

The Future is Now

The high seas account for around 70% of the earth's surface and the shipping of nearly 90% of all volume goods and produce, underlining the importance of the oceans for global commerce and trade.

Advanced technologies are needed to ensure that ships can be operated safely and economically. All areas of ship technology are characterised by demand for equipment offering increased availability and reliability. Which means that shipborne electrical and electronic systems will remain a key focus for continued state-of-the-art development and innovation.

Technical advances are crucial for the competitiveness of the world shipping industry. We do not settle for adjusting our systems to future development – we create them.

**Welcome to
SAM Electronics – Your
Partner for Competence
and Innovation**

For more information please contact:

SAM Electronics GmbH
Behringstrasse 120
22763 Hamburg · Germany

Phone: +49 - (0)40 - 88 25 - 0
Fax: +49 - (0)40 - 88 25 - 40 00
E-mail: info@sam-electronics.de
www.sam-electronics.de

Subsidiaries and offices:
please refer to our website

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Company Profile



Always a Step Ahead



Systems competence for building and operation of ships is in increasing demand. As an internationally-renowned systems company, we are a leading partner of shipyards and shipping companies worldwide. Our capability is based on more than 100 years' experience with the establishment of widely recognised product names such as AEG, ATLAS and DEBEG.

Operating from headquarters in Hamburg and supported by a worldwide network of subsidiaries, associate companies and agents, we provide innovative

state-of-the-art system solutions and products designed to meet the most exacting requirements for ships of all types and sizes. These range from coastal and inland shipping vessels, ocean-going container carriers and gas tankers to specialist offshore, environmental and research ships as well as ferries, cruiseliners and yachts.

As a major manufacturer of turnkey equipment and installations, we supply high-quality electrical and electronic equipment packages to shipyards and shipping companies throughout the world. At a technical level, we also actively participate in leading-edge industry research programmes and communication technologies.

We offer specialised capabilities in the design and development of specific maritime equipment technologies. These include advanced diesel-electric propulsion systems, shaft alternators for economic power generation, shipborne automated monitoring and control systems, nav aids, integrated navigation and bridge configurations, communication technologies as well as safety and security systems.

We regard ourselves as a partner to the shipbuilding industry. That is, one who can be practically involved at preliminary design stages of projects while helping to minimise costs and ensure optimum functionality in addition to ensuring total functionality of differing components within the "System Ship". These capabilities have been proven in many different projects.

Our company is certified to DIN EN ISO 9001, Version 2000. Quality, performance and reliability of our applied technologies are oriented towards the stringent quality standards of the maritime industry and also to the high demands of our customers relating to product benefits.

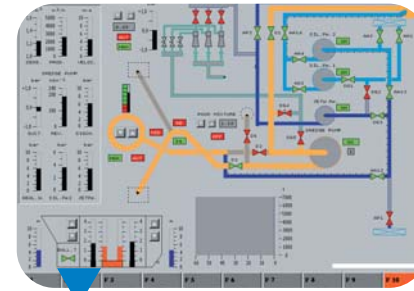
Our customers receive the best possible support backed by a worldwide network of expertise. In cooperation with our subsidiaries, representative offices, agents and dedicated service stations, we provide efficient, reliable services to shipping companies and yards globally.

- ▲ Container vessel "Shanghai Express", Hapag Lloyd fleet
- Multipurpose vessel "Neuwerk", superbly equipped for its tasks
- "Solitaire", the world's largest pipelaying vessel
- ▼ "Komet", the most modern survey vessel in the world
- ◆ Cruiselineer "Norwegian Sky", offering a high standard of safety
- ▷ Trailing suction hopper dredger "Alexander von Humboldt"

- Propulsion and drive systems
- Power generation and distribution systems
- Automation systems
- Integrated navigation and bridge systems

- Navigation and communication equipment
- Safety and security systems
- Service, spares
- Retrofits

Power under Control



Shaft alternators offer an economic and environmentally-friendly solution for electrical power aboard ships. Proven advantages have led to them becoming part of standard equipment. With more than 350 systems already supplied, we are the market leader in this field.

Demand for electrical power aboard container vessels has risen significantly as a result of the increased capacity of refrigerated containers. Based on a new generation of high voltage shaft alternators, our range of systems has been extended to meet these growing requirements.

Our combined shaft alternator / shaft motor systems supply electrical power during normal seagoing operation or can be operated as a booster or redundant take-home propulsion system.

Electrical propulsion systems provide numerous advantages. They are particularly economic, environmentally-friendly and reliable. They are also simple to operate and control while facilitating good positioning properties as well as low noise and vibration levels. Moreover, their reduced size or volume enables the best possible utilisation of space. Increasing numbers of electrical propulsion systems are also supplied for ships with special requirements. We already meet this growing demand, having so far equipped more than 50 vessels.

Our podded propulsion drives for a wide range of vessels offer numerous advantages with regard to manoeuvrability, hydrodynamic efficiency, unlimited thrust direction, low noise and vibration levels during operation as well as maximised payload capacity.

Due to the growing demand for more available power, medium voltage instead of low voltage distribution systems are provided. We are also a leading company in this field and have equipped more than 60 ships from cruise vessels and ferries to dredgers and container vessels with medium voltage switchboards for many decades.

The Primary Power Bus (PPB), our new concept of electrical power distribution for ships, is designed to replace conventional cable networks with switchboards and distribution panels by individual switchgears arranged on decentralised busbar systems.

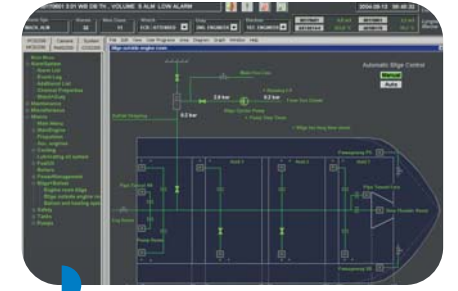
The patented PPB is a very innovative power distribution concept offering significant advantages over conventional distribution methods in terms of availability, clarity, planning flexibility, space requirements and installation costs. Its development will undoubtedly lead to extensive re-assessments of design needs for cost-effective electrical power systems aboard ships.

Safety and security systems are more important these days than ever before. A ship itself and its load has to be controlled and protected. Entertainment and internal communication solutions enhance the comfort as well as safety levels on board. Our product range meeting all these requirements can be delivered as a fully integrated system which has been proven in many projects.

- ▲ Podded drive DOLPHIN, the innovative diesel-electric propulsion system
- Shaft alternator aboard container vessel
- Power supply and distribution system
- ▼ Process visualization on a trailing suction hopper dredger
- ◆ Propulsion motor 15 MW aboard cruiseliner
- ▶ Primary Power Bus for electrical power distribution

- Medium and low-voltage switchboards, motor switchgears
- Cable system planning, installation
- Degaussing systems, magnetic ranging
- Shaft generator systems
- Electrical propulsion systems incl. podded drives
- Electrical equipment for winches, dredgers and cranes, lateral thruster systems
- Generators, motors
- Internal communication and entertainment systems
- Safety and security monitoring and control systems
- Service, spares
- Ship conversions
- Retrofits

Maximum User-Friendliness via One Automation Platform



Over the last decade, volume flows of information aboard ships have increased dramatically as a result of stringent regulations concerning safety and other operational requirements.

To meet this challenge, we have capitalised on our long experience in the development of sophisticated marine automation processes with introduction of the ultimate solution: The Ship Information Platform. This provides maximum user-friendliness with simple handling and clear data presentation supported by helpful recommendations and efficient control parameters – not in

differing ways from system to system, but using just one common protocol covering all ship automation processes.

Our product range for differing automation tasks is based on a small number of standardised hardware and software components specifically designed for marine applications. Thus users are provided with identical man-machine interfaces for all autonomous automation systems supported by a common redundant system net to ensure immediate access to all data – at any time and via each workstation.

This particular advance is the result of our joint alliance with Lyngsø Marine, PartnerShip, which is based on a collective experience of outfitting more than 8,000 commercial and naval vessels with automation products and systems.

Equipment needed for requirements of modern ship operation is available from our comprehensive range of modular products.

From simple alarm systems for monitoring of machinery to advanced monitoring and control systems for remote supervision. Basic monitoring and control configurations can also be readily extended to meet specific user requirements.

Propulsion control systems for bridge control of fixed and controllable pitch propellers in any propulsion configuration are combined with electronic governor systems for controlling fuel racks of main engines produced by all the major manufacturers. Power management systems for operation of generators and other facilities in electrical power net configurations are available, while a reefer container monitoring system utilises dual data rate technology.

Our emergency shutdown system for monitoring and control of safety-relevant equipment aboard new-generation cruiseliners ensures optimum standards of safety for passengers, crews and vessels.

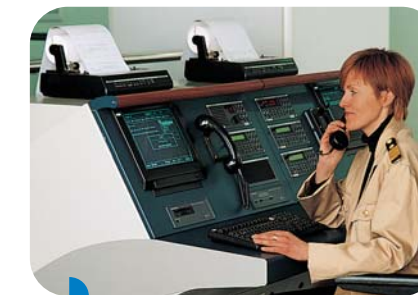
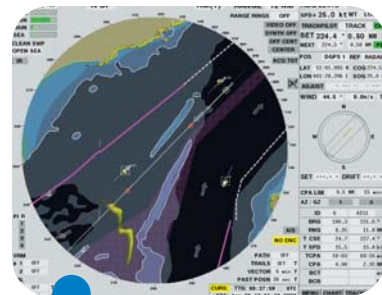
We provide automation solutions for all types of vessels, from trawlers and container carriers to research ships and cruiseliners. Additionally, we also provide authoritative support services ranging from consultancy advice for vessel applications as well as new-building and retrofit projects. These ancillary services also cover technical maintenance advice, repair, installation, commissioning, shoptest and trials of systems on behalf of shipowners, yards and engine manufacturers.

- ▲ Mimic, engine control
- Propulsion control panel
- Operator working station, part of the Ship Control Center (SCC)
- ▼ Process monitoring and control station in the engine room
- ◆ Engine control room
- ▶ Mimic, bilge control

- Propulsion control system
- Engine safety system
- Electronic governor system
- Power management system
- Machinery alarm & monitoring system
- Integrated monitoring, alarm and control system
- Cargo alarm & monitoring system
- Cargo management system

- Emergency management system
- Emergency shutdown system
- Integrated ship management system
- Reefer container monitoring system
- Service, spares
- Maintenance contracts
- Ship conversions
- Retrofits

Bridge Systems leading the Way



Our product range comprises a complete portfolio of systems for navigation and communication aboard all types and sizes of ships. These extend from highly sophisticated, proven equipment to standardised systems for retrofit applications.

The established NACOS series of integrated navigation and command systems has set international standards since 1985, accounting for some 35% of world INS requirements for commercial vessels and 65% of those for ferries and cruiseliners, totally 950 vessels.

Our new NACOS-5 series combines proven functions such as integrated track control and centralised data presentation with state-of-the-art collision avoidance and traffic monitoring features. Advanced sub-assembly nav aids include a Universal AIS system as well as the first type-approved unit combining radar and electronic chart: the CHARTRADAR 1100.

Latest IMO regulations require onboard installation of Voyage Data Recorders and Automatic Identification Systems. The new VDR DEBEG 4300 meets all VDR requirements with automatic recording of key nautical, technical and safety-related data.

Similarly, our Universal AIS, the DEBEG 3400, is a unique system designed to support watch officers by providing detailed target and traffic information. For use in either stand-alone mode or as part of integrated bridge systems, the fully autonomous system transmits ship's own data such as position, course, speed and identification while receiving the same from other UAIS units within VHF range.

With our latest generation of Ship Control Centers (SCC's) we provide a total bridge concept characterised by a high level of integration with particular emphasis on interlinking data from navigation, communication and ship operation functions. Nearly 200 SCC's have already been contracted worldwide.

Introduction of GMDSS necessitates rapid and efficient aid to ships in distress, for which our range of DEBEG products provide all means of communication.

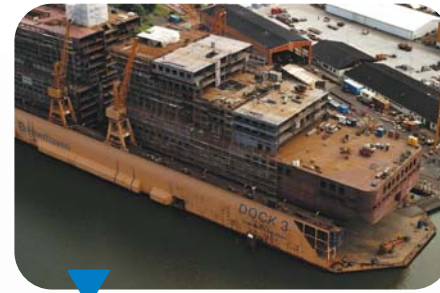
The safety of ship operation requires proven internal communication systems. These requirements are met by our complementary DEBEG scope including telephone and paging systems, general and fire alarm systems as well as those for onboard monitoring and safety.

- ▲ Antenna arrangement
- AIS on radar
- CHARTRADAR/ MULTIPILOT display
- ▼ CHARTPILOT display
- ◆ Ship Control Center (SCC)
- ▶ GMDSS radio console

- Ship Control Centers (SCC)
- Integrated Navigation Systems (NACOS)
- Radar, Chartradar, Multipilot
- AIS, Log, DGPS, VDR
- ECS, ECDIS
- Gyro and steering systems
- Communication systems, GMDSS

- Fire protection and alarm systems
- Internal communication systems
- Service, spares
- Maintenance contracts
- Retrofits
- Radio survey

Anytime and Anywhere



We provide comprehensive worldwide service, maintenance and repair in addition to spare parts for equipment produced and installed by us. Other significant tasks are the retrofitting and renewal of systems and involvement in the conversion of ships of all sorts and sizes.

We offer a range of service contracts like "Full Maintenance Contracts", "Shore Based Maintenance Contracts", "Periodic Inspection Contracts" and "Equipment Rental Contracts" to our customers.

The scope of services is completed by our authorized inspectors checking equipment on behalf of authorities and classification societies.

Providing service is a rather short-term matter due to quickly needed assistance. To meet customer needs the after sales service is continuously adapted to the growing customer demands. We provide a central Customer-Support-Center with a 24 hour availability.

The extensive range of our electrical and electronic systems require experienced and qualified personnel. Competence in technical matters as well as international order processing is the daily demand. An understanding of the system "ship" is a necessary prerequisite for our service team.

Apart from our centralized commercial and contractual activities, looking after and supporting our service network with worldwide approx. 200 partners is our duty.

Rigorous training programs for service specialists are held regularly in Germany in close collaboration with our development departments. The aim of training is to provide customers with the best possible standards of rapid, dependable support. The number of trained personnel is increasing from year to year, ensuring specialized capacity around the world.

Service for our customers, around-the-clock and worldwide is our objective. In case of need our hotline specialists can assist with remote diagnostics

and advice and organizing of service assignments. With the international network of service partners we assure quick reaction times around the world.

To provide the optimal and most qualified logistic support for our products and systems, and aiming at minimizing the response time, the individual product divisions Energy and Drives, Automation, Navigation and Communication are responsible for the service activities.

- ▲ Our service is organized around-the-clock and worldwide
- Intelligent logistics system ensure spare parts availability
- Navigation equipment repair onboard
- ▼ Conversions and ship extensions
- ◆ Service technicians for maintenance of a radar antenna
- ▶ Repair and maintenance of an electrical propulsion motor

- Service, spares
- Preventive and corrective maintenance
- Ship conversions

- Retrofits
- Maintenance contracts
- Radio survey