



System Competence

Made in Germany



People · Technology · Solutions



**SAM
Electronics**

an  communications company

SAM Electronics Group

Competence for the "System Ship"



Hamburg Headquarters



Production facility SAM Taihang Electronics, P.R. China

As an internationally-renowned systems company, we are a leading partner of shipping companies, navies and shipyards 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.

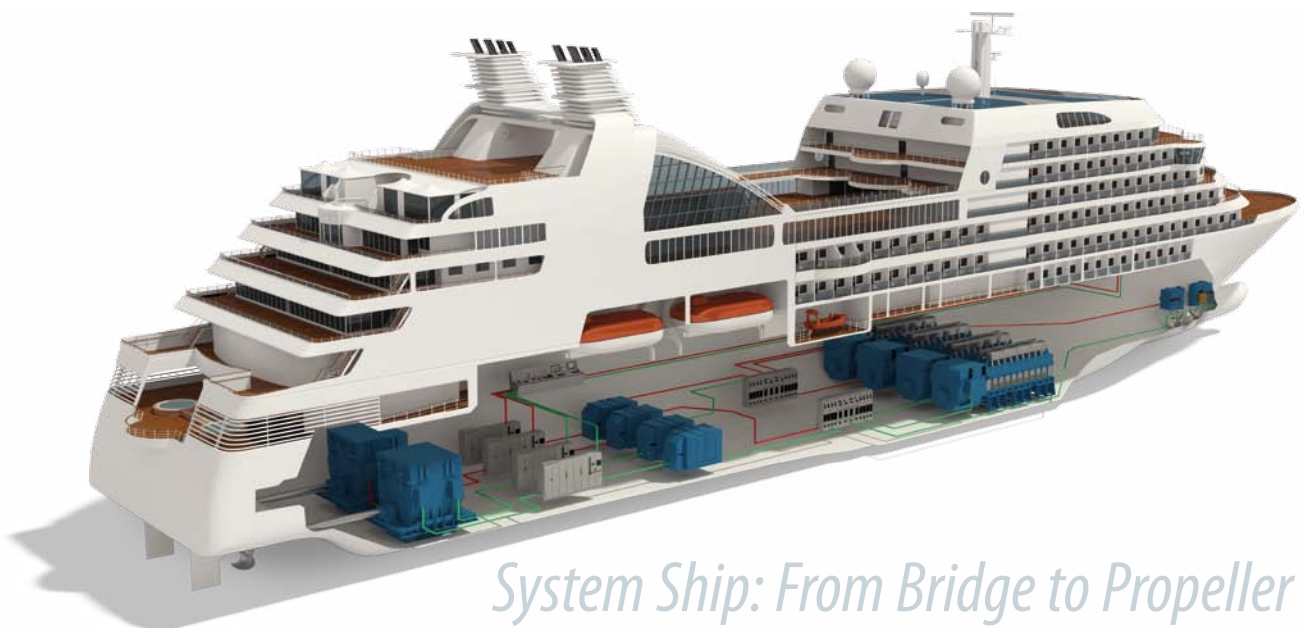
Operating from headquarters in Hamburg and supported by a worldwide network of subsidiaries, associate companies and agents, we provide innovative state-of-the-art system solutions and products designed to meet the most exacting requirements for ships of all types and sizes.

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.

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, navigation and communication technologies, integrated vessel control systems, entertainment as well as safety and security systems.

Our scope ranges from highly sophisticated and proven system installations to standardised systems and individual products for retrofit applications.

Growing demands for complex vessel types set higher standards for technical know-how and project management competency. Realising complete turnkey solutions for vessels of all types and sizes confirms our role as a capable partner for the shipbuilding industry.



System Ship: From Bridge to Propeller

The quality, performance and reliability of our products and services are assured in accordance with customer requirements and all relevant marine industry standards. To meet this target we have established a Quality Management System, which is compliant with the international DIN EN ISO 9001:2008 and certified by Germanischer Lloyd Certification GmbH.

The Quality Management principles and measures are part of the description of our Integrated Management System, which also includes Environmental, Health and Safety (EHS) rules and guidelines.

A vessel requires logistical support over its entire life time. This especially includes particularly the technical documentation, spare part concepts, training of crews and service specialists as well as worldwide service.

In cooperation with our subsidiaries, representative offices, agents and dedicated service stations we are able to provide an efficient and reliable service, maintenance and repair network

to shipping companies and yards across the globe. We are continually adapting our after-sales service to meet growing customer demands. Our dedicated Customer Support Centre is available around the clock throughout the year.

Our scope of services includes a range of specific customer contracts such as those for Full Maintenance, Shore-Based Maintenance, Periodic Inspection, and Equipment Rental. There is also provision for checks of equipment by our authorised inspectors on behalf of official authorities and classification societies.

Technical advances are crucial for the competitiveness of the world shipping industry. Our success is based on our ability to come up with new concepts, solutions and products. We do not settle for adjusting our systems to future development – we create them.

Welcome to SAM Electronics – Your Partner for Competence and Innovation

We provide

- Propulsion and drive systems
- Power generation and distribution systems
- Automation systems
- Navigation and communication equipment
- Integrated vessel control systems
- Safety and security systems
- Entertainment systems
- Shore connection systems (SAMCon)
- Dredger technology
- Degaussing systems and magnetic ranging systems
- Turnkey solutions
- Service, spares
- Retrofit



System check radar equipment



Training center Hamburg



Service around-the-clock and worldwide

Power Supply at Sea and Onshore

Environmental and Economical Solutions

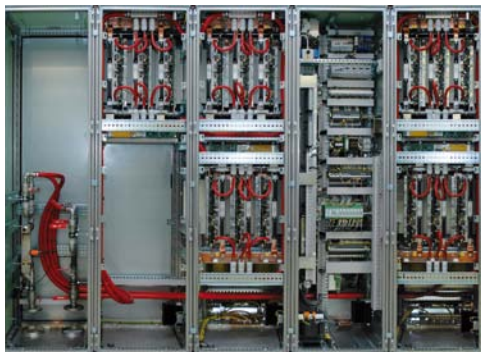


Shaft alternator 4500 kW, 65 - 94 rpm

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 400 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 medium voltage shaft alternators, our range of systems has been extended to meet these growing requirements. Using a PWM converter in modern IGBT technology we are able to design a controlled shaft alternator system without synchronous compensator. Modern technology and reduced components result in a significant cost reduction.

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.

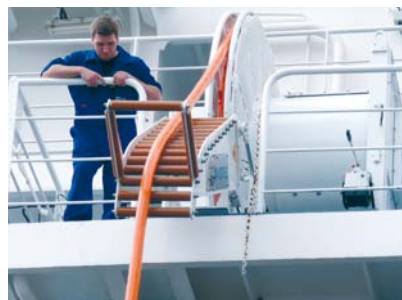


Shaft alternator panel

Benefits

- Lowering of fuel expenditure by lower HFO (heavy fuel oil) cost and better efficiency of main engine
- Reduction of maintenance and lubricant cost by reduction of operating time of auxiliary generating sets
- Return of investment in 3-4 years
- Saving of operating personnel by simplification of ship machinery operation, as the mains is fed only by the shaft alternator systems
- Low noise power generation
- Operation of the shaft alternator from pier to pier due to combinator operation with variable propeller speed and pitch
- Smaller and/or less diesel generator sets

On-Shore Power Supply (OPS) is a result of a groundbreaking effort to reduce emissions from ships at port. For the OPS program SAM has developed a modular shore connection system called SAMCon.



SAMCon being installed on a ship

SAMCon provides solutions to allow vessels to be connected to shore regardless of the local grid frequency. By using frequency conversion different types of ships can be adapted to ports, equipped with 50 Hz or 60 Hz power grids. SAMCon consists of key components for shore connections such as high and low voltage switchgears, low maintenance frequency converters and power transformers, for installation on shore and on board of vessels with a power supply system up to 12 kV.



Container vessel "Hamburg Express"



Multipurpose cargo vessel "Rockaway Belle"



Container RoRo vessel "Grande Ghana"

Since 2003 we have delivered more than 30 SAMCon systems installed on sailing vessels. In October 2008 we commissioned the SAMCon shore installation in Antwerp (Belgium), a 50/60 Hz frequency converter power supply system.

The uninterrupted power supply to systems and consumers onboard modern ships is a matter of course nowadays. This is, however, only possible if reliable power distribution system adapted to the needs of the customer is installed. Be it automation or propulsion system, navigation or communication system: the different consumers are all dependent on a network and the controlled flow of power is essential for smooth operation.

Our systems onboard thousands of vessels have been proven successful for many decades and meet the most stringent requirements for naval and commercial applications. 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 100 ships from cruise vessels and ferries to dredgers and container vessels with medium voltage switchboards.

For protection and control of power supply systems SAM integrates its own developed protection system GPM 500. The microprocessor based protection system covers all necessary protection functions for low and high voltage power supply systems, generator protection and consumer protection. On request a power management function for control of the power supply system is available.

The GPM 500 can be operated as stand alone or in combination with other GPM 500s via data bus. Interfaces to automation systems and other control systems can be provided.



Low voltage power distribution



GPM in use



Medium voltage power distribution



RoRo ferry "Coastal Renaissance"



Cruise liner "Silver Spirit"



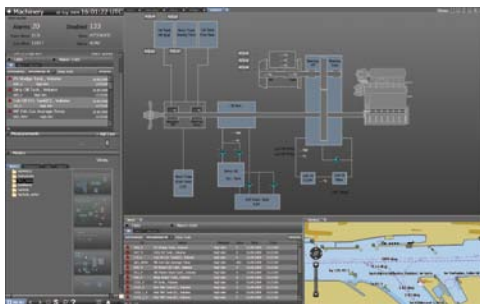
Pipelaying vessel "Solitaire"

Integrated Vessel Control Systems

Maximum User-Friendliness via one Common Platform



NACOS Platinum: ECDIS display with Radar overlay



NACOS Platinum: Automation display with ECDIS

Ships are larger, traffic denser and time for important decision making even less. Information aboard ships has increased dramatically as a result of stringent regulations concerning safety and other operational requirements. Thus, information management is the No.1 issue for 21st century.

Our navigation, automation and communication product range comprises a wide spread portfolio of systems applicable to all types and sizes of vessels. This ranges from highly sophisticated and proven system installations through to standardised systems and individual products for retrofit applications.

NACOS Platinum, the new integrated vessel control system, represents a complete series of next-generation navigation, automation and control systems. The series offers unprecedented features in terms of usability, scalability and network by means of one common hardware and software platform.



Engine control room

NACOS Platinum series offer the entire palette of navigation and automation products from one supplier. Consistency and tight integration between products secures a smooth installation and efficient life time support from one of the largest global suppliers in the market.

Automation Products

- Monitoring control system
- Power management
- Propulsion control
- 2-stroke engine governor
- Engine safety system
- HVAC/fire monitoring and control
- Cargo monitoring and control

Navigation Products

- RADARPILOT
- ECDISPILOT
- MULTIPLOT
- TRACKPILOT
- Conning
- VDR, AIS, sensors
- BNWAS



Megayacht "Amevi"



Cruise liner "Queen Victoria"



OSV "Scandy Acergy"

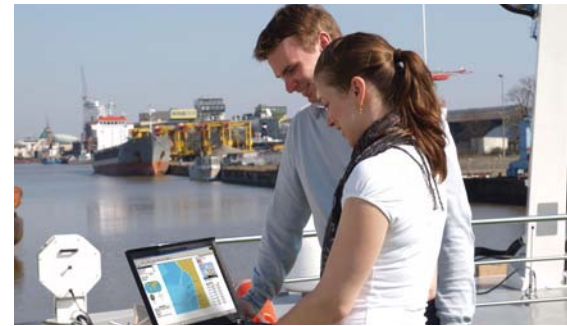
Safety and security systems are more important these days than ever before. A ship itself and its load has to be controlled and protected. Entertainment and internal communication solutions enhance the comfort as well as safety levels on board. Our product range includes telephone and paging systems, general and fire alarm systems as well as those for onboard monitoring and safety. The equipment can be delivered a single stand-alone system up to a fully integrated system .

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

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 for navigation, automation and communication functions. Nearly 240 SCC's have already been installed worldwide.



Ship Control Center (SCC) - bridge concept with high level integration



Email and internet access



GMDSS Radio console



Container vessel "Andromeda"

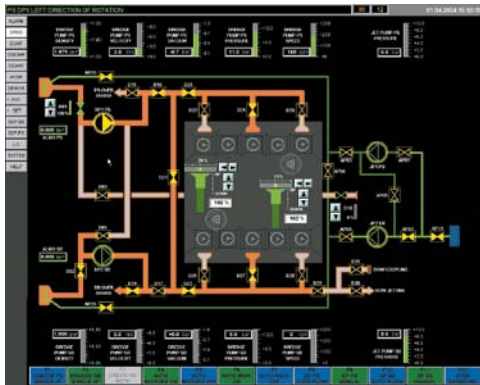


Tanker "Balzac"



Research vessel "Maria S. Merian"

Customised Solutions For Dredger Applications



Functional display: Dredging (Hopper dredger)



Automatic cutter control profile display

Dredging vessels are designed for excavation activities usually carried out at least partly underwater, in shallow water or fresh water areas with the purpose of gathering up bottom sediments and disposing of them at a different location, mostly to keep waterways navigable. To perform these tasks dredgers are equipped with different specific dredging devices.

Maximum efficiency and minimum personnel expenditure are essential for the successful operation of dredgers. Designed to match this requirement our products for dredging applications are based on industrial state-of-the-art hardware components.

SAM dredger control technology permits control of the entire dredging process from one central station (one man operation). All relevant data for production and cost optimized control of the dredging operations are displayed to the dredge master. SAM dredger control and monitoring is designed in partnership with Vosta LMG.

Instrumentation and Automation

- Dredger control and visualization
- Automatic systems for cutter head and cutter wheel dredgers
- Loading computers
- Pipe position indicators
- Density controls
- Data loggers
- DGPS
- Survey systems

Drive Systems

- Dredger pump drives as „electrical shaft“
- Converter-type pump drives
- Cutter wheel/head drives
- Top tumbler drives
- Winch drives for sideline, ladder hoist and stern winches, suction pipe winches
- Winch drives for anchor and mooring winches
- Propulsion systems



Bridge desk of a hopper dredger



Hopper dredger "Vasco da Gama"



Hopper dredger "Volvox Asia"



Cutter dredger "Batang Anai"

Advanced Systems For Naval Applications

Consideration of mines and mine countermeasures requires particular attention regarding signature management of naval vessels.

Our expertise and know-how covers the full range of magnetic silencing. For all types of naval vessels our state-of-the-art degaussing systems provide a significant contribution for magnetic protection against the hazard from magnetic sea mines. More than 220 systems have been contracted for the German Navy and for various navies abroad.

Our multi-influence ranging systems for acquisition of underwater signatures of naval vessels including but not limited to magnetic-, acoustic-, electric- and pressure-signatures for mobile and stationary employment enables navies to adjust and validate degaussing settings

of their vessels. Sophisticated software for modelling and analysis of the ranging results forms an integral part of our supplies.

In addition we are a reliable partner in special system projects like ship to ship supply and exhaust cooling system.

We provide

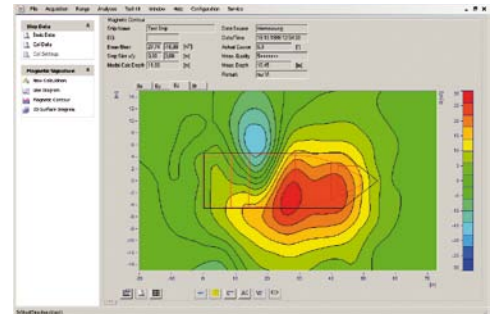
- Shipborne degaussing systems
- Non-magnetic and low stray field design of equipment
- Systems for magnetic ranging
- Systems for demagnetization treatment of naval vessels and equipment
- Electrical platform systems



Degaussing control unit DEG COMP MOD2



Mobile ranging system



Magnetic contour plot



Corvette class 130



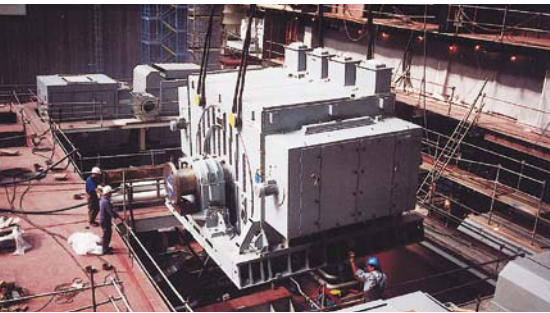
Submarine class 212



Frigate class 124

Power under Control

Efficient Technology onboard ships



Installation of propulsor motor 15 MW, 135 rpm on cruise liner "Norwegian Sun"

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 80 vessels.

Depending on the required grade of redundancy and depending on the operational profile of the vessel LCI-converter or PWM converter systems

with synchronous or induction motors are well proven and reliable solutions for propulsion systems.

We provide

- Low voltage and medium voltage propulsion and drive systems including power generation and distribution
- Drives for cutter and hopper dredgers
- Truster drive systems
- Winch drive systems
- System simulation
- System integration



PWM Converter



Propulsor motor 11 MW, 720 rpm on double ended ferries for BC Ferries



Cruise liner "Seabourn Odyssey"



Research vessel "Sagar Nidhi"



Multifunction tender "Galatea"

Integrated System Solutions

Electrical Systems for Newbuilding, Retrofit and Conversions

Our company is one of the leading system houses for the supply of complete electrical and electronic system packages on vessels - the turnkey solutions.

Turnkey is no product but a system performance, typically in close partnership with building yards. Starting at the preliminary design stage of projects, our company is responsible for the integration of all kinds of electric and electronic systems to an uniform turnkey solution - under the motto „from bridge to propeller“. With competent project management in combination with professional cross-system capabilities for all electric and electronic systems onboard most diverse building specifications will be implemented to the satisfaction of our customers.

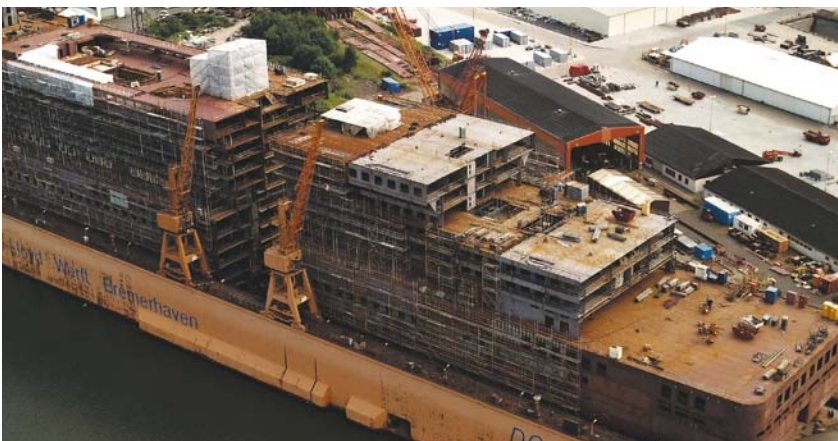
We take care of the project management, planning, owner's and class approvals, mechanical coordination, installation, design and development as well as the interface optimization between shipyards and subcontractors.

The range of system integration level varies from a package delivery of products including product-related engineering up to complete system integration (the turnkey solution) where we are the electrical department of the shipyard.

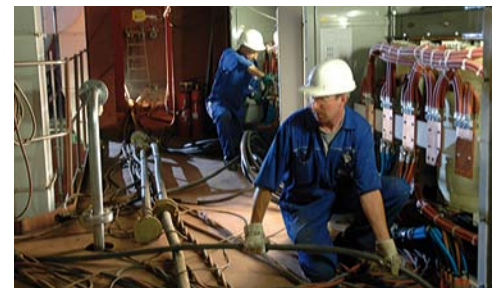
Dealing with a single partner helps to minimise costs and ensure optimal functionality of all components within the „system ship“. This proven expertise is based on intensive involvement in many different projects for both naval and commercial applications and is second-to-none right up to the most complex shipbuildings and retrofits.

We provide

- Project management and complete electrical system integration for new building and ship conversions
- Planning of technical and commercial issues for design and construction period
- Engineering, design and development
- Interface optimisation between shipyard and subsuppliers based on computer aided tools
- Testing and approval with owner and classification
- Turnkey solutions
- Training
- Logistic support
- Service worldwide



Ship extension "Pride of America"



Cable installation onboard vessel



Task force vessel class 702



RoRo ferry "Tor Magnolia"



Jack-up vessel "Windlift 1"

SAM Electronics Group

Business Divisions and Contacts Worldwide



Drives and Special Systems

- Diesel-electric propulsion systems for ships, dredgers and platforms
- Shaft generator systems
- Dredger control and monitoring systems (DCMS)
- Dredger drives
- Medium voltage switchboards
- Shore connection systems
- Generators, motors
- Degaussing systems and magnetic ranging systems
- Service, spares



Integrated System Solutions

- Complete electrical system integration
- New building and ship conversions
- Turnkey solutions
- Electrical power distribution concept
- Cable system planning and installation
- Low voltage switchboards
- ECR consoles



Products Automation, Navigation and Communication

- Propulsion control and electronic governor
- Alarm, monitoring and control
- Power management
- Radar/ECDIS/Autopilot/Track control
- GMDSS and Inmarsat equipment
- Navigation automation control systems (NACOS Platinum)
- Digital communication
- Entertainment systems
- Full Maintenance Contracts
- Retrofit, service, spares

Subsidiaries and Participations

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