



SIGMA Combatants

A PROVEN SERIES OF NAVAL SOLUTIONS

DAMEN



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.

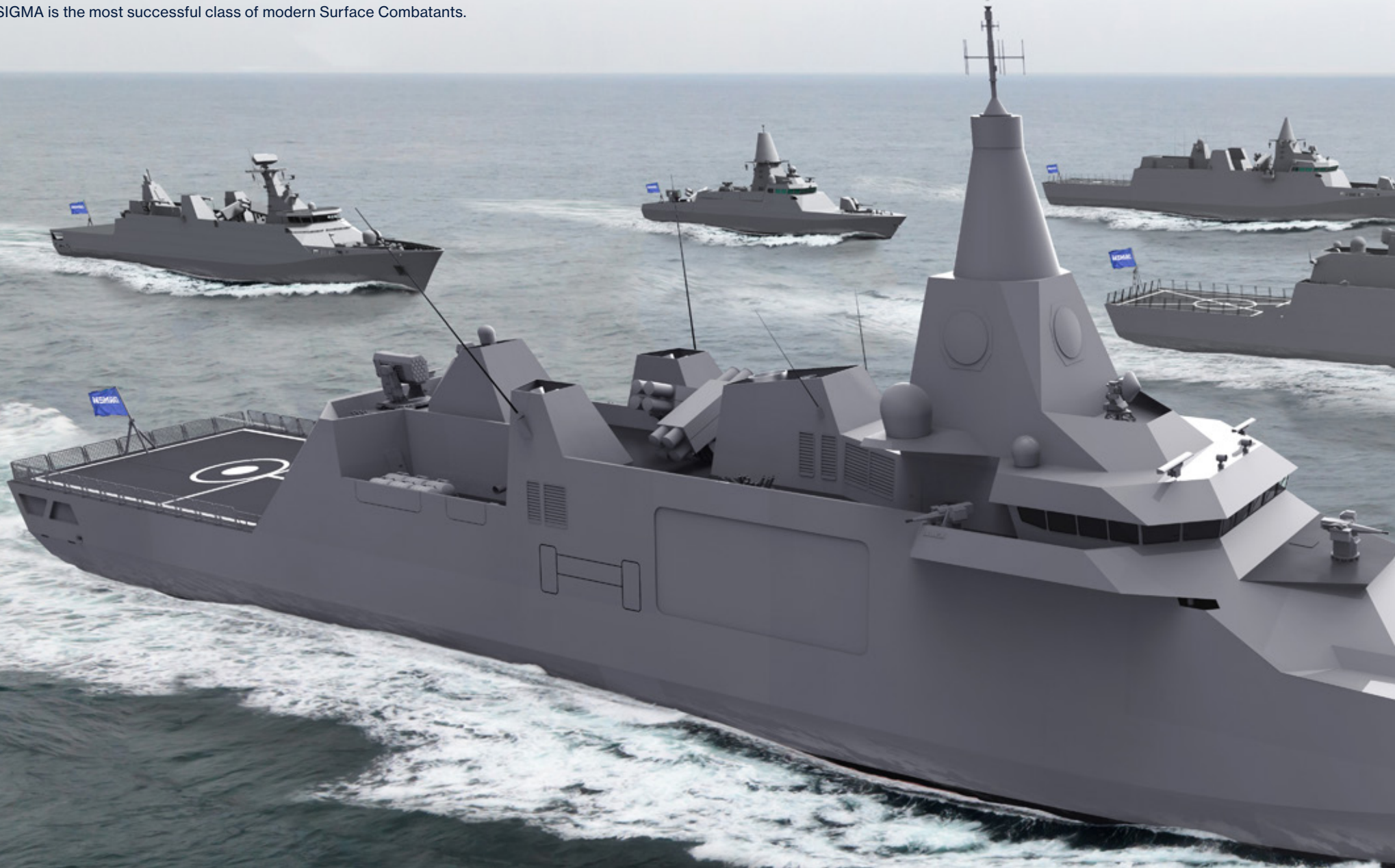
An aerial photograph of a large shipyard situated along a body of water. In the center, a large white SIGMA frigate is docked at a pier. To its left, a smaller grey tugboat is also docked. In the foreground, a blue and white tugboat is moving across the water, leaving a white wake. The shipyard is filled with various industrial structures, including large blue and white hangars, cranes, and stacks of materials. In the background, a city skyline is visible under a clear sky. A light blue wavy graphic is overlaid in the upper right corner of the image.

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

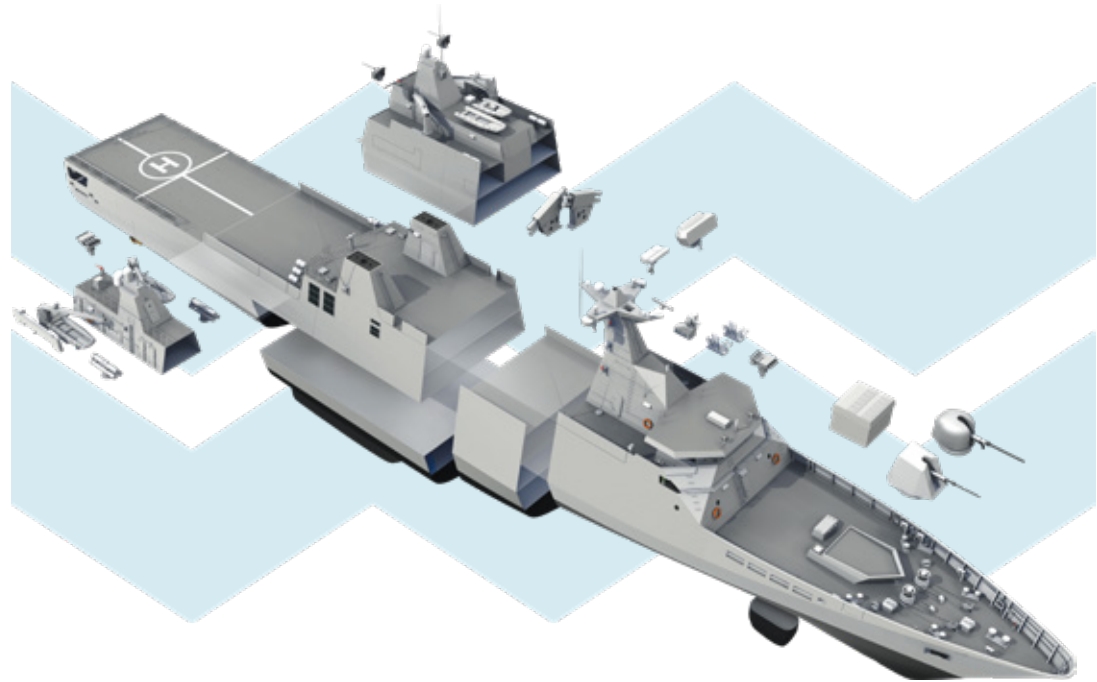
SIGMA is our Ship Integrated Geometrical Modularity Approach.

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





Fast Combatants

SIGMA	6110	7311
Length (m)	61	73
Beam (m)	10	11
Draught (m)	3.0	3.0
Displacement (t)	750	1000
Speed (kn)	25-30	25-30
Range (nm)	2000	2000
RHIBs	1 x 6 m	2 x 6 m
HELO	[-]	[-]
Accommodation	30	60
AAW	self defence	self/area defence
ASuW	3" /RWS / SSM	3" /RWS / SSM
ASW	option	option



Corvettes / Light Frigates

	9113	9813	10513
Length (m)	91	98	105
Beam (m)	13	13	13
Draught (m)	3.7	3.7	3.7
Displacement (t)	1900	2100	2300
Speed (kn)	25-28	25-28	25-28
Range (nm)	4000	4000	4000
RHIBs	2 x 6 m	2 x 6 m	2 x 6 m
HELO	1 x med wt helicopter	1 x med wt helicopter	1 x med wt helicopter
Accommodation	80	90	110
AAW	self/area defence	self/area defence	self/area defence
ASuW	3" /RWS / SSM	3" /RWS / SSM	3" /RWS / SSM
ASW	HMS /TLS	HMS /TLS	HMS /TLS



Multi Mission Frigates

	10514	11515	12516
Length (m)	105	115	125
Beam (m)	14	15	16
Draught (m)	3.9	4.5	4.6
Displacement (t)	2500	3800	4600
Speed (kn)	27+	27+	27+
Range (nm)	5000	5000	5000
RHIBs	2 x 7 m	2 x 9 m	2 x 12 m
HELO	1 x med wt helicopter	1 x med wt helicopter + UAV	1 x med wt helicopter + UAV
Accommodation	120	140	160
AAW	self/area defence	self/wide area defence	self/wide area defence
ASuW	3" /RWS / CIWS /SSM	5" /3" /RWS / CIWS /SSM	5" /3" /RWS / CIWS /SSM
ASW	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 detectibility 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

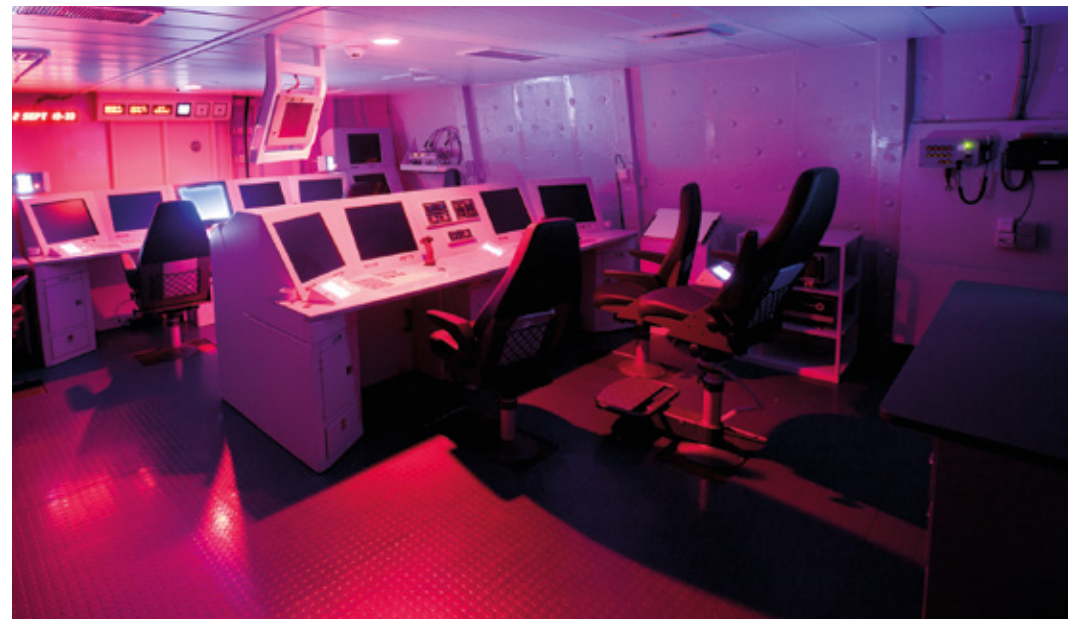
MODERN STANDARDS

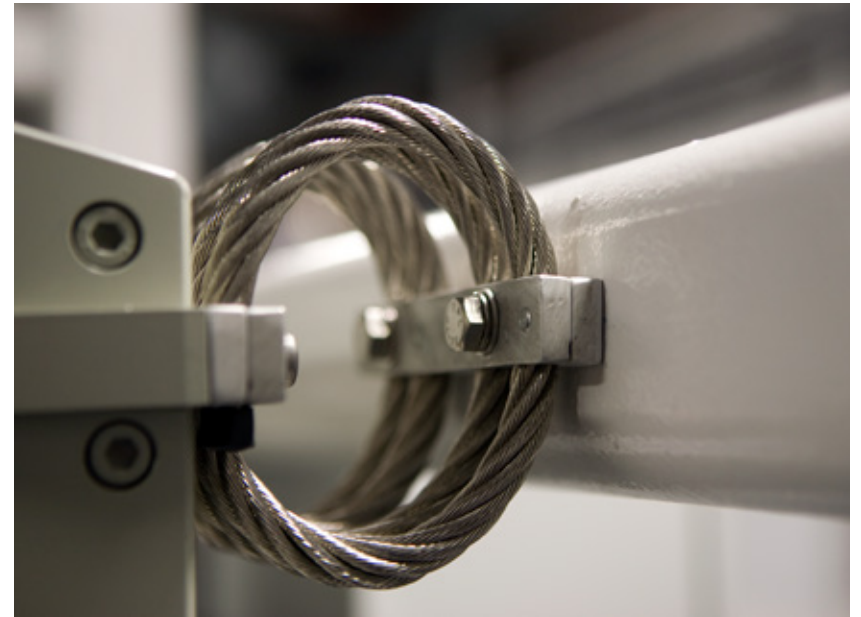
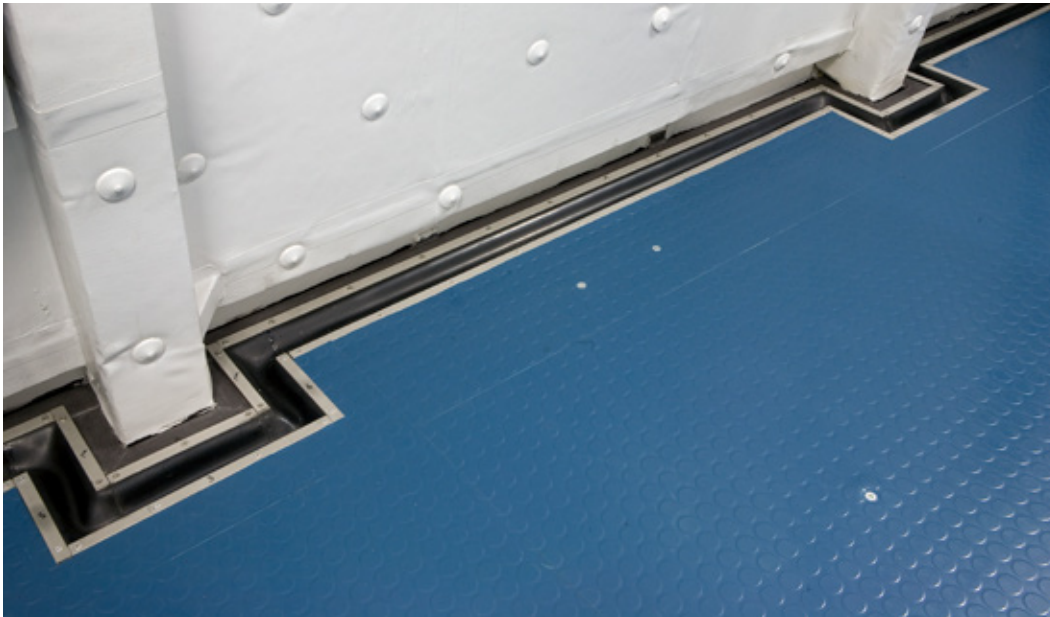
Inner Strength

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





- › **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







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.



77	105 HAARBOER VACHTS NOORWEGEN
78	106 MERKUS PASS'S KONPARET MU
79	107 DE LEXBOOT RADDER LENDENST
80	108 THOR X PASS'S REEDER ARIC SWIT
81	109 G1 TORPEDOBOOT MARINE
82	110 G II " "
83	111 DE SCHELDELUCHTER KON MU DE SCHELDE
84	112 OPHW HALLS ROTT LLOYD
85	113 JASON BRANDSPUITARTUIG
86	114 DREDGER HOPPERJAGER LONDON
87	115 THAMES " "
88	116 LUCTOR ET EMERGO OZBOOT MARINE
89	117 WILIS HALLS ROTT LLOYD
90	118 SROCCO STOKJACHT B.E. RUY'S
91	119 RINDJANI HALLS ROTT LLOYD
92	120 DRAAK TORPEDOBOOT KOLONEN
93	121 KROKODIL " "
94	122 ZEELSLOEP LOOSCHIEZEN
95	123 KAMI HALLS ROTT LLOYD
96	124 TUKONI VACHTS J. J. J. LUN
97	125 ZEELSLOEP LOOSCHIEZEN
98	126 ZEESLANG TORPEDOBOOT KOLONEN
99	127 TABANIAN HALLS ROTT LLOYD
100	128 SUMATRA VACHTS MU NEDERLAND
101	129 BILLITON " "
102	130 FRISIA HALLS KON HOLL LLOYD
103	131 TAMBORA HALLS ROTT LLOYD
104	132 SOPHIE H VACHTS NED WAKES
105	133 OZBOOT O 2 MARINE
106	134 WOLF TORPEDOJAGER " "
107	135 FRET " "
108	136 ZWALLU GOVERN VRTG VOL
109	137 ALBATROS " "
110	138 OZBOOT O 3 MARINE
111	139 GRANJE NASSAU KON WESTING HALL
112	140 BULMOND TORPEDOJAGER MARINE
113	141 JAHYALS " "
114	142 OZBOOT M 1 " "
115	143 MERAKIE VACHTS ROTT LLOYD
116	144 DELI " "
117	145 LYNN TORPEDOJAGER MARINE
118	146 HERMELIN " "
119	147 OZBOOT O 4 " "
120	148 " O 5 " "
121	149 SOERAKARTA VACHTS ROTT LLOYD
122	150 INSOLUDE HALLS " "
123	151 O 15 TORPEDOBOOT MARINE
124	152 E 11 " "
125	153 ZEELSLOEP LOOSCHIEZEN
126	154 TJEKEMBANG VACHTS J. J. J. LUN
127	155 OZBOOT O 6 MARINE
128	156 THONGDAM VACHTS J. J. J. LUN
129	157 Z 5 TORPEDOBOOT MARINE
130	158 Z 6 " "
131	159 EQUADOR KON WESTING HALL
132	160 PATRIA HALLS ROTT LLOYD
133	161 OZBOOT M 11 KOLONEN
134	162 BUNTERKING VACHTS ROTT LLOYD
135	163 GARDEY " "
136	164 OZBOOT M 12 KOLONEN
137	165 J. J. J. LUN " "
138	166 ALMOED VACHTS KON NED ST MU
139	167 OZBOOT M 13 KOLONEN
140	168 " M 14 " "
141	169 " M 15 " "
142	170 MECKLENBURG HALLS MU ZEELAND
143	171 PRINCES JULIANA " "
144	172 HERTINGEN HALLS ROTT LLOYD
145	173 ARNIE DEELUUT H. J. J. LUN AKA
146	174 EODAM HOLLAND J. J. J. LUN
147	175 OZBOOT O 7 MARINE
148	176 OZBOOT O 8 MARINE
149	177 DE BUTTER H. J. J. LUN
150	178 DE BUTTER H. J. J. LUN
151	179 VAN HEISTE H. J. J. LUN
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200	228 KOTA RAJA H. J. J. LUN



229	CLEODORA MOTORTANKS BAT PETR MU
230	O 2 BOOT O 21 MARINE
231	O 2 BOOT O 22 MARINE
232	KONINGIN EMMA HALLS MU ZEELAND
233	PRINSES BEATRIX " "
234	BANTAM MOTORVACHTS ROTT LLOYD
235	ISAAC SWEERS TORPEDOJAGER MARINE
236	PHILIPS VAN ALMONDE " "
237	WILLEM RUY'S MOTOR HALLS KON ROTT LLOYD
238	KONINGIN JULIANA PR ST. X. W. S.
239	PRINS BERNHARD " "
240	BORNEO MOTOR VACHTS MU NEDERLAND
241	WU-NGAPOE MOTORS VEETRANSPORT K.P.M.
242	219 MUNENVEGERS O. K. M.
243	225 MUNENVEGERS O. K. M.
244	225 TORPEDOJAGERS NET VOLTUIG
245	TORPEDOJAGER NET OF STAPEL GEZET
246	STOOMTRAWLER DECHMAG
247	250 STOOMTRAWLERS NET VOLTUIG
248	250 STOOMTRAWLERS NET OF STAPEL GEZET
249	GEAANULEERD
250	250 TONS DRIVENDE BOX
251	SLEEPOOT DE NOLLE K.M.S.
252	SLEEPOOT RAMHENS K.M.S.
253	241 DDD KLASSE GEANNULEERD
254	KALIOPE SCH. TIEUHLAND
255	252 HANSA-SCHOPEN NET VOLTUIG
256	258 HANSA-SCHOPEN NET OF STAPEL GEZET
257	TORPEDOJAGER NET VOLTUIG
258	SPIERBRECHER
259	NET OF STAPEL GEZET
260	ZEELSLEEPOOT K.M.S. VOALLEN
261	GEANNULEERD TUCENS BOUW
262	GARBET MOTORVACHTS C. D. T.
263	CANIMARE " "
264	SLEEPOOT VOOR POLEN
265	261 H.M. PIETER FLORISZ
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300	296 H.M. PIETER FLORISZ



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:

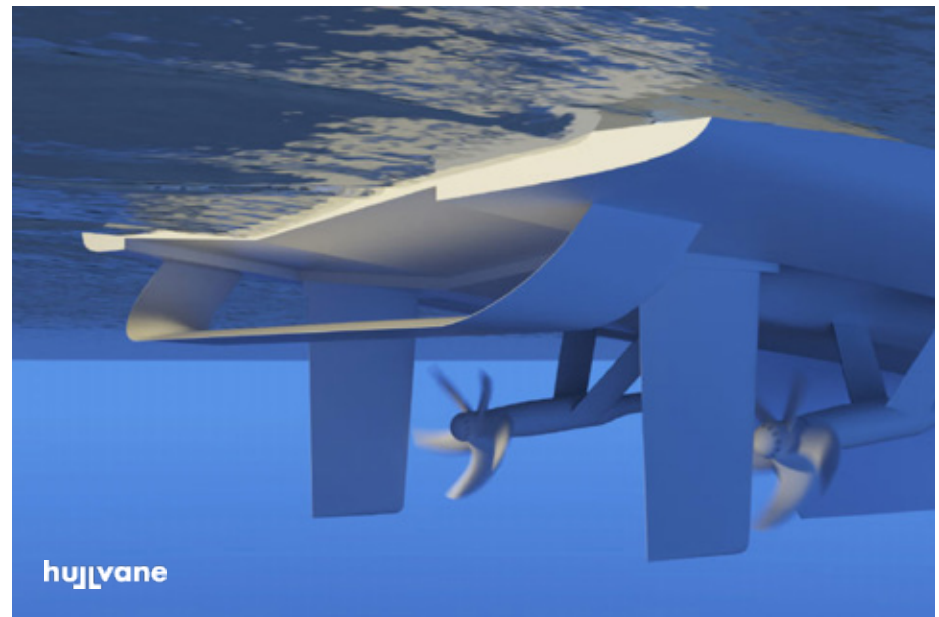
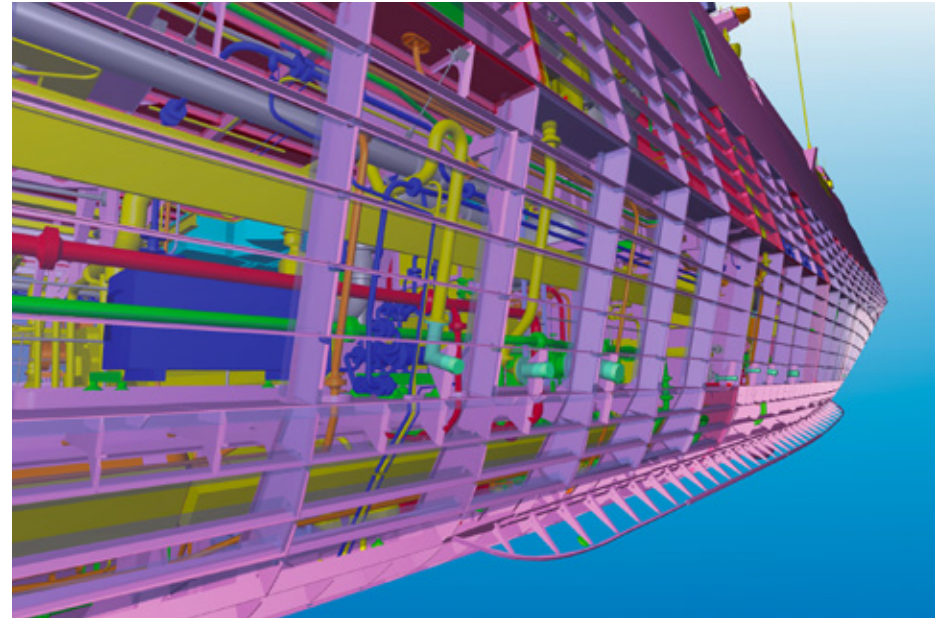
- › Multi-objective optimisation energy management strategy
- › Prototype of the Hull Vane design
- › Adaptive pitch control
- › Hull optimisation on actual operational weather conditions and seas states
- › Several efficiency improvements on HVAC and E&A systems by component selection and system design

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 CO₂ 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



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.

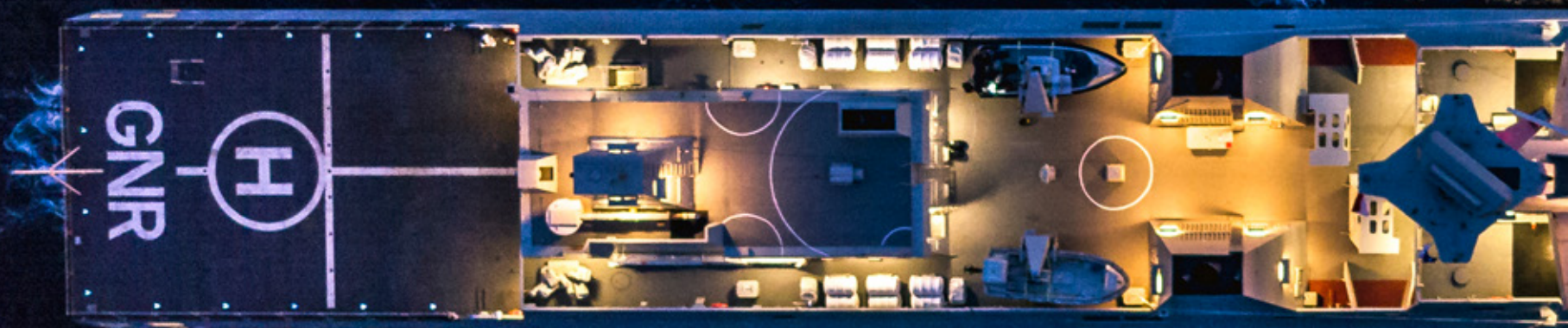
Based on this extensive experience, Damen Naval also offers navies worldwide a broad range of naval and patrol vessels, ranging from 7 to more than 200 metres.

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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info@damennaval.com

Damen Naval

SECURING OUR SEAS



DAMEN
NAVAL

De Willem Ruysstraat 99
4381 NK Vlissingen

P.O. Box 555
4380 AN Vlissingen
The Netherlands

+31 (0)118 48 50 00
info@damennaval.com
damennaval.com

BRO-DNSI-2505