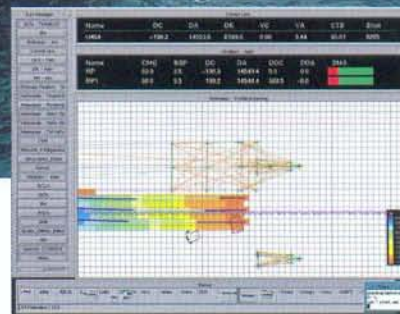
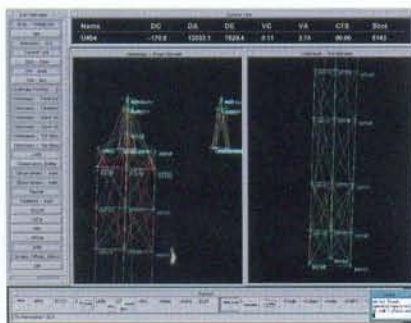


DUAL VESSEL ACQUISITION

Horizon vessels have considerable experience in dual vessel techniques employing reliable GPS-based synchronisation and wide bandwidth transmission systems to ensure optimal 3D survey coverage.

MV Abshire Tide has been equipped as a dedicated recording-only vessel with multiple digital streamers, Syntak MLTP system and full 3D navigation installation to work in combination with other Horizon ships on dual vessel projects.

Horizon vessels can deploy sophisticated onboard 3D seismic processing systems so that the coherency of dual vessel datasets can be confirmed while the ships are still on prospect.



DUAL VESSEL TECHNIQUES

Horizon Exploration ships can use several dual vessel techniques:

- Obstruction undershooting technique. Utilised where a manmade structure, or possibly a patch of shallow water, limits access with a conventional single vessel towed array.
- Asymmetric split spread acquisition where very long offsets (c. 6 kilometres) are required without the penalty of manoeuvring with streamers of that length. The undershooting of salt structures (as in the Gulf of Mexico) often requires this approach.
- Wide swathe surveying with vessels running side by side allowing high volume acquisition, but with the flexibility to separate to use the other techniques or to operate independently.

DUAL VESSEL PROCEDURES

In all of the techniques one vessel is designated the 'Master' vessel, controlling line selection, configuration for both ships, shot numbering, etc., with the other being the 'Slave', responsible only for its own network and transfer of raw positioning data to the 'Master' vessel. In obstruction undershoots, the source vessel, unencumbered by streamers, is the 'Slave' and can be positioned close to the obstruction. In the other techniques where both vessels deploy streamers the ship with the sources is the 'Master'.

Both 'Master' and 'Slave' vessels have SPECTRA systems, with data servers receiving locally GPS time stamped raw data from their Real-Time Navigation Units (RTNU). The two data servers freely pass data between them, using a combination of spread spectrum Ethairbridge and radio modems. The 'Master' vessel has access to all the raw positioning data aboard both vessels and produces a dual vessel network solution which can be made available to the 'Slave'. Both vessels log full P2/91 and P1/90 files throughout the line, with the 'Master' vessel controlling the configuration of the networks, setting the sail lines and supervising the logging procedure. A modified relative position target is transmitted for the 'Slave' to follow based on coverage requirements.

ASYMMETRIC SPLIT SPREAD SHOOTING

Unlike conventional side-by-side techniques, in this case the 'Master' vessel, equipped with both source and streamers, follows in the track of the 'Slave' vessel which

has only streamers deployed. The longitudinal offset between the 'Slave' vessel's streamer groups and the source is maintained to provide seismic offsets complementary to those delivered by the 'Master' vessel's own streamers. The former vessel records far and far-mid offsets while the 'Master' vessel records near and near-mid. As the furthest offsets are contributed by those groups closest to the 'Slave' vessel (and therefore less affected by feather angle) 3D coverage can be significantly enhanced.

MV ABSHIRE TIDE

RECORDING SYSTEM

- Syntron MLTP digital recording system, 1000 channel capability and 3480 cartridge recording Teledyne-designed designed low-noise streamer incorporating 12.5/25.0m group lengths
- Enhanced seismic QC system developed jointly by Horizon and Syntron
- QC displays via high resolution monitors and 24" Oyo plotter
- Up to 200m spread between streamers
- Horizon's 'CAPTURE' high volume real-time seismic data port

NAVIGATION SYSTEMS

- Fully integrated 'SPECTRA' marine navigation system P2/91 and real-time P1/90 files
- All available positioning information (DGPS, radio-navigation, acoustics, compasses and Lasertrak) used for real-time steering and coverage displays
- All raw navigation recording (available for subsequent analysis)
- Extensive real-time and end of line QC analysis available via 'SPECTRA'.

VESSEL DETAILS

GRT:	289
Length:	59.1m
Beam:	12.2m
Cruising Speed:	10.0 knots
Accommodation:	23 maximum

Syntrak is a product of Syntron Inc.
SPECTRA is a product of Concept Systems Ltd.