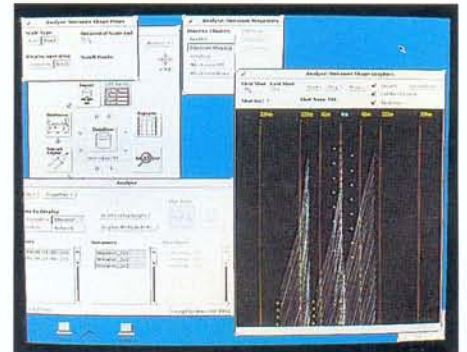
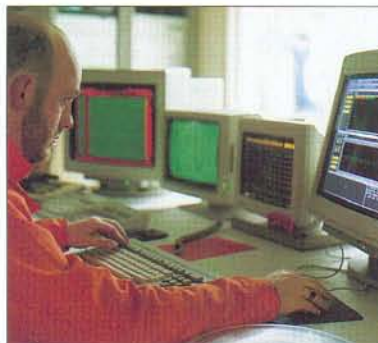
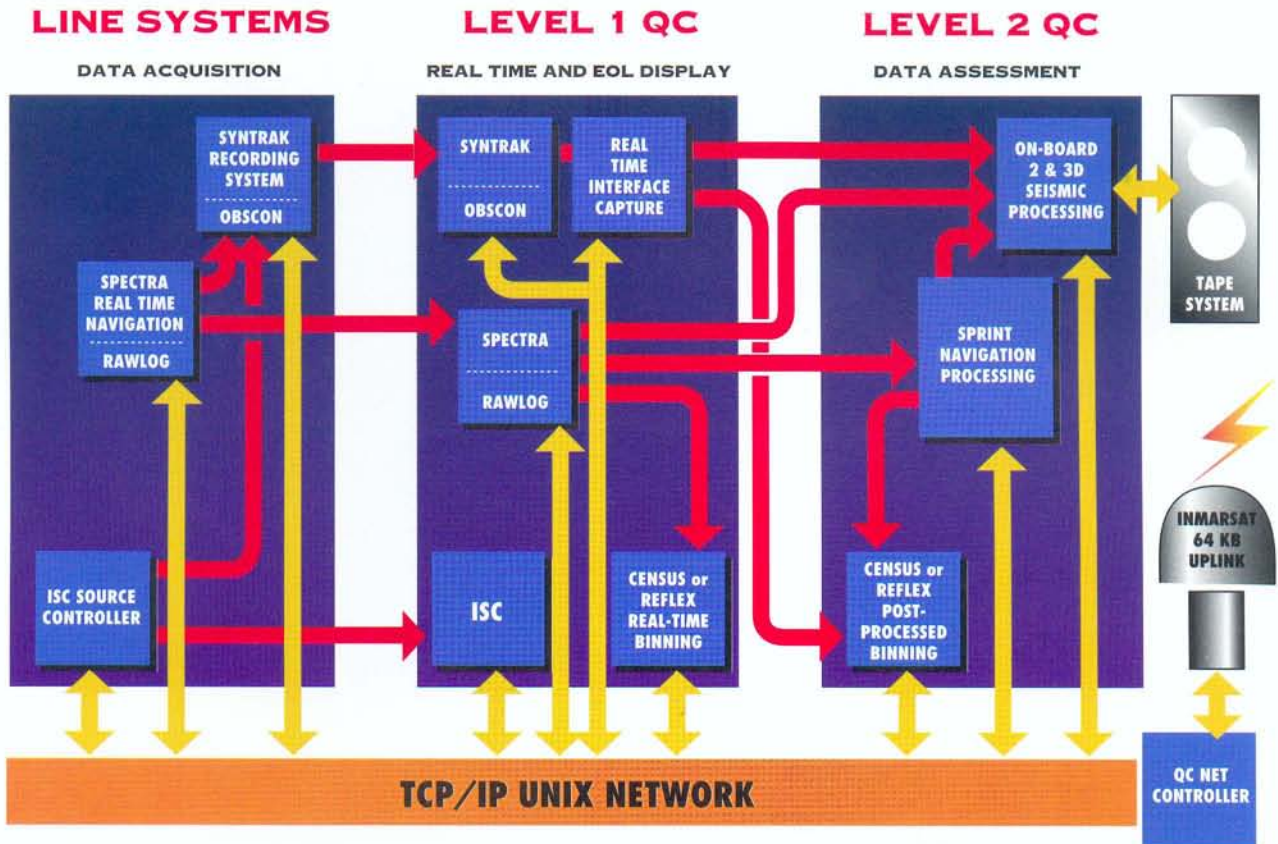


MULTI-LEVEL 3D QC AND ONBOARD PROCESSING

With the adoption of UNIX throughout all the major onboard systems, QC operations are enhanced with communication via a dedicated net for all the major modules. Now the Level One modules, which are largely system specific within the areas of seismic recording, source performance and positioning, are connected via a dedicated network with the Level Two systems.

Level Two systems include the optional SPRINT navigation post-processing, an off-line binning database from CENSUS or REFLEX, with an associated areal attribute database and the Net Controller which has the capability to cross-correlate from individual modules.

With the development of CAPTURE and the ability to pass all recorded traces to an onboard seismic processing system in real-time, comes the capability to detect any abnormalities in processed data and trace them back to their origin. Their impact can be intelligently assessed and corrective action taken where required.



LEVEL ONE QC SYSTEMS

- SYNTRAK QC Module. All channels displayed in wiggle, variable area and variable density
- RMS ambient and signal noise analysis. Recording system test and diagnostic modules
- SPECTRA real-time display of vessel and deployed equipment positions. Fix quality statistics for all systems P2/91 and real-time P1/90
- ISC integrated source controller with real-time graphical and numeric display. Real-time graphical display of near field hydrophones. End of line performance statistics
- OBSCON real-time automatic logging (observer's log)
- CENSUS or REFLEX real-time binning system

LEVEL TWO QC SYSTEMS

- SPRINT navigation post processing system with P1/90 output
- CENSUS or REFLEX off-line binning using post processed navigation for final coverage and infill analysis
- CENSUS or REFLEX attribute database for areal analysis
- QC net controller allowing access to systems on Levels One and Two via TCP/IP link
- Communications via satellite using 64 Kb uplink
- Various specifications of onboard seismic processing up to and including full fold 3D with real-time access to data via the CAPTURE interface

Horizon vessels deploy compact source arrays and manageable streamer spreads to gather high quality 3D data without compromising on offset and azimuth distributions.

Front end in-water equipment is positioned with multi-frequency acoustics using hull-mounted, towed, sub-array mounted and streamer head transceivers in combination with RGPS and Lasertrak data in real-time. Streamer positions are computed using compass shaping (Syntron or

Digicourse units) and acoustics linked to RGPS tailbuoy positions. Extensive display and analysis facilities are available with SPECTRA with all raw navigational input recorded by RAWLOG.

Real-time binning is carried out by CENSUS or REFLEX systems with comprehensive display, editing and infill analysis capabilities.

Primary and sub-system control, synchronisation and major parameter selection are handled by the Horizon OBSCON unit. Input from seismic source, streamer, navigation and seismic recording systems generate real-time displays, automatic on-line logging and external tape headers.

Comprehensive real-time and end of line system-specific QC displays and plots are available within the source, recording and navigation areas with cross-correlation of results available via the TCP/IP network.

Further, more sophisticated QC facilities are available when optional navigation and seismic processing facilities are deployed aboard the vessel. The SPRINT navigation 1 processing system allows final P1/90 generation aboard the vessel with output to the off-line mode of the binning system for accurate assessment of coverage and infill requirements. An areal database for attribute analysis can also be maintained by CENSUS or REFLEX.

Various configurations of seismic processing systems are offered, with access to the full record in real-time on every shot via Horizon's 'CAPTURE' tape imaging interface. Extensive noise and signal analysis of ambient and shot-related conditions can be displayed on a real-time, line-by-line or whole survey basis. Single fold displays are useful to confirm source-receiver offsets and array sequencing.

As a 3D volume is built up, cross-lines and time-slice displays can confirm consistency across the survey area.

In addition, a limited distortion raypath 3D cube, migrated by a two stage process, allows identification of potential problem areas in the full-fold dataset. This volume also provides a valid alternate final dataset often with complementary characteristics to the full-fold data.

Horizon vessels have now carried out several 3D surveys where full-fold data has been completely processed aboard the vessel and has been available for interpretation at the end of the survey. Since the degree of client participation in decision making is a significant factor in how this activity progresses, Horizon Exploration must assess each survey on its suitability for the technique.

CENSUS is a trademark QC Tools

SPECTRA, SPRINT and REFLEX are trademarks of Concept Systems