

GustoMSC

Our activities

exploration, construction, production

Technology
Creating
Value



GustoMSC



For other people this is the horizon. For us the challenge to see beyond it.

GustoMSC - Approach to Business

GustoMSC is an alliance of experienced specialists offering a wide range of design, engineering, construction and installation services to offshore markets. GustoMSC seeks to:

- provide clients with high integrity solutions to operational challenges in the offshore environment, and in so doing assure them of reliable and profitable operations for the future;
- be a responsible employer to staff;
- be a reliable partner to its clients, suppliers and associates.

This brochure introduces a multidisciplinary alliance that has made its name in providing effective and high quality answers to clients in the challenging world of offshore exploration, construction and production. The new domain of wind turbine installation is also addressed. The brochure gives a short introduction to the philosophy of GustoMSC, a few words on its capabilities and some details on past achievements. It is but a glance. A brochure after all is little more than a colourful visiting card. The real detail of what GustoMSC can offer a client lies in its collective capabilities, know-how and experience; information that a brochure can only cover in overview. Behind this brief picture is a motivated team of experienced and skilled technical and project specialists. Please do not hesitate to call on them.

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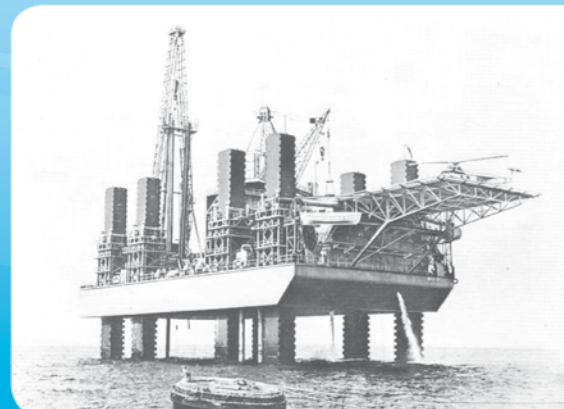


GustoMSC



GustoMSC offers design, engineering, procurement, project management and consultancy services primarily to the offshore oil and gas, and civil construction sectors. GustoMSC has available a variety of proprietary designs for jack-ups, semi-submersible units and drilling vessels with associated hardware kits. It is a close partnership of three specialist companies working to ISO-certified standards, from two key locations in the world that themselves provide a huge resource of experienced manpower – Schiedam, the Netherlands, and Houston, Texas.

The strategy of the company targets high integrity, cost-effective, and unquestioningly safe answers to the toughest of challenges. It seeks to represent the interests of all parties involved: owners, builders, contractors and all project partners. The experience profile covers a wide spectrum of capabilities, from consultancy and concept work to feasibility studies, basic design and detailed engineering, to provision of project management, procurement, verification and quality control services.



GustoMSC designed and built SeaShell in 1960– the Shell oil company’s first ever jack-up drilling rig, thus initiating a period of almost 50 years of experience.

GustoMSC has made a specialty of integrating all its skills into one effective force. Today, it probably represents the most extensive range of skills of its type available from any single source. Achievements of recent date extend from design and engineering for drill rigs, pipelay vessels, heavy duty offshore cranes and crane vessels, mobile production, storage and offloading units, installation of huge wind turbines, both on and offshore, to the supply of a range of high performance equipment.

GustoMSC is familiar with all types of mobile offshore units: jack-ups, semi-submersibles, ship and barge-based, and a range of deck-mounted and associated equipment. Support services range from consultancy and design to construction management, equipment procurement, and shipyard and rig inspection. The company can handle a project from conception and commissioning to care and continuance.

In the conviction that a clearer guide to the company’s capabilities is the company’s past performance rather than its claims, the sections that follow describe some of the alliance’s recent projects with selected technical details.



Some recent projects

Projects and successes described are but a few of the many that GustoMSC has completed over past years. Selected to provide a simple overview of company capabilities, they broadly cover exploration, construction, production, equipment and installation sectors. Further detail on www.GustoMSC.com

Exploration



CJ series of jack-up drilling units

The CJ series of cantilever jack-up drilling units represents GustoMSC's answer to the need for highly efficient drilling units. The patented GustoMSC XY cantilever and drill floor structure move as one fixed package giving exceptional outboard reaches at full drilling load over the full drilling envelope. The Maersk Innovator with its sister the Maersk Inspirer were designed by GustoMSC for the 150 meter water depth and harsh environment of the North Sea. These are currently the two largest jack-ups in the world. GustoMSC provided full concept and basic design, and supplied jacking systems, leg fixation systems and XY cantilever skidding systems. Over twenty CJ drilling jack-up units have been designed and are operational or under construction.



Drilling vessels

In the '70s, GustoMSC was involved in the design and construction of the Pelican series of drill ships of which some still operate in deep waters off Brazil and India. In the early '90s GustoMSC commenced development of the G10,000 and PRD12,000 series. GustoMSC drillship design typically integrates drilling systems in the hull allowing greater deck space which in turn results in smaller overall dimensions thus making a multitude of build and operational savings. Over 15 Pelican units were built and ten of the G10,000 and PRD12,000 designs are currently operational or under construction.



DSS series of drilling semi-submersibles

This series of GustoMSC designed units is characterized by the four column, two floater and deck box structure, typically designed for deepwater regions. Storing the riser joints vertically, net available deck space is significantly increased which improves drilling efficiency for exploration and development drilling. The DSS20, a wire-moored semi-submersible rig, jointly developed with Keppel FELS and one of a series of ten comparable units, was the first operational unit using the vertical riser storage system. Since 2003 it has been working for ExxonMobil in the Azeri part of the Caspian.

The DSS series encompasses the DSS20, DSS40, DSS50 and DSS60 designs of which several of each type have been designed, built and commissioned.



Construction



Heavy lift semi-submersibles

The Balder and Hermod, Heerema's semi-submersible deepwater construction vessels were built in the 1970s to GustoMSC designs. These were the first dual crane heavy lift vessels in the world. The two cranes of 2,000 and 3,000 tons capacity were likewise built under GustoMSC license. Both have received interim upgrades and now offer capacities of 3,000 and 4,000 tons. At the latest upgrade, Balder was converted from anchor-moored to DP, and a J-lay tower added. GustoMSC delivered concept and basic design plus all subsequent engineering for vessel and crane upgrades.



Heavy lift vessels

GustoMSC developed the HLV5000 class as heavy lift vessel and the DPV7500 class as combined heavy lift and pipelay vessel. With these new designs GustoMSC could provide cost-effective answers to expanding offshore installation and pipelaying needs with proven hull and crane designs.



Pipelay vessels

In the early '70s GustoMSC designed and built the Acergy Piper (originally Viking Piper) as one of the first pipelayers of its kind. In recent decades the pipelaying market has changed from emphasis on rigid to flexible pipelaying. The GustoMSC answer was Technip's CSO Deep Blue, the first deepwater DP pipelay that can lay both rigid and flexible pipe down to 2,500 meters. It was based on the proven G10,000 hull design.



SEA and NG construction jack-ups

The construction markets often use jack-up units for support, installation, maintenance and lifting operations. For the construction market four-legged units are often used for preloading. GustoMSC has developed two lines of these type of units: the SEA series of non-propelled units and the self-propelled DP NG series. Depending on the applications area either tubular or trusswork legs are used and in the same manner GustoMSC provides the hydraulic pin-in-hole jacking or rack and pinion systems. Examples of the SEA series include the 'Vagant' and 'Pauline' and the larger JB109 and JB110. Examples of the NG series are 'Wind' and NG2500X.

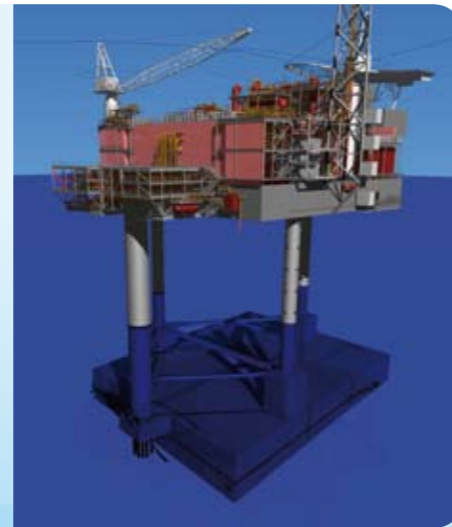


Production



The MOPU line

GustoMSC developed the MOPU line of platforms for marginal fields. The patented MOPUstor offers a highly cost-effective and reusable answer to marginal oil fields in relatively shallow water without pipeline infrastructure. A steel seabed storage tank, three tubular legs, and barge-type platform deck are key features. The tank doubles as platform foundation and 300,000 bbl storage facility and the integrated well caisson contains slots for 12 wells, risers and J tubes. The first unit was delivered in 1998 for the Siri development in Denmark, and at present a similar unit for the YME field for Talisman is under construction. If the infrastructure allows, the unit can be designed without a storage tank. GustoMSC delivered concept, basic design, detailed engineering for storage tank and jack-up structure and supplied the hydraulic pin-in-hole jacking systems.



EWT MOPU and FSO

This extended well test system was specifically designed for construction outside yet assembly in the Caspian Sea area. It consists of a new-build jack-up equipped with process facilities and FSO with external turret. Oil production capacity is 15,000 bpd and storage volume 60,000 bbls. The MOPU is a cruciform shaped jack-up assembled from two barges with three circular legs. Rapid deployment (<15 months from contract to delivery) enabled Petronas Carigali (Turkmenistan) to continue operations in the Caspian. This project illustrated the strength of GustoMSC and the SBM construction and procurement team to act on a client request for a short delivery project. GustoMSC supplied concept, basic and detailed design and hydraulic pin-in-hole jacking systems.



FPSO vessels

Within the SBM Offshore group, GustoMSC is a key centre for the design and engineering of vessel conversions and process topsides. An example is FPSO Marlim Sul which has a production capacity of 100,000 bpd and storage of 1.6 million barrels. The unit is owned by SBM Production Contractors and leased to Petrobras. From contract signing to production of first oil a record was set of 18 months thanks to tight project management and concurrent engineering from seven separate disciplines. Within four months of first oil, production capacity was regularly being exceeded. Maintenance needs were cut drastically by combining gas and steam turbine driven power generators giving high redundancy. GustoMSC provided all basic and detailed engineering for the vessel conversion, process topside and turret integration. This initiative was identical to many preceding FPSO projects for SBM such as FPSO Falcon, FPSO Serpentina, FPSO Espadarte, and FPSO Brasil.



FPU semi-submersible units

In cooperation with SBM Atlantia, GustoMSC developed deep-draft semi-submersible units which are characterized by slender long columns supported by a ring floater. This structure offers a very low motion response allowing SCR for flow and export lines. SBM Atlantia has now delivered the Independence Hub for Enterprise Product Partners and under construction is the Thunderhawk for Murphy Oil Corporation.



Equipment Supply



Marine offshore heavy lift cranes

GustoMSC is a turnkey supplier of large offshore cranes. The standard range of crane starts at 500 tons and currently reaches 5,000 tons.

500 ton heavy lift crane

This type of crane is specifically suited for installation and maintenance activities. Examples are the cranes for ARB1 and WindLift 1.

4,000 ton heavy lift crane

This is often seen in combination with pipelay activities and is fitted on the DPV7500 class. An example is the 4,000 ton crane on the DPV7500 of COOEC.

5,000 ton heavy duty offshore crane

This crane is specifically suited for heavy lift crane operations on board vessels or semi-submersible units. One example is the Oleg Strashnov.



Rack and pinion jacking systems

In the '70's and '80's GustoMSC designed and delivered rack and pinion jacking systems and well servicing barge for several jack-up drilling units. These systems represent over 200 years of successful jacking operations. Recently the rack and pinion systems have been modernized with variable speed drives delivered to the NG series and CJ series of drilling rigs.



Offloading systems

GustoMSC provided the offloading systems for FSO OKHA and FPSO Marlim Sul, for both fitting a reel holding some 250 meters of 20 inch floating hose. Since first oil in June 2004 the Marlim Sul hose and hawser reels have been in continuous operation on a vessel turn-round of typically ten days.



Hydraulic positive engagement jacking systems

For construction units, exploration and production jack-up units and self-propelled well maintenance units, GustoMSC designs and supplies heavy duty hydraulic jacking systems for truss type and tubular or rectangular legs. Reusable, low maintenance, and fully designed to adapt to leg deflection, to date over 50 systems have been delivered. The world's largest systems so far installed are on the Siri platform (6,500t/leg) and the high speed, 4,000 ton leg load capacity systems supplied to MPI's Resolution wind turbine installation vessel.



Active heave compensation systems

To safely manage landing and retrieval of expensive hardware packages in deep water the modular containerized AHC system is a remarkable tool. The 250 ton capacity proactive control system eliminates vessel-induced motions on the load with a 1:10 reduction. Originally tasked for the setting of suction piles, the AHC is now increasingly being used for the installation of production manifolds and sub-sea Xmas trees.



Involvement in the Offshore Wind Installation Market



Introduction

In the field of renewable energy a new and challenging market is the offshore wind farm. There are currently numerous offshore wind farms operational, and many more are forecast to come.

Over much of the last decade GustoMSC has been addressing this market as designers of installation units and turn-key suppliers of special equipment tools.

The installation vessel market

The offshore wind farm market is booming with many governments promoting the use of wind farms. Around the North Sea, for instance, all countries have wind farm projects in operation or in planning.

GustoMSC has been approached by most installation contractors to propose units for the installation of wind turbines, being the foundations, the above water towers and the turbine units. Operating water depths are now advancing beyond 45 meters, turbine weights are already up to 500 tons, rotor diameters 130 meters. Larger turbines are planned, in deeper water, and possibly on floating foundations.

Wind

The first unit used in the early days for the installation of offshore wind turbines was the self-propelled jack-up unit Wind. Although a small unit (55 m by 18 m) the unit successfully installed several offshore wind turbines in 2004.



Resolution

A second dedicated self-propelled unit was the Resolution, owned by MPI. GustoMSC was involved in the turnkey delivery of the double-acting hydraulic jacking systems and the integration of the jack-up technology into the hull design. Its first job was the installation of foundations and turbines for the Kentish Flats wind farm in the UK. A total of 30 wind turbines were installed each with a capacity of 3 MW.



Wind Lift I

After the successful introduction of this unit, GustoMSC was approached by Bard Engineering in Germany to develop their installation vessel, the unit 'Wind Lift I'. For delivery in early 2009, this is the next generation offering more efficient lay out and operation, reduced number of legs (4) and higher crane capacity.

The unit measures 102 meters by 36 meters, with leg length of 72 meters and is capable of working in 45 meter water. The main crane capacity is 500 tons with a reach of 125 meters. Bard is developing offshore wind turbines with the central tower 90 meters above water and nacelle up to 280 tons.

GustoMSC's scope of work included jack-up design, turn-key supply of the double-acting hydraulic jacking system and the 500 ton offshore crane and design and delivery of a number of handling tools.





Examples of units designed by GustoMSC include the Vagant and Svanen which have been adapted for several installation projects.

Vagant

The Vagant is a non-self propelled jack-up barge mainly active in general offshore installation and maintenance. The versatility of this type of unit enables them to be used for the installation and lifting operations for the foundations of wind turbine units. The Vagant is a GustoMSC type SEA 800, delivered in 2002.



Svanen

The Svanen was originally designed as lift vessel for the installation of large bridge sections of the West Bridge across the Great Belt in Denmark. GustoMSC was responsible for the design of the hull and lifting devices.

For the installation of the foundations of the wind farm near Egmond in the Netherlands the Svanen unit was used for the monopile foundation.



Handling tools

For the installation of foundation piles, central columns and nacelles, additional lifting and handling tools are required. These may include:

- the monopile handling tool for the Resolution
- the rotor handling tool for Bard Engineering

The handling and upending tool became necessary as foundations started to become too heavy for existing crane capacities. So GustoMSC designed a special tool, and supplied this turn-key, in an extremely short time. The unit was attached to the stern of the vessel and used to upend the foundation pile.

The handling tool for the nacelle was designed to safely rotate the rotor from the horizontal to the vertical position. This tool, developed for Bard and the Wind Lift I, has successfully been used for installing the first Bard prototype turbine installed onshore.



GustoMSC also provides engineering consultancy services to contractors using vessels originally designed by others. This primarily relates to jack-up and jacking system technology. For new build units many contractors now turn directly to GustoMSC.

The future

For other people this is the horizon. For us the challenge to see beyond it.

Until the year 2012 it is estimated there will be a serious shortage of installation vessels serving the offshore wind turbine market. So various parties are planning newbuild units dedicated for offshore wind turbine installation, primarily European, but companies from the US, Canada and China are also showing interest.

GustoMSC is currently contributing to the construction of wind turbine installation units with crane capacities exceeding 1,000 tons.

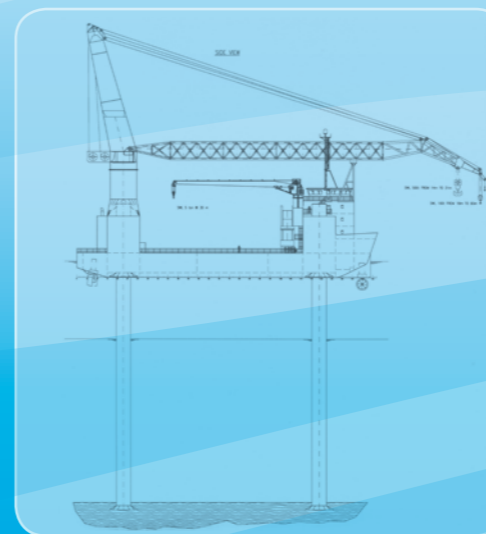
A particular challenge of offshore wind turbine installation is optimized logistics and handling. Weather windows for installation can be short and this can be a serious challenge when typically between 40 and 200 turbine units need to be installed at the one location. There is a large amount of repeat work, which contrasts to typical offshore installation work. Future developments envision installation units staying in the field and being served by dedicated vessels bringing the turbines and other hardware to the field. These vessels will probably also have a jacking system to stabilize the transport vessel during transfer to the installation vessel.

GustoMSC has proposed a patented XY cantilever system for the installation and maintenance of complete towers and nacelles. The idea is that the complete unit (tower, nacelle, hub and blades) will be lifted and put in place by the XY cantilever. The complete system will be transported from shore to offshore location, and eventually vice versa, in the vertical position.

Wind turbine installer

As time progresses, so will offshore wind turbine maintenance rise in importance. This will probably require smaller units that will remain permanently in the field for continuous maintenance of (the several hundred units installed). Dedicated units for these purposes do not yet exist; a fact which provides a future opportunity for GustoMSC.

The offshore wind turbine installation, and eventually maintenance, markets represent developments of great importance to society in general and all the companies with capabilities of serving the market. Designers, builders, installers, maintenance contractors, the field is just opening up. GustoMSC intends to be there.



Next steps



GustoMSC has the fortune to possess a vast resource of skills, expertise and experience that it gladly puts at the service of clients. For further details on projects and references please refer to the company website www.GustoMSC.com

To answer other technical enquiries please do not hesitate to make direct contact with the company.

GustoMSC

CREATIVE THINKING, EFFECTIVE DESIGN AND RELIABLE HARDWARE FOR OFFSHORE MARKETS.

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