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## FUGRO GEOS ENSURES STELLA SPM LEADS THE WORLD

Fugro GEOS has successfully implemented new technology on 'Stella', the Bonga SPM (Single Point Mooring) Buoy - the largest in the world. The project, offshore Nigeria, has recently seen the installation by Fugro GEOS of an innovative, real-time meteorological, oceanographic (metocean) and upgraded tension monitoring system that ensures Stella leads the world in SPM technology. Powered by integrated solar power systems, and with telemetry and remote data display units, the system allows data to be monitored and displayed in real-time for use by approaching tankers.

Contracted to Single Buoy Moorings (SBM) of Monaco, who were working for the Bonga field operators SNEPCo (Shell Nigeria), Fugro GEOS was approached by Shell to design, build and install an accurate real-time metocean monitoring system, in support of tanker approach, berthing and offloading operations from the Bonga SPM and FPSO (Floating, Production, Storage and Offloading). In addition, the existing hawser and anchor tension system was upgraded and integrated to the metocean system. Logged data were to be archived for support of design analysis of FPSO and SPM moorings and risers for the life of the field and for future field developments.

"In this project we made the first use of surface-recoverable ADCP (Acoustic Doppler Current Profiler) deployment frames; cross-turnstile real-time radio modem links for all anchor tension and current profile data; a downward looking ADCP on an SPM; and an H-ADCP (Horizontal ADCP) deployed on a rotating turntable to acquire near-surface current speed and direction, all corrected for turntable heading," explains Michael Quinnell, Fugro GEOS Seasystems Manager.

"This new technology enabled us to undertake and complete the most comprehensive real-time metocean and tension monitoring system of its kind installed on an oil offloading SPM /CALM (Catenary Anchor Leg Mooring) buoy.

"As with all offshore operations, safety was of paramount importance, especially as the majority of the SPM was classified as a Class 1 Div 2 hazardous area resulting in all power systems needing to be intrinsically safe, as well as the majority of the sensors and telemetry components. An added safety bonus was that our robust surface-recoverable ADCP deployment systems negated the need for divers to support installation and future in-water sensor maintenance, significantly reducing personnel risk and installation costs."

The system was designed to acquire a large quantity of raw, high frequency metocean and tension data to allow detailed future investigations of metocean conditions (e.g. squall

monitoring, wave steepness), and SPM movement (e.g. tanker mooring hawser 'snagging', SPM heave, pitch, roll and anchor chain tensions).

Using Fugro GEOS' *'Weather Monitor 2000'* software, all data are transmitted over a radio link at 1-minute updates for display in real-time on portable PCs used by the pilot onboard the tanker and/or tugs as well as on the FPSO. This allows critical data influencing the berthing and oil offloading operations to be available when and where it is required. The data are displayed in a user-friendly and clear format, allowing the operators to view present and past conditions, identify trends in environmental conditions, and be alerted to adverse and worsening conditions.

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Further information on all aspects of Fugro GEOS activity can be found at [www.geos.com](http://www.geos.com).

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