

RESERVOIR AND FRACTURE MONITORING | FIBER OPTICS

Sensori™ Fracture Monitoring Service

Easy-to-deploy, real-time, cost-effective solution for continuous subsurface measurement and visualization

FEATURES

- Low complexity with easy-to-deploy, nonintrusive diagnostics
- Eliminates trailers, additional personnel, cranes, and extensive pressure control, which minimizes operational complexity
- Plug-and-play setup does not impact fracture efficiency
- Integrates recording, processing, and transmission of live fracture data
- Low-cost solution allows operators to record entire program and enable modern machine-learning processes

BENEFITS

- Transparent and seamless data acquisition in the pad
- Live feedback on fracture growth and behavior
- Quantitative metric for near-well fluid distribution during every fracture stage
- Near-well and cross-well output integration to obtain comprehensive view of downhole fracture performance

Overview

The Sensori™ fracture monitoring service is designed to execute continuous subsurface monitoring. It provides a consistent data stream of near-well and cross-well fracture results so operators can integrate, visualize, and measure dynamic subsurface changes in real time. This service consists of the Sensori Near-Well system and the Sensori Cross-Well system.

The **Sensori near-well** system provides a quantitative measurement of fluid distribution in each stage. It takes advantage of pressure transducers and digitally automated pump equipment in each Halliburton fleet. This allows a manufactured pressure pulse to be interpreted at the end of each stage to demonstrate the stage level fluid distribution of a completed interval. The quantitative subsurface results of each stage provided by this nonintrusive technology allow operators to use the power of data to understand completion performance.

The **Sensori cross-well** system monitors adjacent wellbores. ExpressFiber™ cable is deployed before the frac crew arrives as part of regular pump-down and toe-prep operations. It provides fiber-based strain and microseismic measurements in real time to deliver an overview of far-field fracture propagation. The Sensori Cube system minimizes the wellsite footprint and combines recording, processing, and data transmission into one mobile autonomous package.



Sensori Cube service, part of the Sensori™ fracture monitoring service suite.

Subsurface results that align with today's market needs

The Sensori fracture monitoring service overcomes several legacy subsurface data challenges including:

1. It does not interfere with operational efficiency.
2. It is cost-effective in a capital-constrained environment.
3. It provides valuable insight for both near-wellbore interface and far-field fracture growth.
4. It delivers real-time insight to enable meaningful action during frac operations.

The Sensori fracture monitoring service combines nonintrusive technologies, advanced data acquisition, and real-time automated processing into a cost-effective solution. This cost-effectiveness provides operators fracture performance visibility and enables the capability to respond to variability and fracture outcomes.

The Sensori service uses a cloud-based infrastructure where operators can aggregate and store data (near-well, cross-well, and completion data) as it is collected at scale to facilitate continuous monitoring anywhere in the world. Halliburton offers tools to execute advanced analytics to better understand trends and asset behaviors. The results are provided to the operator using a web-based and mobile app, updated live, and can be accessed 24/7.

Applications

- Evaluate asset trends and behaviors using large-scale, dynamic subsurface data
- Understand fracture propagation behavior and the impact of depletion, infill wells, and parent/child/sibling configurations
- Optimize simultaneous operations between the rig and frac crews using the Sensori service for well surveillance
- Maximize capital use by understanding height growth and prevent draining benches that are not the targets

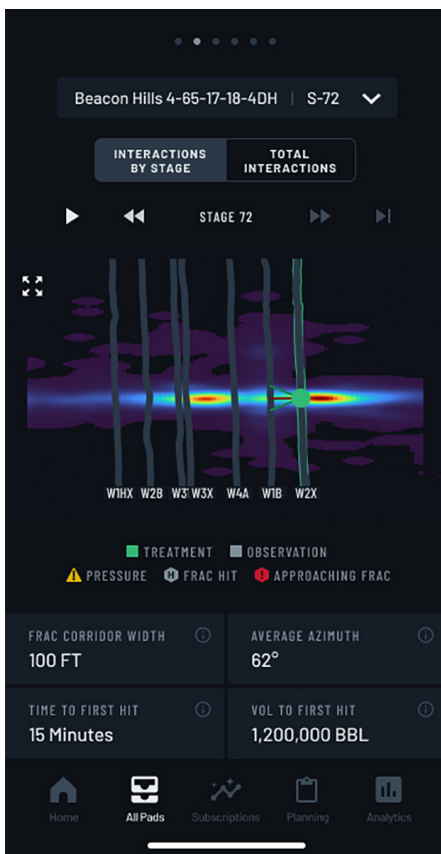


Figure 1

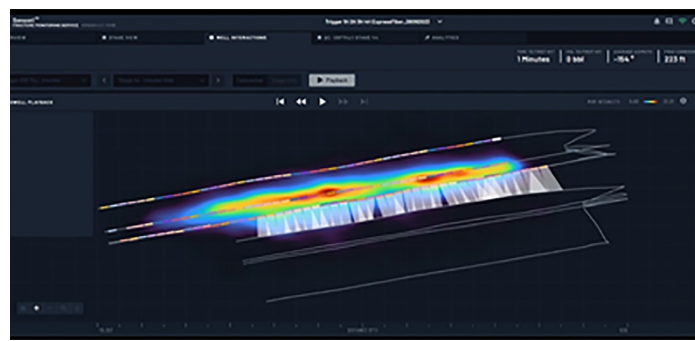


Figure 2

» FIGURE 1 - The Sensori™ fracture monitoring service app makes real-time insight more accessible and provides access to fracture performance anytime, anywhere.

» FIGURE 2 - Real-time Sensori™ service cross-well interactions view in the web viewer

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

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