

# InSide

GustoMSC

April 2009 number 13



## this issue:

NG-2500X for SEAJACKS UK Ltd Project update >

Development of the Offshore Drilling Markets

Interview with Keesjan Cordia of Seafox Contractors and Workfox

Light Offshore Drilling Unit



GustoMSC

# Contents



- 3** Preface
- 4** Development of the offshore drilling markets
- 10** Interview with Keesjan Cordia of Seafox Contractors and Workfox
- 12** DSS series of Drilling Semi-Submersibles at Keppel Fels
- 13** P10,000 Steel Cutting Ceremony
- 14** Construction progress of the three TDS semi submersibles at GPC
- 18** Light Offshore Drilling Unit
- 19** GustoMSC CJ series drilling jack-ups under construction
- 20** MOPUstor for Talisman (under construction)
- 22** AKCO's Kashagan Flash Gas Compression Barges Nr. 3, 4 & 16
- 23** No sunset over P-57 FPSO project
- 24** GustoMSC offshore cranes for installation works offshore
- 26** NG-2500X for SEAJACKS UK Ltd - Project update
- 27** Turn-key delivery PTB (Personnel Transfer Bridge)

## Colofon

GustoMSC Inside is a publication of  
• Gusto B.V.  
• Gusto Projects B.V.  
• GustoMSC Inc.  
• Marine Structure Consultants (MSC) B.V.

Total circulation: 4,000  
This publication is edition 13, April 2009

Edited by Monique van der Have and  
Gerrit Jan Schepman

Design and compilation by Stijlmeester, Utrecht (NL)

Printed by drukkerij Hellinga, Leeuwarden (NL)

All editorial material is the property of above mentioned companies and may therefore not be copied or reproduced without our approval. A copy of 'GustoMSC Inside' can be obtained by calling us: +31 (0)10 2320 000 or by fax: +31 (0)10 2320 101 for the attention of Gerrit Jan Schepman or Monique van der Have or by email: [marketing@GustoMSC.com](mailto:marketing@GustoMSC.com)

# Preface

Since the last issue of Inside, both world business and our markets have taken a drastic turn. From a boom time of orders for some 230 drilling rigs in approx 3 years, to a time in which hardly any drilling rigs have been ordered in the last six months.

Our industry will however be kept busy completing the rigs on order for approximately the next two years. The year 2009 is expected to see completion of some 12 Drilling Units of GustoMSC design with another 10 scheduled for 2010. This issue of Inside provides lots of information on these projects.

As shown in the “matrix” below, GustoMSC has a wide range of mobile offshore units with which to serve the industry. We design Jack-ups, Semi-submersibles and Ships for a wide range of applications, ranging from exploration (drilling) to construction and production.

These Installation units will be equipped with GustoMSC jacking systems and in most cases will also carry a GustoMSC main crane.

There has also been plenty of activity in the production segment with design and engineering for two production jack-ups for respectively the Talisman YME and the Encana Deep Panuke projects, and also the Kashagan barges and P-57 as described in this issue of Inside.

All in all, a product range that enables us to serve all aspects of the Mobile Offshore industry with a wide variety of proprietary designs and the supply of a range of special associated, proprietary equipment.

Exploration	Construction	Production	
			Jack-up
			Semi-submersible
			Vessel

Following on from a very busy time in the drilling segment we are now experiencing serious activity in the construction segment and especially in the Wind Turbine Installation market with increasing demand for jack-up installation vessels. Information on these projects can be found in both this issue and our previous issue.

**Han Mommaas**  
Managing Director - Marine Structure Consultants (MSC) BV



# Development of the Offshore Drilling Markets



*Maersk Developer, Maersk Resilient, Maersk Resolve*

**Besides dividing the world into regions, one can subdivide the offshore drilling activities into water depths, i.e.:**

- **Shallow waters from 40 to 150 m which are mainly the domain of the jack-up units**
- **Midwaters up to around 1,500 m which are mostly covered by third generation semi-submersibles or drill ships**
- **Deep waters up to 3,000 m which are served by the fifth or sixth generation semi-submersibles or new drill ships.**

In the past decade the number of new units added to the market has been high, while in the late 1990's and early 2000's a couple of semi-submersible units were upgraded to fifth generation units.

Present forecast models show that many projects are underway on the production side which will result in a requirement for development drilling. The major oil companies will continue their search for new oil and gas reservoirs (possibly at a slightly slower pace), while independent oil companies and marginal field development will likely see some impact from the current economical situation.

Despite today's financial climate, Petrobras announced their increased spending plan for the upcoming 5 years with an emphasis on the pre-salt discoveries.



**By Sjoerd Hendriks, Remco van der List and Gerrit Jan Schepman**

The effect on the drilling market will certainly be a downward pressure on day rates, but here, too, a difference can be seen between shallow water and deep water.

The jack-up drilling market is much more volatile in nature in terms of day rates and contract durations. At present the utilization is declining, together with the average contract duration.

The same tendency can be seen in the midwater sector, although the average contract duration is still over 2 years. The deep water markets look more stable. Although a large number of units are still under construction and entering the markets up to 2012, most rig capacity has been contracted for long duration contracts (4 years or more).

Although many units will be used for exploration drilling, the development drilling market will expand once a couple of production platforms start their operations. Development plans are extensive, especially in the deep water segment. Some drilling contractors have ordered units specifically for this market.

#### **GustoMSC response to the market challenges:**

### **Shallow waters**

The shallow waters are predominantly the area of the jack-up units. GustoMSC is well known for its CJ series of cantilever drilling jack-ups. The CJ jack-ups have an almost triangular shaped hull with three large truss legs at each corner. The cantilever is positioned aft and the accommodation near the forward leg. Preload tanks around the perimeter of the hull create a double skin and a drilling depth of 30,000 ft is standard for the current designs. The series starts with the CJ36, designed for operating in water depths up to 90 m with moderate environmental conditions, and currently ends with the CJ70, designed for operating in 150 m water depth under North Sea environmental conditions.

The series started in the early 1980's with three CJ46's. After more than 25 years, these three units are still operating in the North Sea for Noble Drilling. In the mid 1980's the series was complemented by two CJ50's, designed for operation in the Far East. Seeing the need for deeper water capability jack-ups, GustoMSC initiated the development of the CJ62, capable of operating in 120 m water depth in the North Sea. This resulted in two units being ordered in the early 1990's.



*Maersk Explorer*



*Noble Piet van Ede*

At the end of the 1990's the innovative X-Y cantilever system was developed, designed to offer a large drilling envelope, both longitudinally and transversely, with full drilling capacity over the complete drilling envelope. The X-Y skidding system enables the drill floor to be fixed to the cantilever structure, reducing the number of flexibles and simplifying BOP handling. The X-Y skidding system also creates additional free deck space, since the cantilever is positioned on 4 skid boxes which elevate the cantilever some 3.5 m above the main deck. This system was first introduced on the CJ70 design, two of which were ordered by Maersk Drilling in 2000, and has been incorporated in every CJ jack-up since then. The CJ70's are the largest drilling jack-ups in the world, capable of working in 150 m water depth in the North Sea. An additional feature of the CJ70 design is the combined drilling and production capability. The Maersk Inspirer CJ70 is currently working in this mode in the Volve field on the Norwegian continental shelf. In 2007, Larsen Oil and Gas ordered the third CJ70, to be built at the Jurong Shipyard in Singapore for delivery in 2010.



*X-Y cantilever*

In 2005 GustoMSC reviewed the CJ50 and included the X-Y cantilever system combined with the high efficient drilling equipment as the CJ50-X100-MC for Maersk Drilling for up to 100 m water depth. Maersk Drilling ordered a total of 4 rigs from Keppel Fels of Singapore with deliveries scheduled between 2008 and 2009.

In the recent years the Drilling industry has been focusing on a general workhorse for the 350 ft water depth, moderate environment. Such requirement suits the CJ46 designs. GustoMSC “restyled” the original 1980 CJ46 to cope with the up-to-date drilling requirements incorporating the X-Y cantilever system.



*Maersk Resilent*



*Stena Tay*

Currently there are 12 CJ series jack-ups in operation worldwide, with another 10 under construction and scheduled for delivery between 2009 and 2011.

A new development in the North Sea is the interest in dedicated offshore Light Drilling units. Swift Drilling signed a contract with NAM for a X-Y cantilever drilling rig based on the successful SEA-2750 hull.

## Midwaters

The midwaters are the area for the floaters such as third generation semi-submersibles (mostly upgraded) and drill ships. The upgrades of the semi-submersibles were centered on increased water depth, increased payload and increased drilling capabilities. GustoMSC has been involved in a couple of major conversions for units such as the Stena Tay, Noble Homer Ferrington and Noble Clyde Boudreaux.

In the midwater drill ships, the well-known GustoMSC Pelican first of its class DP vessels are still operating in Brazil and other spots in the world, as the Noble Leo Segerius, Noble Muravlenko and SC Lancer.



*Noble Muravlenko*

## Deepwaters

In the recent years the deep waters have been the main focus for the industry. The search for new oil and gas reservoirs has been directed into the deep waters of the Gulf of Mexico, Brazil and West Africa. The challenge for the industry was to design and construct new equipment. GustoMSC is very active with proprietary designs for semi-submersibles and drill ships.

The semi-submersible units are focused around the OCEAN series and DSS series (owned jointly with Keppel DTG), while the drill ships are the P10,000 and PRD12,000 classes. The larger units (DSS21/51, OCEAN1100, P10,000) are dedicated to 3,000 m water depth and are suitable to carry out development drilling. The smaller units (DSS38, OCEAN850, PRD12,000) are dedicated to 2,500 m water depth and are mainly for exploration drilling. From 2009 on, three DSS21's will be delivered for Maersk Drilling, one DSS51 for Transocean and two DSS38's for Queiroz Galvao Oil and Gas, while SBM Atlantia will deliver three TDS units for Brazilian drilling contractors.

At present, three P10,000 units are under construction at HHI for Transocean and Metrostar/Odfjell drilling, with another two customized versions of the PRD12,000 for Frontier Drilling at Shanghai Shipyard and Keppel Shipyard.



Maersk Developer (DSS21)

The main features of the semi-submersible units are the Vertical Riser Storage, efficient lay out of the moonpool, substructure and large free deck space. The Vertical Riser Storage requires less deck space than a conventional horizontally stored riser. In addition, the Vertical Riser Storage is forward of the derrick, freeing up more usable deck space for tubular storage and subsea equipment.

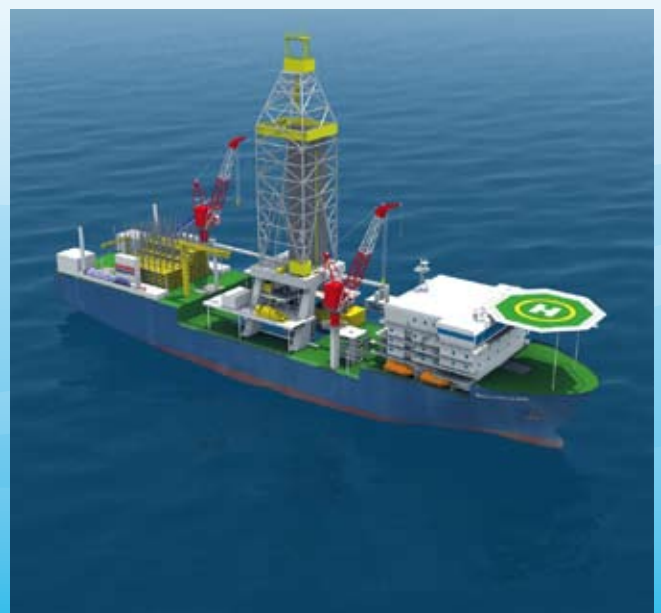
The DSS and OCEAN series are fabrication friendly and easy to construct. The four column layout facilitates to design in which bulkhead spacing is symmetrical. Thus the spaces are interchangeable; owner's preferences can be incorporated without major modification to the structural integrity of the unit.

The main features of the P10,000 and PRD12,000 class are the integration of the drilling equipment and tubular / riser storage in the hull design. This highly efficient lay out has already been developed with the Pelican class of vessels. The integration of the drilling equipment results in smaller overall dimensions, which in turn reduces the required power generation and thruster sizes.

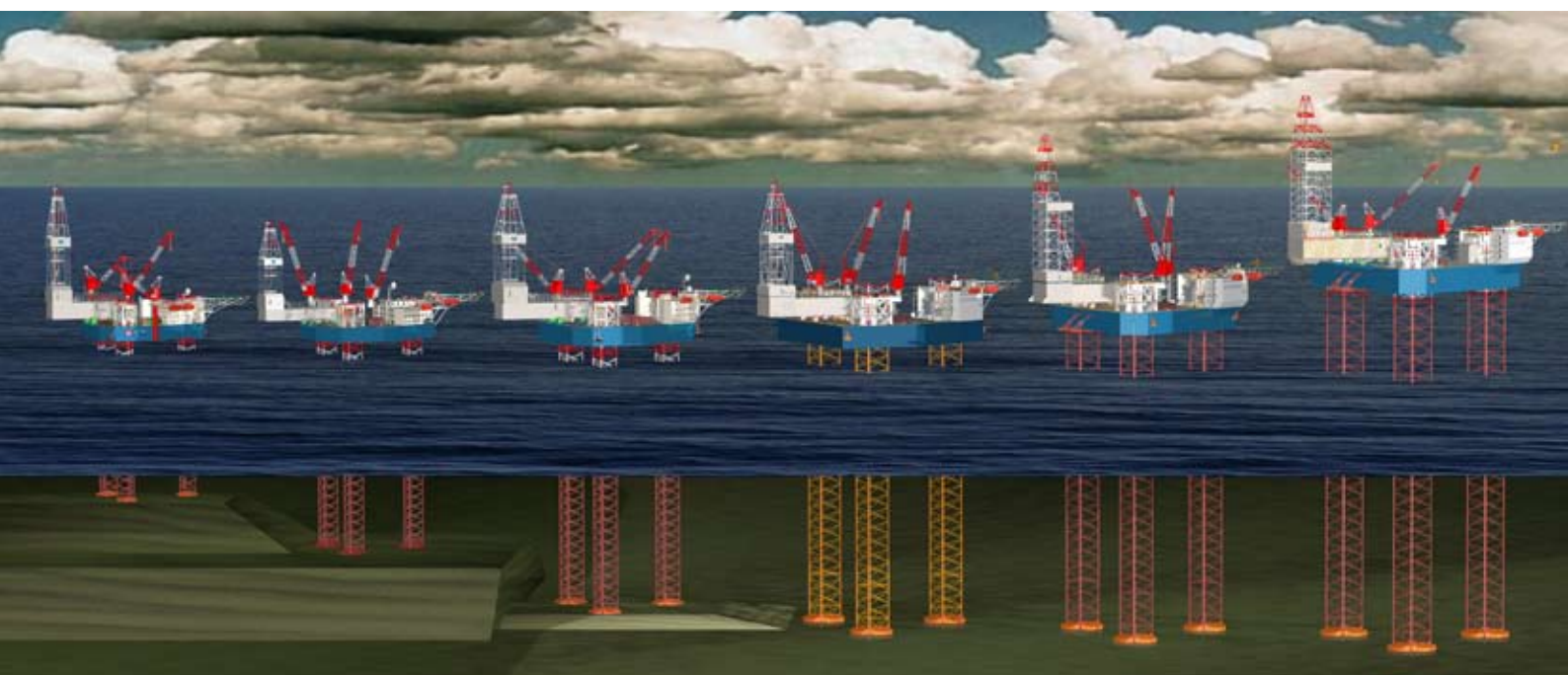
An additional feature applied to the PRD12,000 is the dual operational capabilities with either a Surface BOP or a Subsea BOP. The unit is equipped with a two-tier drillfloor. The drawworks and utilities are located at the lower level, while the rotary and tubular handling is on the upper level. The raised drillfloor serves the distance between Surface BOP, telescopic joint, diverter and rotary table. With a subsea BOP, the PRD12,000 can operate in water depths of up to 12,000 ft (4,000 m).



GSF C.R. Luigs



PRD12,000



Artist's impression CJ series

Jack-ups	CJ46	CJ50	CJ62	CJ70
Water depth	350 ft	350 ft	400 ft	490 ft
Hull size	65 * 62 m	68 * 70 m	78 * 90 m	89 * 97 m
Leg length	147.4 m	147.4 m	175 m	205 m
Var. load	3,500 t	4,500 t	4,000 t	10,000 t
Region	GoM	GoM	North Sea	North Sea

Semi-submersibles	OCEAN850	DSS38	OCEAN1100	DSS21/51
Water depth	2,400 m	2,400 m	3,000 m	3,000 m
Hull size	73 * 73 m	69.5 * 69.5 m	78 * 78 m	78.5 * 78 m
Displacement	43,500 t	39,300 t	55,000 t	53,700 t
Thrusters	8 x 3,000 kW	8 x 3,000 kW	8 x 4,000 kW	8 x 4,000 kW
Dynamic positioning	DP2	DP2	DP2	DP2

Ships	PRD12,000	P10,000
Water depth	2,500 m	3,000 m
Hull size	161 * 32 * 15 m	230 * 36 * 18 m
Displacement	45,000 t	76,000 t
Thrusters	5 x 4,000 & 2 x 2,000 kW	6 x 5,000 kW
Dynamic positioning	DP2	DP2

# Interview with Keesjan Cordia of Seafox Contractors and Workfox



1

As a starting question, could you briefly describe your company and your position in the company?

My position is managing director of Seafox Contractors and Workfox. I joined the company in 2005 after several management positions in oil and gas related companies.

Seafox Contractors (and Workfox) is one of the leading providers of offshore accommodation and multi-support service jack-ups across the world. At present we are operating 5 units plus an additional 60 Temporary Living Quarters (TLQs). Recently, NPM Capital invested in our company to accelerate the realization of the growth plans.



Seafox 2

2

Workfox is active in the maintenance and accommodation market with 5 units at present. Which trends do you see in the North Sea operations? Will there be a tendency towards additional units or perhaps a complete change of direction?

The North Sea market is requiring a perfect safety record supported by safety cases. Seafox Contractors has built up its safety record to the highest level, ensuring that we can offer services to the major operators.

Our jack-up units serve in a variety of operations from accommodation support to installation activities, well intervention and abandonment services. The fleet is under long term contracts.

Yes, we see additional units entering the North Sea market for operations in the oil and gas sector, but units will primarily be in use for the installation of offshore wind farms.



Seafox 7



By Gerrit Jan Schepman

### 3 Might there be any new directions in which your company will expand, such as Wind Farm Installations or Well Maintenance/Light Drilling activities or De-commissioning activities?

In the Wind Farm Installation market we see the need for additional units and our units are capable for certain operations in this field. Other companies have made major investments in new units. However, our strategy at this moment is to wait for this market to mature. Once the needs for installation and maintenance requirements have been better specified, we can develop the right units for the job.

Well maintenance is already being carried out with our units, using Coil Tubing techniques. More wells need to be served in the southern North Sea, and for these operations you do not need full-sized drilling jack-ups. It could be that dedicated units will be developed later.

The decommissioning market is certainly a new market for us. We have signed a major contract with Shell for decommissioning a couple of topside structures. Our Seafox 1 will be modified to do this job.

### 4 To date your main focus has been the North Sea. Do you foresee operations in new and other geographical areas?

We work world wide and several of our units have worked outside the North Sea. Seafox 3, for example, has been on a long term contract in Indonesia and the Seafox 2 in Mexico. Our main focus will remain in the North Sea, but if opportunities arise we will step in to service the needs of oil companies.

### 5 Your first jack-up rig was the SEAFOX 1, built in 1979 and designed by GustoMSC. What will be her next life cycle?

The Seafox 1 is now being adapted for her third life. In the early years she worked successfully as accommodation and installation unit for NAM/Shell from 2000 until to 2008, then she worked in the role of support unit for a producing oilfield of Chevron in the Dutch Sector. We bought the unit back from Chevron in 2007.

Now her third lifecycle is starting with a major upgrade, life extension and refurbishment, increasing the accommodation to 75 POB and installing a 300 ton offshore pedestal crane. For the next three years, she is under contract to Shell UK for their decommissioning project in the Inde field.

### 6 Your latest platform is the SEAFOX 7, which is a GustoMSC SEA2000 unit. What are your operational experiences so far with the unit?

Yes, we acquired the Seafox 7, the first new-built jack up to enter the southern North Sea recently. Her maiden contract was to Tullow Oil on the Horne and Wren field. Her performance was as expected and the operator was pleased with this unit. After that the Seafox 7 carried out two well servicing projects for RWE and Gaz de France. After a couple of months we identified some improvements for enhanced operations. The present accommodation, including the galley, mess rooms, recreation facilities and office space will be expanded to serve 114 POB. After the enhancement the unit will operate for a three year contract as their "Walk to Work" maintenance unit for Conoco Phillips. With the 300 ton crane and the expanded hotel facilities this unit will be well suited for the required operations.

# DSS Series of Drilling Semi-Submersibles at Keppel Fels

**The highlight for each unit is the name-giving ceremony. The Development Driller III, a DSS51 unit, was christened by Mrs Lyn Thierens at the Keppel Fels yard in Singapore on February 9th.**

The Development Driller III is the second rig of the DSS21/51 class of DP semi-submersibles to be built at the yard and features the deep water and drilling capability to construct wells as deep as 11,430 metres (37,500 feet) and operate in water depths of up to 2,286 metres (7,500 feet), upgradable to 12,192 metres (40,000 feet) and 3,048 metres (10,000 feet) respectively, for operations offshore Brazil, Gulf of Mexico and West Africa.



*DDIII name-giving ceremony*

As the name implies, the Development Driller III will be operating primarily on development drilling programs. If the unit is to stay on a location for a longer period, it can be moored to an 8 point mooring system. The mooring system is designed in such a way that - if necessary - additional mooring lines (up to a total of 12 lines) can be added to the system to withstand the hurricane conditions in the Gulf of Mexico.

The DSS21/51 series of rigs have a total payload of 13,500 tons. This heavy duty payload considerably reduces the necessity and the expense of transporting supplies to and from the rig, and this is especially valuable when operating in remote environments.

The Development Driller III will soon be ready for deployment by BP in the U.S. Gulf of Mexico.

Maersk Drilling's Maersk Developer was christened last year and is ready to go.

In addition to these units, Keppel Fels has another two DSS21's for Maersk Drilling, two DSS38's for Queiroz Galvao Oil and Gas and one DSS20-NS-DP3 for Floatel International under construction.

The DSS series of rigs is already clearly demonstrating its acceptance by the market as an efficient and cost effective drilling unit for deep waters.



*Development Driller III*



**By Sibren Bonte**

# P10,000 Steel Cutting Ceremony

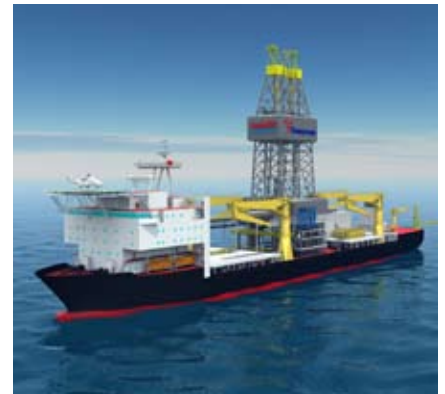
**Just before year end of 2008, GustoMSC finalized the remaining items to complete the customization of the Basic Design of the GustoMSC P10,000 NG drill ship. The GustoMSC P10,000 NG drillship was designed on the lines of the successful P10,000 series: the GSF Jack Ryan and the GSF C.R. Luigs. Delivered in 2000, both vessels are now operated by Transocean.**

The P10,000 NG design customization was contracted by Hyundai Heavy Industries to GustoMSC, and both HHI and GustoMSC were involved in the marketing of the drillship. Transocean recognized the advantages of the drillship design and ordered a P10,000 NG for delivery in Q3 2010.

The drillship will be provided with the familiar Transocean dual derrick, but expanded into a triple activity system by means of the 165 t knuckle boom crane with deepwater lowering capability and heave compensation. Another typical feature of the GustoMSC design is the very large free working deck enabling the vessel to perform any job a drilling contractor or oil company might require, and including space for all 3rd party equipment. For ultimate flexibility the ship can accommodate a total complement of over 200 persons.

The construction of the drillship at the HHI yard in Ulsan, South Korea is progressing on schedule. The steel cutting ceremony for the drillship took place at the yard on January 30th 2009. The ceremony was attended by a large delegation from the Transocean company.

Transocean has secured a five year contract for the vessel, scheduled for Q4 2010. The contract has been awarded by Exxon Mobil for operations in the Gulf of Mexico.



*Artist's impression*



*Striking steel ceremony at the yard*



By Sjoerd Hendriks

# Construction Progress of the Three TDS Semi-Submersibles at GPC

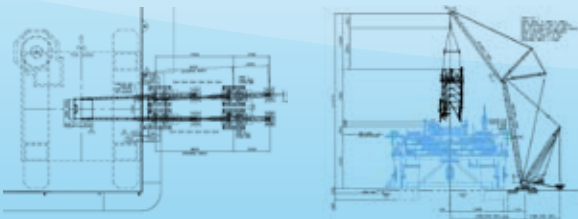
SBM Atlantia (SBMA) has contracted the fabrication of three TDS submersible drilling rigs with Gulf Piping Company (GPC) in Abu Dhabi, UAE:

- LONESTAR, TDS2000 rig for client Queiroz Galvao Oil and Gas
- NORBE VI, TDS2000 rig for client Odebrecht Drilling Services
- DELBA III, TDS2500 rig for client Delba Maritima

SBMA is performing the project execution for these TDS rigs with support from GustoMSC (basic and detail design) and SBM Middle East (site construction management). January and February were exciting months in the progress of the construction of all three rigs.



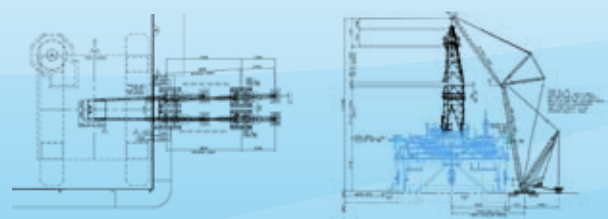
Lower derrick Lift January 9<sup>th</sup>



Lower derrick Lift (358.8 t, radius 48 m)



Upper derrick Lift January 11<sup>th</sup>



Upper derrick Lift (260.11 t, radius 48 m)

By Andrew Couch

## Lonestar

For LONESTAR, the drilling derrick was installed in two sections. Because of both hook height and the significant weight, the completely outfitted lower and upper derrick sections were lifted and set with the two Demag CC4800 cranes equipped with fly jibs for the required extended reach. The lifts were performed on January 9<sup>th</sup> and January 11<sup>th</sup>.

The quayside mooring for LONESTAR was changed twice after the derrick lifts: once to clear the quayside for the pending move of the NORBE VI (January 23<sup>rd</sup>), and the second time for the permanent quayside mooring alongside NORBE VI (January 24<sup>th</sup>). GustoMSC engineers on site performed detailed reviews of the mooring calculations made by the contractor GPC, and SBMA personnel assisted the contractors in planning the movements.



*LONESTAR temporary mooring*

Equipment installation and commissioning will continue for LONESTAR in the coming months – the next major installations include the pedestal cranes and riser gantry crane. Other minor equipment installation, mechanical completion of piping systems and electrical systems installation is in progress. GPC activities will be completed this summer, leading up to the thruster installation and SBM managed offshore sea trials in the Arabian Gulf.

## Norbe VI

For NORBE VI, a major milestone was reached when the unit was discharged from the GPC drydock (January 23<sup>rd</sup>). Leading up to the drydock exit, SBM and GustoMSC personnel performed detailed weight audits of the rig. The flooding of the drydock began on the evening of January 20<sup>th</sup>. SBM personnel stayed aboard the rig during the dock flooding operations, to perform watertight integrity inspections of all the compartments and penetrations that were exposed to hydrostatic pressure for the first time. On January 21<sup>st</sup>, the unit floated free of the dock blocks - within 1” of the estimated draft (actually 104 t lighter than estimated).

The drydock doors were then removed and the rig made ready for the marine move to the quayside. The dock exit marine operations were performed on January 23<sup>rd</sup>. The move, directed by the GPC Rig Master, required the use of four tugs to manoeuvre the unit safely from the dock to the adjacent quayside – in close proximity to the other TDS unit. The operations were performed successfully and both rigs were moored in their current positions on January 24<sup>th</sup>.



*NORBE VI drydock exit*

Outfitting and equipment installation of this NORBE VI will continue along quayside, with the next major activities planned being the derrick lifts for that unit in late March 2009 (similar to the LONESTAR lifts).

### **Delba III**

For the third unit, DELBA III, GPC completed the pontoon sections and began drydock assembly of the pontoon sections. The pontoon sections were built at a separate GPC prefabrication yard a few miles from the drydock. The TDS2500 pontoons are larger than the TDS2000, and the road transport performed for the previous two rigs' pontoons was not possible. Instead, each section was loaded and transported between the GPC yards by barge.

These loadouts and planned marine operations required detailed reviews by SBM engineers. After the offloads at the GPC main yard, the sections were sent for blasting and coating at the GPC painting yard.



*DELBA III Pontoon Section Loadouts/Offloads*

After coating work, the sections were transported (by trailers) to positions alongside the drydock for the pending lifts. The lifts of the pontoon sections required the use of the same two Demag CC4800 crawler cranes, without the superlift – but with new 600 t crane blocks. The spreader bar system utilizes a 400 t strandjack in one leg of the bridle to allow adjustment of the crane hooks over the pontoon section's center of gravity. Currently, four pontoon sections have been installed in the drydock with the last two aft sections planned for the early part of March 2009.

The columns, bracings, and maindeck module installations for DELBA III will then proceed, with the maindeck building lifts planned for late June. Drydock exit is currently planned for late July 2009.

Deliveries of the first two rigs (LONESTAR and NORBE VI) are scheduled for later in 2009. DELBA III will be delivered mid-year 2010.



*DELBA III Pontoon drydock Installation*

	<b>LONESTAR</b>	<b>NORBE VI</b>	<b>DELBA III</b>
Owner	QGOG	ODS	DMA
TDS series	TDS2000	TDS2000	TDS2500
Hull number	C-1335	C-1340	C-1345
Hull size	2 pontoons 15.24 m x 97.60 m ea	2 pontoons 15.24 m x 97.60 m ea	2 pontoons 17.06 m x 97.60 m ea
Maindeck footprint	78 m x 72 m	78 m x 72 m	81 m x 76 m
Displacement	30,000 t	30,000 t	36,500 t
Variable deckload	7,000 t	7,000 t	7,750 t
Power generation	8 x 3,867 KW	8 x 3,867 KW	10 x 3,867 KW
Thrusters	8 x 2,590 KW (at 750 rpm)	8 x 2,590 KW (at 750 rpm)	8 x 2,980 KW (at 750 rpm)
Operating WD	2,400 m	2,000 m	2,500 m

# Light Offshore Drilling Unit

Swift Drilling NV, a joint venture of GDF Suez Energy Services and Self Elevating Platforms NV, are joining forces to build a Light Offshore Drilling jack-up for operations in the Southern North Sea Sector (SNS). At present only full sized drilling jack ups are available for drilling in the SNS. By rightsizing the jack-up and the drilling equipment, Swift Drilling has achieved a significant cost reduction for building rigs that are able to drill in the SNS. The objective is to offer clients an attractive day rate to enable economically sound development of small oil and gas reserves.

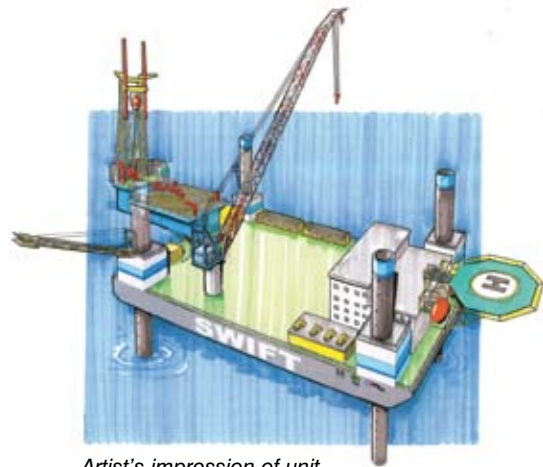
The drilling operation's focus is on the so called "slim well design" but conventional wells are also within the capabilities of the Light Offshore Drilling Jack-up, which can be used in water depths up to 45 m. The more expensive three legged North Sea units currently in use can be replaced by this more efficient, lighter and commercially attractive design.



Progress of hull at Batam yard

## The project

Self Elevating Platforms NV ordered a GustoMSC SEA-2750 jack-up from Drydocks World Nanindah yard. The SEA-2750 is the fifth of the SEA series jack-ups being built by the yard for Self Elevating Platforms NV, the first four being SEA-2000 jack-ups. Together with the specialists at Swift Drilling, the standard design of the SEA-2750 has been modified to accommodate the drilling function and to ensure an optimal operating envelope.



Artist's impression of unit

The unit will be equipped with a GustoMSC X-Y skidding system, which allows the cantilever to skid longitudinally as well as transversely. The X-Y skidding system provides maximum operational flexibility, and has a reach of 16 m longitudinally from the transom and +/- 3.5 m transversely to serve the standard fixed platforms.

The footprint of the X-Y cantilever is significantly smaller than a conventional cantilever and is able to handle full load in the entire skidding envelope. GustoMSC is also supplying the jacking system, including the hydraulic power unit. The cantilever will be fitted with a highly automated drilling rig with a capacity of 250 tons.

## The realization

The SEA-2750 LD is now under construction and scheduled for delivery in Q1 2010. The drilling equipment and X-Y cantilever systems will be ready by Q1 2010. The assembly and outfitting of the unit will take place in The Netherlands, and the complete unit will be ready for operations Q4 2010. The first contract for the Light Offshore Drilling Jack-up, for a period of 5 years, has been signed with NAM/Shell.

### Some technical details:

Hull (L x B x D)	67.4 m x 40 m x 5.5 m
Leg length	90.11 m
Leg diameter	3.5 m
Water depth	Max 45 m
Derrick system	250 t
Mud system	2 x 1,070 kW pumps
Cantilever loading	250 t
Variable operational load	1,400 t
Accommodation	66 POB
Power generation	3 x 2,000 kW plus 800 kW emergency generator



By René de Bruijn  
and Jochem Rutgers

# GustoMSC CJ Series Drilling Jack-ups under Construction

**There are currently 10 GustoMSC CJ series drilling jack-ups under construction in various parts of the Far East.**

In Batam, Indonesia, 6 jack-ups of CJ46-X100-D design are being built by Drydocks World Graha. The first rig is currently in the commissioning phase for the major equipment, with the second to fourth rigs following closely. Rigs number 5 and 6 were ordered at the end of 2008 and fabrication will start in the course of 2009. The GustoMSC hardware (jacking, fixation and cantilever skidding systems) for rigs 1-4 is all delivered and in various stages of commissioning and installation.

China Merchants Heavy Industry Co. Ltd. in Shenzhen and Dalian Shipbuilding Offshore Company in Dalian, China, are each building a CJ46-X100-D custom designed for China Oilfield Services Ltd. Construction at both yards is on track for delivery end 2009, with DSOC 3 months behind CMHI, as scheduled.

In the Keppel Fels yard in Singapore the last of the series of four CJ50-X100-MC jack-ups is nearing completion. Delivery of the third rig, named Maersk Resolve, took place in January 2009.

The CJ70-X150-A construction is progressing as planned at the Jurong Shipyard in Singapore. Hull blocks, jacking structures, spudcans and legs are all in fabrication, while the first equipment is being placed in the hull.



*CJ46 construction - COSL936 at CMHI - Hull and accommodation*



*CJ70 Construction - Jurong, 1231A BlockB Drydock*



*Naga 2 jacking trials at DW/Batam*



*Maersk Resilient at Keppel Fels yard*

By Richard Akkermans  
and Remco van der List



# MOPUstor for Talisman (under construction)



*MOPU at Ad-Yard: Outboard Staircase, DOP's & Bumper Bars on Weather Deck, lower half flare stack*

**The MOPUstor is a GustoMSC patented self-installing and re-usable production jack-up supported by a subsea storage tank. This concept combines jack-up and topsides design technology, both available within GustoMSC.**

Talisman Energy awarded a contract for the design, construction and installation of the unit to SBM, for which GustoMSC carries out the design and engineering.

This article will focus on the design of the platform itself (Hull, Wellhead and Topsides) and especially the regulatory challenges met for the Talisman project.

The MOPUstor for Talisman will be installed on the Norwegian Shelf. The subsea storage tank was successfully installed last year and drilling of the first well is now taking place.

## **Authority Regulations**

Engineering and design are being monitored by the PSA (Petroleum Safety Authority). In consultation with the Norwegian Authorities, it was decided that the Hull will be subject to DNV and the NMD (Norwegian Maritime Directorate) rules and the Topsides subject to Norsok requirements. Impact of Norsok on the Topsides and Wellhead includes a large number of functional specifications, most of which can be implemented without major design consequences.



By Danny Admiraal

The Working Environment Regulations apply to both hull and topside with issues such as noise, lighting and ergonomics, and technical requirements as to the design of access ways, working areas and living quarters to ensure the safety, health and welfare of personnel. A series of dedicated reviews involving the Client, Client workers representatives and GustoMSC has been held to review the Working Environment conditions (with the aid of 3D design models) for verification of the requirements.

Based on a fully developed 3D PDMS model the review team analyzed all aspects of the structure. Obviously, in certain areas some corrections were proposed for improvements as shown on the attached pictures.

Means and procedures for mechanical handling are to be provided for safe and efficient handling and installation of all equipment. Based on frequency of handling, the weight of the equipment (> 200 kg) and various other criteria, permanent lifting facilities (lifting lugs, trolley beams) are foreseen above equipment and valves.

### Acknowledgement of Compliance (AoC) Process

SBM has to prove “positive compliance” to these rules and requirements as required by PSA, in other words SBM must show that the correct rules and regulations are applied and adhered to in all design aspects. This is also known as the AoC or Acknowledgement of Compliance process.

An AoC is a decision made by the PSA to the effect that the technical condition of a mobile facility and the applicant’s organization and management system are considered to be in compliance with relevant requirements in Norwegian Shelf Legislation. In this process the Operator and Contractor jointly have to prove “positive compliance” to the selected rules and requirements as required by PSA. SBM is to show that the correct rules and regulations are applied and adhered to in all design aspects. The other part is related to the Operator’s organization and management system. At present SBM is passing the necessary information to the Client (Operator) so that such an application can be made.

### Status of the Talisman Project

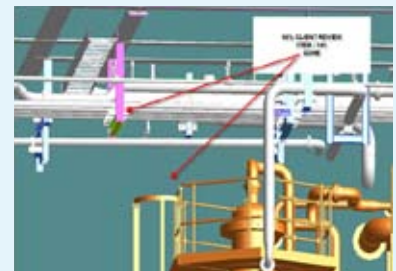
At this very moment GustoMSC is finalizing the detailed design of the MOPU, and construction is taking place at Adyard in Abu Dhabi. The current planning is to load-out in Q3, 2009, followed by transportation to Norway. Once in Norway, the legs of the MOPU will be installed and a number of other construction and commissioning activities will be finalized.

When this has been done, the MOPU with legs will be towed offshore for installation on the pre-installed Storage tank. After Hook-up Completion, Start-up will commence and First oil is envisaged by Q4, 2009.

#### Access to platform on booster compressor blocked by support and lines



Before



After

#### Wellhead area near the caisson is very congested



Before



After

# AKCO's Kashagan Flash Gas Compression Barges Nr. 3, 4 & 16

**Agip Kazakhstan North Caspian Operating Company N.V. (Agip KCO, called AKCO) has been assigned the responsibility for the development of the Kashagan Experimental Program Project (production up to 450,000 BOPD (Barrels of Oil per Day), in the Republic of Kazakhstan (RoK). The full field development to reach a plateau of up to 1.5 MBOPD (Million Barrels of Oil per Day) is envisaged after successful completion of the Experimental Program.**

The Kashagan East field is located in about 4 m water depth in the northern part of the Caspian Sea offshore Kazakhstan, and is icebound during the winter season (see *picture 1*). The reservoir contains 45° API oil with associated sour gas (up to 23% H<sub>2</sub>S). The Caspian Sea is in an environmentally sensitive area, and the entire north coast of the Caspian Sea has been declared a Special Ecological Region.

The development consists of offshore drilling and both onshore and offshore production processing facilities tied into export crude and gas pipelines. The offshore facilities are installed on barges outside the Caspian Sea. The barges are transported into the Caspian through the Volga-Don inland waterways, either directly to site or to an inshore location for further fabrication and pre-hook up. The barges and pipe bridges are installed at their final location on pile foundations (see *picture 2*), while the associated pipe bridges and pipe racks will be installed either on pile supports or civil works. AKCO awarded a letter of intent to the consortium of Single Buoy Moorings Inc. (SBM) and Siemens on 29th July 2004, followed by a contract award on 30th September 2004 for the Design, Engineering, Procurement and Fabrication (EPF) of three Flash Gas Compressor Barges (FGCB) 3, 4 and 16 to be used for the Kashagan Field Development in the northern part of the Caspian Sea offshore Kazakhstan. SBM/Siemens have handed-over the Barges 3 and 4 in June 2007 and Barge 16 in March 2008 (see *picture 3*). Some Key Project Parameters have been listed in the table on this page.

## Barge particulars

Length	95.0 m
Breadth	16.0 m
Height	33.5 m
Module Weight	3,085 t
Design Life	40 years
Minimum ambient Design Temperature	-36°C
H <sub>2</sub> S Containment	23%
Handle the associated gas relevant to a Plant capacity of 225,000 BOPD	

GustoMSC's Scope of Work consisted of providing a SBM/ Siemens Consortium Project Manager and performing Design, Engineering & Procurement.

This Project was a positive challenge for GustoMSC to cope with the above listed Key Project Parameters. Furthermore, during the execution of the project, the GustoMSC Project Team interfaced fully with consortium partner Siemens, the SBM/Lamprell Construction Site Team in the Middle East (Dubai) and AKCO's site-based Engineering Team.



1



2



3



By Marcel van Neck

# No sunset over P-57 FPSO Project

Since the autumn of 2008, the execution of P-57 FPSO project has entered a new phase, with engineering execution centers and fabrication sites all over the world participating. The GustoMSC design team in the Schiedam offices coordinates all these engineering and construction sites, ensuring they work together effectively to secure the timely delivery of the unit.

In Singapore the conversion of the MT "Accord" is progressing at Keppel Shipyard. Based on thickness gauging of the hull, a detailed structural analysis will define the plates in the bottom and steel internals which need to be replaced. The "Accord" will be transformed into a sound base for another 25 years of operation as FPSO P-57 for Petrobras, Brazil.

MT "Accord" entered dry dock on March 4th 2009. Keppel Shipyard immediately started with vessel hull washing and scraping off the marine growth, and then commenced marking and cutting of bottom plates in areas where they are to be replaced.

The FPSO P-57 will be a spread-moored FPSO, using SBM's largest riser balcony to date to hang-off the 80 risers and umbilicals. The accommodation block is being enlarged to house the larger crew for the FPSO, and to create additional office space. Piping systems to transfer the daily production of 180,000 barrel oil/day are being installed in the tanks and the engine rooms are undergoing extensive refurbishment. The maindeck has been stripped and repainted ready to accept the piperack sections.

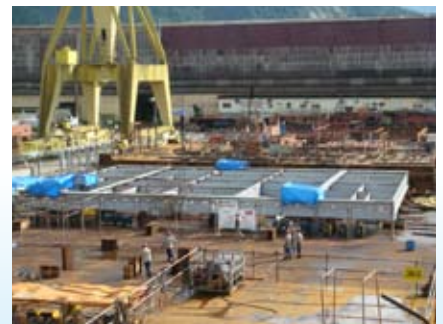
At Singapore's Dynamac, 5 major modules are being built for Power Generation, Local Equipment Room (LER) and Gas Compression. After lifting and installation of these 5 modules, the vessel will sail under its own propulsion power to Brazil in the 4th quarter of 2009.

In the meantime the fabrication for the remaining modules has commenced in Brazil as well. Five modules for sea water treatment and oil processing will be built at UTC. The construction of the remaining 3 modules as well as the flarestack and helideck has already commenced at BrasFels. At Brasfels, the FPSO will be outfitted with the Brazilian fabricated modules (to be shipped on barges) and further integration and commissioning of the FPSO will take place in 2010.

The challenges for the engineering team are defined by the global nature of this project. All worksites need to be supplied with the required quantities of bulks and specific equipment. In Brazil especially, where there are stringent customs requirements, relocation of material and equipment need to be avoided. The round-the-clock coordination of these activities with the Site construction teams is paramount for successful execution, as the sun never sets over this project.



*P-57 at Raffles Dock (Keppel Shipyard)*



*Start of module fabrication in Brazil*



*Artist's impression of P-57 FPSO*



**Jan van den Boomgaard**

# GustoMSC Offshore Cranes for Installation Works Offshore



*Installation of 500 t crane*

**GustoMSC has developed a series of offshore cranes in the range from 500 to 1,500 tons.**

**The major applications for these cranes are seen in the maintenance and offshore installation on fixed oil or gas production platforms and the installation of offshore wind turbines. The offshore cranes are fitted on GustoMSC type of jack-up units, such as the SEA series or NG series of units.**

To date, GustoMSC has four cranes in the GCC series under contract as a turn-key delivery to its clients:

- a 500 ton crane for an undisclosed client
- a 550 ton crane for Aramco
- two 1,000 ton cranes for Resolution Shipping (a subsidiary of MPI / Vroom)

The 550 ton crane for Aramco will be installed on the A.R.B.-3. This unit was designed by GustoMSC and is presently under construction at Jurong Shipyard in Singapore for delivery in 2010. This unit will primarily be used for offshore installation and maintenance in the Arabian Gulf.

The 500 ton crane will be installed on a GustoMSC NG-5300 unit. This unit is presently under construction at Western Shipyard in Klaipeda for delivery in Q1 2010.

The two 1,000 ton cranes for Resolution Shipping will be installed on the MPI adventure and the MPI Discovery, two GustoMSC NG-7500/6 units. These units are contracted for construction by Resolution Shipping to COSCO Nantong yard in China.

For wind turbine installation the cranes need to have a small minimum radius to pick up loads from the deck, to have very long booms for high lifting heights and be fast for installing smaller and lighter equipment parts. These design requirements have been incorporated into the efficient and compact GCC series of cranes.



By Ben Leuvekamp and Max Pouwels



GCC-500-HD



GCC-550-ED



GCC-1000-HD

**Typical specifications of the GCC series of cranes**

	<b>GCC-500-HD</b>	<b>GCC-550-ED</b>	<b>GCC-1000-HD</b>
Main hoist	500 t	550t ( 2 x 275 t)	1,000 t
Min / max radius	16 / 31m at full load, 103 m at reduced load	20 / 29 m at full load, 73.7 m at reduced load	16 / 25 m at full load, 89 m at reduced load
Boom length	Approx. 109 m	Approx. 88.5 m	Approx. 95 m
Hoisting height (ref. main deck)	121.5 m	75.4 m	105 m
Auxiliary hoist	160 t	138t	160 t
Min / max radius	18 / 70 m at full load, 109 m at reduced load	17 / 64 m at full load, 89.9 m at reduced load	23 / 70 m at full load, 93 m at reduced load
Hoisting height (ref. main deck)	124.5 m	91.5 m	108.5 m
Whip hoist	10 t		
Min / max radius	20 / 110 m		
Hoisting height (ref. main deck)	126.5 m		
Trolley hoist		30 t	25 t
Min / max radius		11 / 80 m	17.5 / 72.5 m
Tail swing radius	9 m	9.1 m	10 m

The 500 ton and 550 ton cranes are already in an advanced stage of fabrication.

The column parts of the 500 ton crane are being fabricated and completed in the Netherlands and loaded out for shipment to the shipyard. Crane boom, pedestal and bearing are already at the shipyard. The assembly of the crane will start early Q2 2009 and commissioning will commence in Q3 2009.

The major parts of the 550 ton crane are being fabricated in China and load out for shipment is scheduled for May 2009. Assembly of the crane at the Jurong Shipyard in Singapore will commence in Q3 2009.

# NG-2500X for SEAJACKS UK Ltd Project update



**On Monday February 23<sup>th</sup>, 2009 the name-giving ceremony took place at the Lamprell yard in Hamriyah (UAE) for the first of the two GustoMSC NG-2500X self-propelled self-elevating units built for Seajacks UK Ltd.**

The name-giving for this first unit was performed by Mrs Ainslie, spouse of Blair Ainslie, the Managing Director of Seajacks. The unit was given the name “Seajacks Kraken” with reference to the Norwegian mythical sea-monster which was supposedly an octopus-like sea creature of gigantic proportions. After the ceremony had taken place, the unit was prepared for its final sea trials and took to sea.

The sea trials consisted of a range of tests, including speed and Dynamic Positioning. The jacking trials were performed on March 3<sup>rd</sup> and the unit was jacked-up reaching an airgap of over 51 m. The GustoMSC variable speed jacking system was commissioned successfully.

Seajacks took delivery of the Seajacks Kraken on March 12<sup>th</sup>. The unit was delivered on time, on budget and well within the estimated light weight, increasing its variable load to 1,300 t.

At the time of writing, the unit is being prepared to be loaded onto a heavy lift vessel to be transported to Canada where it will start on its first project near Sable Island for Exxon Mobil in April.

Construction of the second unit is progressing well at Lamprell’s yard in Jebel Ali, and delivery of this unit is scheduled for end of June this year. This unit will be deployed at Greater Gabbard in the UK sector of the North Sea for the installation of wind mills starting in the third quarter of 2009.

**Design particulars NG-2500X Seajacks Kraken**

Hull length (waterline)	61.0 m
Hull width	36.0 m
Hull depth	6.0 m
Legs	84.4 m
Accommodation	90 persons
Water depth	40.0 m
	(all year survival North Sea conditions)
Propulsion	4*1,500 kW azimuthing thrusters
Main crane	300 t



By Paul Groote Woortmann

# Turn-key Delivery PTB (Personnel Transfer Bridge)

**In September 2006, DSME awarded GustoMSC the contract for the design and turn-key delivery of a hydraulically driven Personnel Transfer Bridge (PTB). The intention of this PTB is to form the connection for the transfer of people between the compliant tower and support vessels. The Chevron compliant tower will be located in the Tombua Landana field offshore Angola.**

In the past, GustoMSC has designed several PTBs, each with specific design requirements. Some of the lessons learned from these earlier designs were implemented in the design of the Chevron PTB, but nonetheless the design of this GustoMSC gangway provided enough design challenges.

The PTB is hydraulically driven and capable of slewing, luffing and telescoping. In disconnected mode the PTB can be operated with joysticks from the operator cabin. When the PTB is connected to a vessel, the drive systems are automatically switched to idle mode and the PTB is free to follow the motions of the vessel. The control system monitors whether the PTB is staying within the motion limitations and warns when limits are approached or exceeded.



*PTB on transport to the Tomba Landana field*



The construction and assembly of the PTB was carried out in the Netherlands, making it easier to supervise the construction and assembly. After installation and assembly of the drive control systems, initial FATs were also carried out in the Netherlands.

At the DSME yard, the PTB was assembled and installed on the compliant tower under supervision of GustoMSC. After completion of the installation a complete SAT was carried out to test the functionality of the PTB. This SAT consisted, among other things, of landing with the PTB at different landing points (simulating different bridge orientation angles) and simulation of wave motions by suspending the PTB from a crane. After successful completion of the SAT the PTB was transported from Korea to Angola together with the compliant tower modules.

In the second quarter of 2009 GustoMSC will assist Chevron with the first operation of the PTB. The PTB will be connected to the TAD vessel "Seahawk" of Atwood Oceanics that will be moored next to the compliant tower. GustoMSC has been involved in the design and engineering of modifications to the "Seahawk" for this project.

## Main particulars of PTB

Gangway minimum extended	23.5 m
Gangway maximum extended	37.5 m
Width fixed part	2.4 m
Walking width telescopic part	1.0 m
Max. luffing angles	± 20 degrees
Slewing angle	150 degrees

By Mark van Heumen



[www.gustomsc.com](http://www.gustomsc.com) / [www.sbmoffshore.com](http://www.sbmoffshore.com)

**Gusto B.V. / Gusto Projects B.V.**

P.O. Box 11, 3100 AA Schiedam  
Karel Doormanweg 66  
3115 JD Schiedam  
The Netherlands  
Telephone +31 (0) 10 2320 000  
Telefax +31 (0) 10 2320 101  
Gusto@GustoMSC.com

**GustoMSC Inc.**

1255 Enclave Parkway, suite 200  
Houston, TX 77077, U.S.A.  
Telephone +1 281 679 8000  
Telefax +1 281 679 8008  
Houston@GustoMSC.com

**Marine Structure Consultants (MSC) B.V.**

P.O. Box 687, 3100 AR Schiedam  
Karel Doormanweg 66  
3115 JD Schiedam  
The Netherlands  
Telephone +31 (0) 10 2320 800  
Telefax +31 (0) 10 2320 801  
MSC@GustoMSC.com



**GustoMSC**