

INSIDE

SEPTEMBER 2014 # 22

GLOBAL COOPERATION



GustoMSC

THE PIONEERS OF OFFSHORE ENGINEERING

CONTENTS

4 NEWS IN BRIEF & AGENDA

12 FACTS & FIGURES OF THE MAGELLAN

The GustoMSC Magellan class is the most capable drillship that GustoMSC has designed to date. It brings a distinctive alternative to the market.

14 ASSOCIATED EQUIPMENT

The GustoMSC Thruster Retrieval System (TRS) is used in a number of drillships and features in the new GustoMSC Magellan drillship design. The TRS facilitates thruster inspection and maintenance, increasing safety and uptime, and reducing maintenance costs.

16 EXPLORING INTO ULTRA-DEEPWATER

Exploration markets have been developing and will develop into more extreme environments.

17 PERSPECTIVE

Quentin Whitfield, Director of Infield Systems, foresees considerable growth of the deepwater and ultra-deepwater sector.

18 DEEP SEA FLOATERS AT WORK

GustoMSC deep sea floaters are operating worldwide.



CUSTOMER SERVICE BUILDING RELATIONSHIPS

10

Our involvement with our clients does not end after delivery of the design for a platform or a vessel. In fact, this moment usually is the start or the continuation of a decades-long relationship.

INTERVIEW TEAMING UP WITH PETROBRAS

20

Ahead of unprecedented offshore exploration and production activities in Brazil, GustoMSC is cooperating with Petrobras to fulfill one of the most ambitious business plans in the O&G industry. Reginaldo Sarcinelli Filho, General Manager of Petrobras responsible for the construction supervision of 28 drilling rigs being built in Brazil, speaks about the huge and diverse challenges Petrobras is dealing with.

GLOBAL COOPERATION

The map on the cover shows global scientific cooperations, data generated from the exchange of books, trade journals and peer-reviewed journals. The yellow lines indicate the cooperations between GustoMSC and its key partners around the world.

COOPERATING WITH O&G COMPANIES WORLDWIDE

Freedom of choice is what most of our clients are after and that is exactly what GustoMSC can offer them. GustoMSC is not affiliated to a yard, equipment supplier or parent company that restricts the movements of its clients.



6

Source: Olivier Beauchesne Science-Matrix

COLOPHON

GustoMSC InSide is a publication of GustoMSC B.V.
Total circulation: 3,000
Edition 22, September 2014

Editing, design and production
Total Identity, Amsterdam

Editors
Hans van Bemmelen
João Montenegro
Catherine Poventud
Corianne Roza
Tessa Vleugels
Yvonne van de Wal

Photography and illustrations
Aatjan Renders
William McVean
Julius van der Woude

GustoMSC
Karel Doormanweg 25
3115 JD Schiedam
The Netherlands
+31 (0)10 2883 000
info@gustomsc.com

www.gustomsc.com

All editorial material is the property of GustoMSC and may therefore not be copied or reproduced without our approval.

PREFACE

THIS INSIDE IS ABOUT COOPERATION



Cooperation is becoming even more relevant now the challenges we face to provide our global societies with energy are increasing. Offshore oil and gas remain relevant, despite the important developments in unconventional oil and gas, like shale. Reserves are being found in areas that present difficulties in terms of environmental conditions: primarily deeper, harsher and colder. Consequently, new solutions and technologies are required in order to facilitate exploration and production. Because the required solutions and technologies cannot be provided by one company alone, successful cooperation between companies and other organizations is fundamental to the development of our future.

GustoMSC has a long history of cooperation with other companies. In the early years of offshore technology, together with Shell the Gusto shipyard developed the first European jack-up Seashell (1959). This type of cooperation has remained key throughout GustoMSC's history, and has involved contractors and national and international oil companies, but also equipment suppliers and research institutes.

When it comes to the oil companies of the past, it has often been concluded that primarily the IOCs were at the root of the technological developments; the NOCs were not associated with the greatest technological advancements. However, this has changed, as Statoil and Petrobras are now showing. We are therefore pleased to have had the

opportunity to work intensively with both of these companies: most recently with Statoil, on its CAT J CJ70 jack-up projects, and prior to that with Petrobras on the development of its 28 deepwater drilling rigs, 15 of which will be built according to GustoMSC's basic design. These projects are still successfully ongoing. The interview with Reginaldo Sarcinelli Filho, General Manager of Petrobras, in this issue of InSide provides more background to this topic.

Besides a number of NOCs, the IOCs naturally continue to be key drivers for technological developments in our industry. We are involved in a number of IOC-driven developments in the fields of arctic exploration and 20kpsi drilling units. Our new Magellan drillship design, portrayed on pages 10 and 11, is our generic solution to what we see happening in the market. We collaborate with operators like IOCs to incorporate their specific requirements. Excellent business relations with the NOCs and IOCs are fundamental in enabling us to develop the right solutions for the future, and we continuously strive to enhance and improve these relations.

A key ingredient in our successful cooperation with our clients is the freedom our designs give them to build at the shipyard of their preference. It enables them to obtain a mobile offshore unit (MOU) to their specification in an optimum manner. The fact that over 75 MOUs are presently being contracted and constructed at more than 15 shipyards worldwide underlines the appreciation of our basic designs and our business model. As a

result, the major shipyards across the globe have become valued users of our basic designs and the associated equipment and support we provide.

Next to the larger scale cooperation with external parties, also internal cooperation remains extremely important to the success of our company. We are pleased that our company is steadily growing based on this success. This has led us to plan a move to new offices close to our current location. The Timmerloods (the carpentry workshop of the former Wilton-Fijenoord shipyard) will be transformed into the new headquarters of GustoMSC. This three-story building will be refurbished into modern and transparent offices, which will facilitate even more intensive cooperation and serve as a great meeting place. We plan to move in Q3 2015. Prior to the move, we will have ample opportunity to meet at Rio Oil & Gas or any of the other events listed in the calendar in this InSide, or at your headquarters or project anywhere in the world. We look forward to it!

Nils van Nood
Managing Director GustoMSC



TEAM WORK
A NEW SPACE FOR EXCHANGING IDEAS

GustoMSC recently signed a long-term lease for the former carpentry workshop of the Wilton Fijenoord shipyard in Schiedam. This iconic industrial building dating from 1948 will be redeveloped and transformed into a contemporary workplace.

GustoMSC has grown considerably in recent years. The increase in staff requires a larger office. After the redevelopment, GustoMSC will have 6,500 m² of office space. This work environment will support the growth and agility of our company. A key concept was to

keep the building as open and transparent as possible to create an environment for cooperation and exchanging ideas, both internally and externally. This unique building with its special qualities and maritime history is a perfect fit with GustoMSC's culture.



OFFSHORE WIND SPECIALISTS JOIN FORCES IN PAN-EUROPEAN CONSORTIUM

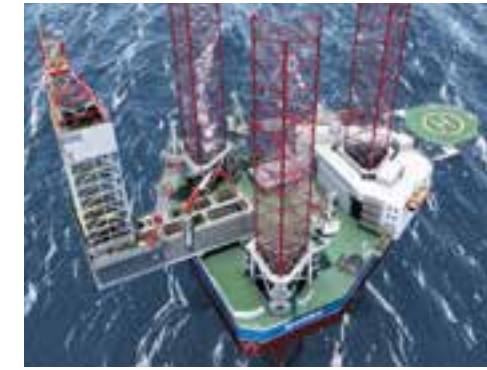
GustoMSC is starting preparations for a demonstration model of the SPINFLOAT, a floating wind turbine with a vertical axis and variable pitch blades, mounted on our semi-submersible Tri-Floater. The preparations take place within a pan-European consortium in which GustoMSC participates. Fons Huijs, Technology Coordinator Hydrodynamics at GustoMSC: "This consortium, led by the French wind specialist EOLFI (formerly known as ASAH LM), was set up in April 2014, with leading specialists in different disciplines." Besides EOLFI and GustoMSC, the participants include SSP Technology (a leading Danish blade manufacturer), Fraunhofer IWES (German

Institute for wind energy, responsible for the drive train), ECN (Energy Research Centre of the Netherlands) and the Politecnico di Milano (an Italian university) for wind tunnel testing. The cooperation with EOLFI is a long-term commitment. Huijs: "For GustoMSC this consortium and the cooperation with EOLFI provide an opportunity to develop a new application for the GustoMSC Tri-Floater. This semi-sub is highly suitable for vertical axis rotors, as well as for conventional horizontal axis wind turbines."

Fons Huijs
Technology Coordinator

FOURTH CUSTOMIZED DESIGN FOR SEAJACKS

Seajacks, a service provider to the offshore wind, oil & gas industries, took delivery of the Seajacks Hydra last June. This self-propelled jack-up vessel was specifically designed for offshore wind and oil & gas installation and maintenance services. The Hydra was ordered in July 2012 and built and delivered by Lamprell in Dubai. The Hydra is the fourth vessel that Lamprell has built for Seajacks, based on a GustoMSC design. Three were constructed to the GustoMSC NG-2500X design, one vessel was based on the larger GustoMSC NG-5500C design. At Seajacks's request the Hydra has an enhanced jacking system, an increase in persons on board from 90 to 100, an increase in main crane capacity from 300 tonnes to 400 tonnes and improved automation and space allocation. The jack-up vessel will soon be relocated to the North Sea and was specifically designed for the harsh environment in this area but is also very suitable for milder environments.



CJ54 LATEST ADDITION TO THE CJ SERIES

The CJ54 is the latest design in GustoMSC's successful series of cantilever drilling jack-ups (CJ series). The design is developed for operations in 450 ft (135 m) water depth worldwide and 360 ft (110 m) water depth for North Sea operations. With a capacity between that of the existing CJ50 and CJ62, the CJ54 is a very cost-effective rig for offshore fields where earlier designs were not economically attractive. The unit combines the typical CJ characteristics: high efficiency and high uptime through the GustoMSC patented X-Y Cantilever system and the GustoMSC VSD rack & pinion jacking system. The efficiency of the CJ54 has been recognized by several drilling contractors. To date at least two major drilling contractors are close to signing construction contracts.

Gerrit-Jan Schepman
Sales Manager



GUSTOMSC CONGRATULATES EVERSENDI OFFSHORE AND GULF MARINE SERVICES

Eversendai Offshore in the United Arab Emirates (UAE) ordered the basic design, jacking system, commissioning work and delivery of two NG-2500X jack-up vessels. Once completed, in February and May 2016, the vessels will be operated by Vahana Offshore. "For Eversendai Group and Vahana Offshore working with jack-ups is new. They decided that to enter this market successfully they needed a sound design and found it at GustoMSC," says Sales Manager Jan-Mark Meeuwisse. "It shows that the NG-2500X, a relatively new product, is accepted in the market.

Vahana is the fourth operator of these NGs." Gulf Marine Services (GMS), also in the UAE, confirmed that they will exercise the option for their third S-Class, a NG-1800X design. It is identical to their first two S-Class jack-up vessels which are currently under construction. With six GustoMSC units, GMS has become one of our most loyal clients. The GMS fleet serves the oil, gas and renewable energy industries worldwide.

Jan-Mark Meeuwisse
Sales Manager

15 – 18 SEPTEMBER 2014
RIO OIL & GAS
RIO DE JANEIRO

GustoMSC stand no. A19, Pavilion no. 1

28 – 29 OCTOBER 2014
OFFSHORE ENERGY
AMSTERDAM

GustoMSC stand no. 10.021

10 – 13 NOVEMBER 2014
ADIPEC 2014
ABU DHABI

GustoMSC stand in Holland Pavilion

2 – 5 DECEMBER 2014
OSEA 2014
SINGAPORE

GustoMSC stand 114-06

10 – 12 MARCH 2015
EWEA OFFSHORE
2015
COPENHAGEN

GustoMSC stand no. C1-C25

17 – 19 MARCH 2015
2015 SPE/
IADC DRILLING
CONFERENCE
LONDON

GustoMSC stand no. 1011

23 – 25 MARCH 2015
ARCTIC
TECHNOLOGY
CONFERENCE
COPENHAGEN

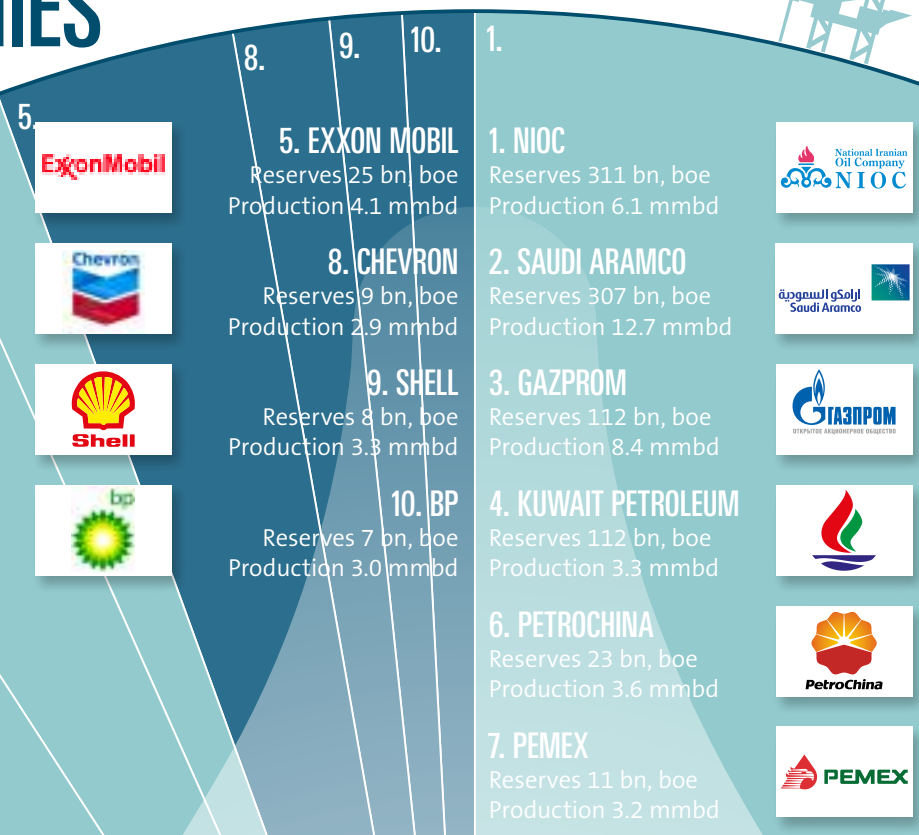
GustoMSC stand no. 419

4 – 7 MAY 2015
OTC 2015
HOUSTON

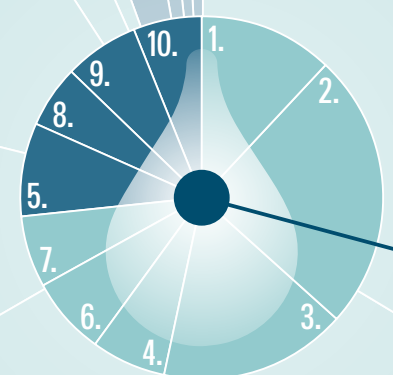
GustoMSC stand no. 113.07

TOP 10 O&G COMPANIES

IOCs Total reserves 49 bn, boe
NOCs Total reserves 876 bn, boe



IOCs Total production 13.3 mmbd
NOCs Total production 37.3 mmbd



TOTAL ANNUAL PRODUCTION VERSUS THE RESERVES
 The total production of the top ten oil & gas companies was 18,469 million barrels over the year 2012. The proven and recoverable reserves of these companies are estimated at 925,000 million barrels. That would suffice for the coming 50 years.

COOPERATING WITH O&G COMPANIES WORLDWIDE

Today, more than 80% of the world's proven-plus-probable oil reserves are controlled by national oil companies and their host governments. Technology is opening up new types of hydrocarbon resources, such as light tight oil and ultra-deepwater fields, which until recently were considered too difficult or expensive to explore and produce. External parties are expected to address these complex technological issues and come up with solutions that remain economically and socially acceptable. In this article we focus on several of the top 10 oil & gas (O&G) companies, some of the challenges they face, and what GustoMSC offers to national and integrated oil companies around the world.

According to the International Energy Agency, global energy demand will increase by one-third between now and 2035. The center of gravity of energy demand is shifting to the emerging economies, particularly China and India. In addition, the Middle East is moving towards center stage as an energy consumer, looking set to become the world's second-largest gas consumer by 2020 and third-largest oil consumer by 2030. Brazil, meanwhile, is expected to experience an 80% increase in its energy consumption by 2035. By contrast, energy demand in OECD countries is barely rising and by 2035 energy consumption will be less than half of that of non-OECD countries. Clean technologies, efficient vehicles and demographic trends will lead energy use to a steady state in these countries.

Success of O&G companies

As a result of the rising global demand for oil, and the high prices, many O&G companies have thrived. Six of the ten largest oil producers in the world are national oil companies (NOCs): Saudi Aramco, Gazprom, NIOC, PetroChina, Kuwait Petroleum and Pemex. Above all, the rise of the NOCs has been based on their reserves: in the 1970s, NOCs controlled just 10% of the world's known oil. At present, they own 80% of the reserves. Saudi Aramco has remained at the top of the list, finding and producing more new oil than any of its competitors. Companies like Statoil and Petrobras have outstanding expertise in deep-water exploration, and have become leaders in this field. Recently GustoMSC worked with Statoil on the optimized rig design for operating in mature fields on the Norwegian Continental Shelf: the CAT J CJ70 jack-up project. In cooperation with Petrobras, GustoMSC teamed up on their large 28 drilling rigs development (see interview at page 16). Generally speaking, NOCs own their equipment for exploring and producing energy. The same applies when it comes to more specialized equipment that is less economically viable for drilling contractors to own, such as for example maintenance units. In this way, they are able to control the exploration, production and maintenance cycle themselves.

Naturally, the four largest integrated oil companies (IOCs), ExxonMobil, Shell, BP and Chevron, are also benefiting from the increasing demand and high prices. Despite this, they are challenged to maintain their production levels. Amongst other things, increased competition for access to new resources is causing a decline in the IOC's reserve replacement ratios (RRRs). As a result, the IOCs are increasingly finding themselves focusing on the exploration and production of gas instead of the more profitable oil business. Gas now accounts for more than 40% of their production, and for Shell and ExxonMobil, more than 50%. The IOC's will endeavour to maintain their

Source: Oliver Wyman; Wood Mackenzie; Bloomberg; company reports

production levels by reviving unique in-house technology in close collaboration with service companies and research institutes. GustoMSC is currently involved in a number of IOC-driven developments in the fields of arctic exploration and 20kpsi drilling units.

Country-specific regulations

In the past, NOCs relied significantly on the know-how of the IOCs to explore, produce, refine and sell their oil. Today, more and more NOCs are able to develop their own know-how by cooperating with service and specialist companies. NOCs expect external parties to comply with country-specific regulations like the local content requirements in Brazil. In India, for instance, contractors who promise to build in India receive a credit in the evaluation of tenders, which artificially lowers the price offered. In Saudi Arabia, where the population has grown rapidly from 20 million in 2000 to 27 million in 2013, the government is aiming to encourage more domestic employment. Consequently, there are opportunities for external parties able to facilitate projects in line with such local requirements. GustoMSC provides the NOCs with basic designs which can be developed or optimized to fit the needs and possibilities of the local operations, and built at local shipyards.

Saudi Aramco's challenge to meet domestic demand

Aside from generating domestic employment, Saudi Aramco wants to produce gas for power generation in order to free up oil for higher export volumes. Oil is currently being used domestically to cope with growing demand. One of Saudi Aramco's current challenges is the Red Sea where large fields are believed to be located in deeper waters, unlike those located in the much shallower waters of the Persian Gulf on the kingdom's east coast. Deepwater oil production means that companies with extensive operations in Europe's North Sea and the Gulf of Mexico, will be well positioned to secure work when tenders are released.

Rosneft goes Arctic

Rosneft is another major player amongst the NOCs. With the acquisition of TNK-BP, a Russian joint venture between BP and a group of Russian oligarchs, Rosneft was launched into the league of the world's largest listed oil companies. Rosneft realized that it should open up to foreign shareholders, in addition to BP, because they need modern technology to operate in technically challenging parts of Siberia and the Kara Sea, located in the Arctic Circle. Statoil, ExxonMobil and ENI all signed similar deals and joint ventures with Rosneft to develop Russia's offshore energy resources in the Arctic. By joining forces with these IOCs and fellow NOCs, Rosneft will be able to develop the potentially rich offshore fields.

ExxonMobil's major acquisitions

ExxonMobil is the world's largest IOC. In 2010, it finalized its agreement with XTO Energy Inc., thus creating a new organization to focus on global development and production of unconventional onshore resources, mainly shale gas. It was its first major acquisition since the megadeal that created ExxonMobil in 1999. The acquisition signals that ExxonMobil expects the primacy of oil to decline. By acquiring XTO Energy, and through the recent joint venture with Rosneft, ExxonMobil's RRR remains at a comforting 115%. The U.S. sanctions over the crisis in Ukraine have not impacted the joint venture with Rosneft. Very recently, the two companies started drilling for oil in the Arctic.

GUSTOMSC IS NOT AFFILIATED TO A YARD, EQUIPMENT SUPPLIER OR PARENT COMPANY THAT RESTRICTS THE MOVEMENTS OF ITS CLIENTS. THEREFORE CLIENTS OF GUSTOMSC ARE FREE TO CHOOSE WHEREVER THEY WISH THEIR DESIGNS TO BE BUILT.

International expansion for China's NOCs

BRIC country China is also dealing with a growing population and rising living standards. However, the country does not have large oil and gas reserves at its disposal. The Chinese NOCs, who are dealing with a shortage of domestic supplies but have significant capital from their government at their disposal, are spending heavily to acquire undeveloped fields. Chinese investments can be found in Australia's gas business, the US shale-gas sector, and in Africa's upstream. Russia aims to enter into a long-term relationship with China in order to deliver gas. GustoMSC has been working with CNOOC on offshore oil and gas exploration and development since 1999.

Shell relies on its own strengths

Shell is also moving increasingly into the gas business, growing not so much through acquisitions, but primarily by relying on its own strengths and expanding its operations. One of Shell's major strengths is developing new technologies. Floating liquefied natural gas (FLNG) is such a revolutionary technology that it will allow Shell to access offshore gas fields that would otherwise be too costly or difficult to develop. Shell's Prelude FLNG Project off the coast of Australia will facilitate the production and export of LNG. The floating facility will chill natural gas produced at the field to -162°C (-260°F), shrinking its volume by 600 times so it can be shipped to clients in other parts of the world.

New solutions and technologies

The key to success for NOCs and IOCs is the development of new solutions and technologies that enable them to enter reserves that are being found in complex environments: primarily deeper, harsher and colder. Because these technologies cannot be provided by one company alone, successful cooperation between companies and research institutes is fundamental to the development of game-changing solutions. Besides a number of NOCs, the IOCs continue to be key drivers for technological developments in the oil and gas industry. For NOCs, GustoMSC delivers best-in-class solutions based on existing proprietary technologies and concepts, adapted to meet the challenges of the specific market segment and the demands of the owner. Furthermore, GustoMSC is not affiliated to a specific yard, equipment supplier or parent company that could restrict the options available to its clients. Clients of GustoMSC are therefore free to choose wherever they wish their designs to be built. Excellent business relations with the NOCs and IOCs are key in enabling GustoMSC to develop the right solutions for the future.



WORKING WITH CNOOC, COSL AND COOEC

GustoMSC has been collaborating with CNOOC, the Chinese national oil company, and its subsidiaries China Oilfield Services Limited (COSL) and China Offshore Oil Engineering Company (COOEC), since 1999. The collaboration focuses on offshore oil & gas exploration and development.



COSL specializes in drilling units. In 2009, it ordered the first two CJ46s, which were the first two cantilever jack-ups to GustoMSC design to be built in China. In 2013, COSL ordered a customized CJ50. This CJ50 is adapted to the local seabed conditions. It will be equipped with extra-large leg footings to deal with the soft underground found in Chinese waters. In 2014, COSL purchased two additional CJ46s that were already under construction for another owner. These units were intercepted so that COSL could

expand its capacity rapidly. Currently COSL is evaluating additional GustoMSC jack-up units. Its units are traditionally employed in the Bohai Bay in the East and South China Sea, but COSL is significantly expanding its worldwide operations. This offers a unique opportunity for collaboration based on other GustoMSC designs.

GustoMSC delivered two crane/pipe-lay vessels to COOEC, Lan Jiang and Hai Yang Shi You 201, and two jacket launch/transport

barges: Hai Yang Shi You 229 (30,000t) and Hai Yang Shi You 221 (8,000t).

GustoMSC is able to optimally utilize its know-how in the collaboration with CNOOC, COSL and COOEC, because the units are tailored or customized to their specific requirements. In addition to GustoMSC being one of the first Western offshore design companies to obtain access to China, the relationship has become stronger and proven its worth over time.



OUR CUSTOMER SERVICE

BUILDING RELATIONSHIPS

At GustoMSC we know that our involvement with our clients does not end after delivery of our design for a platform or a vessel. In fact, this moment usually marks the continuation or the start of a decades-long relationship.

After the delivery of the GustoMSC designed equipment to the end user, our Customer Service department is offering services such as training, supply of spare parts, inspections and surveys, preventive maintenance and repairs. Guarantee claims are also managed by Customer Service. These service activities form the basis of dedicated Service Agreements for each type of equipment. The agreements include 24/7/365 access to operational and technical support.

Guarantee follow-up

Although we aim to supply designs and components of the highest quality, guarantee claims can still arise. In that case Customer Service works with the relevant package engineers and our subcontractors to resolve the issues quickly.

Training

We can provide customized training for rig personnel for using our equipment. Usually we give the theoretical part of a course onshore, followed by practical sessions onboard the vessel (in port or offshore). Our specialist engineers can also support the vessel's personnel during the initial operation of these systems. This can reduce the learning curve and benefit both safety and operational efficiency.

“CLIENTS KNOW THAT IF THEY NEED SUPPORT, OUR FRONT OFFICE RESPONDS VERY QUICKLY.”

Jaap Visser
Manager Customer Service

Long-term support

As the equipment we design has intended lifespans of several decades, it is essential that the units are effectively inspected and maintained. We always supply lists of recommended spares and can develop detailed maintenance plans in consultation with the client, tailored to their maintenance philosophy. A typical maintenance plan includes routine preventive maintenance by the onboard crew, combined with specialist preventive maintenance by us in years 2 and 4. This is followed up with recommendations for maintenance and, possibly, upgrades in year 5, in preparation for the scheduled survey. Customer Service has extensive records on all the equipment we have ever designed. Units change ownership several times during their lifetime and records are regularly lost in the transition. Hence the current owner contacts us with requests for documentation, inspections, and advice on modifications and lifetime extensions. Customer Service

can also supply spare parts and arrange their installation. This gives the client more certainty, and the advantage of a simpler supply chain.

Repairs

If equipment suffers a failure, Customer Service can help identify the causes and propose a solution. Some owners decide to contract the whole repair project out to us. In that case we subcontract the mechanical and electrical work to reputable subcontractors and take responsibility for parts procurement and project management.



Jaap Visser
Manager Customer Service
customerservice@gustomsc.com



Picture: courtesy Saipem

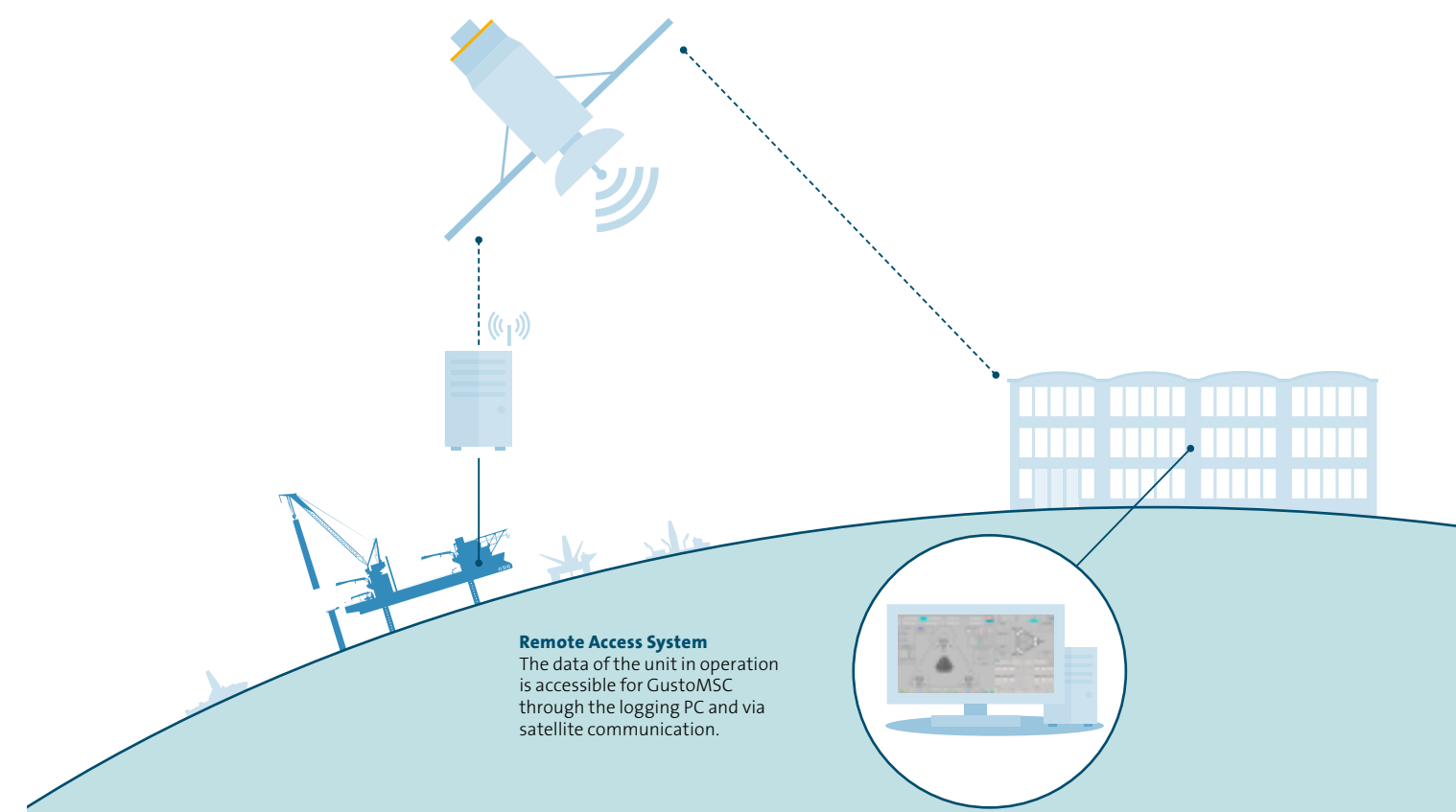
VIKING PIPER: PIPE LAYING VESSEL STILL GOING STRONG

The Viking Piper was built in 1974 at the Gusto shipyard and has changed hands several times and undergone modifications. The vessel, now named Castoro 7, is still operating after

40 years in service. We have recently supplied spares to keep it operational for another decade.

REPURPOSED PLATFORM

GustoMSC designed a jack-up platform for offshore oil & gas maintenance operations. The original design envisaged that the platform would be repositioned and jacked up/down at intervals of several months. The platform was acquired by a new owner and used for wind turbine installation projects. Consequently, the envisaged number of lifetime jacking operations was reached in less than two years. After inspecting the jacking system, it appeared still in a good condition, and we consistently advised the new owner about future maintenance and inspections.



THE VALUE OF REMOTE ACCESS

Jacking systems, X-Y skidding systems and cranes supplied in recent years are equipped with logging PCs and remote access. The data logged for a jacking system includes: leg loads, rig angle, jacking speed, brake operation, position of operator controls, and motor torque or current. This information is useful for the owner's records. Furthermore, if an operational problem arises a GustoMSC

engineer can access the logging system remotely and the data can help determine the cause of the problem and options for its resolution. In many cases our engineer can find a solution without visiting the platform. Hence remote access can save our clients significant time and costs.

A case study Fixing a lagging leg

One weekend, a client operating a wind turbine installation vessel with a continuous hydraulic jacking system noticed that one leg lagged behind the others during jacking. They

contacted our Customer Service call centre who routed the call to the duty engineer. The client authorised our engineer to access the logging PC of the jacking system and view the history files. The data indicated that one of the hydraulic valves was probably faulty and our engineer recommended its replacement. This valve was included in the kit of recommended spares carried on the vessel and the client was able to replace it immediately. This is a good example of how remote access can avoid the need for an engineer to visit an installation, thus increasing uptime and saving costs.



For more information, please visit:
<http://magellan.gustomsc.com>

FACTS & FIGURES

15,000 FT

ULTRA-DEEPWATER THE NEXT STEP

Growing interest in units that could drill in deeper water with more operational flexibility and capability prompted our new generation of drilling vessels. The GustoMSC Magellan class is the most capable drillship that GustoMSC has designed to date. It brings a distinctive alternative to the market.

An important step forward is that the Magellan is equipped for 20,000 psi well-control systems, including the associated increases in capacity, such as high hook loads and a large setback capacity. Magellan's ability to accommodate higher pressure, high variable loads, mud volumes and setback capacities and incorporate any type of advanced drilling techniques, means it is equipped to drill well beyond the current market limit of 12,000 feet. The Magellan is ready for the different drilling and development scenarios of the future.

Large available areas and flexibility

A popular feature is that of a large workable deck area on board, since not all the equipment stays on board permanently and lay-out varies, depending on type of operations. By integrating the hull and mission equipment in a highly efficient manner, it is easy to customize the Magellan design for a variety of drilling operations and different equipment suppliers, providing ultimate flexibility.

Safety, an important focal point

The Magellan incorporates an increased availability of electrical power and features increased separation of ventilation openings from the hazardous areas without interrupting the drilling equipment handling paths. To ensure operational overview under all circumstances, an integrated central operations control room with a clear view over the drilling plant is foreseen.



LARGE WORKABLE
DECK AREA
7,500 M²

Of the 80,000 ft² capacity, 1,500 m² (16,000 ft²) is reserved for well-completion operations, and 700 m² (7,500 ft²) for advanced drilling technology applications such as managed pressure and dual-gradient drilling.

IMPROVED
OVERALL SAFETY
8 RAM BOPs

Safety is enhanced by two full eight-ram BOP stacks. Enhanced fire insulation, explosion protection measures and emergency response equipment may be incorporated without affecting the efficiency of the drilling operations.

MAXIMUM
WATER DEPTH
15,000 FT

The Magellan is capable of drilling well beyond the current market limit of 12,000 ft (3,660 m). It can be equipped for drilling in a water depth of up to 15,000 ft (4,580 m).

HIGHER
PRESSURE
20,000 PSI

Pressures of 15,000 psi are customary on the current drillships. The Magellan is not only able to accommodate higher pressures, but also higher hook loads, mud volumes and setback capacity. It has the ability to incorporate any type of advanced drilling techniques, such as managed pressure and dual-gradient drilling systems.

LARGE
VARIABLE LOAD
37,500 T

The total vessel capacity in terms of consumables allows for greater autonomy of up to at least 100 days or more. Large drain tanks and ample capacity for drill cuttings storage to minimize the impact on the environment.

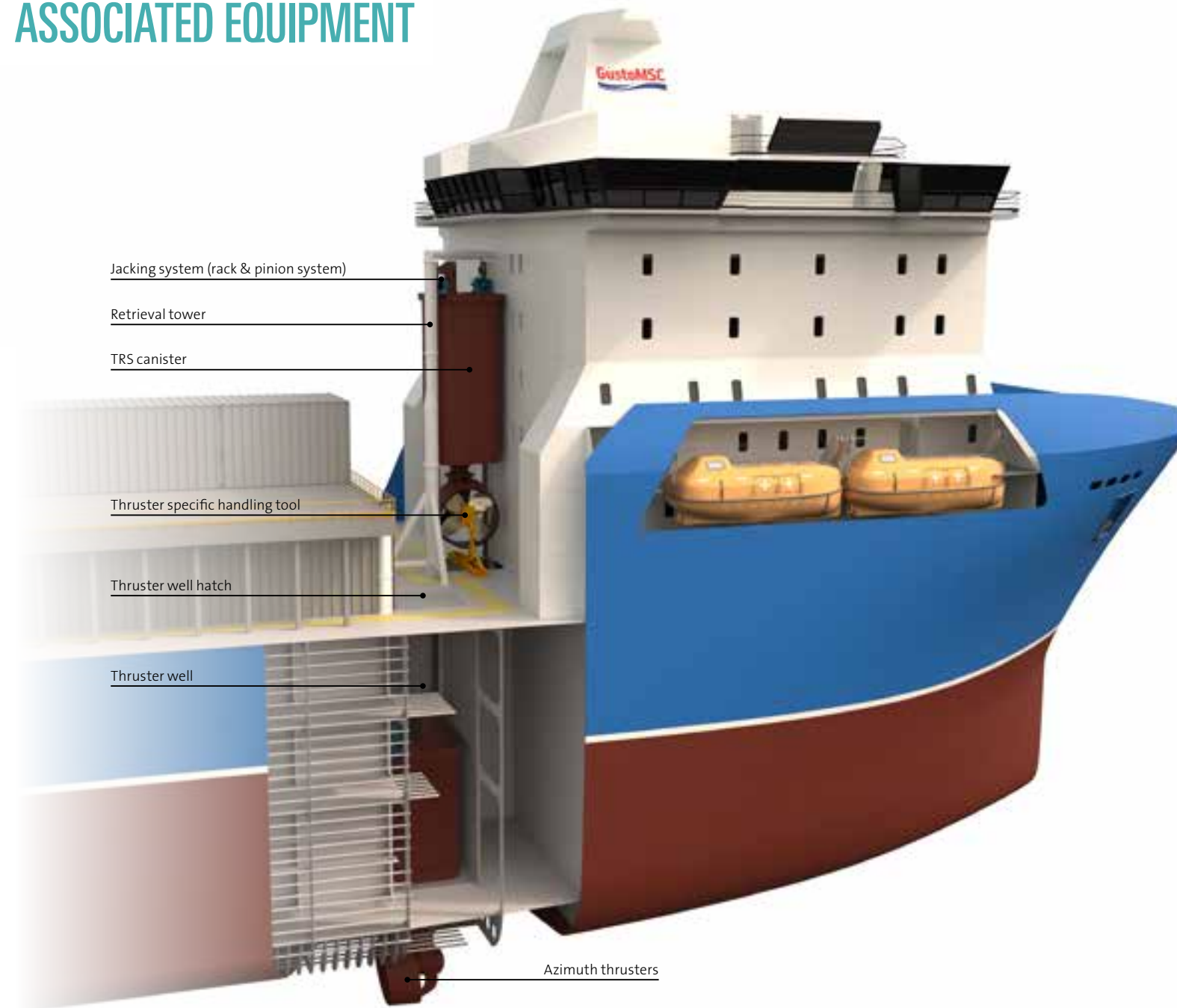
MAXIMIZING
UPTIME
TRS

The Thruster Retrieval System (TRS) allows the thrusters to be retrieved above deck for full maintenance while the drillship is in the field. Design condition for the retrieved position: Santos Basin 95% Non-Exceedance environmental. In transit conditions the forward thrusters can be retracted within the hull reducing drag and increasing full efficiency. A detailed description of the TRS can be found on page 14 and 15.



Sjoerd Hendriks
Design Manager
magellan@gustomsc.com

ASSOCIATED EQUIPMENT



THRUSTER RETRIEVAL SYSTEM

MAXIMIZING UPTIME AND SAFETY

Highlights Thruster Retrieval System

- Facilitates thruster inspection and maintenance, increasing safety and availability
- Robust, proven design
- Compatible with thrusters from any vendor, can be built by any yard
- Based on standard components
- Cost-effective

The GustoMSC Thruster Retrieval System (TRS) is used in a number of drillships and features in the new GustoMSC Magellan drillship design. The TRS can also be incorporated in other floaters.

Retractable thruster systems, to withdraw thrusters into a vessel's hull, have long been used in the offshore industry. They reduce drag in transit and enable a vessel to enter ports and dry-docks with a limited water depth. However, inspection and maintenance have to be undertaken with the thrusters extended below the hull, as with fixed thrusters. For inspections this generally requires diving operations or dry-docking, reducing uptime. Underwater mountable thrusters allow to be exchanged underwater, eliminating the need for dry-docking but these operations can only be done in benign



The TRS canister with the azimuth thruster machinery

weather conditions. As exchange of thrusters could easily lead to being several weeks off location, this is time-consuming and costly due to the downtime and the requirement for support vessels. Apart from the costs involved it is a complex and relatively dangerous operation due to the diving operation. GustoMSC has taken the logical next step and designed the Thruster Retrieval System (TRS). This system can raise a thruster above deck, beyond the retracted position. In this position the thruster is easily accessible for dry inspection and maintenance on, for example, the sealing arrangement. Repairs with TRS could even be done when remaining operational. This benefits safety, uptime, costs and maintainability.

TRS in operation

The key component of the TRS is the rack and pinion drive that facilitates the movement of the canister that houses the thruster and its auxiliary equipment. The thruster well in which the canister is located reaches up



The TRS allows for quick and easy inspection and maintenance

to the deck and is covered by a hatch. When a thruster needs to be retrieved the hatch is removed and a temporary retrieval tower is installed, extending the racks above deck. The TRS drive then engages with the racks in the retrieval tower and raises the thruster above full deck level, allowing full access to the thruster.

The TRS range

Different versions of the TRS have been developed, for thrusters ranging from 1.75 MW upwards and a maximum combined canister/thruster mass of 240t. The system is used in a number of drillships and features in the new Magellan class design. The TRS can be incorporated in all types of floaters, such as semi-submersible units.

Technical details

The GustoMSC patented TRS design is based on our proven rack and pinion technology. The great advantage of the system is that it can be built to normal shipbuilding tolerances. The canister is built by the shipyard according to the GustoMSC-supplied canister design. GustoMSC also provides selected components for drive and control, locking and sealing of the canister.

The hydraulic motors, gearboxes and pinions are installed at the top of the canisters, while the racks are fitted in the wells and retrieval towers. The motors can be powered by a fixed or portable hydraulic powerpack, and can be controlled locally or remotely. Locking pins secure the canister in the deployed, retracted and retrieved positions.

The retrieval tower is assembled from components which can be stored and handled

on board with on board mechanical handling. The tower design can be adopted to thruster specific handling equipment.

Design variations

The TRS design is available in standard and compact versions. The top of the Standard TRS canister should always remain above the waterline. This could lead to a long canister in some floater designs with a large draught. In other cases where underdeck space is limited, it could cause difficulties in the retrieval position. In this case a Compact TRS, with a relatively short canister, is more appropriate. In the operational position the top of this canister can be below the waterline. A watertight sealing arrangement is then provided to maintain a dry thruster well in the operational position for access to the canister.

Both TRS versions are fitted with simple radial seals at the bottom of the canisters. These radial seals are not watertight but prevent the ingress of marine growth into the well. All seals are included in GustoMSC's scope of delivery and have proven their robustness and long service life.



Alain Wassink
Sales Manager
magellan@gustomsc.com

CONDITIONS

EXPLORING INTO ULTRA-DEEPWATER

Exploration markets have been developing and will develop into more extreme environments. The circumstances can be harsher, colder or deeper. Current market demands for exploration vessels ask for drilling rigs with depth capabilities up to 12,000 feet. GustoMSC developed the Magellan class drillship suitable for all future deepwater scenarios. It can be equipped for water depths of up to 15,000 feet with respect to well control capability, variable load and other capabilities.

ULTRA-DEEPWATER 12,000 FT & BEYOND

Riser capacity, setback & hook load ready for up to 15,000 feet



INCREASING
WELL PRESSURE AND
WELL CONTROL
REQUIREMENTS

20,000 PSI

Covering a vast part of the North Sea and its oil & gas fields

WORLDWIDE OPERATIONS
IN REMOTE AREAS

AUTONOMY

High variable deck load, quick transit and increased redundancy

PERSPECTIVE CAPITAL GROWTH FOR THE DEEPWATER MARKET



The deep and ultra-deepwater sector has grown considerably over the previous five years, with capital expenditure demand for projects in water depths of 500 metres and greater increasing from a 37% share of the market in 2009 to a forecast 49% share of demand for 2014. Over the five years to 2018 Infield Systems expects this trend to continue, with deepwater developments anticipated to form 49% of demand. Within this, the ultra-deepwater market is expected to be the key area of demand growth, with 47% of deepwater capital expenditure anticipated to be comprised by developments at water depths of 1,500 metres and greater.

Offshore Latin America, the leading global deepwater market, Petrobras' highly ambitious pre-salt development plans are expected to drive a considerable proportion of growth going forwards. According to the operator pre-salt currently comprises 22% of Petrobras' total production (source: Petrobras 2014, Pre-Salt page, Petrobras Company website). By 2018 this is expected to rise to 52%, with key developments driving this growth including Iracema Sul, Lula Alto and Lula Central. Whilst Petrobras is expected to continue to lead development offshore Brazil, an increase in Independent and foreign IOCs active within Brazil's deepwater market is also anticipated, with Queiroz Galvao and Shell leading development.

Offshore Africa, Angola is expected to hold a 44% share of capital expenditure demand in the period to 2018, driven by projects such as Block 15/06 and Kaombo North. Whilst strong demand is expected offshore Nigeria, with uncertainty and increased business risks associated with operating within the country, several operators are altering their development strategies. Simultaneously, Infield Systems expects an increasing share of deepwater capital expenditure demand to be seen offshore Ghana, viewed by many as the success story of West African development in recent years, whilst Congo (Brazzaville) is also expected to see a marked increase in deepwater Capex going forwards.

Within the US Gulf of Mexico (GoM), Infield Systems expects Capex to be led by Shell and Anadarko, whilst production gains within the region are expected to be driven by projects such as ExxonMobil's Julia and Shell's Appomattox developments. Whilst the future of Gulf of Mexico production appears positive, significant challenges remain. The GoM is a notoriously capital intensive area and with the increased regulation of activities following the Macondo well blow-out, operators have been forced to carefully reassess development plans in order to ensure economic viability.

Whilst Brazil, West Africa and the US Gulf of Mexico are expected to remain the key deepwater market going forwards; holding a 72% share of deepwater capital expenditure demand over the 2014-2018 timeframe,

significant growth is expected to take place elsewhere. Areas such as South East Asia, Australasia and Europe, anticipated to witness substantial growth, driven by developments such as Rotan offshore Malaysia, Scarborough offshore Australia and the development of Statoil's Aasta Hansteen, within the Norwegian Sea. From an operator perspective, areas of emerging production, such as South and East Africa and the Eastern Mediterranean, are anticipated to boost the future market share of Independent operators such as Anadarko and Noble. Infield Systems therefore expects to see a far more diverse market going forwards to the end of the decade, with emerging regions of production, each with their own specific challenges, expected to form an ever increasing share of the deepwater sector and a changing operator dynamic within this key growth market.

Quentin Whitfield
Director of Infield Systems

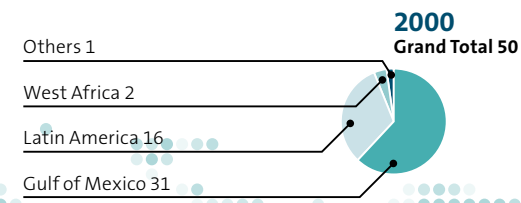
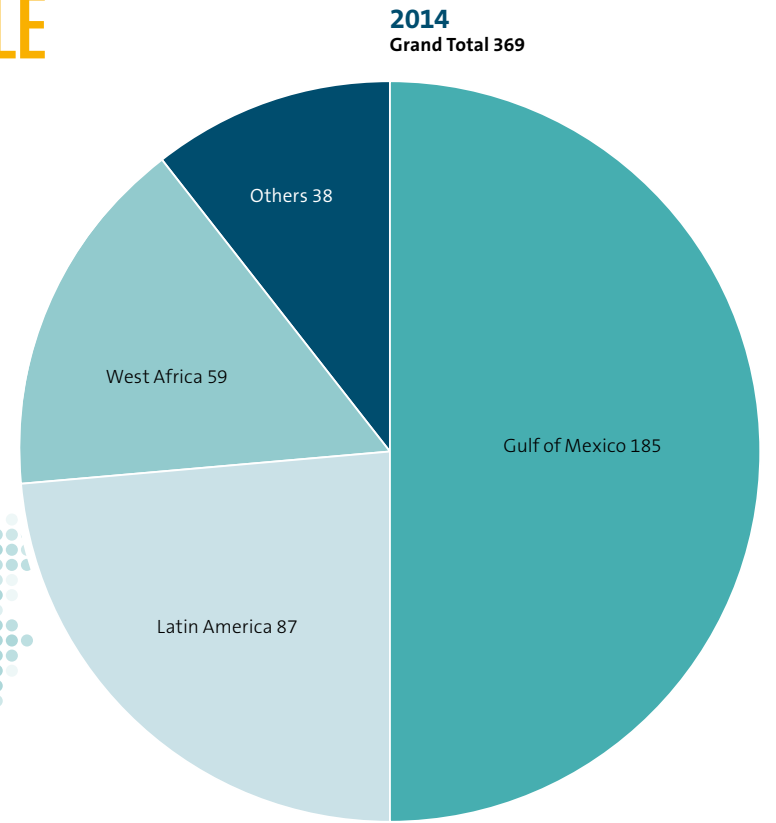
For more information: Infield Systems' Global Perspectives Deep and Ultra-Deepwater Market Report to 2018

GUSTOMSC DESIGNED DEEP SEA FLOATERS AT WORK

This map shows GustoMSC designed deep sea floaters at work, mainly in the 'Atlantic Triangle': Latin America, the Gulf of Mexico and West Africa. The Atlantic Triangle is expected to dominate deepwater expenditure. However, continuing technological advances and increased cost-efficiency will be required to ensure the viability of future prospects in both existing and new deepwater provinces.

ATLANTIC TRIANGLE

Deepwater (> 1.640 ft | > 500 m) oil & gas fields in production.
Source: Infield Systems Limited 2014



P10,000 OCEAN BLACKHAWK
Owner: Diamond Offshore
Position: Gulf of Mexico



PRD12,000 BULLY 1
Owner: Noble
Position: Gulf of Mexico



DSS51 DEVELOPMENT DRILLER III
Owner: Transocean
Position: Gulf of Mexico
(Image copyright: BP)



DPV7500 HAI YANG SHI YOU 201
Owner: COOEC
Position: East China Sea



P10,000 DEEPSEA METRO II
Owner: MetroStar/Odfjell
Position: South Atlantic



TDS2500 DELBA III
Owner: Odebrecht
Position: South Atlantic



DSS21 MAERSK DELIVERER
Owner: Maersk Drilling
Position: South Atlantic



DSS38 GOLD STAR
Owner: Queiroz Galvao Perfuracoes
Position: South Atlantic



P10,000 BOLETTE DOLPHIN
Owner: Fred. Olsen Energy
Position: South Atlantic



- Deepwater development areas
- Atlantic Triangle
- Deepwater oil & gas fields in production

- Drilling units
- Drilling semi-submersible (DSS/Ocean series)
- Drilling vessel (PRD12,000 P10,000)
- Construction units
- Installation vessel (Constructor)

MAKING THE DIFFERENCE IN BRAZIL TEAMING UP WITH PETROBRAS

Ahead of unprecedented offshore exploration and production activities in Brazil, GustoMSC is cooperating with Petrobras to fulfill one of the most ambitious business plans in the world's O&G industry. Fernando Frimm, President of GustoMSC USA, interviews Reginaldo Sarcinelli Filho, General Manager of Petrobras responsible for the construction supervision of 28 drilling rigs being built in Brazil to operate in the pre-salt areas. Sarcinelli Filho: "We needed companies that fully understood our requirements, with expertise and know-how to implement them in their designs. For this, we counted on the experience of GustoMSC."



Semi-sub under construction at BrasFels



Qdrill under construction at Ecovix

"PETROBRAS IS SEEKING THE VERY LATEST TECHNOLOGIES BECAUSE IT NEEDS MORE EFFICIENT, FASTER DRILLING, AND LESS COSTLY WELLS."

Reginaldo Sarcinelli Filho
General Manager of Petrobras

Brazil has been making great efforts to develop its local industry. One of the main initiatives towards this goal is the country's government local content policy, which establishes that a certain percentage of expenditures during the exploration and development phases of onshore and offshore projects be done in Brazil. This obligation is established in the contracts oil companies enter into with Brazil's National Petroleum Agency (ANP) either under the concession or the production sharing regulatory regimes. The concession regime applies in all Brazil's onshore and offshore sedimentary basins outside the so-called pre-salt polygon, where the production sharing regime is in force. This pre-salt area is very large, encompassing most of the Santos and Campos basins and the southern portion of the Espírito Santo basin.

Brazilian legislation established that Petrobras has to be the operator and hold as a minimum 30% interest in field development activities within the pre-salt polygon. The remaining interest is made available to other oil companies through ANP bidding rounds. To this date, only one block in the pre-salt polygon has been auctioned, the Libra area, which is believed to contain between 8 billion and 12 billion barrels of equivalent oil.

It is widely recognized that Petrobras is one of the world leaders in deepwater exploration and production. They have created and developed innumerable cutting edge technologies that are key to bring deepwater fields into production safely, quickly and efficiently. But even for a company with Petrobras prowess, the challenges ahead are enormous. The pre-salt reservoirs lay thousands of meters beneath the sea bottom, in water depths reaching up to 3,000 meters, 200 miles to 300 miles off the coast. In addition there is the commitment to develop the local supply chain to satisfy the local content commitments.

By 2020, Petrobras plans to have more than twice its present daily oil production; increasing output from the current 2 million barrels of oil per day (bopd) to over 4 million bopd. The resources needed to achieve this production target are staggering: 35 new production platforms in addition to 55 existing units; 28 new deepwater drilling rigs in addition to an existing fleet of 40 units; over 30 deepwater PLSVs; innumerable

multipurpose service units for offshore installation work; hundreds of offshore supply boats; drilling, completion and connection about 90 new wells per year etc. Out of the US\$ 220 billion dollars investment foreseen by the oil company's 2014-2018 business plan, US\$ 154 billion will be directed to the Exploration & Production-activities.

One of the key projects to achieve the local content requirements established in the Petrobras contracts with ANP consists of the construction of 28 deepwater drilling rigs in Brazil, capable of drilling in waters 3,000 m deep. As the leading designer of deepwater drilling rigs in Brazil, GustoMSC is proud to be part of this undertaking. Three Brazilian shipyards are building a total of 15 drilling rigs designed by GustoMSC: the Enseada Paraguaçu shipyard, in the state of Bahia, is building six Qdrill drillships; the Ecovix shipyard in Rio Grande do Sul is building three Qdrill drillships; and BrasFels is building six DSS38-E semi-submersible units at their shipyard in Angra dos Reis, Rio de Janeiro.

All these rigs must have between 55% and 65% local content. Reaching such indexes is considered to be a huge challenge, taking into account that construction of deepwater drilling rigs are technologically advanced projects that have never been carried out in Brazil yet. GustoMSC is playing a role of paramount importance in the Brazilian oil & gas scenario, providing the local shipyards with its unique know-how and large experience with drilling rigs and helping Petrobras to fulfill its challenging plans.

What is the significance of the 28 drillings rigs for Petrobras?

"They are very important because they are part of the development strategy of the pre-salt fields offshore Brazil. At the early stages of the pre-salt discoveries, Petrobras realized that the development of these fields would require more drilling rigs than the market was able to provide at that time; that new build units were needed. The challenge is that these rigs had to be capable to operate in water depths up to 3,000 meters in the more demanding environment of the pre-salt areas, which required rigs with cutting-edge technological features. Therefore Petrobras is seeking the very latest technologies because it needs more efficient, faster drilling, and less costly wells."



Reginaldo Sarcinelli Filho joined Petrobras in 1979. Being a naval architect, he started working on construction supervision of oil tankers; then he moved to the operation side, to the division that managed and operated its tanker fleet. Later on, he migrated to the offshore exploration and production areas of the company and worked on the operation of semi-submersibles. About ten years ago, he moved into the engineering department and started working on the construction of drilling rigs and production platforms.

What was it like to undertake such large projects in a country with no experience in this type of construction?

"In order to prepare the overall specifications for these drilling rigs and to put in place their construction strategy, we had the collaboration of designers and equipment suppliers with state-of-the-art design practices, technologies and equipment. We decided that we could not take chances with designers and suppliers who did not have solid experience and know-how in this field. Also, for the construction phase we required that the Brazilian shipyards associated themselves with foreign technology partners, who had expertise in shipyard management and construction of offshore platforms with similar characteristics as the drilling rigs. Brazil by itself, without assistance of these companies would not be able to do this."

How was the designer selection process like?

"At the time when this project started, there were a number of drilling rigs operating in deepwater offshore Brazil. We knew that some rigs performed better than others. So we contacted the companies that had designed these rigs to adapt their designs for the pre-salt operation requirements. GustoMSC was part of this group."

What is GustoMSC's importance in the drilling rig projects?

"GustoMSC was very active from the early days of the project. They presented solutions for various types of hulls. We realized the company had the capacity to develop both semi-submersible units as well as drillships and it also had innovative solutions. The result of the overall tender process attested to this ability, because several shipyards submitted bids with GustoMSC designs."

What changes had to be made to arrive at the final design?

"Because the conditions in the pre-salt region are more demanding than in other Brazilian areas like Campos Basin, there were additional requirements to the drilling rigs for the pre-salt areas. Changes were made in the hull design, engine power ratings, the dynamic positioning system et cetera. We needed companies that fully understood our requirements, with expertise and know-how to implement them correctly in their designs. For this, we counted on the experience of GustoMSC."

The 28 rigs represent very significant orders for Brazilian shipyards. What is the relationship of these projects with the government's local content policy?

"These orders created the motivation for foreign shipyards to establish themselves in Brazil. They were critical for the creation of the EJA - Jurong Aracruz Shipyard, in Espírito Santo; the EEP - Enseada Paraguaçu Shipyard, in Bahia, and to expand two existing shipyards: BrasFels in Rio de Janeiro and Ecovix in Rio Grande do Sul. Today, from the north to the south of the country, we have shipyards building drilling rigs. These orders were a very important initial step to get local industry standing up and start walking on its own legs."

How are the projects progressing?

"Generally, they are going very well. The first rig probably will be ready in the second half of 2015. Shortly thereafter, still in 2015, the first rig of GustoMSC design, the DSS38-E semi-submersible under construction at BrasFels in Angra dos Reis will be completed. The last units will be delivered over the course of 2020. GustoMSC's Qdrill drillships will start being delivered in the first half of 2016 by Enseada do Paraguaçu and Ecovix shipyards."

Does GustoMSC provide you with support during the construction phase?

"Yes. They are providing technical assistance to shipyards and to the detail engineering companies."

What are the main challenges to conclude these projects successfully?

"One of them is that the Brazilian shipyards acquire and implement the know-how and expertise brought by their foreign partners. We need this expertise in the areas of industrial processes and construction management, to meet the large demand for offshore platforms that are needed to develop the pre-salt oil fields offshore Brazil."



Fernando Frimm
President of GustoMSC USA



**A GIFT TODAY
IS A RESCUE
TOMORROW**



"The KNRM responds to rescues all year round and in all weather conditions. Last year, we carried out over 2,000 rescue missions, saving over 3,000 people. I am a volunteer, just like the entire KNRM crew. The commitment shown by the men and women I work with is incredible. With the support of our contributors we make the difference between life and death."

Kees Kuyt, Volunteer rescuer

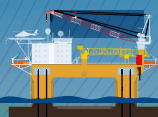


Safety at sea is an important topic for both GustoMSC and the KNRM. The KNRM life-saving service is funded entirely by voluntary contributions, donations and legacies. All contributions are spent directly on saving lives at sea. That is why GustoMSC is a proud sponsor of the KNRM.

THE PIONEERS OF OFFSHORE ENGINEERING



CONSTRUCTOR-XL
FIELD DEVELOPMENT
VESSEL
**HIGH CAPABILITIES,
EFFICIENT DESIGN**



OCEAN 500
ACCOMMODATION
SEMI-SUBMERSIBLE
**SAFE WORKING
& LIVING
ENVIRONMENT
FOR 750 POB**



MAGELLAN CLASS
DRILL SHIP
**OPERATIONAL
FLEXIBILITY
& ROBUST
DEEP SEA
CAPABILITY**



OCEAN 1100
DRILLING
SEMI-SUBMERSIBLE
**SAFE WORKING
& LIVING
ENVIRONMENT
IN HARSH
CONDITIONS**

GustoMSC

GustoMSC is an independent, world renowned and leading design and engineering company, thanks to the vast knowledge and expertise of our dedicated professionals and our close relationships with the most influential players in the offshore market. We serve the offshore industry by providing the best in class solutions for mobile offshore units.

GustoMSC

Karel Doormanweg 25
3115 JD Schiedam
The Netherlands
+31 (0)10 288 30 00

GustoMSC US

840 West Sam Houston Pkwy North
City Center 4 - Suite 410
Houston, Texas 77024 USA
+1 713 380 2600

www.gustomsc.com