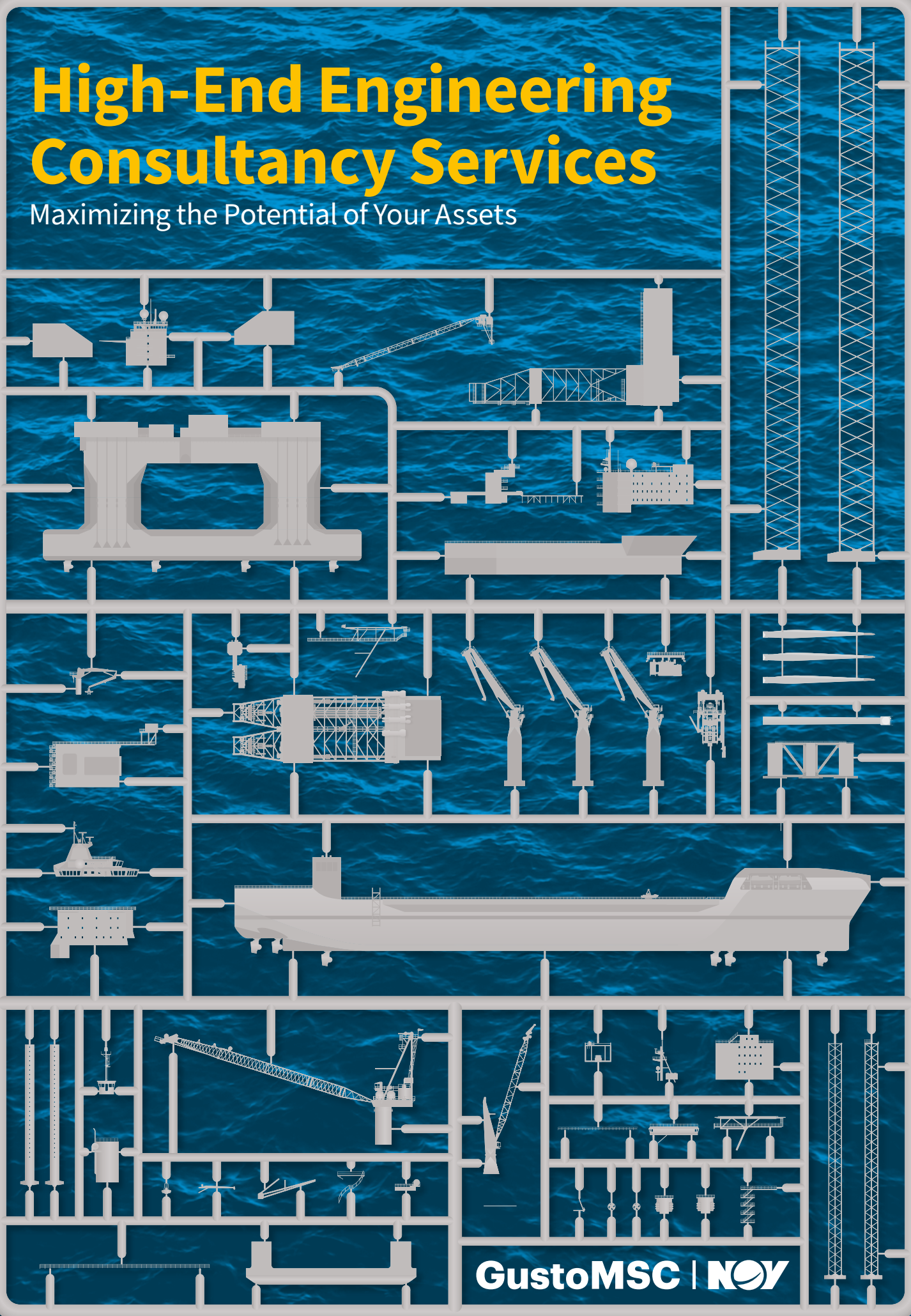
High-End Engineering Consultancy Services

Maximizing the Potential of Your Assets



GustoMSC | NOV

Operational Support and Engineering Consultancy

Leveraging our experience in the offshore industry, we provide operational support and engineering consultancy services to offshore contractors, wind-farm developers, energy companies, and yards. These services enable our clients to safely extend the boundaries of what is possible with their units, continuously improve their operations, and maximize the return on their assets.

Energy transition and digitalization

Given the global energy transition, the need for energy security, and higher environmental requirements, embracing technological development opportunities is a precondition for success.

In a market where efficiency is paramount, our engineering services enable our clients to streamline operations, optimize resources, and minimize downtime while implementing cutting-edge technologies. In addition, GustoMSC offers a robust infrastructure that collects and processes data, a software platform that handles data delivery, and applications that translate data into valuable information. Implementing these digital innovations in our engineering consultancy services further enhances our clients' competitive advantage.

As the offshore industry continues its way through the energy transition and digital transformation, the demand for innovative solutions is on the rise. Our integrated and interdisciplinary approach enables our clients to benefit from advanced technologies.

Advanced technology

Creating designs for mobile offshore units requires a multidisciplinary approach in which skills, experience, and state-of-the-art tools are used to translate client requirements into a well-balanced solution that is readily accepted by regulatory authorities.

Based on our track record of delivering designs and equipment for more than 250 mobile offshore units, we have received unequalled feedback on the construction, operations, and performance of these units. By working with the major classification associations, we have gained a thorough understanding of their requirements. Our research and development, involvement in joint industry projects, and cooperation with technical institutes and universities contribute to keeping our advanced technology up to date.

Our highly skilled and experienced engineers and designers have a profound and in-depth knowledge of the physics behind the phenomena that occur in the interaction between offshore structures and the environment, creating a solid basis to deliver engineering consultancy at the cutting edge of technology.

Operational support and engineering consultancy

Our involvement does not end with the delivery of our designs or equipment. In more than two hundred projects a year, GustoMSC provides services for units and equipment in operation, ranging from engineering project support to asset upgrades and major conversions.

Upgrades and conversions enable our clients to follow the ever-evolving market requirements. Cranes are upgraded to accommodate the growing size of offshore wind turbines and vessels are equipped with alternative fuel systems to lower their emissions. Units originally built for the offshore oil and gas industry are converted into heavy-lift vessels or cable layers to be redeployed in the offshore wind industry.

Our engineering consultancy services range from specialized technical analyses to concept reviews, fleet enhancement, and field development studies. Our consultancy comprises studies to obtain strategic insights and business scenarios, translating market analysis into design requirements and practical solutions. GustoMSC can support you with high-end engineering consultancy, from site-specific or dynamic-positioning analysis to earthquake-response or vessel-impact analysis.

Digital solutions

GustoMSC leverages the NOV Max platform, a versatile system integrating with diverse data sources to convert raw data into actionable insights. Real-time data is securely stored in the cloud for comprehensive analysis and immediate sharing with offshore and onshore teams. Dashboards offer a centralized view of asset health and performance, facilitating informed decision-making.

The Max platform also serves as a robust development environment, enabling the deployment of innovative applications like the Operator Support System (OSS). This suite includes edge and cloud-based solutions tailored to specific operational needs. Edge applications, like digitized reporting and real-time guidance, support offshore personnel, while cloud applications empower onshore teams with engineering, planning, and monitoring tools.

An example is the OSS.Lift app, visualizing crane operational envelopes based on crane and jack-up limitations. The edge version provides real-time information to crane operators, aiding decision-making during critical operations. The cloud version, accessible to onshore engineers, facilitates lift planning and validation based on manual input, ensuring safe and optimal asset utilization.

GustoMSC, at the forefront of data insights, integrates analytics and digital solutions into engineering consultancy, empowering clients to maximize asset potential. We navigate the digital landscape, optimizing operations to achieve business objectives.

Time-domain simulations

Solving complex structural or multi-body dynamics

To maximize the workability of offshore operations, a thorough understanding of the dynamic response to wind, waves and current is essential. Our engineers use their insight into the underlying physics to create numerical models in state-of-the-art simulation tools. These models are used to perform time-domain simulations including dynamic mooring analysis, thruster-assisted mooring analysis, dynamic-positioning (DP) analysis, lifting simulations, monopile installation, and multi-body hydrodynamic analysis. These analyses enable us to determine allowable sea conditions for critical operations, minimizing operational downtime.

Earthquake-response analysis

Enabling jack-up operations in seismic areas

As the offshore wind industry expands into regions with higher seismic activity, there is a risk of jack-up vessels facing an earthquake while elevated above the sea surface. Building on knowledge and physical models from the building industry, GustoMSC has developed advanced methodologies to analyze the earthquake response of jack-ups, contributing to safe operations in seismic zones.

Site-specific analysis

Meeting the specific challenges on site

Each site comes with its specific geotechnical and metocean conditions. Site-specific analysis for jack-up vessels provides the required verification of soil capacities and leg loads, enabling safe operations. Utilizing our experience and the latest industry developments and insights, we support our clients for any site, ranging from standard site-specific analyses to extensive studies involving advanced simulations or specialized geotechnical scope.

Lifetime extension

Keeping your assets in operation is a worthwhile investment

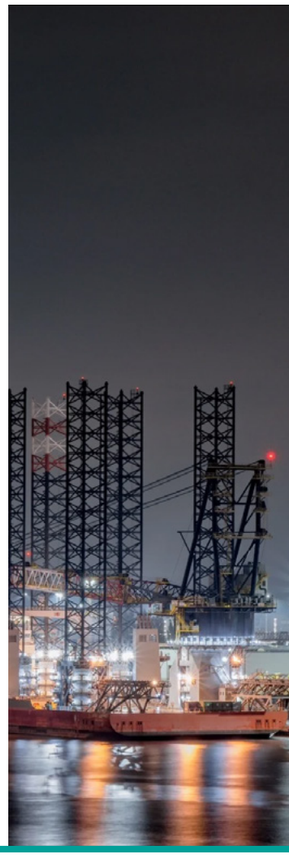
Fatigue utilization or lifetime extension studies enable us to assess and extend the operational life of offshore units. The operational history is used to calculate the actual fatigue damage compared to the initial calculations for the design life. The remaining lifetime may be extended with some local reinforcements and the fatigue hotspots found from the analysis can be included in the inspection plans. In this way, assets can be kept in operation in a safe and cost-effective manner.

Conversions

Strategic interventions to adapt to an evolving industry

As the offshore industry evolves through the energy transition, there are opportunities to upgrade or convert existing units so that they can deliver what the industry needs today. Through innovative engineering, GustoMSC supports the conversion of existing mobile offshore units into state-of-the-art assets, for example from offshore support vessel to cable layer. GustoMSC can also help reduce the emissions of your vessel, for instance by designing the integration of alternative fuel tanks.

Read more



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Leg-to-seabed impact analysis

Maximizing the allowable wave height for jack-up installation

Installation on site is typically the most wave-restricted operation of a jack-up. The loads on the leg footings (spudcans) when they hit the seabed depend on the motions of the jack-up vessel, the water depth, the spudcan shape, and the soil type. GustoMSC has a unique track record of assessing this transition from floating to elevated stage, using a dedicated simulation tool. A leg-to-seabed impact analysis allows for a sharp definition of the allowable sea state for installation, maximizing the operational weather window without compromising safety.

Vessel-impact analysis

Making informed decisions and mitigating risks

Marine operations near an elevated jack-up inherently involve the risk of a vessel impacting one of the jack-up legs. Our team is experienced in performing non-linear finite element (FE) calculations including plastic deformation to assess the effect of such impact and the remaining capacity of the damaged jack-up. The results of such analysis are key to mitigate risks and define procedures for safe marine operations around the jack-up platform.

Jack-up upgrades

Accommodating evolving project requirements

Leveraging our experience with jack-up designs, upgrading jack-up platforms enables our clients to undertake projects in different environmental conditions, enhance the foundation stability or lifting and payload capacities of the platform, facilitate increased deck space, or accommodate evolving project requirements. These upgrades can encompass critical components such as leg extensions, spudcans, jacking systems, or heavy lift cranes.

Read more

Computational Fluid Dynamics

Optimizing the design and performance of offshore structures

We support our clients with hydrodynamic analyses ranging from standard motion and seakeeping analyses to Computational Fluid Dynamics (CFD). By employing advanced CFD simulations to calculate vessel resistance, moonpool sloshing, wind loads on complex superstructures or thruster interaction phenomena, we can meticulously analyze the fluid behavior, enabling us to improve designs and ensure optimal performance. CFD simulations are a powerful tool to compare different design solutions, either replacing model tests or making model test campaigns more efficient and insightful.

Read more

Our tender support enables clients to make informed decisions during the bidding process, providing them with accurate technical insights that contribute to a competitive edge and additionally, enhance the robustness and safety of their designs. By engaging our independent experts to scrutinize and validate third-party offshore designs, you ensure compliance with industry standards and demonstrate your commitment to delivering solutions of the highest quality and reliability.

Tender support and third-party design review

Feasible plans for complex challenges

The Pioneers of Offshore Engineering

GustoMSC is recognized for providing advanced design and engineering consultancy for mobile offshore units and reliable equipment. In close cooperation with our clients, we translate experience, science, and technical knowledge into realistic and innovative ideas. In this way, GustoMSC enables and supports safe and efficient operations at sea, contributing to a sustainable future.

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