Xaminer® Sonic Imager Service

CROSSED-DIPOLE SONIC TOOL WITH FOUR MONOPOLES DELIVERS HIGH-RESOLUTION ELASTIC PROPERTIES FOR IMPROVED SEISMIC PROCESSING AND GEOMECHANICS

The Halliburton Xaminer® Sonic Imager (XSI™) service is a step change in acoustic formation evaluation. It provides operators with high-fidelity data and advanced processing capabilities to more accurately characterize seismic properties, geomechanics, and completion needs in a wide range of reservoirs, from poorly consolidated high-porosity gas-saturated sandstones to low-porosity carbonates.

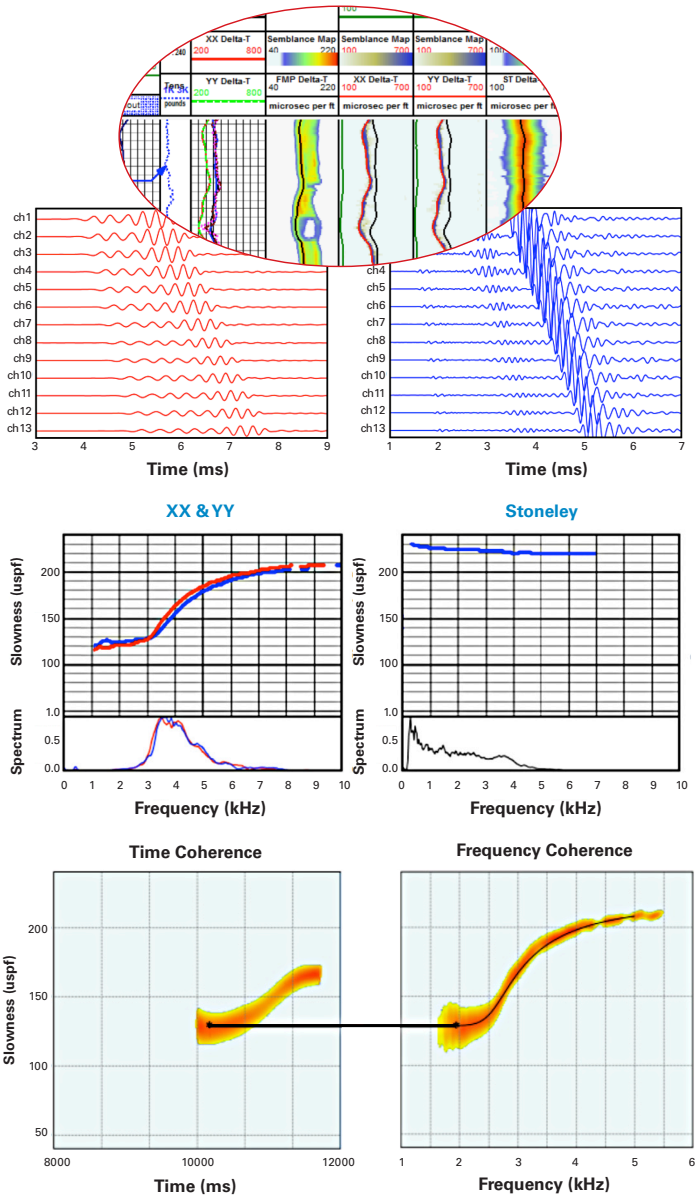
The XSI service reduces risk by measuring true formation P-wave velocity beyond the altered zone using the farthest-spaced monopole in the industry. It also measures S-wave velocity in all formation types in real time without need for additional dispersion correction processing. The unique onboard memory guarantees high-resolution data integrity and augments the real-time data streams. Additionally, in-hole tool programmability allows quick configuration changes between logging programs, ranging from conventional cement bond log mapping in cased holes to deep formation imaging in open holes.

THE PRODUCT OF SUPERIOR TECHNOLOGY

All Halliburton Xaminer acoustic components and processing technology are combined into one state-of-the-art tool string for open and cased-hole sonic logging. The XSI crossed-dipole acoustic service takes advantage of densely spaced azimuthal receiver arrays and two low-frequency, broadband shaker sources with unprecedented modal purity to make it easy to determine fast and slow shear-wave velocities and orientation in the formation. This information is vital for geomechanical analysis, wellbore stability, and production-enhancement treatment design.

The XSI tool boasts four broadband MP sources that provide enhanced flexibility in run designs, as well as options for cement bond logging, advanced P-wave applications, such as radial profiling, altered zone detection, and acoustic imaging, and Stoneley analysis of borehole-intersecting fractures and vertical transverse isotropy measurement for Thomsen gamma (γ).

Sonic attributes, such as P-wave slowness, fast and slow shear-wave velocities and dispersion, identification of compressive fluids in the pore space, and anisotropy orientation and Thomsen gamma, aid in better seismic processing and characterizing formation 3D stiffness, natural fractures, and shales.

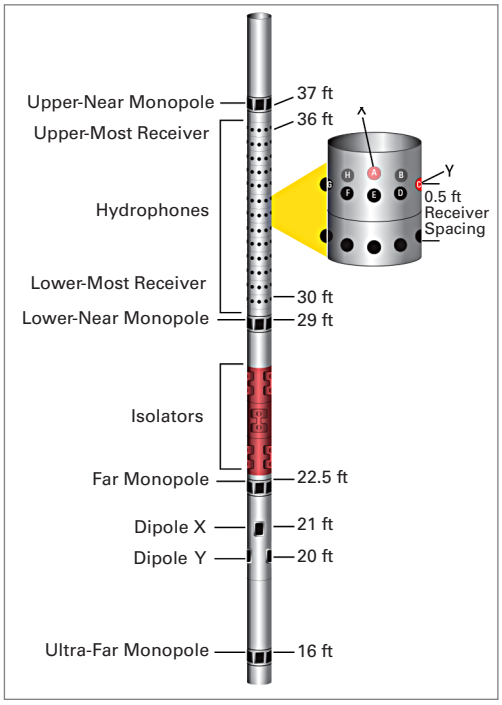


BENEFITS

- Broadband 13-level, 8-receiver array for high-quality waveform data; all 832 (up to 8 firings, 104 receivers) waveforms for each set of transmitter firings are recorded in tool memory for advanced waveform processing techniques
- Provides investigations of sonic slowness measurements around the borehole in both the near and far fields
- Enables characterization of the formation with continuous regular sampling from 1 to 20 ft of transmitter-to-receiver distances to measure true formation properties beyond low-contrast altered zones
- In cased holes, measures conventional 3-ft cement bond log and 5-ft QC waveform
- Provides pure dipole-mode low-frequency source signals:
  - No need for dispersion corrections due to real-time frequency semblance dispertion model matching that delivers formation shear slowness
  - The low-frequency broadband dipole enables the XSI service to log in slownesses up to 1,500 us/ft
- Real-time telemetry data delivers reliable slowness (1/velocity or Delta-T) of formation for compressional, dipole shear, and Stoneley on-site
- Memory data stored in the tool can be accessed on surface without requiring power through the wireline cable, and delivers the highest quality waveforms from each receiver for use in advanced post-processing

Xaminer® Sonic Imager Specifications

Max Temp	350˚F (177˚C)
Max Pressure	20,000 psi (138 MPa)
Max Tension	35,000 lbf (48 kN m)
Max Compression	5 Klbf > 8-in. Hole, 7 Klbf 8-in. Hole, 9 Klbf 6-in. Hole (7 kN.m > 20-cm Hole, 10 kN.m 20-cm Hole, 12 kN.m 15-cm Hole)
Max Weight below Tool	1,500 lb (680 kg)
Torsion Strength	600 lb-ft (813 N-m)
Bending Strength	5,000 lb-ft (6779 N-m)
Length	25.4 ft (774.2 cm) Basic / 51.1 ft (1557.5 cm) Full Service
Max OD	3.69 in. (9.37 cm) (Receivers and Transmitters)
Nominal OD	3.625 in. (9.21 cm) (Electronic Instruments)
MP Delta-T Range	38 to 300 µs/ft (±2%, ±5% 14 to 22-in. Borehole)
DP Delta-T Range	50 to 1,500 µs/ft (±2%, ±5% 14 to 22-in. Borehole)
ST Delta-T Range	185 to 1,500 µs/ft (±2%, ±5% 14 to 22-in. Borehole)
Borehole Range	OH: 4.5 to 22 in. (11.4 to 56 cm) CBL: 4.5 to 20 in. (11.4 to 51 cm)



Xaminer® Sonic Imager measurements from base of tool

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com