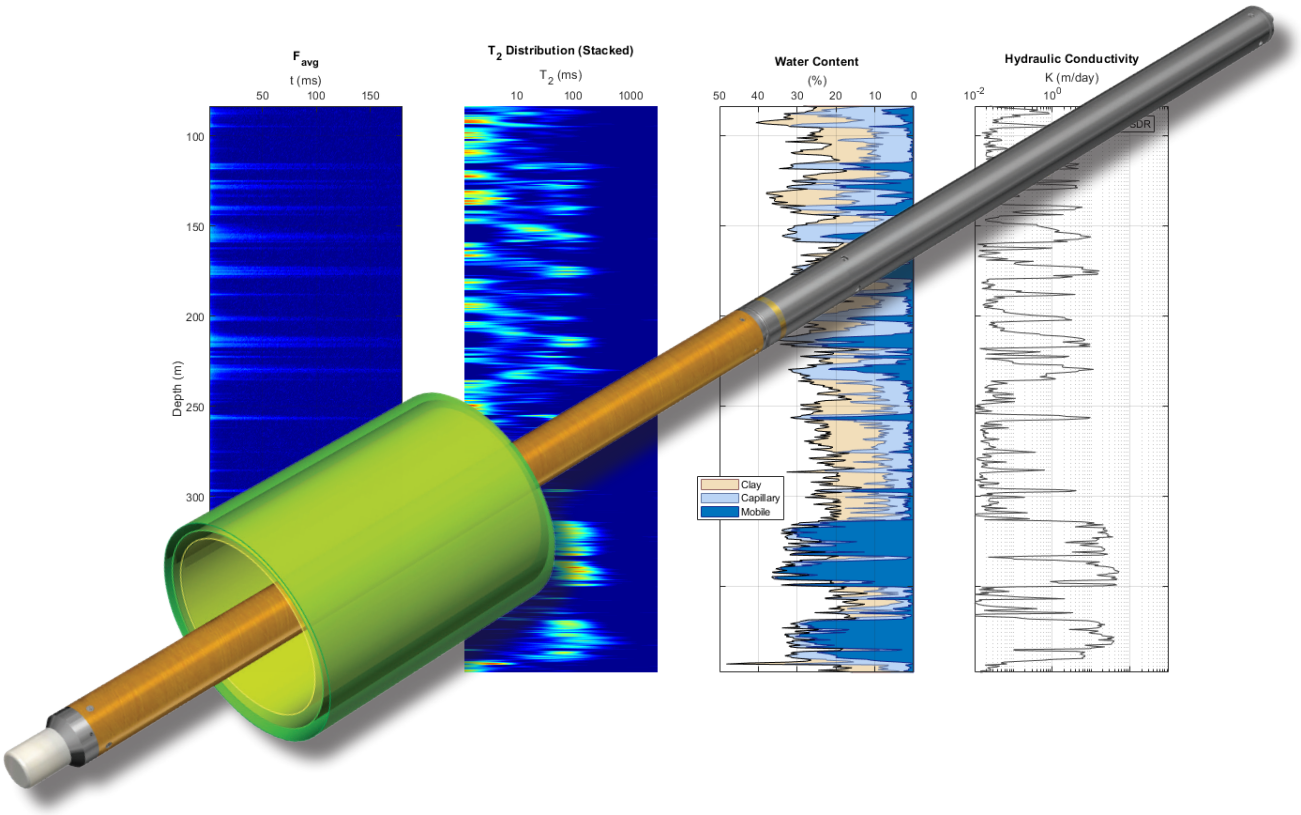
JAVELIN®

MAGNETIC RESONANCE WIRELINE LOGGING TOOLS

FOR SALES, RENTALS, AND GEOPHYSICAL SERVICES



HIGH-RESOLUTION IN-SITU CHARACTERIZATION OF HYDROGEOLOGIC PROPERTIES

BOUND AND MOBILE WATER CONTENT
PORE SIZE DISTRIBUTION & POROSITY
HYDRAULIC CONDUCTIVITY
TRANSMISSIVITY

VISTACLARA INC.
NMR GEOPHYSICS

MEASURE GROUNDWATER DIRECTLY

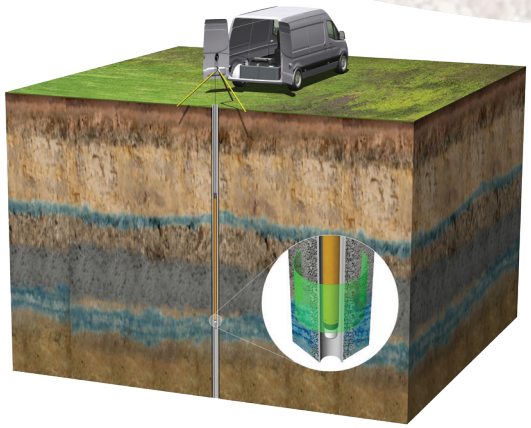
HIGH RESOLUTION SITE CHARACTERIZATION • ENVIRONMENTAL REMEDIATION • GROUNDWATER RESOURCES • GEOTECHNICAL ENGINEERING • MINING

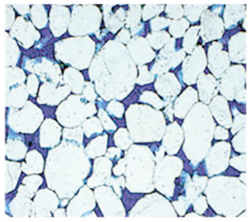
JAVELIN® The Magic of MRI Adapted for Groundwater

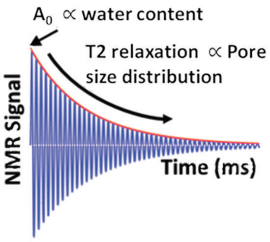
Designed specifically for groundwater investigations, Javelin® borehole Magnetic Resonance (MR) logging tools provide the highest resolution characterization of aquifer properties possible. Capable of collecting data down to 1600m (5200ft), Javelin's powerful permanent magnets polarize hydrogen nuclei of water molecules. Simultaneous multifrequency operation speeds up logging time while ensuring the sensitive zone is outside the zone disturbed by drilling.

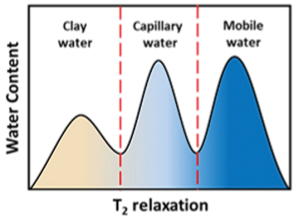
Measure Hydrogeologic Properties Directly

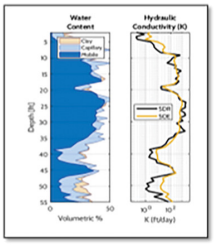
Javelin provides high-resolution measurement of volumetric fluid content in the native formation. It is directly sensitive to the pore size distribution, bound vs mobile fluid in porous space, and provides quantitative estimates of porosity and hydraulic conductivity.









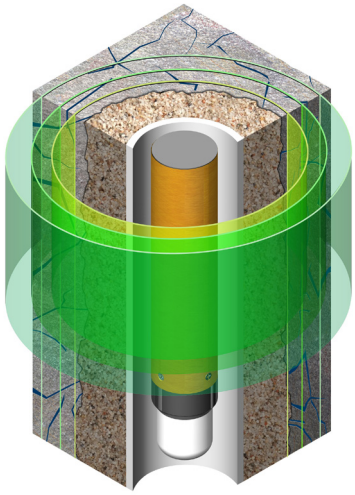


The Magnetic Resonance Advantage

Javelin incorporates a Magnetic Resonance (MR)-based technology that uses the same physics as medical MRI. This technology provides inherently non-destructive detection of water, using static and alternating magnetic fields to polarize and excite hydrogens in the native formation fluids out past the annular space. The initial amplitude of the MR signal observed after this perturbation is linearly proportional to the volumetric fluid content, or porosity if the formation is saturated.
MR relaxation times are strongly correlated with the size of the pore space and are used to distinguish between water bound in small pores from more mobile water in large pores and fractures.

The Confidence of Multiple Measurement Shells

All Javelin borehole logging tools incorporate multi-frequency operation. This enhanced versatility enables it to see radially outward in multiple measurement shells during a single log. This multi-frequency capability, combined with Javelin's unique ability to operate below the commercial AM broadcast band, provides greatly increased immunity against electromagnetic interference and faster logging speeds than single-frequency-based MR tools.

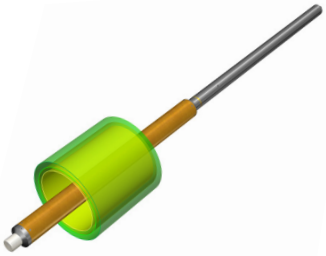


US Patents #8,816,684; 10,162,026; 8,736,264; 10,113,982; 9,348,054; 9,588,068; 10,302,733
Javelin® is a registered trademark of Vista Clara Inc.

JAVELIN® Magnetic Resonance Wireline Logging Tools

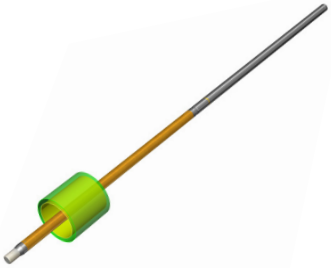
Boasting a wide range of tool diameters, the Javelin® product family fits most any well or borehole size. Interchangeable lower probe sections enable flexible operations and reduce capital equipment costs.

JAVELIN® BOREHOLE LOGGING TOOLS



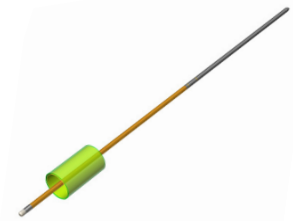
Max

Ideal for medium to large size borings up to 460mm (18 inches) in diameter, Javelin Max includes three frequency operation for the fastest logging speed and highest SNR possible. The Max is an exceptional tool for well design, aquifer storage & recovery, and brine mining. An integrated Gamma sensor is optional.



Slim

Popular for small and medium-diameter boreholes from 75mm to 300mm (3 to 12 inches) diameter, the Javelin Slim system is routinely used in mining, geotechnical, and groundwater explorations. The Slim system incorporates two-frequency operation with optional Gamma sensor.



Micro

The world's smallest diameter wireline MR logging tool. It is perfect for logging within existing 50mm (2 inch) PVC-cased monitoring wells, which are very common in environmental remediation and groundwater monitoring wells.

Javelin Surface Station

The Javelin surface station operates all Javelin tools. It provides tool power, control, telemetry, and interfaces to depth encoder and tension sensors.

Javelin Software Performs

While in the field, see everything you need for your log with Javelin's full-featured professional data acquisition and analysis software. Focus on your project outcomes while the software performs real-time data processing, quality control, and interpretation of hydrogeological properties. Control all aspects of data analysis from acquisition to visualization, to final reporting. Results can be exported in standard formats including LAS and LAS-2.

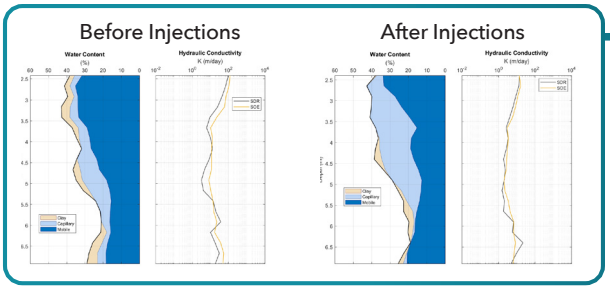
JAVELIN® APPLICATIONS

Javelin's Magnetic Resonance-based tools yield the highest resolution continuous measurement of aquifer properties possible. This results in superior project outcomes and lowered overall project costs across a number of important earth science applications.

High Resolution Site Characterization (HRSC) for Environmental Remediation

Measure the most important hydrogeologic properties governing contaminant storage and transport.

- Volumetric water content, bound and mobile porosity, hydraulic conductivity and transmissivity
- Accurate high-resolution conceptual site models
- Identify contaminant location and their mobility
- Inform remediation planning



Environmental Monitoring

Improve project outcomes while lowering costs as Javelin provides reliable and accurate monitoring of remediation processes within existing PVC wells with no new drilling.

- Monitoring bio-geochemical processes
- Soil moisture monitoring
- Permafrost examination

Groundwater Resources

Identify the most productive zones for screening and groundwater production while accurately estimating pumping yields to lower costs and improve project outcomes.

- Characterize seasonal changes in water table and soil moisture
- Deep water investigations up to 1600m (5200 ft)
- Characterize aquifer properties directly
- Aquifer recharge projects

Mining

Make informed decisions regarding resource estimation, extraction strategies, and production optimization, leading to more efficient and sustainable mining operations.

- Brine mining (e.g., Lithium) operations management
- In-situ measurement of ore moisture content
- Heap leaching - mineral recovery
- Mine tailings investigations
- Mine water management

Geotechnical and Construction

Improve foundation designs by characterizing high-resolution formation properties along construction sites enabling superior outcomes while lowering projects costs.

- Characterize soil structural properties for terrestrial and offshore constructions
- Earthen dam and levee investigations
- Soil and sediment characterization
- Liquefaction management

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