

A photograph of an oil drilling rig at sunset. The rig is a tall, complex structure of metal towers and pipes, silhouetted against a sky filled with golden, scattered clouds. The ground is a flat, dusty field with some smaller structures and equipment in the distance.

Intervention-based reservoir flow diagnostics

with Silixa's Carina[®] Sensing System
combined with **ULTIMA[™] DTS**

Why reservoir flow diagnostics matter

Reservoir flow behavior is often complex, transient, and highly dynamic.

Challenges such as intermittent inflow, low-rate production, behind-casing crossflow, unidentified water or gas breakthrough, and uncertain contribution from individual zones can significantly impact production efficiency and recovery strategies. These effects may evolve gradually or appear only during transient conditions, making them difficult to detect with conventional snapshot measurements.

Delayed or incomplete flow understanding can lead to sub-optimal choke settings, ineffective stimulation decisions, premature water or gas handling costs, and long-term recovery loss.

Early, high-confidence flow diagnosis enables informed production optimization, targeted intervention, and reliable verification of reservoir performance while preserving asset value and maximizing recovery.



Detect, diagnose and understand reservoir flow faster and with confidence with Silixa's distributed sensing-based flow diagnostics

Silixa's Carina[®] **Sensing System (DAS)**, delivering distributed acoustic measurements using the engineered **Constellation**[™] fibre, combined with the **ULTIMA**[™] **Distributed Temperature Sensor (DTS)**, provides a comprehensive reservoir flow diagnostics solution on standard intervention conveyance (slickline, e-line, or coiled tubing).

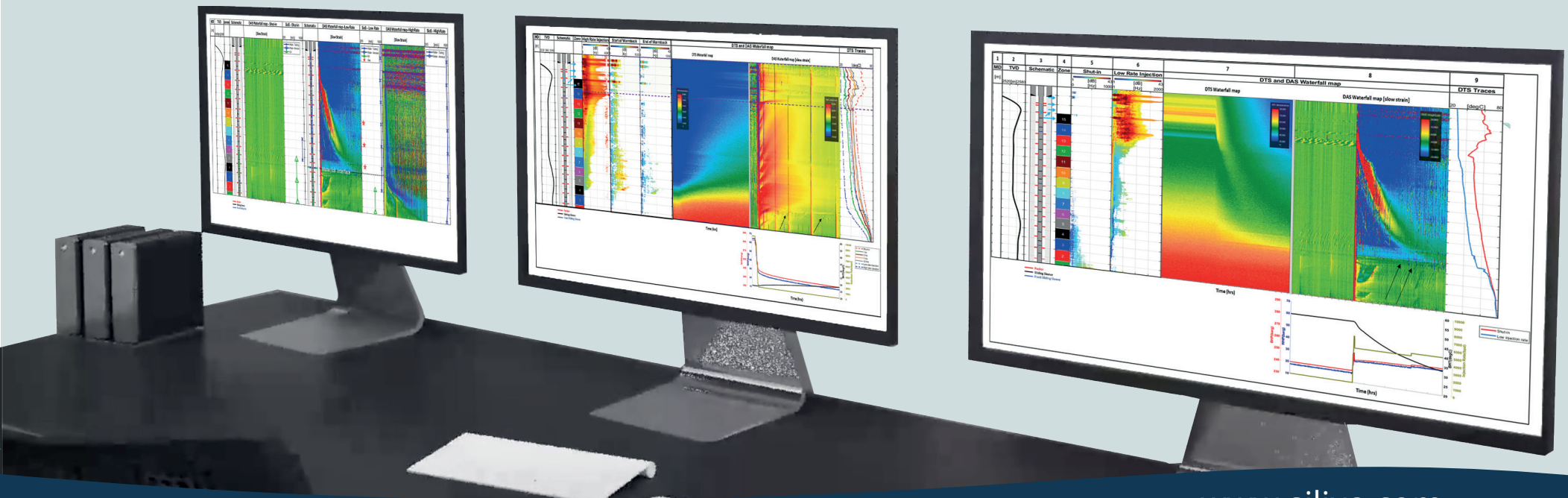
Phase-coherent distributed acoustic data (**Carina Sensing System**[™]) together with the highest resolution temperature data (**ULTIMA**[™] **DTS**) offer a better way to understand reservoir flow dynamics, phase distribution, and integrity behavior in real-time across the entire well.

Advanced analytics transform distributed measurements into actionable flow intelligence across the entire reservoir section.

Distributed fibre-optic sensing delivers continuous, full-well, real-time flow and phase intelligence, capturing low-rate, transient, multiphase, and behind-casing behavior in a single deployment, without blind zones or missed events.

Applications

- Identification of active and intermittent producing intervals
- Multiphase flow profiling along the entire reservoir section
- Low-rate and horizontal well flow profiling
- Behind-casing flow and crossflow detection
- Water or gas breakthrough localization
- Pre- and post-stimulation evaluation
- Transient flow behavior monitoring during rate changes
- Identification of active fractures (where fracture presence is known)



Key benefits of using Silixa's reservoir flow diagnostics

Faster diagnostics, instantaneous answers

- Identification of active flow intervals, transient behavior, and zonal contribution during the survey, enabling faster operational decisions.

Actionable information

- Continuous, meter-scale measurements provide clear identification of producing zones, behind-casing activity, low-rate flow, and multiphase behavior across the entire wellbore.

Significantly reduces overall costs by enabling easy, intervention-based fibre deployment

- Single-deployment execution without the need of multiple passes with rapid data turnaround minimizes rig time and enables timely optimization or remedial action.

Provides full wellbore coverage

- Replaces station-by-station, depth-by-depth observation with continuous, full-well event capture, ensuring that no flow event is missed.

Delivers continuous distributed temperature and acoustic measurements along the fibre optic cable in real-time without blind zones

- Multiphase flow identification and tracking.
- Speed-of-sound analysis enables identification of oil, water, and gas phases and the tracking of phase changes at any depth over time.

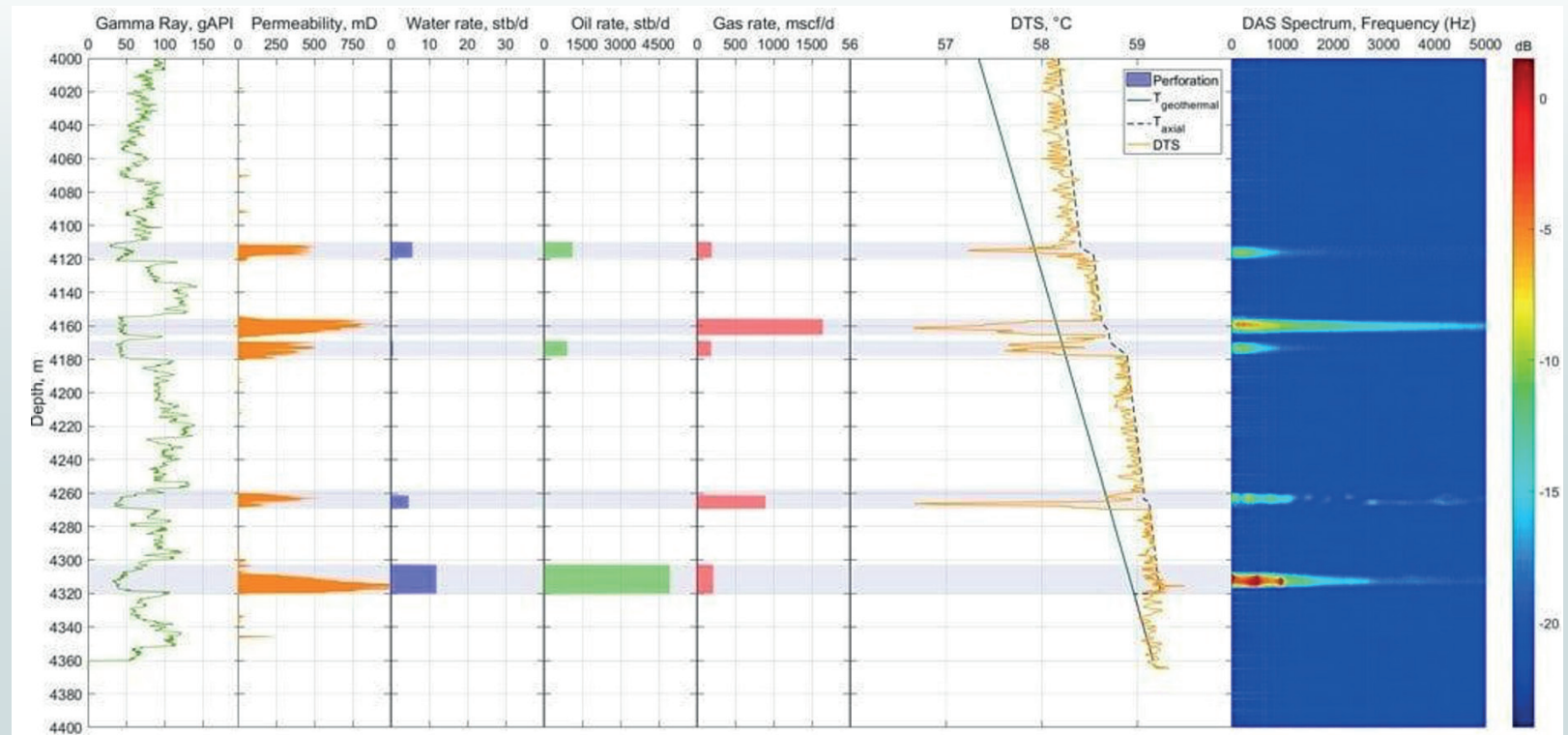
Reliable in challenging well conditions

- Optical sensing with no moving parts ensures stable measurements, independent of debris, heavy oil, or flow regime.

Intervention-based reservoir flow diagnostics with Silixa's Carina[®] Sensing System combined with ULTIMA™ DTS



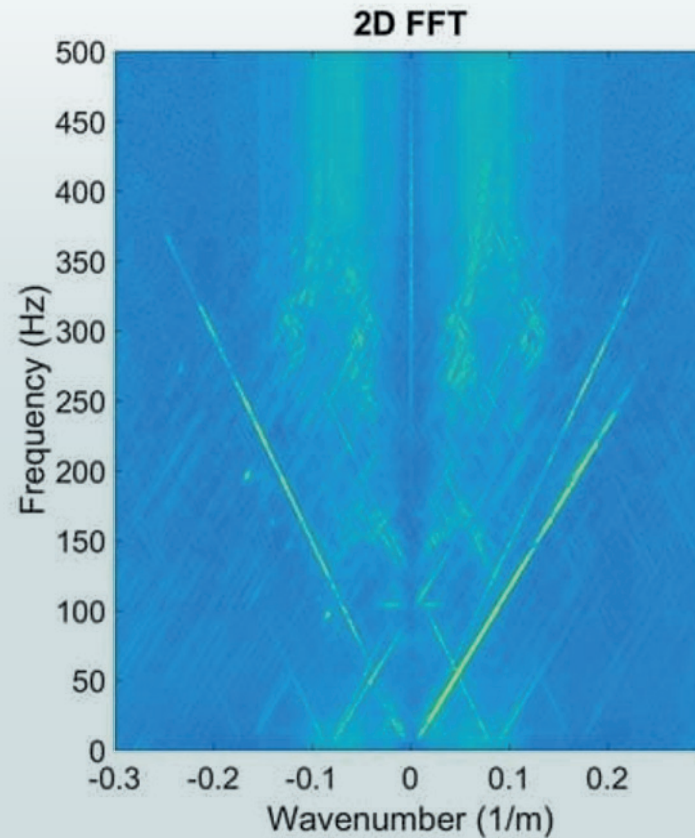
Image 1: Multiphase reservoir flow quantification derived from the combined interpretation of distributed temperature sensing (DTS) and distributed acoustic sensing (DAS) data.



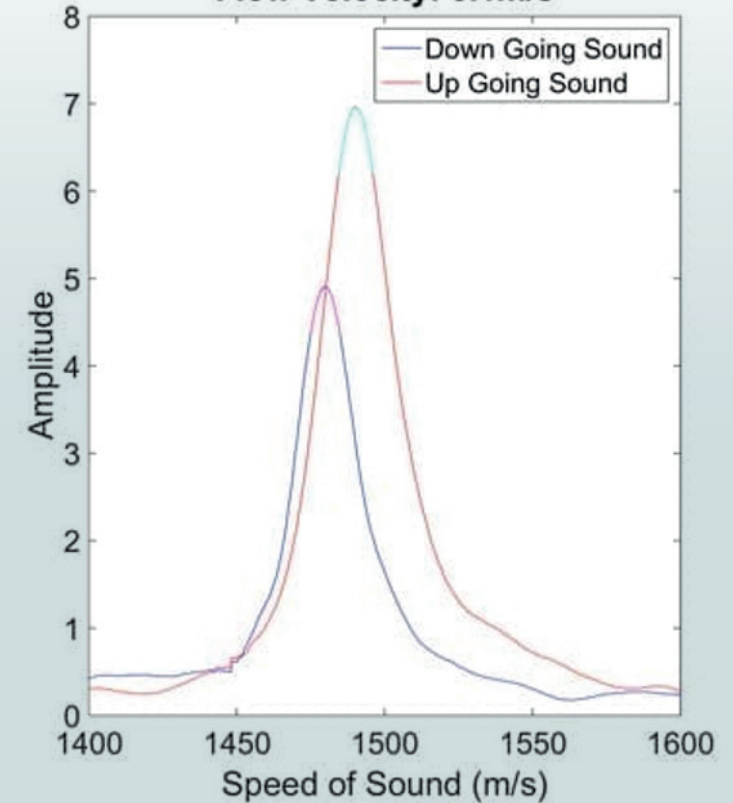
Localized temperature deviations observed in the DTS track indicate fluid entry points and thermal contrasts associated with different flowing phases. These thermal responses are correlated with elevated acoustic energy and frequency signatures in the DAS spectrum, confirming active flow at the same depths.

Phase identification is done using speed-of-sound analysis, enabling discrimination between oil, water, and gas flow. The integrated DTS-DAS interpretation results in a continuous, depth-resolved multiphase flow profile across the entire interval.

Image 2: An illustration of DAS speed-of-sound propagation and Doppler shift



Up: 1479.9m/s, Down: 1490.1m/s
Flow Velocity: 5.1m/s



Advanced acoustic processing, unique to Silixa, can be used to determine the speed of sound in the production fluid at different depths; this information indicates in-situ fluid type and can be used to resolve hold-up in two-

phase flow. Additionally, the Doppler shift between the speed of sound modes travelling up and down in the well make it possible to measure the fluid flow velocity and hence flow rates for a given tubing size.

Why choose Silixa?

We redefine the limits of the possible by delivering the world's highest quality data driven solutions from distributed fibre optic monitoring arrays.

Originators of both DTS & iDAS technology

- Provides integrated solutions and answers

Superior acoustic data quality

- The **Carina Sensing System**, with the **Constellation** fibre, provides 100x better signal to noise ratio compared to conventional DAS data

World's best resolution data

- Highest precision data available

Truly phase coherent acoustic data

- Richer signal content gives more accurate answers

Deep domain knowledge with fibre optic expertise

- To support your decision making with confidence

