

4D Baseline Planning & Acquisition

LEADER IN 4D SURVEY OPTIMISATION

ION Concept Systems (CSL) has been on the cutting-edge of 4D since the technique emerged in the 1990s. Through close customer collaboration, CSL continuously develops innovative tools and techniques to image subtle changes in reservoir fluid movements that inform decision-making and improve asset management.



Designed to work in tandem with industry-leading Orca command and control system, CSL pairs unrivaled planning and modeling capabilities with in-field technology and Acquisition Specialists to optimise the survey at every step.

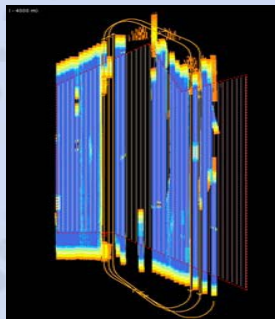
CSL Acquisition Services has advised the planning and acquisition of more than 100 4D programs worldwide, including the North Sea, West Africa, Malaysia, and Australia. This unique, comprehensive methodology has proven time and again to achieve geophysical objectives in the most safe, efficient manner.

COMPREHENSIVE BASELINE PLANNING

It's critical to establish a solid 4D program foundation with an efficient, highly repeatable 3D baseline survey. CSL provides comprehensive services to optimise 4D baseline acquisition, ensuring that the geophysical objectives are achievable in the subsequent monitor surveys in a cost-effective manner.

The baseline services can be broken down into:

- Detailed Feather Analysis
- Scenario Modeling and Coverage Analysis
- Close Pass Modeling in Obstructed Areas
- Pre-plot Creation
- In-field Acquisition Specialist



Intelligent Acquisition

ION is leading the next wave of marine seismic with Intelligent Acquisition, an integrated, survey-wide approach to optimise operations in real-time.

Combining independent technologies into a single, smart system improves safety, efficiency, and data quality.



Orca dynamically controls systems to position the spread to ideal parameters while reducing cycle times and costs.

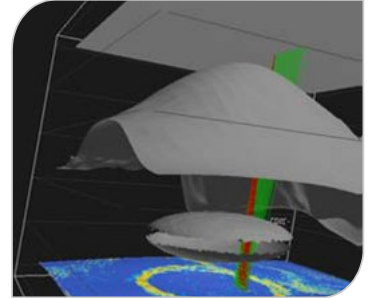
DigiFIN™, when integrated with Orca, controls lateral cable positioning to enable tighter, more uniform streamer separation to minimise infill while maximising 4D repeatability.

DETAILED FEATHER ANALYSIS

Ocean currents can wreak havoc on even the best laid survey plans. Despite their perceived unpredictability, CSL has demonstrated the ability to successfully forecast feather, with significant survey uplift.

Analysis of vintage seismic data sets or current meter data from the area can provide valuable information to help design the baseline survey. Identifying ocean current trends can provide a realistic forecast of the anticipated feather match that will be achieved on the baseline and future monitor surveys.

CSL can perform retrospective analysis on the historical data to assess how the feather predictions that could be achieved with the latest in-field technology. The information gained from this will significantly enhance the accuracy of subsequent survey planning stages and can also help with refine the required inputs for the in-field feather predictions.

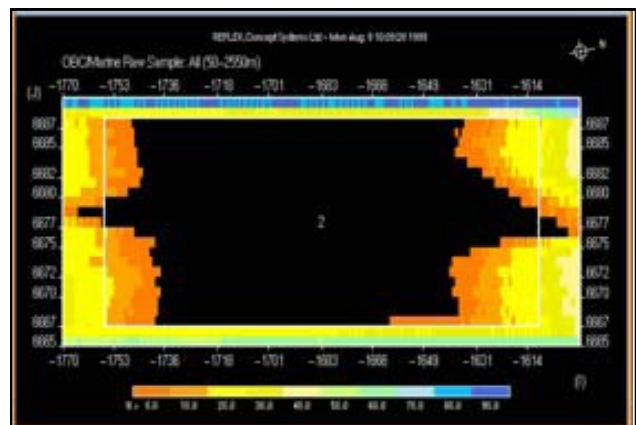
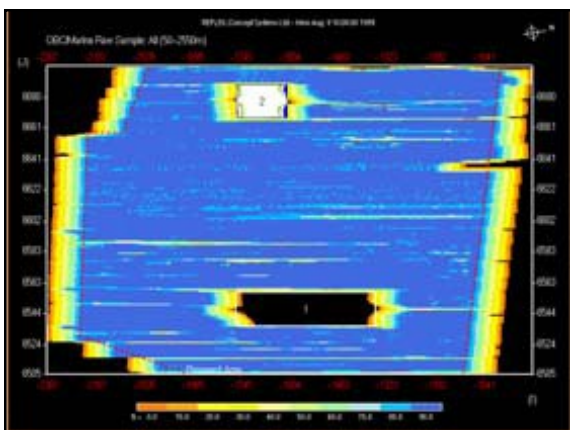
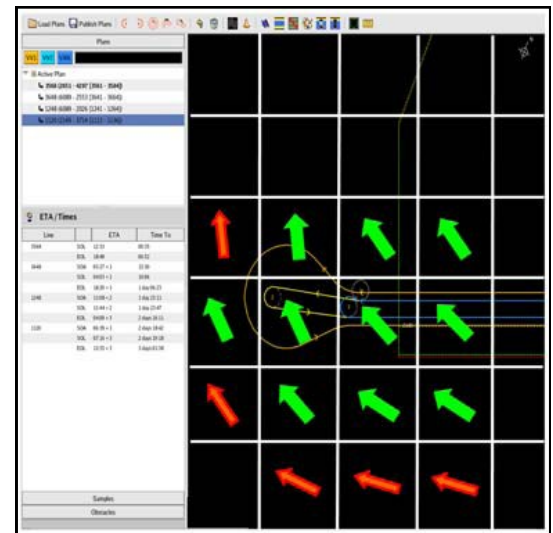


SCENARIO MODELING AND COVERAGE ANALYSIS

As with any 3D survey, the primary concern is achieving sufficient coverage. Utilising the results from the Detailed Feather Analysis, CSL can analyse multiple scenarios to quantify and ultimately recommend the configuration and sail line requirements to achieve the best balance of data quality and survey cost.

CSL collaborates closely with clients to determine the ideal pre-plot survey design and configuration requirements. This can include analysis of reduced sail line spacing and / or assess the merit of streamer steering, fan mode, and dual vessel acquisition.

The monitor survey is also factored in at this early stage to ensure future surveys can achieve the necessary repeatability in a safe and efficient manner. CSL will present the coverage and repeatability quality likely to be achieved by nominal sail line kilometers, identifying the anticipated infill and impact to future survey quality, duration and costs.





CLOSE PASS MODELING IN OBSTRUCTED AREAS

Surface obstructions present a significant challenge for all seismic operations and this is an issue for most 4D programs. A particular issue on baseline surveys is that the obstruction is not yet present but the acquisition has to ensure that the source to receiver azimuth can be repeated when the obstruction does come on to the field. CSL analysis identifies the sail line techniques and strategies required in the obstructed area to ensure high quality repeatability can be achieved safely and efficiently on future monitor surveys.

For each line affected by the obstruction, CSL utilizes their accurate streamer shaping model to simulate close pass options whilst also accounting for various feather conditions. The close pass lines may include detouring offline around the obstruction, a dead head complimented with a drop-in pass to maintain the baseline sail line heading, a reverse dead head, etc. ensuring the best result.

PRE-PLOT CREATION

CSL provides a pre-plot using standard P190 files for all vessels to ensure a seamless transition of the acquisition strategy from the office to the field.

IN-FIELD ACQUISITION SERVICES

In-field Acquisition Specialists ensure the agreed upon acquisition strategy is effectively implemented by the service provider. Utilising the latest CSL tools, Acquisition Specialists combine enhanced feather predictions with management of the survey simultaneous operations to produce optimal shooting plans in real-time, providing the best chance of achieving objectives.

Using a number of spatial and temporal inputs, such as ADCP and SatOcean, ION objectively prioritises lines based on the level of confidence in the prediction and the likelihood of achieving the desired coverage given the currents (applying their Feather Aperture approach).

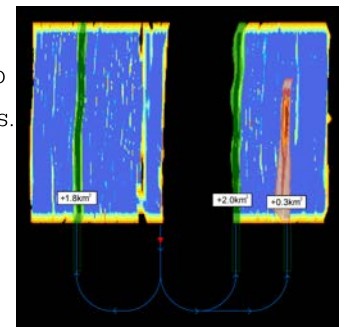
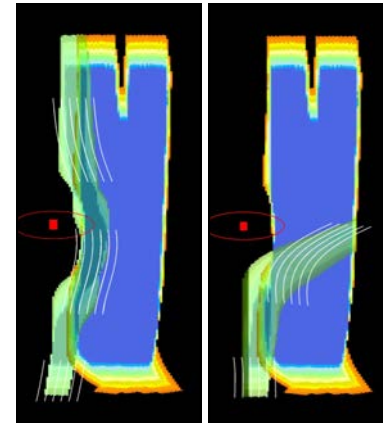
Find out how these services can enhance your 4D projects:

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→ LINE PRIORITIZATION

During a survey, some prime lines and infill contribute little to the overall data quality or repeatability. Pre-survey modeling is combined with in-field data to dynamically select the least number of lines to achieve the desired results.