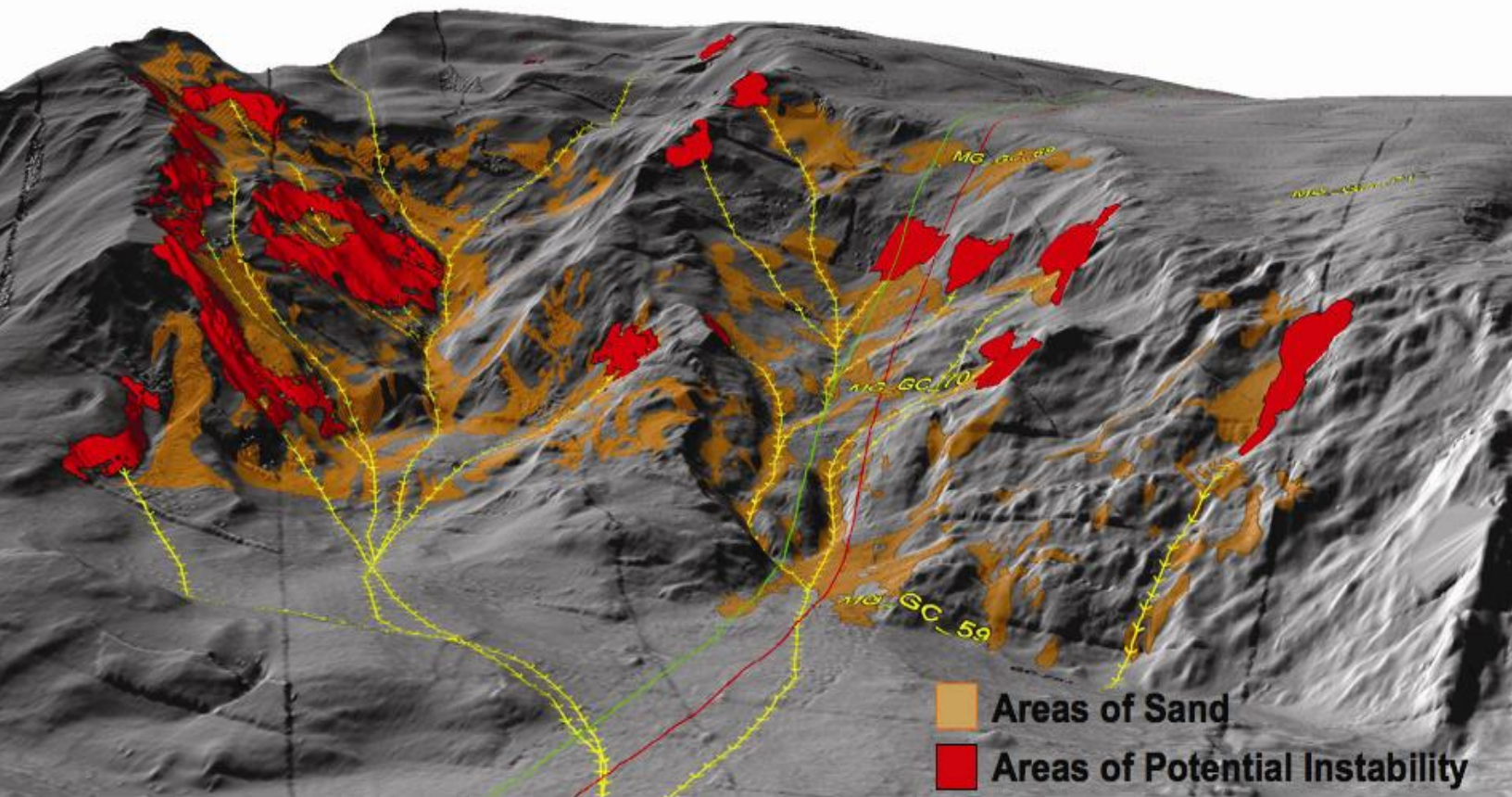


Survey Engineering

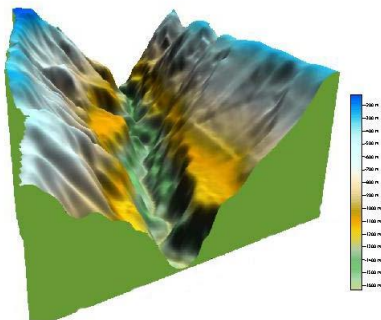
Capability and Experience



Capability Overview

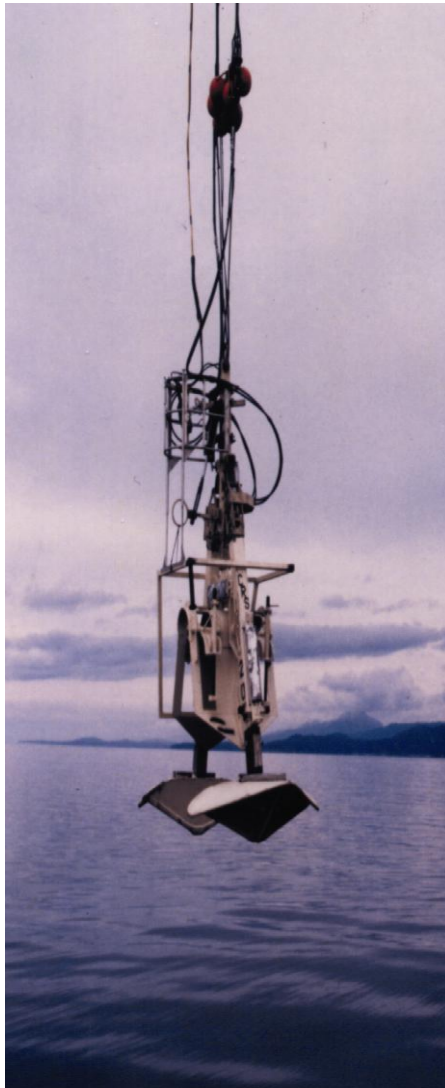
INTECSEA's survey and geotechnical staff includes senior surveyors, marine geophysicists and geologists, oceanographers and geotechnical engineers, as well as pipeline engineers with extensive site and route selection and field layout, survey management and offshore survey supervision experience. All field personnel are trained in offshore HSE management and compliance monitoring.

INTECSEA's offshore survey capabilities and project experience encompass marine geophysical and geotechnical surveys, pipeline routing, geohazard mitigation and permitting support through construction oversight and as-built documentation. INTECSEA has established a reputation of expertise in the oil and gas industry, particularly in regards to route and site evaluation surveys in challenging and frontier environments.



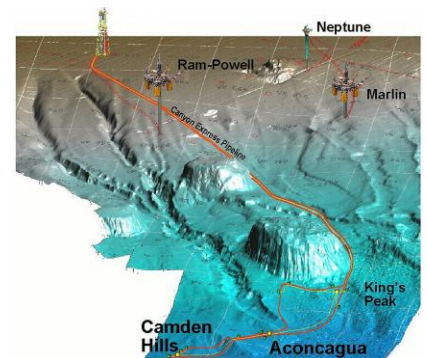
2,200m

Water depth and beyond



Services

- Desktop and Site Evaluation Studies
- Pipeline Layout and Route Selection
- Geophysical/Geotechnical/Environmental Survey Specifications
- Preparation of Survey Tender Documentation
- Bid Evaluation
- Contract Negotiation Assistance
- Survey Vessel HSE Audits
- Onshore/Offshore Survey Supervision
- Geohazard Evaluation and Mitigation Recommendations
- Review and Approval of Survey Reports and Charts



Project Experience

Project: Vancouver Island Gas Pipeline Project

Client: West Coast Energy

Phases: IDENTIFY >> EVALUATE >> DEFINE >> EXECUTE >> OPERATE

Preliminary design and cost studies through detailed engineering and construction supervision

A 530 km gas transmission system was installed to transport natural gas to Vancouver Island, British Columbia. The system includes several marine crossings of the deep channels of the Strait of Georgia and Malaspina Strait. All crossings are dual 10.75-inch pipelines, with a total length of 92 km in water depths to 425 m.

Vancouver Island, Canada



Project: CPC Talinpu SPM No. 3 Terminal Project

Client: Chinese Petroleum Company

Phases: IDENTIFY >> EVALUATE >> DEFINE >> EXECUTE >> OPERATE

Complete engineering and construction management of the offshore terminal project

The Talinpu Refinery SPM No. 3 crude oil import terminal near Kaohsiung, Taiwan consists of a Single Point Mooring (SPM) for 300,000 dwt tankers, and 8 km long 56-inch crude oil and 8 km long 16-inch bunker fuel offshore pipelines.

Kaohsiung, Taiwan



Project: Star and Rayong SPM Terminal

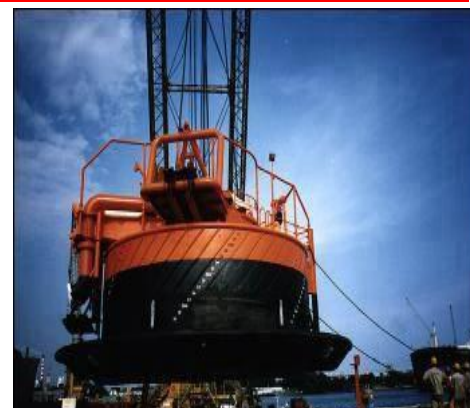
Client: Star Petroleum Company

Phases: IDENTIFY >> EVALUATE >> DEFINE >> EXECUTE >> OPERATE

Detailed engineering, procurement assistance and construction management services

A crude oil import terminal consisting of an SPM for 280,000 dwt tankers and a 19 km long 48-inch pipeline was installed to service the Star and Rayong Refineries in the Gulf of Thailand. The refineries are operated by Caltex and Shell, respectively.

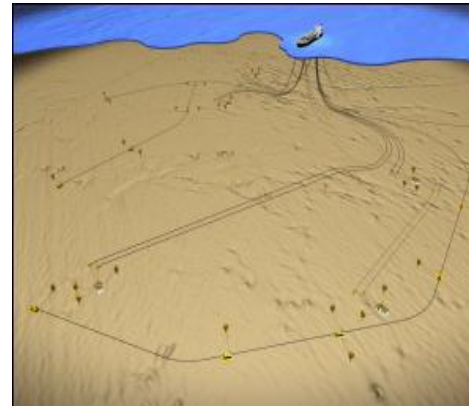
Gulf of Thailand



Project: Bonga Field Development**Client: Stolt Offshore Services****Phases:** IDENTIFY >> EVALUATE >> DEFINE >> EXECUTE >> OPERATE

Layout of the infield flowlines and gas export pipeline route selection, and flow assurance of the gas export pipeline and water injection flowlines

The Bonga Field is located southwest of Warri, about 120 km offshore Nigeria in approximately 1,100 m water depth. The development includes a permanently spread moored FPSO, to which ten 10-inch and 12-inch diameter pipe-in-pipe production flowlines will transport multi-phase hydrocarbons from subsea wells via eight production steel catenary risers (SCRs). Field layout was a significant element, particularly in the early stages of the project. The local topography is dominated by a large channel that traverses the development area, and in the northern area, mud volcanoes rise approximately 100 m above the seafloor. Evidence exists for the widespread occurrence of shallow gas and there are numerous large depressions and deep pockmarks, gas chimneys and carbonate concretions.

Bonga Field, Nigeria**Project: Uruguay to Brazil Pipeline****Client: Gasoducto Cruz del Sur SA****Phases:** IDENTIFY >> EVALUATE >> DEFINE >> EXECUTE >> OPERATE

Front End Engineering Design (FEED) and produced more than 300 deliverables including drawings and reports during this fast-track project

This gas transmission pipeline project from Colonia, Uruguay to Porto Alegre, Brazil, consists of approximately 870 km of a 24-inch pipeline at a maximum pressure rating of 95 bars. Design flowrate is 12 mmscmd with three compressor stations. The pipeline route encounters different geological formations and topography, including three major river crossings close to Porto Alegre.

Uruguay and Brazil**Project: Malampaya Pipeline****Client: Shell Phillippines Exploration****Phases:** IDENTIFY >> EVALUATE >> DEFINE >> EXECUTE >> OPERATE

Pipeline conceptual engineering and final pipeline route selection

Offshore pipelines transports natural gas from the Malampaya Field to Batangas Bay, South Luzon Island for conversion to electric power. Hydrocarbons produced from the Malampaya subsea wells in 850 m water depth flow through two 16-inch CRA clad pipelines to a shallow water platform in 40 m water depth. After separation, sales gas is transported through a 500 km long 24-inch offshore pipeline to Batangas.

The offshore pipeline traverses highly varied and challenging terrain consisting of vast zones of relict coral reefs, a complex, active tectonic plate boundary, an extensive system of active submarine channels formed by river discharges and active tectonic fault zones. INTECSEA was selected by Shell to provide conceptual engineering services, detailed pipeline route surveys and engineering assessments.

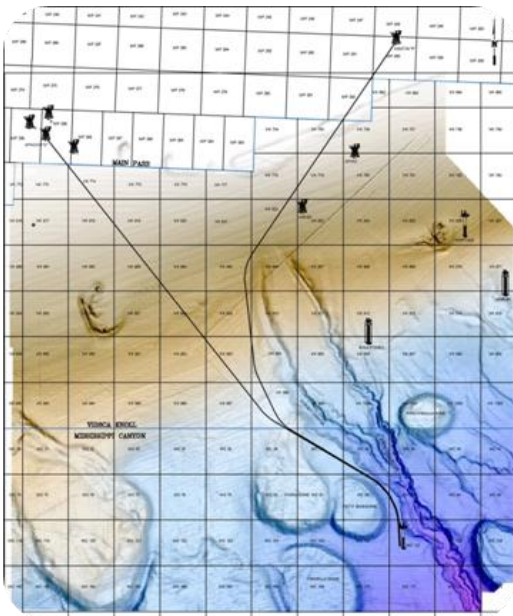
Malampaya Field, Philippines

About INTECSEA [\(click here to learn more about INTECSEA\)](#)

For more than 25 years, INTECSEA has provided frontier technology leadership for the energy industry's most challenging offshore field development and pipeline projects.

INTECSEA was formed in 1984 and provides design for floating systems, risers, pipelines, and subsea engineering and construction management services within the global WorleyParsons Group. INTECSEA has established operating offices in Houston, Kuala Lumpur, Singapore, Delft, Rio de Janeiro, Jakarta, Angola, Cairo, St. John's, Perth, Melbourne, and London. [\(see all WorleyParsons' locations\)](#)

INTECSEA's major areas of expertise include deepwater subsea and floating production systems, marine pipeline and riser systems, Arctic pipelines, marine terminal systems, and Arctic structures. Additional areas of expertise include flow assurance and operability, marine surveys, marine operations, and offshore equipment design.



A History of Innovation and Benchmark Achievements...

SUBSEA

- Deepest Subsea Production
- Longest Oil Tieback
- Longest Gas Tieback
- First Subsea Allocation Flow Meters
- First 15,000 psi Subsea Trees
- First Electrically Heated Pipe-in-Pipe Flowlines
- Deepest Multiphase Subsea Pumps
- First Super Duplex Umbilical
- First Diaphragm Chemical Injection System

RISERS

- First Pipe-in-Pipe Steel Catenary Riser
- First Reeled Steel Catenary Riser
- The Deepest Steel Catenary Risers
- Most Shallow Catenary Riser
- Largest Diameter Flexible SCR Joint
- First SCRs on an FPSO
- Most Direct Vertical Access Risers
- First GOM Free-Standing Riser

FLOATING SYSTEMS

- Largest FPSO
- Deepest TLP at Time of Installation
- Deepest SPAR at Time of Installation
- Most Installed TLPs
- First Deepwater FPU Operated with a Drilling Tender
- Most Types of Floating Systems

MARINE PIPELINES

- Deepest S-lay Pipeline
- Deepest J-lay Pipeline
- Longest Offshore Pipeline
- First Offshore Arctic Pipeline
- First Arctic Pipeline Leak Detection System
- First Piggable Wyes
- First Arctic Pipeline Bundle

(for more capabilities information [click here](#))

Global Reach,
Local Knowledge,
Global Solutions



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our global capability, email

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