

# SIGMA Combatants

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A PROVEN SERIES OF NAVAL SOLUTIONS

DAMEN NAVAL

# Complex vessels, on time and on budget

The SIGMA range, from fast and agile Surface Combatants to Multi Mission Frigates, offers proven solutions tailored to the specific needs of each navy.

# Built at your desired location

SIGMA Frigates not only operate all over the world, they can be built all over the world too. Building locally results in valuable transfer of technology and increased local content.

# A proven concept

With 10 ships already delivered to different navies around the world, SIGMA is the most successful class of modern Surface Combatants.

# A range of design possibilities

From 50 to 125 metres long: Damen Naval delivers turnkey design, engineering and construction in addition to product lifecycle support.



AN EVOLVING SUCCESS

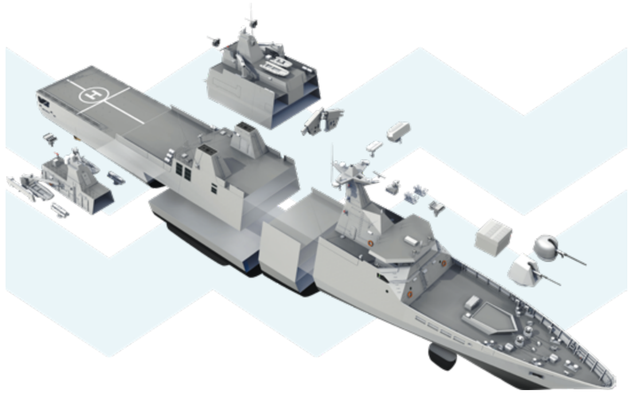
# The SIGMA Series

**SIGMA is Damen's Ship Integrated Geometrical Modularity Approach.**
**It is based on the experience gained by building seven generations of surface combatants for, and including feedback from, the Royal Netherlands Navy.**
**The use of modular platform components enables bespoke tailoring of operational characteristics.**

### Naval design features

- Decreased detectability by signature reduction measures
- Increased survivability e.g. by improving shock resistance
- Redundancy in vital systems using Naval Intact and Damaged Stability
- Military damage control
- Enclosed gas citadel (CBRN)
- Using military standards

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| | Fast Combatants | | Corvettes / Light Frigates | | | Multi Mission Frigates | | |
|---|---|---|---|---|---|---|---|---|
| **SIGMA** | **6110** | **7311** | **9113** | **9813** | **10513** | **10514** | **11515** | **12516** |
| Length (m) | 61 | 73 | 91 | 98 | 105 | 105 | 115 | 125 |
| Beam (m) | 10 | 11 | 13 | 13 | 13 | 14 | 15 | 16 |
| Draught (m) | 3.0 | 3.0 | 3.7 | 3.7 | 3.7 | 3.9 | 4.5 | 4.6 |
| Displacement (t) | 750 | 1000 | 1900 | 2100 | 2300 | 2500 | 3800 | 4600 |
| Speed (kn) | 25-30 | 25-30 | 25-28 | 25-28 | 25-28 | 27+ | 27+ | 27+ |
| Range (nm) | 2000 | 2000 | 4000 | 4000 | 4000 | 5000 | 5000 | 5000 |
| RHIBs | 1 x 6 m | 2 x 6 m | 2 x 6 m | 2 x 6 m | 2 x 6 m | 2 x 7 m | 2 x 9 m | 2 x 12 m |
| HELO | *[–]* | *[–]* | 1 x med wt helicopter | 1 x med wt helicopter | 1 x med wt helicopter | 1 x med wt helicopter | 1 x med wt helicopter + UAV | 1 x med wt helicopter + UAV |
| Accommodation | 30 | 60 | 80 | 90 | 110 | 120 | 140 | 160 |
| AAW | self defence | self/area defence | self/area defence | self/area defence | self/area defence | self/area defence | self/wide area defence | self/wide area defence |
| ASuW | 3" / RWS / SSM | 3" / RWS / SSM | 3" / RWS / SSM | 3" / RWS / SSM | 3" / RWS / SSM | 3" / RWS / CIWS / SSM | 5" / 3" / RWS / CIWS / SSM | 5" / 3" / RWS / CIWS / SSM |
| ASW | *option* | *option* | HMS / TLS | HMS / TLS | HMS / TLS | HMS / VDS / TLS | HMS / VDS / TLS | HMS / VDS / TLS |

Typical characteristics, other possibilities can be discussed.

MULTI-MISSION DEPLOYMENT

# Mission ready

**Multi-disciplinary potential from maritime security operations to power projection and comprehensive naval warfare.**

- Green and blue water operations
- Individual and task group deployment
- ASW, ASUW, AAW and information warfare













SPEED IS THE KEY TO SUCCESS

# Fast Combatants

**The Fast Combatants are SIGMA designs in the lower displacement range. These are characterised by a high design speed, reflecting the current needs of navies for fast ships in this size range. At the same time they feature military standards and detectibilty measures such as robustness, reduced underwater signatures and the efficiency of a twin propeller propulsion system.**

**Sensors**
- 3D Surveillance Radar
- Radar / EO Fire Control
- Infrared / Electro-Optical (EO) Surveillance (360°)
- Radar Electronic Support / Counter Measures
- Communications Electronic Support Measures

**Effectors**
- Main Gun (3"/76mm)
- Remote Weapon Stations
- Heavy Machine Guns
- Surface to Surface Missiles
- Short Range Surface to Air Defence System

**SIGMA Fast Combatants**

| | |
|---|---|
| Length o.a. | 51 - 80 m |
| Beam mld. | 9 - 12 m |
| Draught | 3.2 - 3.6 m |
| Displacement | 500 - 1500 t |
| Speed | up to 30+ kn |
| Accommodation | 35 - 75 ppl |








- Advanced lightweight solutions
- CODAD propulsion
- High speed diesel engines
- Twin screw high efficiency shaft arrangement
- Full redundancy
- Stealth design
- Flexible topside design
- State of the art solutions for Above Water Warfare (AWW)

THE IDEAL MARITIME SECURITY TOOL

# Corvettes / Light Frigates

**SIGMA Corvettes / Light Frigates are perfectly adapted for naval patrol and maritime security operations. They provide fighting capabilities in all warfare segments (AAW, ASW, ASuW), all to military standards. They represent the perfect solution for situational awareness and defence of essential security interests at sea.**

**Sensors**
- 3D Surveillance Radar
- Radar / EO Fire Control
- Infrared / Electro-Optical (EO) Surveillance (360°)
- Hull Mounted Sonar
- Radar Electronic Support / Counter Measures
- Communications Electronic Support Measures

**Effectors**
- Main Gun (3"/76mm)
- Remote Weapon Stations
- Heavy Machine Guns
- Surface to Surface Missiles
- Short Range Surface to Air Defence System
- Torpedo Launching System

**SIGMA Corvettes / Light Frigates**

| | |
|---|---|
| Length o.a. | 80 - 105 m |
| Beam mld. | 13 m |
| Draught | 3.5 - 3.8 m |
| Displacement | 1600 - 2200 t |
| Speed | up to 28+ kn |
| Accommodation | 80 - 110 ppl |



**SIGMA 10513 (enlarged 9813)**

| | |
|---|---|
| Customer | Moroccan Navy |
| Basic functions | Naval patrol EEZ, deterrence, search and rescue, ASW, AAW, ASUW, EW |

**SIGMA 9813**

| | |
|---|---|
| Customer | Moroccan Navy |
| Basic functions | Naval patrol EEZ, deterrence, search and rescue, ASW, AAW, ASUW, EW |

**SIGMA 9113**

| | |
|---|---|
| Customer | Indonesian Navy |
| Basic functions | Naval patrol EEZ, deterrence, search and rescue, ASW, AAW, ASUW, EW |







- **Twin engine redundant configuration**
- **Option for electric drive**
- **Helicopter deck and hangar**
- **Fast RHIBs with option for slipway**
- **Ample accommodation spaces**
- **Comfortable platform for extended patrols**
- **Surveillance and defence in all warfare segments**

FLEXIBLE DEPLOYMENT

# Multi Mission Frigates

**SIGMA Multi Mission Frigates are frontline vessels designed for maximum flexibility and adaptability to specific roles (enhanced ASW/AAW/ASuW). They are suitable for expeditionary missions and long range/endurance deployments. With excellent seakeeping, they can comfortably stay for prolonged periods on blue water duties. They are capable of stand alone operations or task force interoperability as escort and protection of high value units.**

**Sensors**
- 3D Surveillance Radar (rotary/planar)
- Radar / EO Fire Control (multiple/phased array for missile fire control)
- Infrared / Electro-Optical (EO) Surveillance (360°)
- Hull Mounted Sonar
- Variable Depth Sonar
- Radar Electronic Support / Counter Measures
- Communications Electronic Support Measures

**Effectors**
- Main Gun (3"/76mm or 5"/127mm)
- Remote Weapon Stations
- Heavy Machine Guns
- Surface to Surface Missiles
- Multimodule Vertical Launcher Strike Length (wide area defence)
- Torpedo Launching System

| | **Multi Mission Frigates** |
|---|---|
| Length o.a. | 105 - 125 m |
| Beam mld. | 14 - 17 m |
| Draught | 3.7 - 4.8 m |
| Displacement | 2500 - 4800 t |
| Speed | up to 27+ kn |
| Accommodation | 120 - 160 ppl |



| | **SIGMA 10514** |
|---|---|
| Customers | Indonesian Navy & Mexican Navy |
| Basic functions | Naval patrol EEZ, deterrence, search and rescue, ASW, AAW, ASUW, EW |









- Full redundant propulsion with several configurations possible
- Option for electric drive
- Helicopter deck and hangar
- Fast RHIBs with option for slipway
- Ample accommodation spaces
- Comfortable platform for extended patrols
- Surveillance and defence in all warfare segments

MODERN STANDARDS

# Inner Strength

**Damen Naval is more than a ship builder; we are a systems integrator. Our SIGMA vessels are prime examples of this. Sensors, weapons, command, alarms, navigation, energy generation, propulsion – all ship systems work together to create one multi-disciplinary platform.**
**We deliver high platform standards with operational spaces fully tailored to customer wishes.**

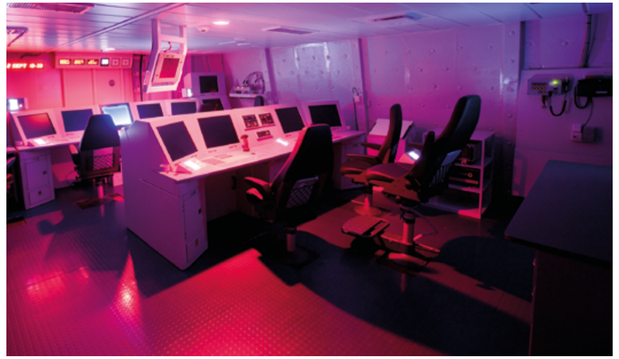
- Continuous improvement and evolution of platform solutions
- Up-to-date mission equipment
- Modern solutions for platform management systems





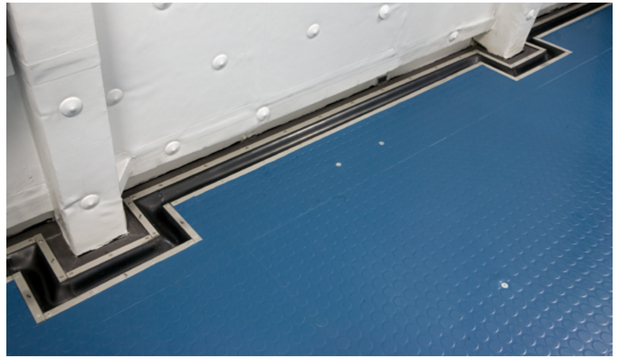


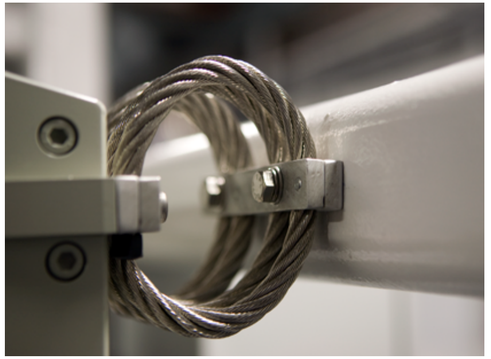




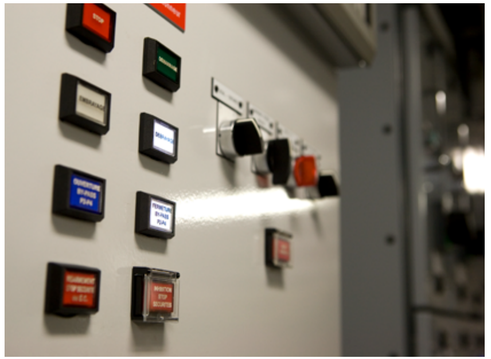














THE YARD OF YOUR CHOICE

# Local Construction

**Damen offers local building for its entire portfolio, and has built more than 1,000 vessels in this way in over 70 countries around the world.**

For naval clients Damen Naval is able to support vessel construction at a location of the client's choice, beside the option of building vessels at Damen yards.
Damen Naval has already completed successful projects like this for the Indonesian Navy and Mexican Navy.

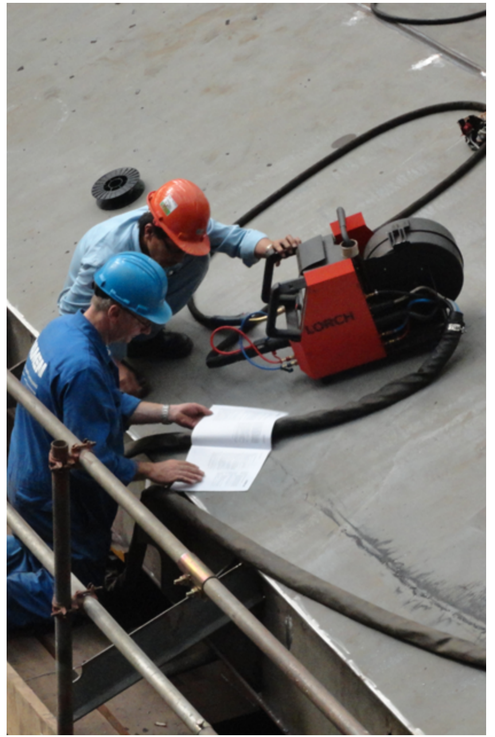
Furthermore, the modular design of our SIGMA range of vessels means that construction can be carried out in different locations, depending on locally available manpower, knowledge and facilities. This innovative and efficient modular building method shortens delivery times.

**The benefits of modular build and local construction**

- Proven naval designs
- Design flexibility to meet specific demands
- Guaranteed Damen quality and building support
- Transfer of technology and skills development to local shipbuilding industry
- Convenience of local production
- Increased local content to meet political requirements
- Stimulation of local economy and employment opportunities

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- Modular building strategy
- Short delivery times thanks to parallel construction in several sites
- Transfer of technology
- On-site production support
- Local procurement and supply chain
- National industry development
- Key enabler for future service support

YOUR MISSION IS OUR GOAL

# Product Lifecycle Support

**Keeping your assets operationally available and relevant throughout their lifecycle against predictable Life Cycle Costs is our goal. We achieve this by delivering a comprehensive package of digital and smart innovative solutions, and services.**

Damen Naval's Product Lifecycle Support portfolio contains both local one-stop-shop support and transfer of technology programs, enabling our customers to create their strategic autonomy.

We support our customers in keeping their vessels relevant in the operational arena, by modernising them with the latest technologies.

With innovative software solutions such as a computerised maintenance management system, interactive electronic publications, and the use of extended reality simulated environments, we digitalise asset management.

**Key features**

- Improved fleet readiness
- Controlled lifecycle costing
- Operational relevance of your assets
- Strategic autonomy
- Digital support environment
- Local technical support
- Global spares availability
- Sustainable services

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SECURING OUR SEAS

# Damen Naval

**Damen Naval is the dedicated naval shipbuilding division of the Damen Shipyards Group, which brings together all the naval activities of the group, both in the Netherlands and abroad.**

With roots stretching back almost 150 years – to the Royal Schelde yard in Vlissingen – Damen Schelde Naval Shipbuilding, the only naval original equipment manufacturer (OEM) in the Netherlands, is a core part of the Damen Naval division.

Having delivered more than 400 vessels to customers all around the world, we are a trusted partner in the international marketplace, known for our role as full-service provider, or integrator, throughout the lifecycle of our products.
While taking pride in our heritage, we are looking towards the future.

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TOWARDS A SUSTAINABLE FUTURE

# Sustainability

**Damen Naval works proactively to decrease the environmental footprint of its vessels in several ways.**

**Operational performance**
In order to reduce fuel consumption of our vessels, the following implementations will be executed on the next generation of products:

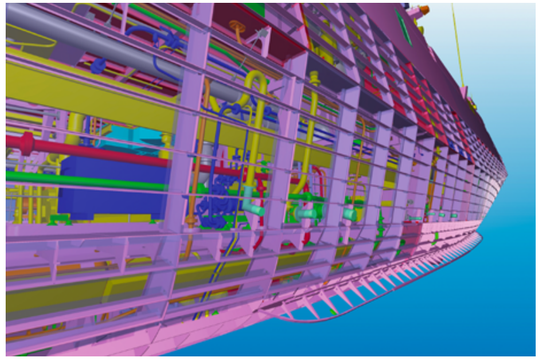
- Multi-objective optimisation energy management strategy
- Prototype of the Hull Vane design
- Adaptive pitch control
- Hull optimisation on actual operational weather conditions and seas states
- Several efficiency improvements on HVAC and E&A systems by component selection and system design

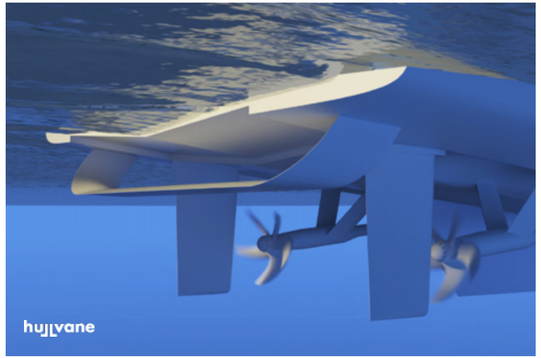
**R&D**
In cooperation with strategic partners in the naval production chain, research institutes, and the Royal Netherlands Navy, we participate in numerous research programmes aiming to lower $CO_2$ emissions and reduce dependence on fossil fuels.

These have the following themes:

- Alternative fuels
- Alternative (hybrid) power and energy storage
- System optimisation and energy management
- Exhaust gas treatment systems

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WE TAKE PRIDE IN OUR TRACK RECORD

# References

**For more than 50 years, Damen has worked with the Royal Netherlands Navy on the design, engineering and construction of eight generations of combatants, as well as Naval Auxiliaries, Landing Platform Docks and Hydrographical Survey Vessels.**

Based on this extensive experience, Damen Naval also offers navies worldwide a broad range of naval and patrol vessels, ranging from 7 to more than 200 metres.
The SIGMA range of vessels is an important part of this export market. Although built according to a standardised concept, SIGMA vessels are tailored to the clients' unique operational requirements and can be equipped for missions ranging from maritime security up to naval warfare and power projection.

With every vessel we build, we guarantee quality standards based on proven technologies.
















# Damen Shipyards

## OCEANS OF POSSIBILITIES

Damen Shipyards Group has been in operation for over ninety years and offers maritime solutions worldwide, through design, construction, conversion and repair of ships and ship components.
By integrating systems we create innovative, high quality platforms, which provide our customers with maximum added value.

Our core values are fellowship, craftsmanship, entrepreneurship and stewardship. Our goal is to become the world's most sustainable shipbuilder, via digitalisation, standardisation and serial construction of our vessels.

Damen operates 35 shipyards and 20 other companies in 20 countries, supported by a worldwide sales and service network. Damen Shipyards Group offers direct employment to more than 12,000 people.

**Colophon**
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