

Rail-Based ADCP Deployment System for the Pacific Santa Ana Drill Ship

Project Characteristics:

- *Real-time metocean system on drill ship in Gulf of Mexico*
- *Deck mounted frame with a sliding block*
- *Hull mounted rails guide a sled carrying a 75KHz or 38KHz ADCP*
- *Power, data, and control signals carried through a slip ring providing real-time measurements to NDBC*

The current measurement system installed on the Pacific Santa Ana is designed to measure ocean currents at multiple depths from the near surface to approximately 500 meters (~1600 feet) below the ship's keel. Measurements are produced in near real-time and are available on-board to support safe drilling operations and associated adjustments of ship's heading and position. Surface and near-surface currents exert large forces on the hull that could force a vessel off station if not counteracted with thrusters. The currents below the keel also can exert large forces on the drill string. Current speed and direction both commonly vary with depth, creating shearing forces that can twist and bend the drill string. Awareness of the magnitude and direction of these forces enhances drilling safety and efficiency.

The current measurements are also sent over the internet to shore-side servers. Metocean personnel use the measurements to understand and model local oceanographic processes. Measurements are also combined with other rigs to understand oceanographic processes on larger scales. Better understanding of these ocean processes, particularly extremes of current and wave strength, is used to design safer rigs and improve safety.



Velocity measurements are made by a Teledyne RD Instruments (TRDI) Long Ranger, a 75 KHz Acoustic Doppler Current Profiler (LR75 ADCP). The LR75 is mounted on a steel sled, which rides between the deck and the operational position at the turn of the bilge keel along steel rails mounted to the hull.

The ADCP is deployed and recovered with a Launch and Recovery System (LARS) designed and built specifically for the Pacific Santa Ana. The LARS includes the rails and sled, an A-frame, hydraulic winch, and associated components on A-Deck along with electro-mechanical cabling between the LR75 and the system control computer. The system control computer is located in the Engineering Control Room (ECR).