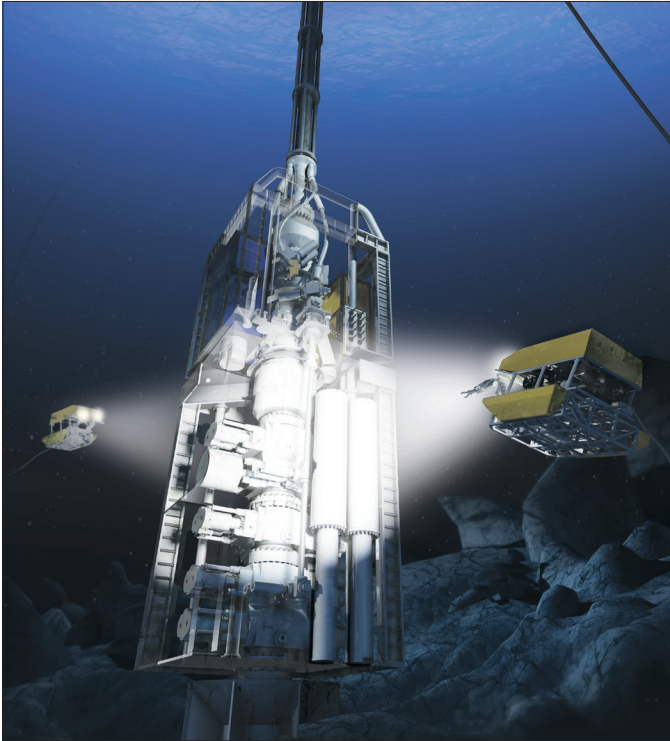


Cognition Stack Instrumentation Infrastructure Package



The Cognition™ package is a network of sensors, data recorders, and communications on the subsea stack that provides critical information for real-time subsea stack monitoring, condition-based maintenance, and emergency mitigation and recovery.

Real-time subsea stack monitoring can provide access to crucial details about subsea stack condition and performance.

Subsea BOP condition data is gathered and analyzed, providing drillers new information that can be useful in planning and conducting maintenance which can be helpful in reducing unplanned downtime.

The rich new set of data and redundant means for transmitting data from the subsea BOP to the surface provides vital information to identify and respond to well control emergencies.

Features and Benefits

- Helps to prevent failures and reduce downtime
- Data retrieval and recovery of historical and real-time information
- Up to four redundantly accessible data transmission paths
- Flexibility to incorporate a wide range of sensors

System Components

- **Sensors and monitoring** gather data from the subsea BOP including ram position, hydraulic fluid condition, stack accumulator bottle fluid volume, pressure and temperature, solenoid performance, and connector unlatch pressures
- **Sensor Interface Box (SIB)** aggregates data from 80+ sensors to capture crucial subsea stack operation information
- **Inductive connections** can robustly and reliably transfer data and power throughout the system even if main umbilicals experience failure
- **Multiple data retrieval techniques** are designed to increase data availability in an emergency and include data retrieval via main umbilicals, acoustic transducers, ROV (inductive or wet-mate), and black boxes
- **Black box** enables forensic data analysis by recording three weeks of time-stamped data from all sensors plus communication from the main control system
- **Cognition Knowledge Base** provides advanced analytics, alerts, alarms and reports that synthesize both real-time and historical data into useful information