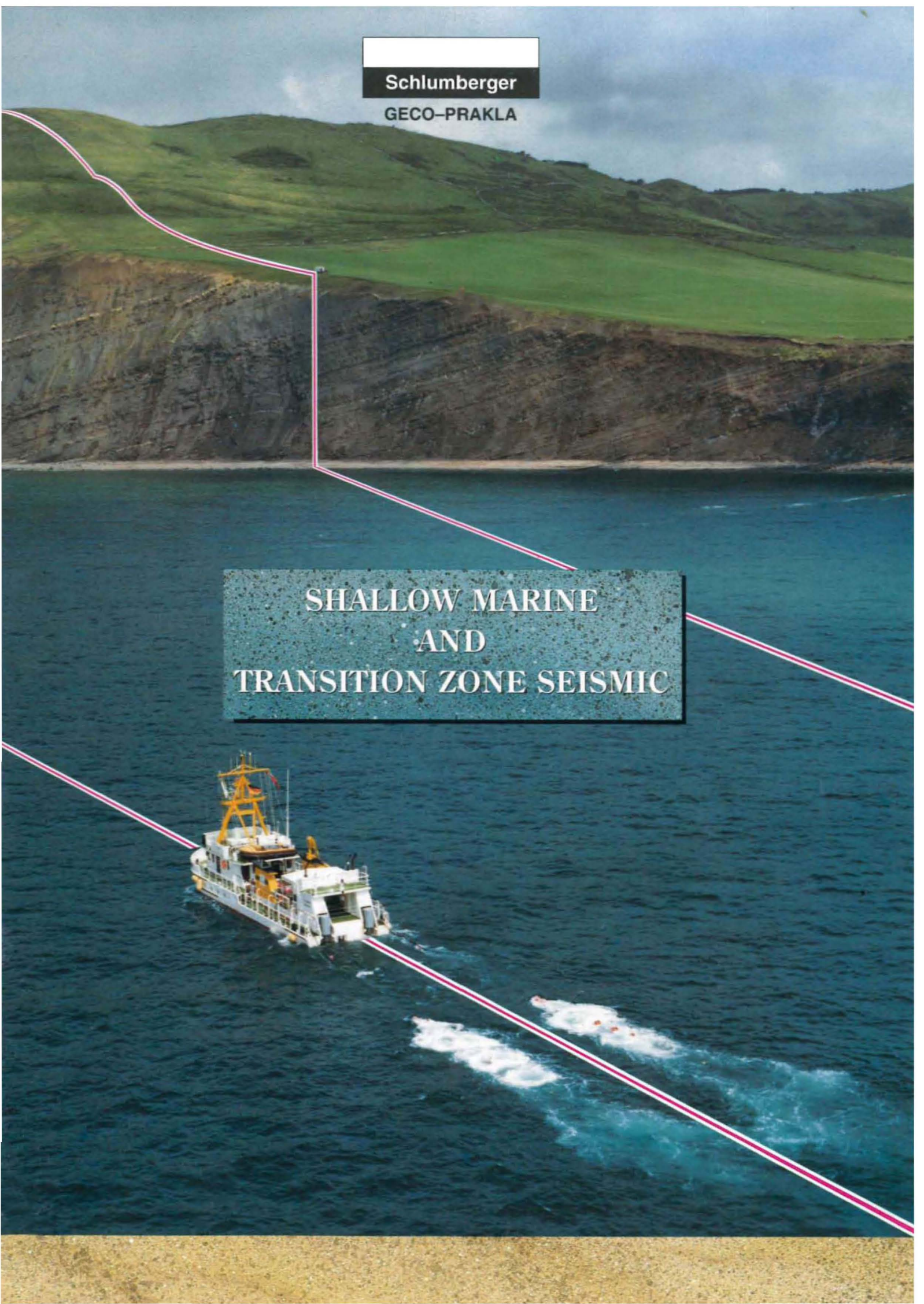




Schlumberger

GECO-PRAKLA

SHALLOW MARINE
AND
TRANSITION ZONE SEISMIC

WHAT DO WE MEAN BY SHALLOW WATER AND TRANSITION ZONE ?

- Too "wet"
for Land Seismic Crews
- Too "dry"
for Deep Sea Seismic Vessels

GECO-PRAKLA Shallow Water Crews are specialized in world-wide seismic data acquisition in extremely difficult environments, such as:

- Coastal waters up to the shore, including surf zones, mud flats and tidal areas
- Rivers and river estuaries
- Islands, shoals and reefs
- Heavily frequented harbour areas
- Lakes and lagoons



MV FLORA



SV SOLEA

Seismic surveying in shallow waters and the transition zone has been our speciality for 5 decades. This experience has led not only to the development of special shallow water survey vessels but also to new operation concepts for 2D and 3D, which enable GECO-PRAKLA to offer flexibility, efficient services and quality data. The task to combine onshore and offshore surveys, is solved by using a wide range of operational "tools", e.g. shallow draught survey vessels, mother-ships, airgun pontoons and a fleet of auxiliary boats.

The company offers efficient streamer/airgun continuous tow modes on lines extending from deep sea areas into coastal waters. Telemetric systems are used for data acquisition in the transition zone to tie shallow water lines and onshore extensions.



SV MANTA



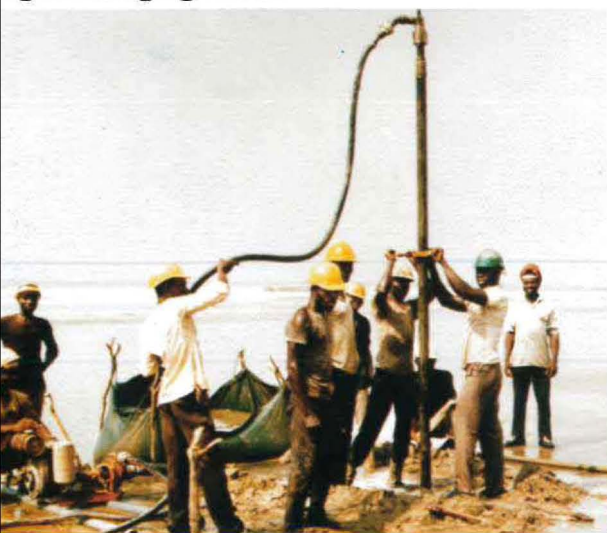
SV FLUNDER



Light drilling rig P 0501



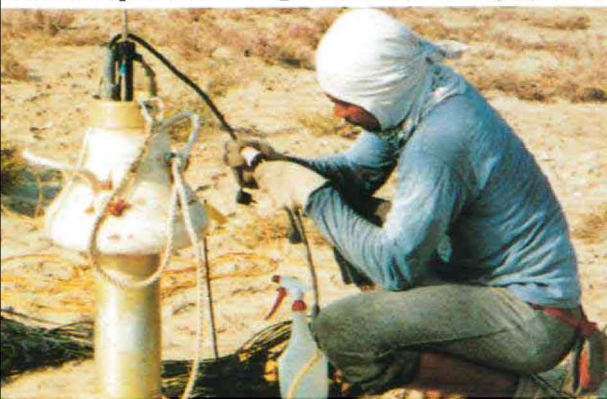
GECO-PRAKLA vibrators VVEA



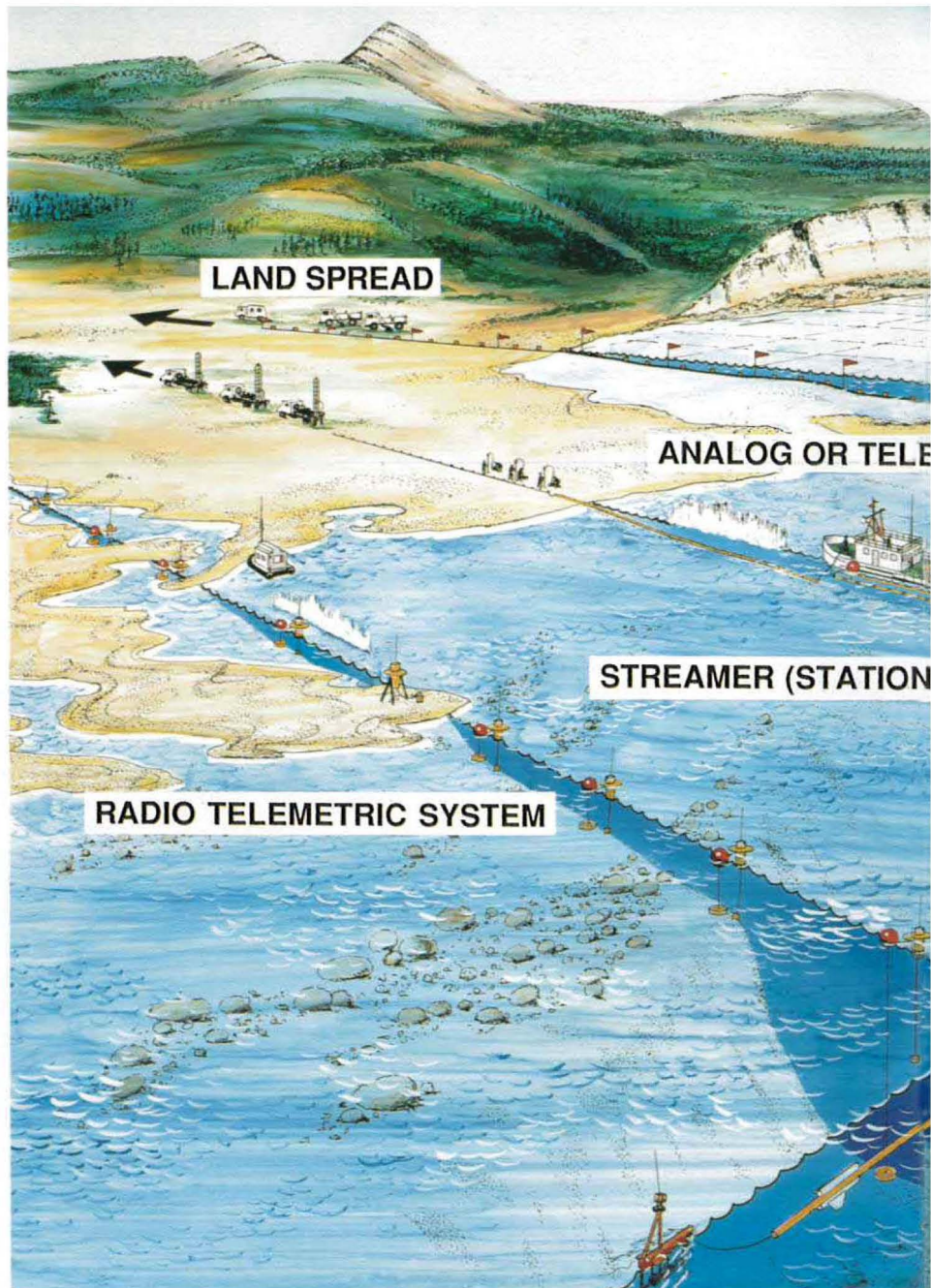
Flushing drilling operation in Nigeria



Land tie operation using a telemetric buoy system



MYRIASEIS buoy



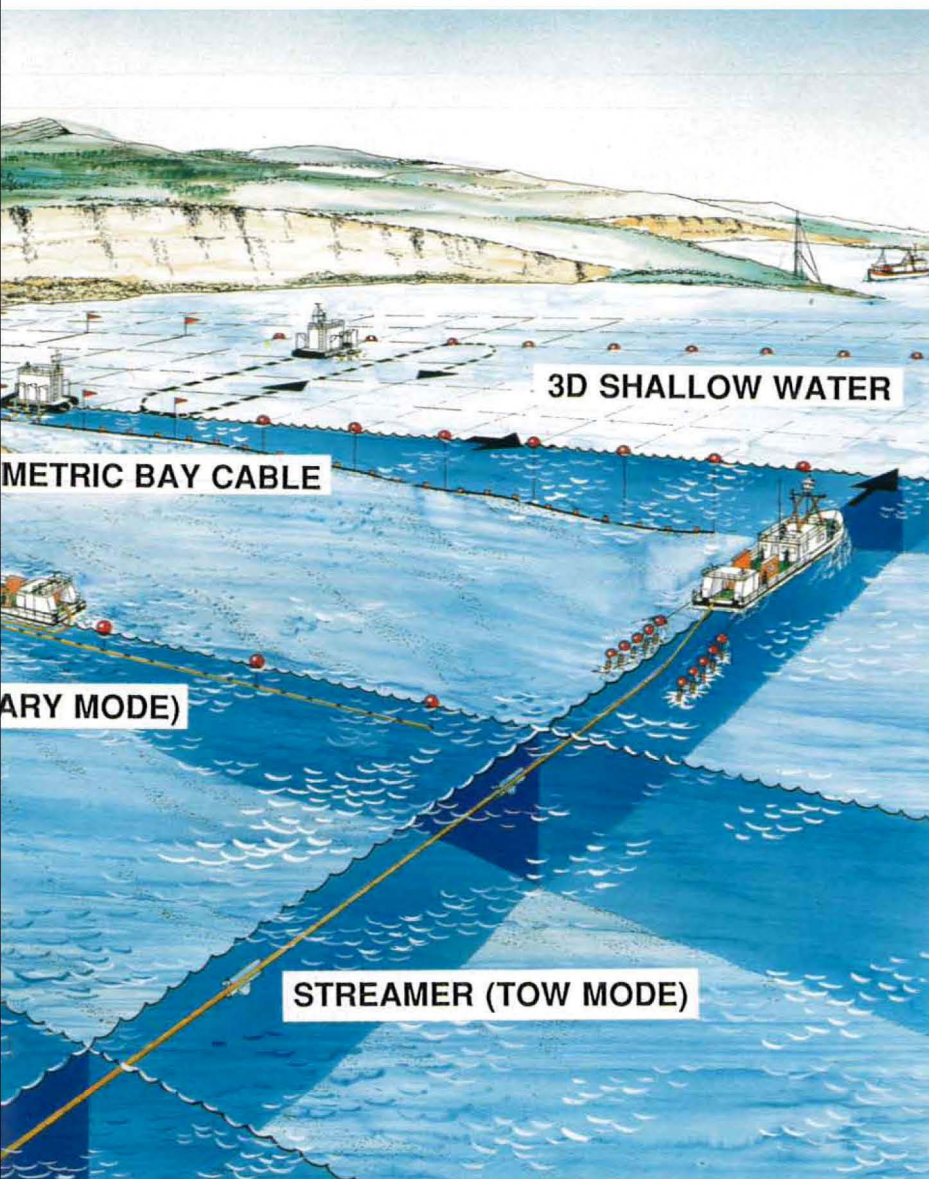
Telemetry receiver spread



Shallow draught airgun pontoon



Bay cable operation



Mother and support vessel FLORA



Shallow water survey vessel FLUNDER

THE SHALLOW WATER WORLD OF GECO-PRAKLA



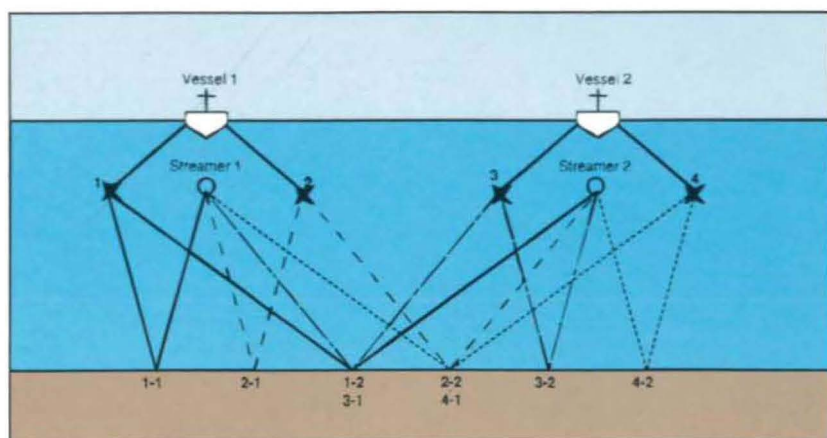
Telemetry recording pontoon



Land tie operation

ADVANCED 3D SHALLOW WATER DATA ACQUISITION

GECO-PRAKLA's DUAL SURVEY VESSEL TECHNIQUE IN OPERATION

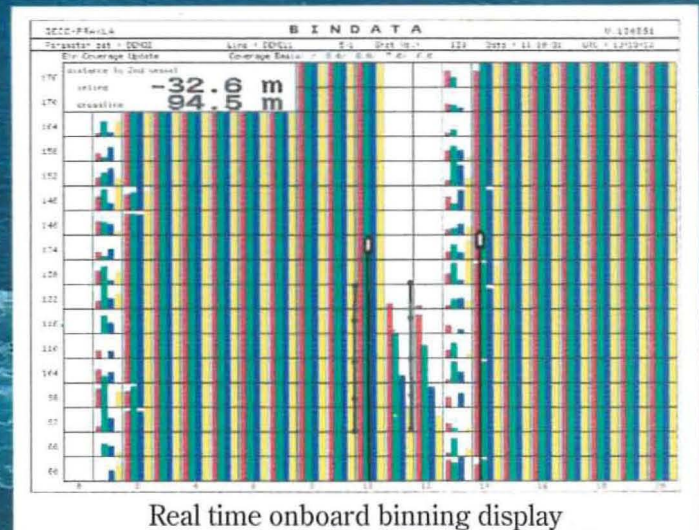


Quad source/Dual streamer/Dual vessel operation in shallow waters

As an extension of the well known "Quad Source / Quad Streamer" 3D deep marine acquisition technique, GECO-PRAKLA is able to offer a similar and very cost effective 3D seismic data acquisition mode for shallow water areas. The "Quad Source / Dual Streamer" 3D shallow water technique combines advanced streamer and source positioning technology with proven shallow water data acquisition modes.

Two specially designed shallow water vessels are used, each towing one streamer and 2 energy sources. Typical lateral tow distance between the airgun arrays is 50 - 80 meters.

Both survey vessels are guided by a computer controlled track steering system in order to maintain the desired vessel separation. The real time onboard binning systems process all available positioning data and ensure continuous bin coverage and field quality control.

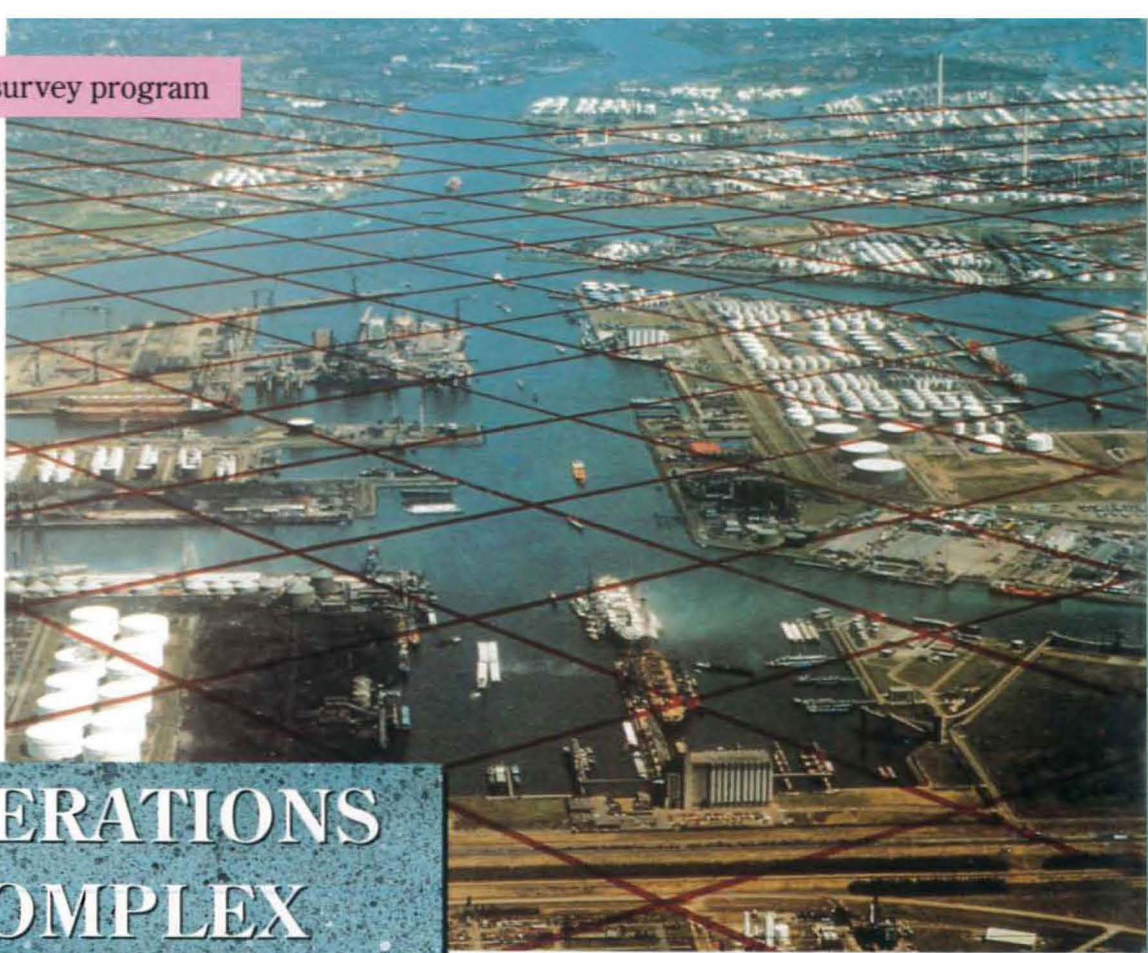


TELEMETRIC SYSTEMS

DIGISEIS 200 E*
240 channels/buoys with self test
Transmitter frequency 72-77 MHz
* Trademark of TERRA MARINE



The survey program



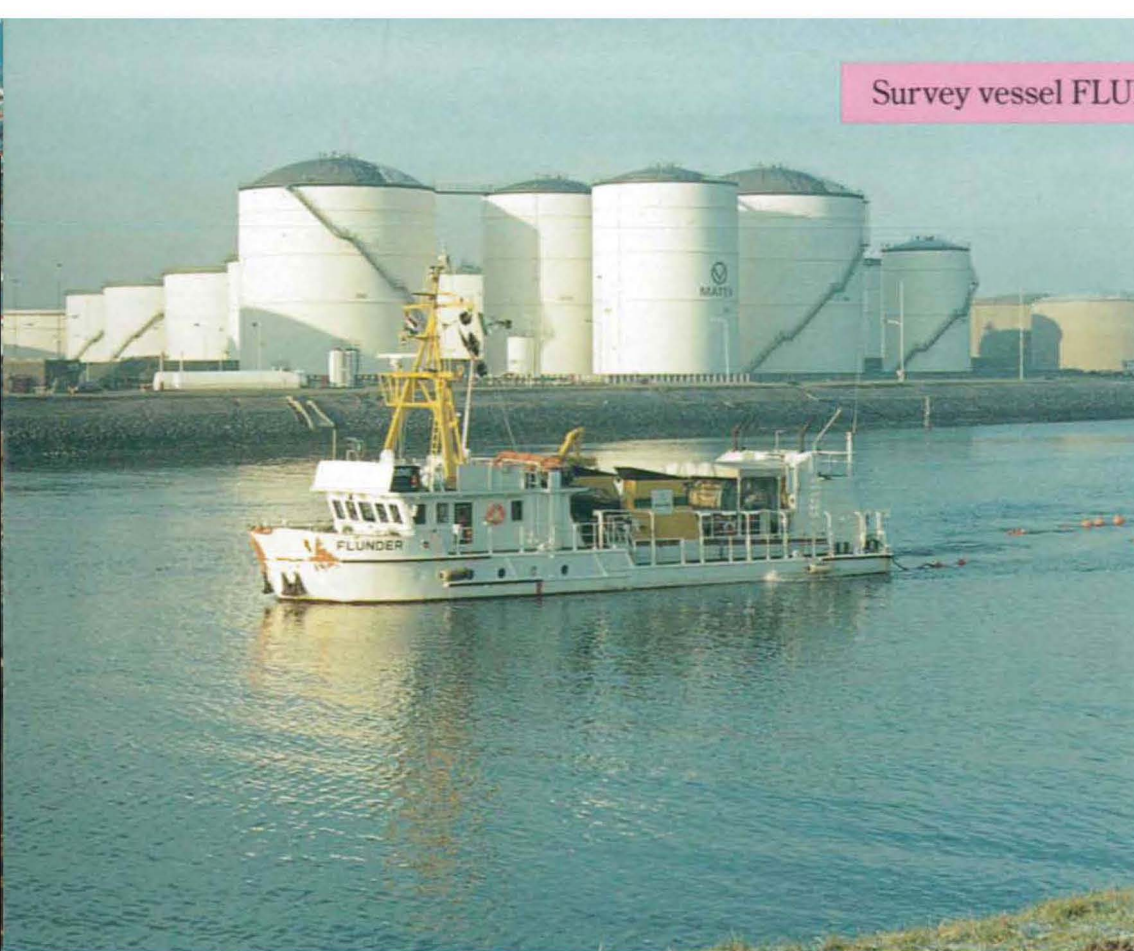
3D OPERATIONS IN COMPLEX ENVIRONMENTS



Airgun pontoon in Rotterdam harbour

A 3D program like this requires very flexible methods, experience, and a creative seismic survey party. In order to achieve the flexibility that this program demanded more than US \$ 13 million worth of equipment had to be available. Know-how and experience gained in 25 years of continuous work in such or similar environments was the key to success!

Survey vessel FLUNDER



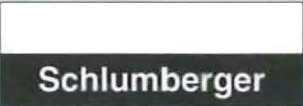
Land tie operations

Energy sources used:

- Vibrators onshore
- Explosives in drilled holes
- Airguns on survey vessels and pontoons

Receiver types used:

- Geophones on land
- Hydrophones in bay cables
- Hydrophones in streamers



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