SISHIP — Solutions for Shipping

Navigate to new horizons — Get on course with green returns

siemens.com/marine
Global competition, rising fuel prices, and ever stricter environmental regulations call for a new perspective in commercial and passenger shipping, a perspective that enables shipbuilders and operators to keep pace with the increasing requirements of their trade. As the traditional technology leader in the marine branch, Siemens gives the right answer to these challenges: Innovation from a trusted partner.

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For more than 130 years, Siemens has been the innovation leader in electric drives, power generation, and automation for marine applications.

Leading innovations from Siemens like fuel-cells and permasyyn motors are taking the industry further, while Siemens’ latest technological advances like the HTS generator (high-temperature superconductivity) and SISHIP SIPOD are inaugurating a new era of energy efficiency.

Siemens offers the broadest environmental portfolio of the industry to answer sustainability and economic challenges at the same time – for newly built ships or for modernizations.

Space and load-saving innovations from Siemens help optimize ship designs.

Innovative automation technology from Siemens assists crews in tackling ever more complex technical processes on board.

Apart from the individual advantages of our innovations, only their seamless integration into a dedicated system will make full use of the economical and ecological potential that helps you compete and succeed in your business.
A trusted partner for continual improvement

Our goal: A big competitive edge
The passenger and commercial shipping industries are faced with ever stricter requirements. To keep customers ahead of competition, Siemens Marine is the right partner for continual improvement – throughout the entire life cycle of an asset. Our in-depth knowledge of the industry and unique engineering capabilities have led to a portfolio ensuring and improving our customers’ competitive edge in shipbuilding and operation. Based on more than a century of experience, Siemens Marine has taken on a new approach toward sustainable competitiveness. SISHIP integrates technical excellence in terms of innovation, environmental compatibility, and economic efficiency in all three dimensions:

- **Horizontally** in all electrical products, systems, and solutions for higher efficiency, operational safety, and reliability under all operating conditions.
- **Vertically** with automation solutions to control all platform systems, from the networking of communications and peripheral systems to IT solutions that gather and process all information during shipbuilding and operations to better prepare decisions.
- **Over the entire life cycle** of the ship with expert services and consulting through all phases, from shipbuilding to maintenance and modernization, as a basis for rapid commissioning, efficient operation, and higher long-term availability.

Our tradition: Innovative solutions that pay off

To us, innovation is not only part of our tradition, but also a means of creating a win/win situation for us and our customers. Since we have an integrated solution in mind, our innovations are not restricted to optimizing a single function, but rather aim at the entire process, thus creating additional value for our customers – and a quicker ROI.

At the same time, our innovations become consistent solutions, and already include the complex adaptation to other equipment and the automation technologies. Thus, our innovations help avoid costs in building new ships or in modernizing existing ships: Through our product-family-based approach and the coordination of all electrical equipment in our role as general contractor we are the only company in the world that has the expertise and the portfolio to do so.

Our hallmark: Sustainable success for our customers

Siemens innovations have another very important aspect: they are aimed at sustainability. And to us, sustainable success means highest efficiency in both products and processes. This includes the market-leading energy efficiency of our drive systems and generators. And it includes the invaluable environmental performance of our solutions across their entire life cycle, which helps our customers meet ever stricter regulations. But most importantly, we have consolidated all our solutions for commercial shipping into one integrated offer – the SISHIP product family. This ensures that every solution improves ship efficiency – and adds to the sustainable success of our customers.
Our solutions – Marine equipment for commercial shipping

The world economy is becoming increasingly globalized, and international trade in products and materials has already become a key element of Germany’s economy. Intense competition is taking place on the world’s oceans, and to be a winner, a ship must fulfill three key requirements for sustained competitiveness and productivity: superb reliability and compliance with strict safety standards, lower day-to-day operating costs, and compliance with the most stringent environmental regulations.

Our electrical and systems engineering expertise enables us to supply products, components, and systems needed to succeed on the oceans. If requested, we can act as general contractor for electrical equipment to minimize interface problems, and we can also be of help when it comes to finding the right financing solution – all based on a certified quality management system.
SISHIP PAX – Affordable comfort for passenger ships

Building passenger ships requires the ultimate in shipbuilding expertise, as the ship must fulfill the requirements of the shipyard, the shipping company, and, of course, the passengers. We offer individualized solutions to help meet these demands for convenience, low acquisition and operating costs, interface adaptation to the required systems, and worldwide availability. Our solutions substantially reduce construction costs, and thus also the required investment, using turnkey models and designs precisely tailored to specific requirements. Our experience in marine operational systems and design integration ensures reduced operating costs and increased ship reliability and availability.

Getting there fast and in comfort: Ferries with diesel-electric propulsion

To survive in the ferry business, companies need every possible advantage when it comes to technology. The electrical equipment and systems installed on today’s ferries must, of course, fulfill the minimum requirements for absolutely safe and fault-free operation, with maximum stability under all conditions. But they also need to do much more, as technical innovation and the further development of power generation and drive systems have created a higher standard for demanding ship classes such as RoRo ferries. Here, modern diesel-electric SISHIP SiPOD podded drives offer maximum maneuverability, speed, and reliability. And in addition to reducing operating costs, they also especially increase passenger comfort by significantly reducing noise and vibrations. Our many years of experience in planning, construction, and system integration for all ship equipment and systems required on ferries ensure highest quality during both the construction and operational stages.

Setting your own sails: Private yachts

Every yacht is different. And while individual requirements for comfort and luxury may vary, they are always stringent. A high degree of customization calls for unique designs to meet specific requirements, and our modularized collection of systems and components fulfills this need at a very favorable price-performance ratio. The resulting 100 percent compatibility ensures best results in the implementation of the entire electrical and electronics package, from diesel-electric propulsion based on our SISHIP EcoProp, SISHIP Drive LV and MV, as well as podded propulsion SISHIP SiPOD, to SISHIP IMAC comprehensive automation solutions, up to and including the bridge design. Alarm and monitoring systems help maximize safety, as does optimized maneuverability in any navigational situation.
SISHIP CARGO – Solutions for efficient cargo ships

Container ships, for example, are designed to meet the specific requirements of the type of cargo to be transported and of the associated loading and unloading process. Here, the integration of the logistics process is just as important as central controlling and monitoring from the bridge. Attainable speed is also a key factor for project profitability, which is why Siemens Marine supplies hybrid propulsion solutions for existing or new ships to complement the power of the main engine. The resulting improved maneuverability with our drives further shortens docking and undocking times, while the use of electrical and electronic standards reduces operating costs.

Maximum safety included:
Cargo ships for all requirements

Building an LNG tanker, for example, calls for specialized knowledge of maritime operations and the related technology, not only to maximize profitability but also to minimize accident rates and consequential costs. Siemens Marine supplies the shipyard and the shipping company with customized solutions, beginning with joint project management, for optimizing the system as a whole. One suitable product is SISHIP Boost, an electrical machine implemented into the ship’s shaft line, which leads to increased redundancy, energy savings, improved safety, and lower emissions.

SISHIP Special Vessels

Extra-special solutions for ships with demanding tasks

Extraordinary requirements call for extraordinary solutions. Siemens Marine therefore works closely with the operator and the shipyard as early as the planning phase to develop an electrical design that meets all construction requirements. The availability of existing design versions and modularized subsystems reduces costs and allows testing of functionalities even prior to installation. Our expertise in centralized control and monitoring from the bridge translates into increased safety and reduced personnel costs.

Maximum reliability and fuel efficiency for innovative offshore supply vessels

Among the service duties performed by modern supply ships are transportation of construction materials, tools, pipes, fuel oil, drill water, cement, and mud, hauling in platform anchors, operating as rescue units, and assisting during underwater operations. Taking that many different duties into account, there are several reasons why almost every new supply ship has electric propulsion. The tasks of a modern supply ship show that low utilization of the installed propulsion power is common in operations close to platforms or during standby duties. This operation profile gives the electric propulsion system a huge advantage compared to a conventional propulsion system. With an electric propulsion system the number of engines in operation is restricted to the actual number needed for restoring the energy balance. This also means that the engines run with optimum efficiency, saving energy and thereby the environment. Siemens Marine offers electric propulsion systems with the highest possible redundancy and operational safety, thus fulfilling the strictest requirements for those parameters set by oil companies and government authorities.
Horizontal integration with SISHIP
Driving your success
**Systems and products**

**Diesel-electric propulsion systems: The engine of the future**

The market share of diesel-electric propulsion systems in ships for a wide range of different tasks and duties has substantially increased in recent years. Due to their flexibility and versatility, these diesel-electric propulsion systems are highly adaptable to a wide range of applications. They are very quiet and low vibration, so they are an excellent choice for passenger and cruise ships as well as special ships.

Podded drives have made it possible to achieve superb maneuverability, including dynamic positioning.

At the same time, a maximum degree of safety, availability, and environmental compatibility is ensured by the development of diesel-electric inboard propulsion systems.

Our modular drive systems, which are thoroughly proven on every ocean, are key to a ship’s profitability: Our experienced systems specialists will develop a customized design that is exactly tailored to suit the technical and budgetary requirements. Customers can feel secure setting off on long-haul voyages, backed by the quality of the world’s leading electric propulsion systems specialist – one that offers a global network of services and other resources in case problems arise.

The results of our drive technology will be highly appreciated not only by the passengers and crew but also by the shipyard during construction and by the shipping company during the operation of the ship.

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**SISHIP – Horizontal integration**

In the horizontal dimension, we offer SISHIP products, solutions, and services, which primarily aim at the optimization of the reliability, availability, and competitiveness of the ship during the operational phase.

These solutions only reach their full potential when integrated with the associated systems at the vertical and life cycle levels.
SISHIP SiPOD

High-performance outboard drives with mono or twin-propellers for high performance vessels

Electric pod systems are widely used on diesel-electric powered vessels requiring very high levels of maneuverability, efficiency and reliability. With SISHIP SiPOD, Siemens offers a solution in the power range from 5–25 MW that provides maximum vessel design and layout flexibility thanks to its minimal onboard space requirements. The crucial advantage of SISHIP SiPOD is its substantially higher overall efficiency resulting from the combination of a compact, hydrodynamically optimized design and an efficient, permanently-excited synchronous motor.

One system – Two versions

In the area of electric pod-based systems, Siemens is the only supplier of podded propulsion systems that can be optionally equipped with mono or twin propellers. In other words, the propulsion system can be optimally adapted to suit your needs according to the vessel type and operating profile. Combining all of the features of an innovative drive system, both the mono (SISHIP SiPOD-M) and twin propeller (SISHIP SiPOD-T) versions pack a lot of performance in a compact package.
Diesel and gas turbine electric propulsion systems: Efficient and cost-effective

Many versions of electric propulsion solutions that produce the required power by means of gas turbines or diesel generators are presently in use on board hundreds of ships representing a wide range of design types. This success is the result of the high efficiency in generating power at any speed, even at low loads. A further advantage: The operation of diesel generators can be controlled to provide the required energy, both for propulsion and for the onboard network. Pollutant emissions are reduced, since the operation is always controlled to occur at the optimum speed and within the optimum load range. The redundant design ensures high availability of the propulsion system. The maintenance-friendly, modular design in combination with longer service intervals reduces maintenance costs and shutdown times. Diesel-electric propulsion systems are especially well suited for cruise ships, ferries, drilling ships, thruster-supported floating production platforms, shuttle tankers, cable- and pipe-laying ships, icebreakers, and supply ships.

Diesel-electric propulsion systems with AC technology: Powerful propulsion at any voltage

Propulsion systems using AC technology have come to play a dominant role in the global market. In any possible power range, the Siemens Marine portfolio includes a choice of different systems with medium-voltage technology. Converter-driven propulsion systems based on the Siemens Marine industrial SINAMICS converter family are very appealing because of their excellent operating characteristics, low torque oscillations, and sensitive dynamic response at low speeds. Also, owing to their relatively simple construction and flexible, compact design, these very dependable propulsion systems can be readily adapted to the space constraints of a ship.

Diesel-electric propulsion systems with DC Bus technology

Due to requirements such as fuel saving and environmental protection, DC based networks get more and more popular for special applications. Compared to a traditional network, these topologies offer advantages like variable speed diesel-engines and easy integration of alternative energy sources like batteries or fuel cells. The systems are based on industrial products like the SINAMICS S120 chassis and cabinet modules, bus components and controls.
Using energy economically:
The booster solution SISHIP Boost

Heavy seas, tight delivery schedules, cost-efficient energy production, and specific safety requirements (maintaining minimal maneuverability) are the main reasons for using a hybrid propulsion system based on SISHIP Boost. The booster complements the power of the main propulsion system, facilitating controlled energy flow under all operating conditions. Using a booster can result in considerable energy and cost savings. During booster operation, the system converts electrical power from the onboard network into additional mechanical power for the propeller shaft. Such power boosts enable the ship to meet peak power demands during heavy seas or when advancing through ice, or simply to increase speed when the schedule requires it. Two-stroke main engines in particular become more efficient when assisted by a booster, and they are therefore subjected to less thermal stress. In addition, warm-up times are substantially shortened by the backing from the electric motor. The result is reduced maintenance and shutdown times. If the main diesel engine is down, the electric drive can be operated in “take-home mode,” a safety feature that is becoming increasingly important and is even mandatory for certain types of ships (chemical tankers, petroleum product tankers, single-shaft passenger ships).

The flexible booster designs nearly always allow the system to be integrated into existing machinery rooms. SISHIP Boost with WHRS/TES (waste heat recovery system/thermoefficient system) combines the advantages of the booster and the benefits of the waste heat recovery systems or thermoefficient systems. The recovery of thermal energy results in significant energy savings, hence lower emissions and increased propulsion performance of the green ship. At the same time, it is a clean solution. The system is compliant with large main engine designs.

Full speed ahead:
Energy efficiency on board ships

Perfect coordination of energy generation and energy distribution

Every ship is at the same time an electric power plant, a utility company, and a fuel depot. In each role the energy system must be adaptable to an extreme range of requirements. Noise and heat generation must be addressed in the planning stage, and so must existing space constraints. Emission values and fuel consumption play an increasingly important role and are now key elements in energy supply systems, along with cost efficiency and reliability.

To ensure that electric power gets where it is supposed to go, the distribution system must function flawlessly. The power network must withstand the most diverse requirements with respect to such variables as frequency, voltage, and short-circuit behavior. Everything must be perfectly coordinated, and the energy flow must remain controllable and transparent.

We’ve used diesel generators and proven new energy concepts to develop numerous solutions that can be perfectly tailored to individual requirements. We also supply seamlessly compatible accessory equipment, such as transformers, converters, etc., for processing the generated power. All these high-tech products have a single purpose: To save as much energy as possible, so the ship can reach its destination even more profitably.
Systematic success – With integrated power generation and power distribution
The shaft-driven generator:  
Making energy available where it is needed  
Operational conditions aboard a ship are constantly changing: The weather, heavy seas, and the need to maintain maneuverability all affect the power demand at the propeller drive. To keep operating and fuel costs as low as possible, it makes sense to make electric power available only where it is needed.

In shaft generator technology, Siemens Marine has developed a system that controls the energy flow aboard a ship automatically, flexibly, and economically. The propeller power of the main propulsion system or the available electrical energy of the shipboard network can be increased as required. This design, which is also intended for retrofitting and for power upgrades, develops sufficient energy to ensure maneuverability in the “take-home mode.” Efficiency is also improved by other means, such as exhaust gas recovery. As a result, controlled energy flow is provided and substantial energy and cost savings are achieved.

Powerful and energetic:  
SISHIP Power MV – Medium-voltage switchgear for commercial ships  
Ships with an especially high energy demand, such as large container ships for refrigerated containers or cruise ships, need suitable medium-voltage switchgear.

Today this type of switchgear is widely used in ships with diesel-electric propulsion or complex energy distribution systems.

We’ve designed medium-voltage switchgear to control the primary distribution of electric power aboard commercial ships. It features an innovative systems concept that greatly simplifies implementation on ships of widely different designs. This system excels through its outstanding performance, high flexibility, and low maintenance. As a part of the overall Siemens Marine power generation and distribution concept for ships, the system can be relied upon for exceptionally high availability and operational reliability.
Fine-tuned: Cabling and installation

Today’s ships are floating cities. On board, electric power from wall outlets is indispensable. Power is simply there where it is needed, and the electric supply of the connected systems and users is ensured around the clock.

To meet this high standard, a ship needs not only flawless power generation but also seamless power distribution. The cable connections must withstand the most diverse requirements with respect to such variables as frequency, voltage, and short-circuit behaviour. All parts of the network must be perfectly compatible and meet the design rules and guidelines of regulatory organizations for the shipbuilding industry. As specialists in electrical engineering systems, we also apply our expertise to the cable systems of the ship and handle the installation of all cables and equipment as a matter of course.
SISHIP IMAC – High-performance alarm, monitoring, and control

IT and automation concepts for maritime networks
High-speed information exchange on all levels is a critical success factor. To meet this need, Siemens Marine has developed automation solutions that allow access to all relevant data on the ship from a single location.

These concepts are based on PC-based, open systems that comply with the international standard for data exchange with other computers or computer systems. They facilitate the installation and interconnection of navigational devices, shipboard management with integrated bridge systems, or integrated solutions via SATCOM satellites.

From access security for the ship itself to onboard IT security, security is the top priority in all shipboard processes. All of our automation processes are designed with this in mind, and our specialists have developed additional measures to ensure the safe and reliable operation of the ship. These solutions enable the crew to constantly monitor all relevant data on specially designed user interfaces, while ensuring the compatibility and availability of replacement parts or services.

Our intelligent solutions minimize installation costs for individual systems. Siemens Marine is also the first choice when it comes to maintenance and repair services. Thanks to our years of experience with automation systems, not only for ships but also in many industrial applications, our products such as the SIMATIC automation product family offer superior quality and availability, while features such as remote diagnostics via telecommunications links provide additional safety and reliability.
In the vertical dimension, we offer SISHIP products, solutions, and services that effectively link the ship, the bridge, and the shipping company, ensuring secure and reliable operational integrity, with more effective interaction of all processes.
No task too difficult: Integrated control system for ships with highly complex automation technology

The complex technologies on modern seagoing ships require high-performance control systems that ensure maximum system availability and a high level of operational reliability. Only very reliable, high-speed networks are compatible with the enormous integration density of onboard electronics systems and with the need to provide data communications with land-based computers. The reliable, high-capacity SISHIP IMAC control system handles all monitoring and control tasks on ships with particularly extensive automation requirements (cruise ships, large ferries, special-purpose ships). This system is especially well suited when the application requires processing of a large number of signals. SISHIP IMAC communicates with other onboard automation systems and accommodates the integration of complex control tasks, such as control of the main engine or of the electric power generation system.
High security with Defense in Depth

Our products and solutions take security seriously and address all necessary measures. This will be done with the so-called "Defense in Depth" concept. Following some key facts:

- Multilayered concept to fully protect your ship based on plant security, network security, and system integrity and complying with ISA 99/IEC 62443
- Segmentation of subnetworks – to further increase security
- Reliable protection against unauthorized access user authentication and allocation of access rights.
Life-Cycle Management –
A built-in option with SISHIP LCM

Longer life. Lower cost. For the entire life cycle.
Maintenance, service, and modernization, retrofit, and upgrade services for ships

Overall consideration on the entire life cycle is crucial for the return on investment. Key questions are: What happens after the ship has been delivered? How much time is required for maintenance? How can the ship be kept competitive during the next decade?

Right from the very first day of commissioning, we address these issues through our professional services as part of our integrated solutions. These services cover a wide range of tasks, including planning the ship’s electric power supply, installation, commissioning, modernization, retrofit, and upgrade, and maintenance.

Siemens Marine has the best-qualified answers to these questions. Engineering, equipment, information technology, and services are integrated and delivered from a single source. Based on our profound knowledge and experience with a multitude of maritime ships and logistics processes, we always consider these aspects in a holistic approach.

The results of this integrated approach speak for themselves. Our impressive reference lists demonstrate the confidence of many well-known shipping companies and shipyards that entrust us daily with the fate of their crews and cargo.

SISHIP – Life-Cycle Management:

This component of our integrated SISHIP solutions refers to services that we are able to provide over the entire life cycle of the ship. SISHIP services ensure that the solutions are adapted specifically to meet the needs of merchant and passenger ships, just like the modernization, retrofit, and upgrade services we use to keep the electrical equipment, systems, and solutions of ships operative at optimum levels.
Our Life-Cycle Management comprises three pillars: Service, migration and value preservation.

The service pillar comprises predictive maintenance, planned maintenance, unplanned maintenance, and spare parts & logistics. The migration pillar consists of modernization, retrofit, and upgrade options. Modernization describes the replacement of equipment by new (modern) equipment and components, enhancing monitoring and operation by maintaining the functional level of the original system.

Retrofit refers to replacement of ship subsystems while maintaining the operational and/or functional performance of the ship at its original level.

Upgrade actions refer to replacement/modification of complete systems, increasing the overall operational and/or functional performance of the ship.

Value preservation was recently instituted as a further important portfolio element in order to keep the value of the asset ship compatible with dynamic regulatory changes. It covers areas such as energy/emissions management and technical condition surveys, etc.

Advantages of comprehensive Life-Cycle Management Services

Virtually any ship has features that would benefit from modernization, so we might suggest technical upgrades of presently used products and systems, or solutions based on typical maritime applications. In every case, these investments soon begin to save money and safeguard the functionalities of the system over the long term. For customers requesting ultimate rapid response and the highest level of operability we offer maintenance and service contracts. Those contracts can be tailored to the many individual needs of our global customers and are provided through our global Siemens Marine network. We suggest submitting individual inquiries to make the best use of the significant volume of individualization options we offer.
Life-Cycle Management – Knowing what best supports your business.