

# Global specialist in energy management

Navy solutions



Horizon Frigate in trial period

**Schneider**  
Electric



Safety and service  
continuity requirements

Schneider Electric  
expertise

# 100% effective fleet operation

Our solutions in energy management optimize your capital and operational expenditures by increasing the life cycle of your fleet, designing and building more flexible and effective ships.

100% operational  
submarines  
and surface vessels

# A partner you can trust on

Provide efficient, safe, reliable and seamless solutions for electrical distribution, automation and safety systems



Over **90** years experience in :

- Conventional and nuclear submarines, combatant and support surface ships
- Medium and low voltage electrical distribution, automation and safety applications

• References for **15** navies

## Expertise in energy management solutions

Schneider Electric proposes all the competencies to design and implement relevant solutions to satisfy your requirements: engineering and installation, maintenance, on-site operation, retrofit, spare parts and training.

## Innovation

We offer and supply systems based on well proven technologies to guarantee service continuity and best in class performance from a world wide company.

## After sales services

Our service is tailored to your requirements to increase the installed base reliability, to check, repair and refurbish all safety-critical equipment on your ship. We send experts, wherever and whenever they are needed.

## World wide presence

To match with customers requirements, Schneider Electric proposes know-how transfers, local contents and interventions through its own facilities or local partners.



## Consulting

Involved right from the design stage of your project, we intervene according to your technical and economic requirements and constraints while working on differentiating and innovative axes.



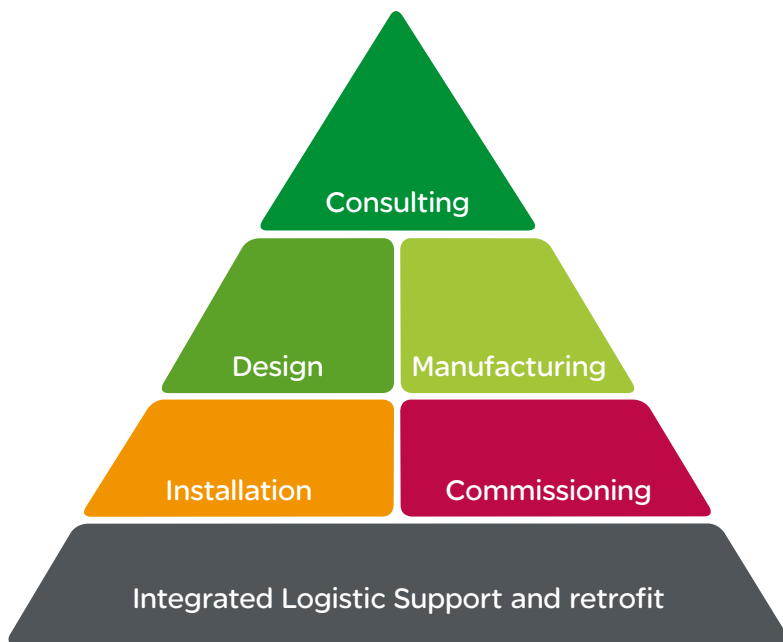
Partnership all along  
the 40 years  
ship life cycle



# Electrical distribution and automation fully customized

Right from design phase to ship life extension in line with most stringent requirements

- > Total cost optimization guaranteeing high performances, reliability and quality during life cycle
- > Expert embedded in your design
- > Efficient fleet operation
- > Extend life of your installation
- > Local facilities and services



## Some references

### Conventional submarines

- Scorpen class (Chile, Malaysia)
- A19 Gotland class (Sweden)
- A17 VDG Class, A14 Naek (Norway)
- Agosta class (Pakistan)
- Collins class (Australia)

### Nuclear submarines

- Barracuda class (SNA/SSN)
- Triumphant class (SNG/SSBN)
- Inflexible class (SNLE/SSBN)
- Rubis class (SNA/SSN)

### Land simulator

- PCRS (Propulsion Control and Reference System) T471 programm



### Design

According high constraints (shocks and vibration, thermal, EMC, high current, compactness,..)



### Software & Hardware automation offer

- Port & standart redundant networks
- Redundant control & supervision processes



### Electrical Distribution with :

High performance DC breakers and cabinets

# Consistent energy management solutions





# Secured fleet operation

Adapted solutions from well proven technologies with worldwide installed base

- > Optimized solutions and architectures
- > Peace of mind contracts from a manufacturer with type approved and adapted solutions
- > Through life support provided by a reliable and secured power offer
- > Local facilities and services

## Solution offer

### Electrical distribution

- MV & LV distribution
- Transformers
- Busways
- Ultra secured power
- Variable Speed Drives & Softstarters
- ...

### & Automation

- Power management system
- Alarm monitoring System
- Connectivity / Transparent Ready application
- Generator control
- ....



## Some references

### Frigates

- FREMM, Horizon class, La Fayette class (France)
- Sawari (Saudi Arabia)
- City class CPF (Canada)

### Corvettes

- Formidable class frigate (Singapore)
- C58 class (Algeria)

### Littoral combat ship

- LCS (US Navy)

### Patrol vessels

- Kingston class (Canada)
- Patrol vessels (US Navy)

### Aircraft carriers

- Charles de Gaulle (France)

### Troop landing ships

- Siroco, Foudre, Ouragan, Orage (France)

### Surface ship weapon systems

- Sylver (France)

### LHD

- Mistral (France)
- Tonnerre (France)



Combatant ship equipped with MV and LV distribution according high constraints, shocks, vibrations...



Power management system for ship with electrical propulsion

# Solutions for safety system



# Solutions for high demanding applications

Automation solutions dedicated to launching and flight termination systems

50 years experience providing very high reliability and safety systems free from failure

- > Achieve required performances
- > Provide turn-key systems
- > Maintain the installations all along their lifespan



## Application domains

- Weapon launching control system for nuclear submarines
- Nuclear weapon handling system
- Rocket flight termination system



Workstation for the supervision and control of sub-systems



Data collecting and operation status checking



## Some references

- Safety system for M51 launching system - **DCNS**
- Safety hardware PLC for M51 handling monitoring - **EADS Astrium**
- Adaptation to the Meteor missile of the flight termination system - **DGA**
- Flight termination system for Ariane 5 launcher - **CNES**

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$<10^{-9}$   
per operation

Probability of occurrence of undesirable events

$<10$  GHzertz

High level of resistance to EMC aggression

# Services for a long duration programme



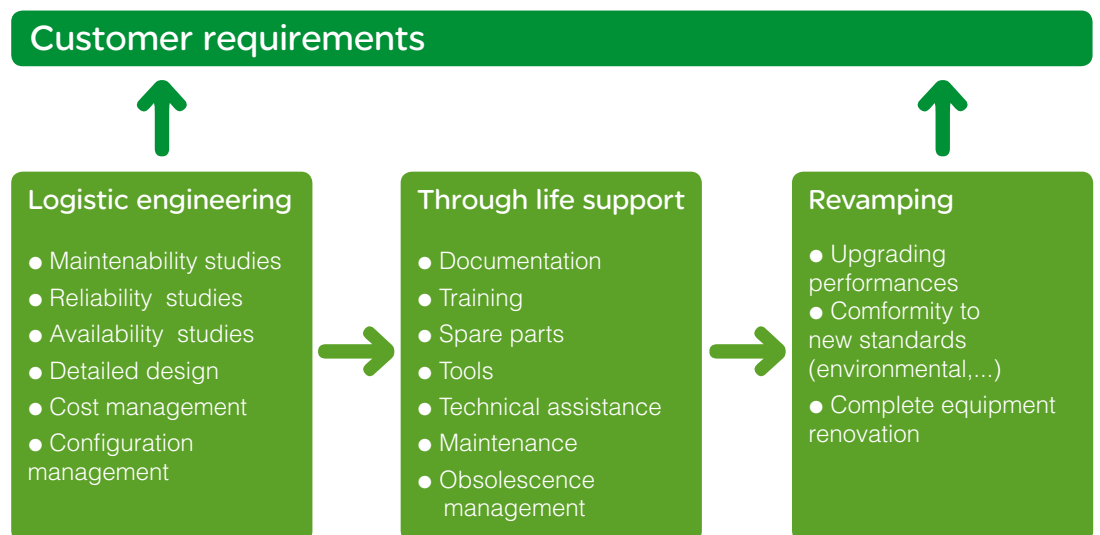
# A total life cycle solution with worldwide services offer



Our challenges begin with the initial design and continue throughout the life of each vessel **to ensure efficient fleet operation and service continuity.**

All over the world, a specific logistic support based on an organisational structure dedicated to navy, guarantees maximum availability of Schneider Electric's installations.

## Integrated Logistic Support



## Propulsion Control & Reference System for Australia

The Propulsion Control & Reference System (P.C.R.S) is an ashore simulator used for equipment embarked aboard 6 submarines of the Commonwealth Of Australia.

It allows the crews and maintenance teams trainings, the validation of the spare parts, the simulation of incidents and modification's tests if necessary.

90 years know-how  
in navy applications



# Expertise in customized electrical distribution and automation solutions in partnership with french or foreign navies and shipyards



## Australia

- Collins type submarines: Collins, Farncomb, Waller, Deschainaux, Sheean Ran King frigate
- Land simulator: PCRS (Propulsion control and reference system) T471 programme

## Argentina

- Avisos corvettes: A69 type

## Canada

- City type corvette: Halifax, Vancouver, Toronto, Quebec city
- Patrol vessels: Kingston, Glace Bay, Nanaimion, Edmonton

## Chile

- Scorpène type submarines: Liberator O'Higgins, General Carrera

## France

- SNLE NG submarines: Le Terrible, le Triomphant, Le Téméraire, le Vigilant
- Nuclear attack submarines: Barracuda, Rubis, Saphir, Casablanca
- SNLE submarines: l'Inflexible, le Redoutable, le Foudroyant
- Anti-aircraft frigates: FREMM, Horizon class, Cassart, Jean Bart
- Light frigates: La Fayette, Surcouf, Courbet
- Missile launcher frigates: Suffren, - Duquesne, De Grasse, Tourville
- Troop landing ships: Siroco, Foudre, Ouragan, Orage
- LHD: Mistral, Tonnerre
- Nuclear drive aircraft carrier: Charles de Gaulle
- Helicopter carrier: Jeanne d'Arc
- SNG immunisation: SEA network
- Les Landes test centre: ETNA remote neutralisation system
- Neutralisation system on MONGE type test and measurement vessel
- M4, M45, M51 missile launcher tube control and monitoring Sylver anti-missiles
- Adaptation to the Meteor missile of the flight termination system
- Flight termination system for Ariane 5 launcher

## Italy

- Sauro type submarines: S. Pelosi, G. Prini, P. Longobardo, etc.

## Malaysia

- Scorpène type submarine

## Netherlands

- Walrus type submarines: Walrus, Zeeleeuw, Dofjin, Bruinvis

## Pakistan

- Agosta type submarines: Hasmat, Hurmat
- Agosta B type submarines: nKhalid, S138, S135
- Daphné type submarines: Hangor, Shushuk, Mangro, Ghazi

## Saudi Arabia

- Sawari frigates: Al Riyadh, Makkah, AL Damman

## Spain

- Agosta type submarines: Galerna, Siroco, Mistral, Tramontana
- Daphné type submarines: Delfin, Tonina, Marsopa, Narval
- LHD: BPE

## Singapore

- Corvettes: Formidable class frigate

## Sweden

- A19 Gotland class submarine
- A17 VGD class
- A14 Naëk

## USA

- Littoral combat ship: LCS
- LHD: LPD17



# Make the most of your energy\*

\* Tirez le meilleur parti de votre énergie

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