic sensors deployed in an adjacent well or wells to provide cross well imaging or sensor orientation of fracture monitoring instrumentation. When the AST is deployed with the Geochain™ system it will be possible to provide single well imaging.

#### Main Features

- 1000J Energy Output per shot
- Bandwidth 10-4000 Hz
- 150°C (356°F) and 10,000 psi rated
- 3" Diameter
- 25 second recharge rate

With a low power requirement of 100W and high energy output of 1000J the AST is a versatile downhole seismic source which can be deployed in various configurations.

