RIG MOVE ASSIST™

SUPPORT & SERVICES

Keppel

Offshore Technology Development

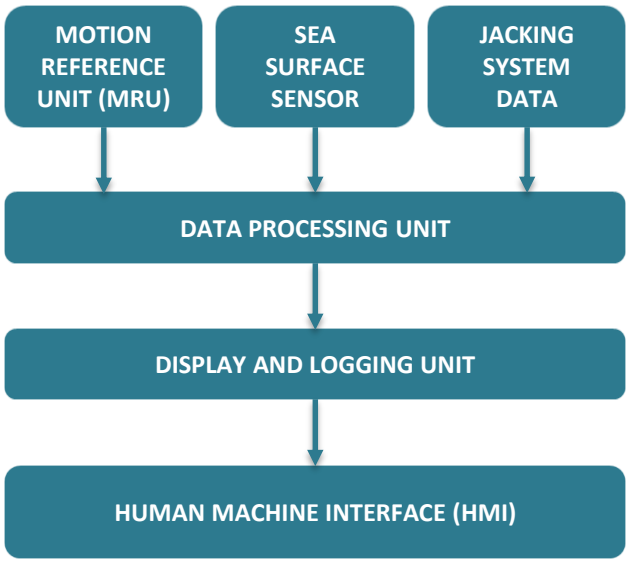
OTD Rig Move Assist™ is developed with the objective of helping rig movers in their decision making process required during rig move operations such as jack up rig transit, going on location and leg lowering, preloading as well as going off location and leg raising operations.

The Rig Move Assist™ utilises on-board sensors to capture information about present vessel conditions, responses, sea-states, and present the processed information which can be easily viewed and interpreted by user. Site dependent or generic vessel operating limits can be integrated into system to provide timely information to assist rig movers in decision making process.

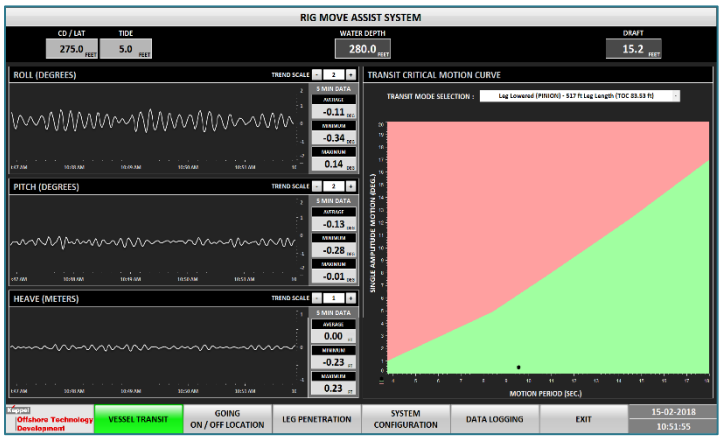
The Rig Move Assist™ is a microcontroller based system which process data from a number of sensors to derive various critical parameters required during rig move operation. The system offers a continuous and automated monitoring of information and provides rig movers better visibility of on-going operation against the design limits.

The system focusses on three critical areas for rig move operation: **Vessel Transit, Going On/Off Location,** and **Leg Penetration.**

A module dedicated to each operation is provided, with simple toggling between modules as the operations proceed. On each display, the processed information associated to the particular operation is isolated and presented in the most relevant form to assist in decision making.



VESSEL TRANSIT MODULE



During vessel transit, the information gathered from the motion reference unit are processed and observed against critical motion curves which are integrated in the system based on the rig's Marine Operation Manual (MOM).

The vessel transit module eliminates the need for the rig movers to manually determine the rig's motion period and single amplitude angle of motion, reducing potential human measurement error.

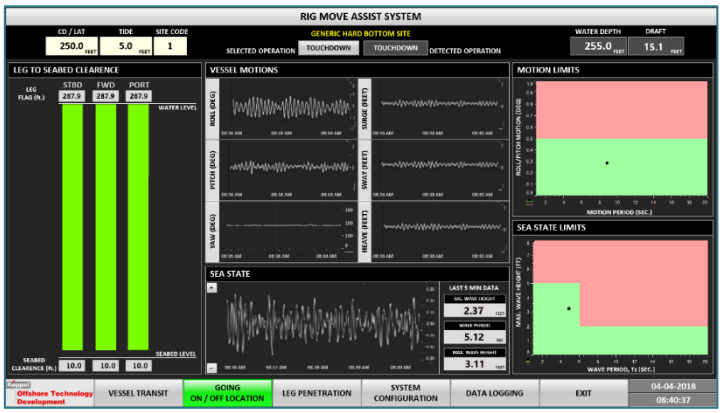
Key Features:

- Integrated processing and visualization of real-time vessel motions
- Selection of different transit modes
- Direct comparison with MOM critical motion curves

Key Display Parameters:

- Draft
- Water depth (user input)
- Raw vessel motions: roll, pitch, heave
- Processed motion information: average, minimum, maximum, periods

GOING ON/OFF LOCATION MODULE



During going on/off location operation, it is important for rig movers to be equipped with timely information on the present location of the legs, the units motions, and the local sea states.

The going on/off location module collates and processes information from a range of sensors to deliver this information in a form directly comparable to assessed rigs limits.

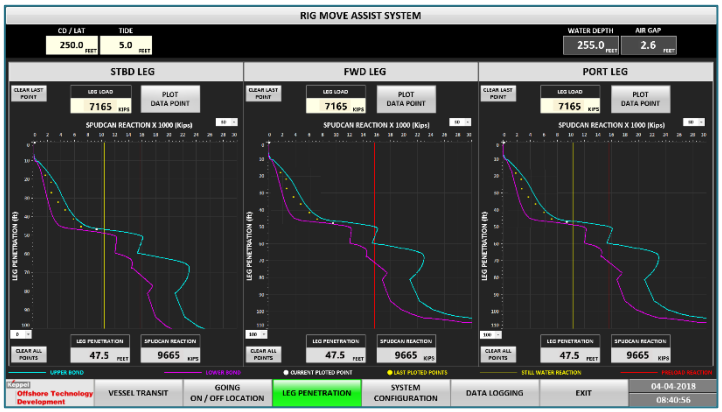
Key Features:

- Real time tracking of legs position against seabed
- Integrated processing and visualization of real-time motions
- Integrated processing and display of real-time sea state information
- Intuitive display of motions and sea states against assessed limits
- Fully compatible with OTD site-specific rig move assessment. Limits developed in site specific assessments can be uploaded into the system

Key Display Parameters:

- Draft
- Water depth (user input)
- Leg travel and clearance from seabed
- Raw vessel motions (going on location): roll, pitch, heave
- Processed motion information: average, minimum, maximum, period
- Sea surface profile (going off location)
- Processed wave information: significant wave height, maximum wave height, wave period

LEG PENETRATION MODULE



The leg penetration module utilizes information from sea surface sensor and leg position measurement to automatically calculate the amount of penetration on each leg as the leg penetration progresses.

During preload or hull raising operation, the operator is able to enter the estimated leg load in system, which then calculates and displays spudcan reaction vs. penetration as the leg penetrates into seabed.

Key Features:

- Upload and visualization of site specific penetration curves (prepared for each site)
- Simple entry and plotting of penetration positions as the installation proceeds
- Assists rig movers in assessing penetration progress as providing an indication of unexpected penetration behavior

Key Display Parameters:

- Air gap
- Leg load
- Leg penetration
- Spudcan reaction

SYSTEM ARCHITECTURE

OTD Rig Move Assist™ typically consists of motion reference unit, sea surface sensor, data processing unit, display and logging unit, human machine interface, and connection with on-board jacking system. Additional sensor can be added to customize the system as per requirement.

- **Motion Reference Unit:**
  The motion reference unit is recommended to be installed at centre of gravity of the vessel. The sensor measure six degree of motion of the vessel.

- **Sea Surface Sensor:**
  The sea surface sensor is typically installed under the helideck or on the main deck with extended mounting arm. The downwards facing sensor measurement are used to calculate vessel draft during floating condition and air gap during elevated condition. As the wave is undisturbed when the vessel is elevated, the sea surface sensor is also used for developing sea-state information for moving off location.

- **Monitoring Console:**
  The monitoring console is provided to house the data processing unit, display and logging unit, and human machine interface. The console can be conveniently located in the jacking control room.

Motion Reference Unit

Sea Surface Sensor

Monitoring Console

Keppel
Offshore Technology Development

55 Gul Road, Singapore 629353
Tel : (65) 6863 7409
Fax : (65) 6862 3465
Enquiries : enquiry@keppelotd.com
Support : support.otd@keppelotd.com
Web : www.keppelom.com/otd