

# Maximum performance, value highlight GSF jackup

**GLOBAL SANTAFE'S NEWEST JACKUP** rig, Constellation I, was designed and built with maximum performance and value in mind. The company's engineers combed through every component and searched for what could be done to decrease the overall cost while maintaining high performance.

The result is a state-of-the-art jackup with unique systems designed for performance as well as the highest level of safety. These systems include Deck SMART and Wellhead SMART, anti collision system for equipment and personnel, state-of-the-art Driller's cabin and 75 ft cantilever reach with a cantilever pipe rack long enough to make up and store drill pipe triples and casing doubles.

## INNOVATIVE DESIGN

One of the design features of the Constellation I is its placement of the crew quarters. Rather than placing the accommodations in front of the bow leg as is typically the case, taking up valuable space, the Constellation's quarters are placed on each side of the bow leg and are slightly cantilevered over the deck.

Additionally, deck hatches have also been moved to the perimeter of the deck. This arrangement serves several purposes, according to **Darren M Sutherland**, Sales and Contracts for GlobalSantaFe.

"The center deck area provides clear, uncluttered and unrestricted access to the deck to minimize trip hazards," Mr Sutherland said, "and it gives operators a clear view of what is on the deck."

"A side effect is that we can get a longer cantilever in the space, so the cantilever deck is larger."

Moving the accommodations to the outboard sides of the bow leg also acts as a counterbalance, providing better weight distribution for the longer 75 ft cantilever reach, which can accommodate more weight if necessary.

The cantilever beams are 174 ft long, with a 108 ft long cantilever deck, which

provides the space necessary to store triple stands of drill pipe and doubles of casing as well as the pipe handling equipment to make up and break out pipe and to move the pipe from horizontal to vertical position.

There is additional room in the cantilever for mud processing equipment, cement unit and BOP.



**GlobalSantaFe's Constellation I as it nears completion at PPL Shipyard in Singapore. The rig is presently working for Premier Oil offshore Myanmar under a three-well plus option contract.**

The combined cantilever load capacity on centerline at 75 ft is 2,600 kips. At 15 ft either side of centerline at 75 ft the load capacity is reduced to 1,209 kips.

The rig has 16,100 square ft of useable deck space, more than twice the area of a LeTourneau Enhanced 116-C Class jackup and nearly 3,000 more square ft than a Friede & Goldman Mod V design.

Variable load rating of 10,000 kips in the drilling mode and 6,600 kips in storm conditions also compares favorably to an enhanced 116-C and Mod V.

The quarters features accommodations for 120 with 58 two-man cabins and four

one-man rooms. Each room has its own private bath and is sized to meet the latest requirements of the UK HSE.

The rig has three raw water pumps delivering 2,200 gallons per minute each, and one dedicated preload pump rated at 6,000 gpm, providing a total of 12,600 gpm for preloading.

"That gives us the ability to take on full preload in about 3 ½ hours," Mr Sutherland said.

## DECK SMART

The Deck SMART (Stand Make-Up and Run Technology) system moves stand make up off the critical path by transferring the process to the cantilever deck area. During make up and break out, a knuckle boom crane located on the cantilever deck feeds single joints of drill pipe or casing to the automated tubular stand make up and break out machine, which builds stands of pipe horizontally on the cantilever deck.

The use of a knuckle boom crane in conjunction with the automated system significantly reduces risk to personnel by eliminating manual handling and reducing the level of drill floor activity.

The system is capable of handling 3 ½-in. to 6 5/8-in. drill pipe, including heavy wall pipe, 4 ¾-in. to 9 ½-in. drill collars and casing up to 13 3/8-in.

When the stands are made up they are either stacked on the cantilever deck or moved to the catwalk where the horizontal to vertical pipe elevator transfers the stand to the drill floor. The pipe elevator can lift two stands of drill pipe or casing at one time.

Once in the derrick, the National Oilwell StarRacker pipehandling system, with an integrated Iron Roughneck, removes the stands from the elevator and transfers them to the setback area or directly to the well center. The elevator then returns to the horizontal position and collects the next pair of stands.

The StarRacker system can rack back a total of 30,000 ft of pipe.

## WELLHEAD SMART

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Wellhead SMART is the rig's BOP and subsea tree handling system installed in a completely enclosed area below the drill floor.

"The system comprises equipment from different manufacturers but the concept is ours," Mr Sutherland noted.

The BOP forklift is a 125 ton bridge crane that moves longitudinally and transversely and is equipped with a set of hydraulic telescoping lifting forks that move vertically. The forks engage the BOP under the annular on a specially designed lift ring. The BOP forklift allows the BOP to be placed anywhere within the drilling envelope.

The storage and test area is a clean, dry area separate from the cellar deck. It is equipped with a portable test unit and a 30 ton overhead crane to assist with assembly and disassembly of the BOP. The 13x13 ft access hatches above this area immediately forward of the drill floor allow BOP and subsea equipment to be placed in the storage area by the rig's cranes.

The BOP is a Hydril 18 3/4-in. 10,000 psi unit rated for H<sub>2</sub>S service. The single stack reduces BOP handling and nipping up and down times. The BOP is also fitted with work platforms that provide safe and easy maintenance.

The conductor tensioning unit (CTU) consists of eight hydraulic cylinders below the connector-lifting ring, which provides up to 600 kips of tension. An additional 300 kips of secondary tension can be supplied from above. The 900 total kips enables the rig to maintain tension on the conductor pipe when drilling subsea templates in deepwater locations. The CTU has the ability to hold tension anywhere within the drilling envelope.

The conductor tensioner platform (CTP) is an enclosed support structure suspended below the CTU and provides a safe working environment by eliminating all over open water operations.

Splitable deck panels allow subsea templates and trees to be run from the rig.

## ENVIRONMENT

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The rig was designed with a zero discharge philosophy, meaning the rig is

technically not zero discharge but facilities are in place to allow GlobalSantaFe to accomplish that.

"The rig is configured to contain spills on the decks and in major rooms," Mr Sutherland said.

Among the environmental considerations, all areas where there is potential for hazardous spills have containment

bunding and drainage routed to designated tanks. The oil/water separator is designed to reduce oil contamination to 15 ppm.

Additionally, the solids control area has been designed to accommodate skip and ship cutting containment equipment and cuttings cleaning equipment, which is possible due to the rig's large deck space. ■