DAS (Ariane/SP^{2}S)

Real Time Processing for DFO Well Surveillance Data

The DFO data challenge

Data volume presents a significant challenge for DFO technology users, with a standard DAS sensor producing tens of terabytes of data in a single monitoring period.

Post acquisition analysis is frustrating due to drive shipment delays, and further hindered by the inability of applications to utilize the entire data set.

In essence, the true value of DFO data is impossible to realize as the scale of data produced is unmanageable.

Meaningful data in real time

ISP's Ariane solution revolutionizes DFO data analysis, utilizing powerful data processing software capable of residing on a standard laptop.

Ariane's SP^{2}S pre-processing software uses proprietary algorithms to process the *entire* DFO dataset and extract only the relevant data based on pre-defined parameters. This process occurs more rapidly than the raw data is produced, and SP^{2}S can accomodate up to ten analysts applying distinct parameters concurrently with zero impact on processing speeds.

Non-relevant data is disregarded and the resultant output (GB rather than TB) is transferred in real-time across the network. Once received, data is visualized through the Ariane viewer, where it can be overlaid with other well information for comprehensive in-depth analysis.

The Ariane SP^{2}S solution enables improved production efficiency, solves well integrity issues and allows companies to fully unlock the value of DFO data through the ability to identify issues in real time.

- Rapid, remote qualitative analysis of real time DFO data

- Reduction of data volumes from 320mB/s to 50-100 kB/s

- Optimized flow allocation, well integrity and sand control through combined DTS and DAS analysis

- Ability to apply multiple concurrent user parameters (10 parallel interrogations)

- DFO data overlaid with all other well data including production monitoring, pressure, integrity etc

- Enhanced production efficiencies through flow rate optimization

- Pinpointing of optimally and worst performing clusters (fracking)

- Maintains vendor neutrality between measurement and analysis

- Cost savings via cross functional data usage

- Potential to centralize analytical functions and resources
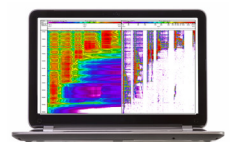
- No loss of data due to drive replacment

DAS — Data condensed from TB to GB — SP2S — Real time data transfer — Instant availability via Ariane viewer

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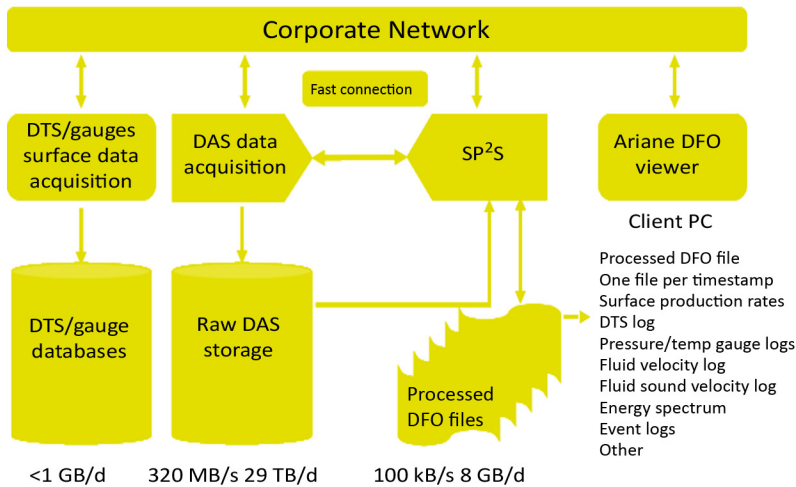
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SP^{2}S Data Compression

ISP's Streaming Preprocessing System (SP^{2}S) enables real-time DAS data processing by selectively extracting the relevant information needed to analyze fracking, well integrity, sand control or fluid properties. This effects a substantial data reduction and allows immediate delivery of information to experts over a corporate network in seconds. DFO data is imported real-time from acquisition boxes or from off-line storage. Advanced post-processing tasks executed in Ariane extract high-level information and highlight critical events for manual or automatic action.

Corporate Network

Fast connection

DTS/gauges surface data acquisition

DAS data acquisition

SP^{2}S

Ariane DFO viewer

Client PC

DTS/gauge databases

Raw DAS storage

Processed DFO files

Processed DFO file
One file per timestamp
Surface production rates
DTS log
Pressure/temp gauge logs
Fluid velocity log
Fluid sound velocity log
Energy spectrum
Event logs
Other

<1 GB/d   320 MB/s 29 TB/d   100 kB/s 8 GB/d

Reduction of data volumes from 320mB/s to 50-100 kB/s

Production optimization

SP^{2}S configuration can be carried out remotely via the Ariane interface; complex reports are automatically generated enabling rapid access to real time meaningful information. The ability to pinpoint problem areas with a higher degree of accuracy facilitates faster decision-making and subsequent reaction to issues, reducing intervention costs.

100% data integrity and continuity

With data reduced to enable real time transfer across the network, analysts can be assured of 100% consistency with no lapse in data capture (e.g. as a consequence of switching hard drives).

Vendor Neutrality

The Ariane SP^{2}S solution maintains independence between measurement and monitoring/analysis solutions whilst retaining the ability to take advantage of specific vendor acquisition features.

Flow Rate Allocation

In fractured reservoirs with complex completion design or poor well access, Ariane enables optimal flow allocation through the qualitative evaluation of contributing intervals and differentiation of matrix from fracture flow.

Fracture Optimisation

Fracture stages can be visualized with the energy spectrum during each operation. Analysts can observe remotely in real time to assess optimally performing perforation clusters.
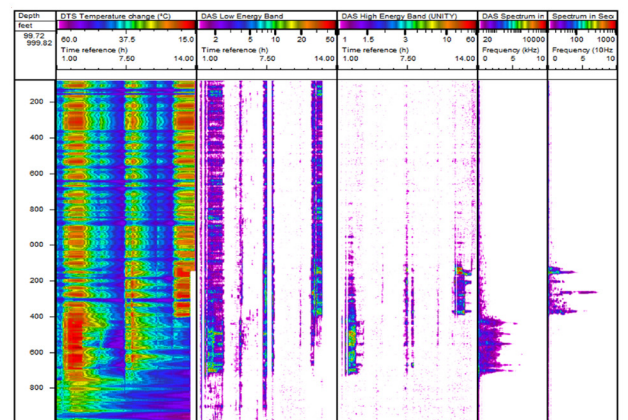
Well Integrity

Combined DAS/DTS analysis and early warning detection capabilities enable well integrity issues such as flow behind casing, leak detection, cross-flow, cement bonding and curing to be identified earlier.

Sand Control

Enhanced levels of monitoring/early warning detection enable the optimization of sand control (sand source, grain size, sand volumes).
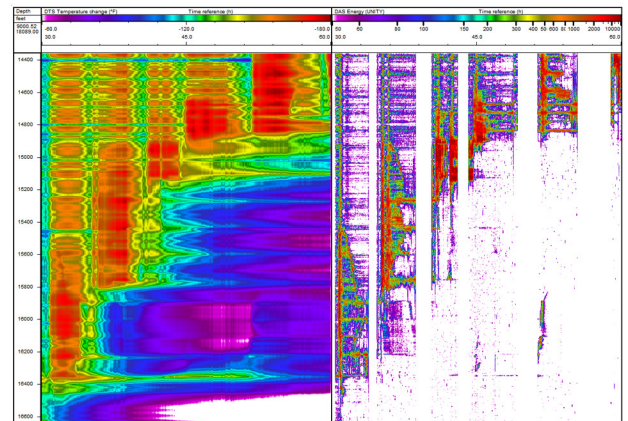
Cross-flow detection

Fracturing optimization