

# Jack-Ups

## Our activities

Technology  
Creating  
Value



**SBM**  
OFFSHORE

## Applications for offshore energy

Exploration

Construction

Production



Jack-up



Semi-submersible



Vessel



The horizon is just the beginning. The challenge to see further is ours.

## Jack-ups

GustoMSC has been active in Jack-Up Technology since late '50's. The first offshore drilling jack-up delivered by the Gusto Shipyard was the SEASHELL in 1960.

Since those early days, GustoMSC continued with the design, engineering and delivery of jack-up platforms for a variety of applications. Many platforms have been designed and delivered to the Oil and Gas industry and Civil Construction companies. Currently the market interest is with jack-up technology for the Wind Farm industry and again the Oil and Gas industry. GustoMSC provides jack-up solutions for exploration, construction and production.

### Exploration



### Construction



### Production



Technology  
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Value



# Exploration



Since the late '50's, GustoMSC has been involved in the design, engineering and construction of different type of jack-up drilling units. In the early '80's GustoMSC introduced the successful CJ series of jack-up drilling units. The units built in the '80's and '90's were provided with a classic cantilever for drilling over a platform. In the late '90's GustoMSC introduced the patented X-Y cantilever concept, which has been provided on the units since then. The X-Y cantilever enhances the drilling efficiency, reduces the weight of the cantilever, thus increasing the capacities. By the X-Y system the loadcharts of the cantilever allow for maximum hookloads over the full envelope, improving the development drilling over fixed platforms.

## X-Y cantilever



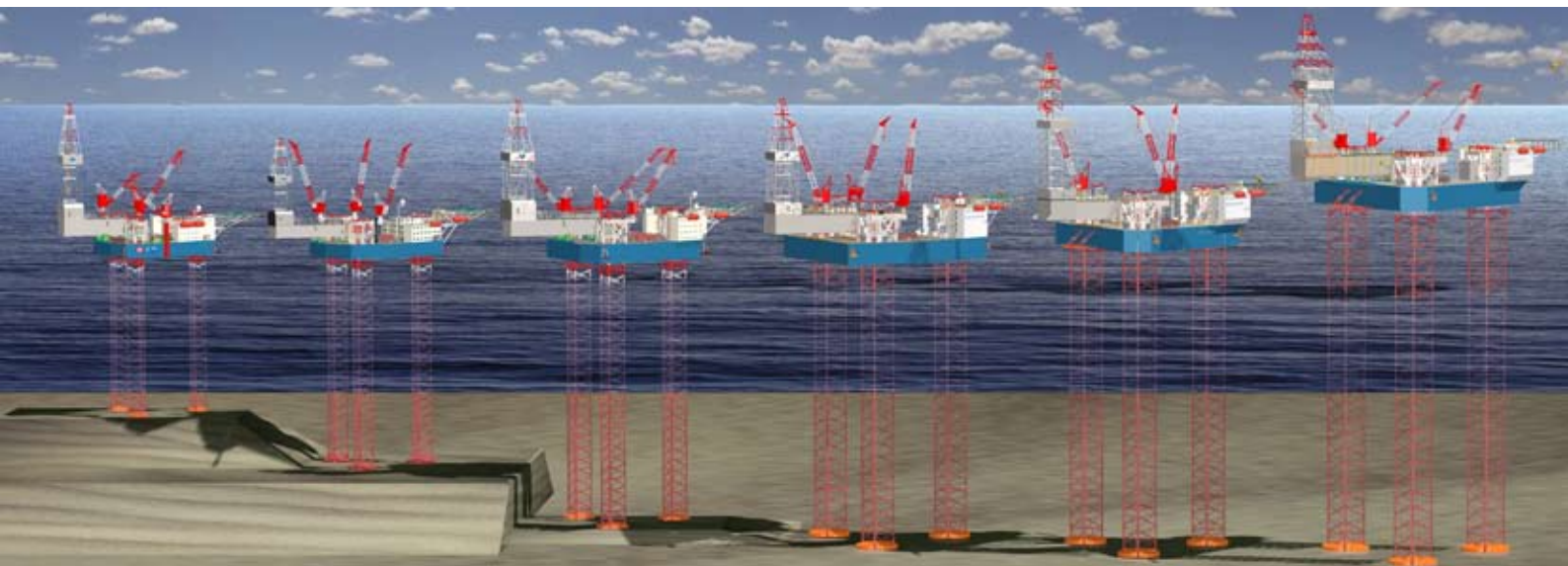
*skidbox*

*dragchain*

*mud ditch*



# Exploration



The CJ series of drilling jack-ups ranges from 250 ft to 450 ft water depth, as per below overview.

Class	CJ36	CJ46	CJ50	CJ62	CJ70
Number	-	9	6	2	4
Water depth	250 ft	350 ft	400 ft	400 ft	450 ft
Area	Moderate environment	Moderate environment	Moderate environment	Harsh environment	Harsh environment
Variable load	8,000 kips	9,000 kips	9,000 kips	10,500 kips	17,500 kips

Some pictures of CJ units in operation or recently delivered



*Noble Piet van Ede (CJ46)*



*Maersk Resilient at yard (CJ50)*



*West Epsilon (CJ62)*



*Maersk Inspirer at Judy field (CJ70)*

# Construction

## SEA series of construction jack-ups



GustoMSC is one of the market leaders with respect to jack-up units for the construction market. Over 50 units have been designed and delivered since the early '60's. These types of units are active for civil construction activities near shore or in estuary, for offshore accommodation and installation support activities and for the emerging offshore wind farm industry.

Typically for the civil construction activities, these self-elevating platforms are four legged units without any propulsion or marginal accommodation. The SEA series reflects the new line of these platforms.

Class	SEA 800	SEA 900	SEA 2000
Number	1	1	5
Hull	43.5 x 22.5 m	48 x 23.5 m	55.5 x 32.2 m
Leg length	57.5 m	60 m	73.2 m
Water depth	30 m	30 m	40 m
Variable load	1,000 t	1,100 t	1,250 t



# Construction

## NG series



For the offshore accommodation, construction and installation, the new trend is for DP and self propelled units. GustoMSC serves this market with the NG class of units.

Class	NG 600	NG 1650	NG 2500
Number	1	1	4
Hull	55 x 18 m	50 x 30.5 m	61.2 x 36 m
Leg length	45 m	78 m	85 m
Water depth	25 m	48 m	40 m
Variable load	550 t	650 t	900 t



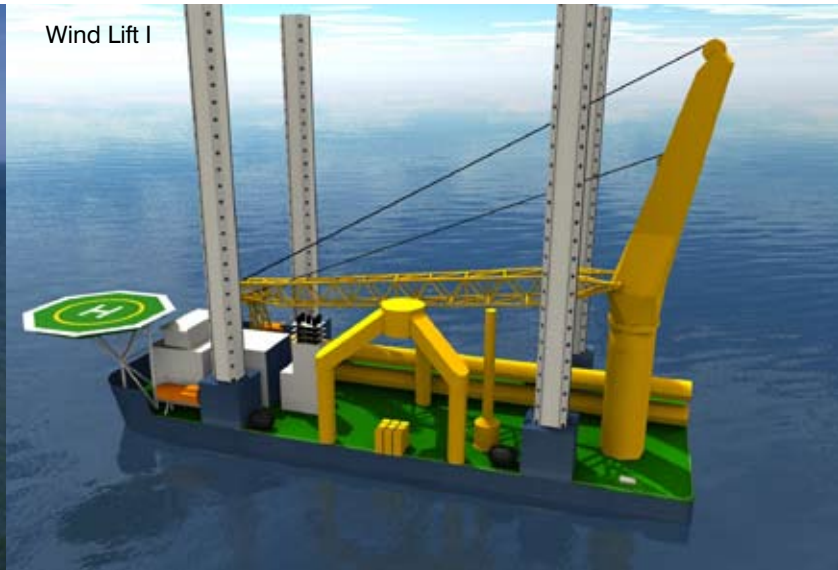
# Construction

## Wind Turbine Installation Vessels

Resolution



Wind Lift I



In the field of renewable energy a new and challenging market is the offshore wind farms. There are currently numerous offshore wind farms operational and many more are forecast to come. GustoMSC has been addressing this market as designers of installation units and turnkey suppliers of special equipment. As this evolving market is looking to different solutions, GustoMSC has contributed to a number of projects.



*Wind*



*Buzzard and Vagant*



# Production

## Overview - concept range



### A cost effective alternative to conventional fixed platforms for marginal field developments

Especially in the more recent years with the high oil prices, self-installing production jack-ups have proven to be flexible and cost effective solutions for the (re-)development of oil and gas fields. GustoMSC with its vast experience in the design, construction and operation of FPSOs could combine this with the jack-up technology and introduced the MOPUstor concept. To date several solutions have been proposed and accepted by the industry. The MOPUs are ranging from the MOPU (without storage), MOPUstor (with subsea storage tank) to the MOPUdrillstor (also supports a drilling package).

To date GustoMSC has been involved in the design and engineering of the following SBM Offshore turn key delivery or lease and operate of the units below.

Unit	MOPU + FSO Saparmyrat Turkmenbashi	MOPUstor Yme Talisman	MOPU Deep Panuke Encana
Number	1	1	1
Hull	100 x 60 m	57 x 54 m	52 x 62 m
Leg length	80 m	100 m	89 m
Water depth	54 m	93 m	45 m
Variable load	n.a.	350,000 bbls	n.a.



Deep Panuke Encana

# Associated hardware



## Rack and pinion jacking systems

In the '70's and '80's GustoMSC designed and delivered rack and pinion jacking systems for several jack-up drilling units. These systems represent over 20 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.

## GustoMSC rack fixation systems

The patented GustoMSC fixation system provides a clearance free, rigid connection between the leg and platform during operation and transport. This enhances the water depth capability as well as the fatigue life of the jack-up.

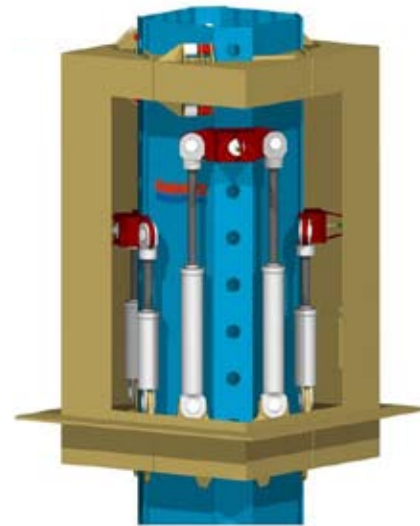
## X-Y cantilever

The cantilever jack-ups of the CJ series are equipped with the patented GustoMSC X-Y cantilever system that combines the cantilever- and drill floor structures into one fixed package which can move both longitudinally and transversely relative to the hull of the jack-up.





# Associated hardware



## 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 the MPI Resolution wind turbine installation vessel.

## Handling tools

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

The monopole handling and upending tool became necessary as foundations started to become too heavy for existing crane capacities. GustoMSC designed a special tool. The unit for the Resolution was supplied turn-key in an extremely short time. It 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.







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