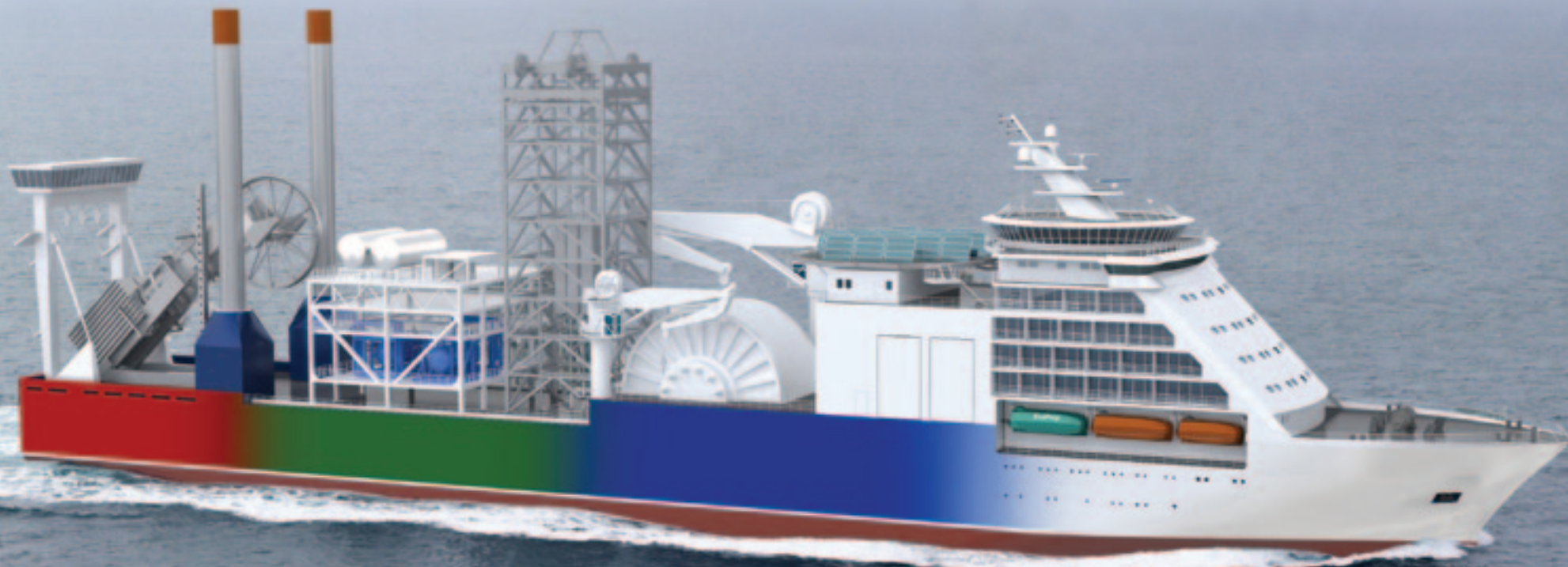


SIEMENS



Safe, profitable and environmentally friendly solutions

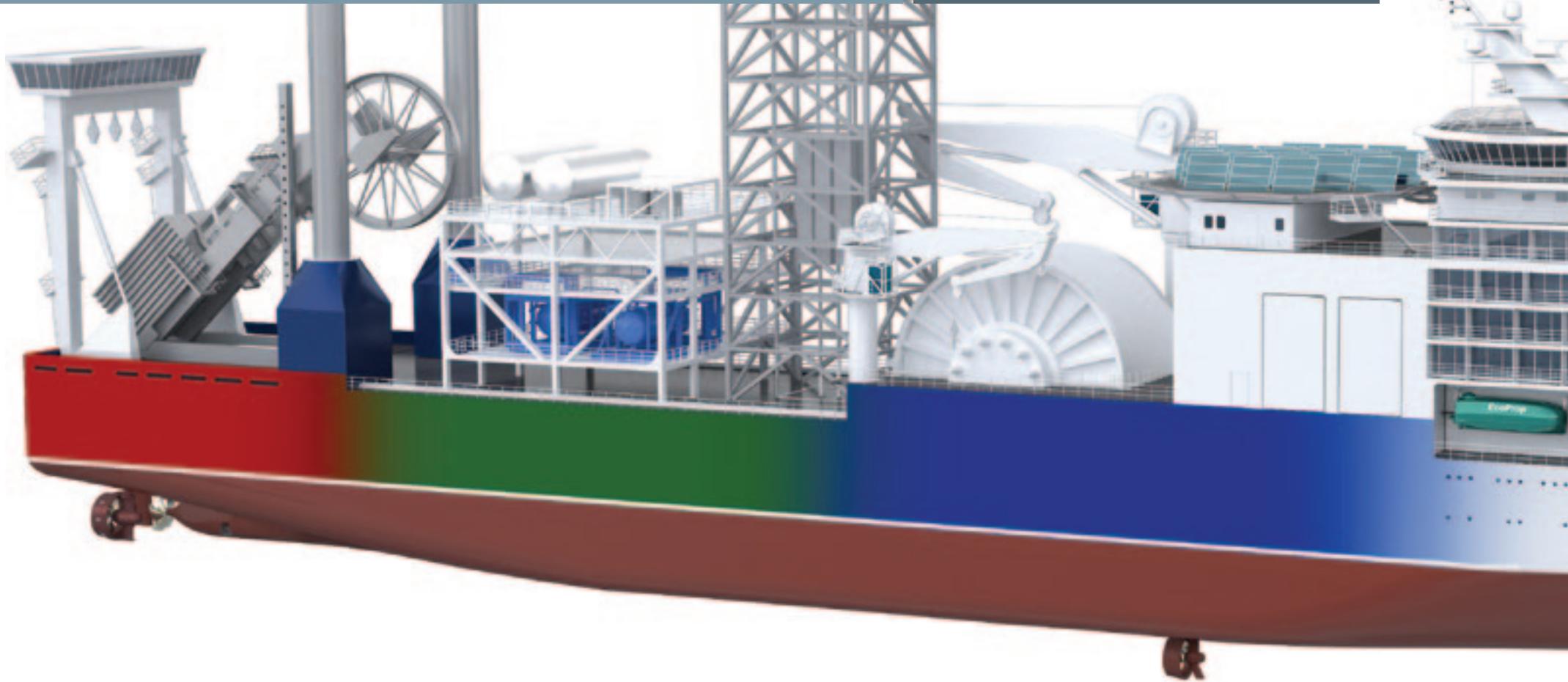
Vessel of the future

www.siemens.no/marine

Vessel of the future

Safe, profitable and environmentally friendly solutions

“Whether it’s cargo, passenger, offshore or special-purpose ships, Totally Integrated Propulsion and Automation meets every requirement for shipbuilders and ship operators, and delivers clear benefits over a ship’s lifetime.”





Total Integrated Automation

Drive Technology

Fire & Safety

Diesel Electric Propulsion

Ballast Water Management System

Topside & Drilling Solutions

Access & Security

Onshore Power

Siemens Industry Software

Energy Management System

Creating the Vessel of the Future

In an increasingly heavily regulated climate where key resources are becoming more expensive, shipowners, shipbuilders and operators are challenged to think smarter.

“Onshore power supply for ships - environmentally friendly and economical.”



Safety, reliability, environmental protection and maximizing financial returns are critical. A clear strategy to help achieve these objectives is to optimize synergy across the vessel's systems. This is where the Vessel of the Future comes into its own.

As one of the largest industrial companies in the world, Siemens is a powerhouse of innovation and technology. Applied to the maritime industry this translates into the Vessel of the Future – customized, best-in-class solutions that help improve economic results, reliability, onboard safety and environmental protection. All from a single supplier backed by a truly global support network.

The Vessel of the Future is created from Siemens wide product portfolio and connects all onboard products in an holistic and uniform system. The result is true synergy and real benefits through the lifetime of the vessel.

Smart benefits

- reduce overall engineering costs
- increase reliability and safety
- cut the number of items installed and minimize use of signal cabling
- decrease fuel consumption
- make better informed operational decisions
- increase efficiency for all onboard processes
- optimize environmental compatibility
- simplify maintenance
- reduce life-cycle costs
- increase adaptability for future technology

Listed below are the products and systems that combine in integrated, tailor-made solutions to create the vessels of tomorrow.

Successful lifecycle management

Our product lifecycle management business unit, Siemens PLM, delivers software that enhances production planning and system integration for the entire shipbuilding process. It helps all

partners – naval architects, external digital product suppliers and the shipyard itself – function as one to successfully take a ship from concept to delivery, and finally through to the end of its service life.

Total Integrated Automation

With the Totally Integrated Automation (TIA) Portal Siemens redefines engineering. TIA Portal is by far the most intuitive, efficient, and proven engineering framework, enabling you to optimally design all your automation processes. Not only does this groundbreaking innovation allow you to work more efficiently, it increases both productivity and competitive advantage.

Electric propulsion

From cargo and special-purpose ships to passenger liners and offshore vessels, Siemens delivers electric-propulsion systems that optimize the vessel's operation over its lifetime. The systems includes all elements from the generators to the

“Drive technologies with maximum productivity, energy-efficiency and reliability.”



propellers' electric motors and range from less than 100kW to 100 MW. Specifically, they include:

- Compact Eco-pop propulsion systems for smaller vessels that improve drive system efficiency and deliver significant fuel savings
- Energy-saving and environmentally friendly shaft generators with motor functionality
- User-friendly SSPs (Siemens Solution for podded propulsion) that optimize design flexibility, manoeuvrability and ease maintenance
- Bluedrive Plus C electric propulsion systems for small and mid-sized vessels that cut greenhouse gas emissions to a minimum and significantly reduce life-cycle costs

Drive technologies

From gears, couplings and motors to frequency converters, Siemens technology solutions for drive systems ensures maximum productivity, energy-efficiency and reliability for all torque ranges, performance classes, and voltage specifications. Whether it's a simple component or a complex system, Siemens has solutions for the entire drive chain. This includes applications from essential propulsion gearboxes and electric drives for main propulsion and thrusters, cargo handling, deck machinery to all other types of auxiliary drives.

Sensor portfolio

With its broad industry experience and in-depth technological know-how, Siemens is the global market leader in automation systems. With its unique capabilities, Siemens offers an unrivaled sensor system range ideal for the maritime industry. The intelligent, robust products set the benchmark for precision and reliability, and can help

improve an organization's competitive edge. Whether you want to measure pressure, temperature, flow or level, Siemens can help.

Process instrumentation

Siemens's comprehensive process instrumentation portfolio offers best-in-class transmitters for the widest spread of applications. To complement the range, Siemens also delivers electropneumatic positioners, process controllers and process recorders.

Remote diagnostics

The Remote Diagnostic System increases vessel safety and reduces costs by facilitating remote maintenance of all Siemens products connected within the totally integrated automation and propulsion system.

Siemens engineers retrieve vital data online. By gaining early access, small modifications are easily made that may prevent significant problems



“Ballast water management system without the aid of chemicals.”

in the future. More information means greater control and more effective service planning, which often negates the need for Siemens personnel to be onboard or reduces call-out time when they are required. If an engineer is necessary, information from the Remote Diagnostic System means they are better prepared to complete the work more effectively. In short, this cuts downtime and direct costs of system maintenance, and reduces operational risk.

Fault-tolerant automation system

Downtime in automation systems can lead to complicated re-start procedures, which cripple entire processes and can result in high costs. To reduce risk and increase safety, Siemens offers a comprehensive high-availability concept for vessels through its SIMATIC S7-400H programmable controllers. These deliver high reliability in time-critical, dynamic applications, and are especially suitable for data-intensive tasks. Independent of network topology, redundant connections are

created for use in the event of a serious problem. Switchover to these connections is automatic and without data loss.

Ballast water treatment

The patent-pending SiCURE™ ballast water management system uses a combination of physical separation and proprietary, on-demand treatment with biocides, produced in-situ from seawater, without the aid of chemicals. The system is based on over 30 years' experience and more than 2,500 shipboard installations of Siemens's well-known Chloropac® biofouling control system.

Fire safety

Fire safety requires a comprehensive understanding of the potential hazards faced by the crew and their vessel, and how innovative solutions can alleviate or minimize these risks. Sinteso™ is the result of Siemens's vast fire-protection expertise. This expertise supports you throughout the vessel's life cycle from a thorough risk analysis to fast and

reliable service. The system's full network capability, scalability and innovative functionality provide the best possible protection against all fire hazards.

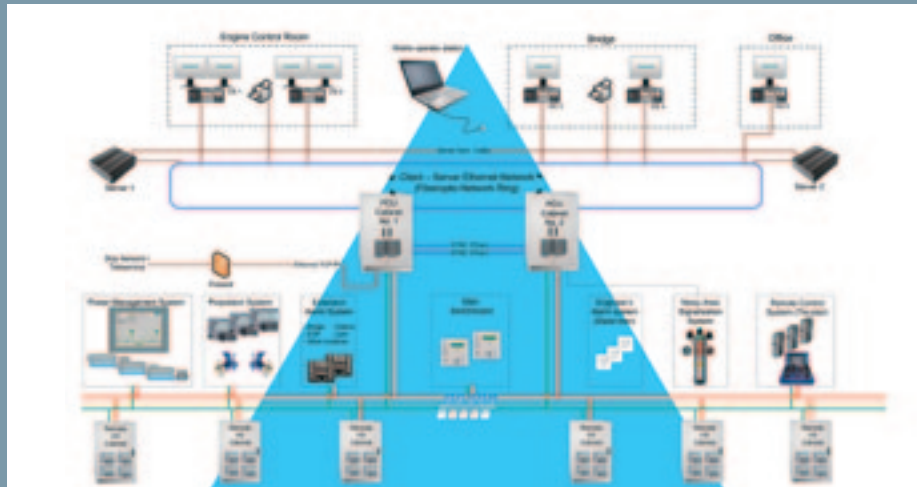
Using onshore power

Onshore power links – as recommended by the EU – reduce pollution and save vessels from the expense and noise of running onboard systems in port. Siemens's SIPLINK™ is a flexible and reliable network coupling for onshore power supply. It offers many frequencies and voltages for the shore-to-ship connection and makes vessels compliant with a range of different power systems.

Security and access

Drawing upon in-depth know-how, Siemens is able to conceive, design, build, maintain and monitor integrated security solutions and services. Siveillance™ incorporates the entire Siemens security portfolio under one roof. It provides user-friendly and innovative solutions that focus on:

“Energy management solutions with savings of up to 40 percent.”



- command and control solutions
- security management solutions
- intelligent video analysis
- access control.

Energy management system

Siemens is continually setting new global standards for energy efficiency with its intelligent, integrated technologies. The innovative automation and energy management solutions enhance ships' energy efficiency and productivity, with savings of up to 40 percent.

The technology creates seamless communication between all systems, including auxiliaries, such as heating, cooling, control of lights and blinds, and low-voltage energy distribution, as well as predicting electrical system performance. The result is optimal use of energy and equipment, which decreases energy and environmental costs, and increases system efficiency over the vessel's lifetime.

Marine lighting solutions

Siemens's subsidiary OSRAM is the leader in special marine lighting solutions. As 40 percent of non-propulsion energy is used by lighting, significant savings can be made by utilizing Osram energy-saving products, including LED and lighting management systems.

In fact, almost a third of the connected load needed for lighting and up to eight tonnes in weight can be saved with Osram's tailor-made lighting solutions.

Topside and drilling solutions

Siemens has a long and successful history of supplying integrated solutions for offshore installations, including fixed or tension-leg platforms, semi-submersibles and floating production systems. Its focus on reliable, innovative, efficient and environmentally friendly products, systems and solutions clearly pays dividends in fulfilling challenging offshore specifications

Siemens Industry Software

Our product lifecycle management business unit, Siemens Industry Software, delivers software that enhances production planning and system integration for the entire shipbuilding process. It helps all partners – naval architects, external digital product suppliers and the shipyard itself – function as one to successfully take a ship from concept to delivery, and finally through to the end of its service life.

- 3D CAD/CAM/CAE, digital manufacturing, data management
- License compliance and permit management
- Virtual commissioning and 3D walk-thru

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