

Where defence and security counts

Navy and Coast Guard





Naval lighting solutions ahead of their time

In a rapidly changing world, defence and security are more important than ever. Glamox has a long history in the maritime defence and security sector, where our complete and comprehensive product and lighting solutions have contributed greatly to global maritime security.

We offer extensive lighting packages and solutions for all marine defence-related needs, making Glamox the perfect partner for complex applications where extensive knowledge and experience of the

applicable standards are required. This know-how is indispensable when equipping frigates, aircraft carriers, support vessels, patrol boats, and submarines with lighting solutions.

From the first consultations to long after installation, our team is at the ready to help you plan, design, and execute your lighting solutions – with a special focus on finding the best lighting solution for each project. We can offer MIL-tested light fittings and systems, integrated light management systems, and human-

centric lighting, with high efficiency and sustainability among our top priorities. All this allows us to confidently fulfil the strictest requirements of naval lighting system suppliers all over the world.

Our wide portfolio includes navigation lights, floodlights, searchlights, interior and exterior technical lighting, explosion-proof luminaires, as well as integrated system solutions for surface ships, submarines, and Helicopter Visual Landing Aid systems (HVLAS) – everything that is needed to create light for a better life.



A global partner with a local network

As a global partner with a strong local network, Glamox has been a leading and trusted supplier of lighting to the marine and offshore industries worldwide.

Founded on the harsh west coast of Norway in 1947, Glamox's history spans over more than 75 years of tried, tested and proven application in harsh and demanding environments for sea-faring vessels within fishing, naval, cruise, ferry, tankers, freight and aquaculture, and so much more – where Glamox's Navy and Coast Guard experience spans many decades.

Qualified and motivated employees are the driving force at our company. We have people with different backgrounds, but what we all

Our quality brands within the Navy and Coast Guard segment:

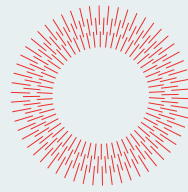


have in common is our competence and passion in relevant marine and offshore topics, trends and technologies – grounded in research and development.

Our solutions have been tested and proven in harsh and demanding environments, in all types of marine applications. We understand our customers' challenges and concerns and know the best solutions for delivering good light for insert a break/paragraph after the word environments.

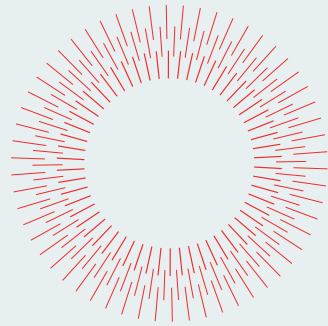
Smart and reliable solutions demand more than today's expertise – it demands generations of experience.





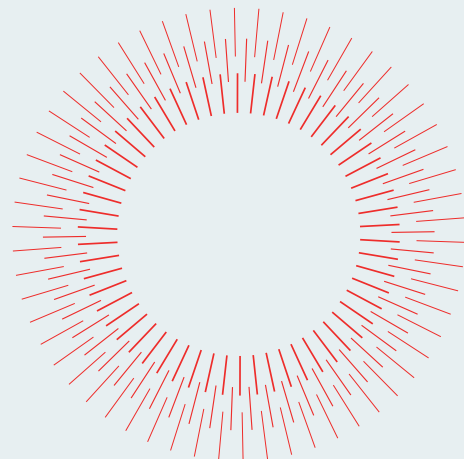
GOOD

Basic specification LED products with Declarations of Conformity (DOC) according to marine requirements.



BETTER

LED marine light fittings in accordance with DNV marine requirements. Naval LED marine light fittings (typically identified by the 'N' marking) according to DNV marine requirements. NVG, dimming, sensor integration and the remote control of functions are possible. MIL-tested products are also available.



BEST

MIL LED marine light fittings (typically identified by the 'N MIL' marking) and LED MIL systems in accordance with DNV marine requirements and MIL tests on EMC, Shock and Vibration, or products with specific MIL options. NVG, dimming, sensor integration and remote control of functions are possible.



The Glamox GOOD-BETTER-BEST product philosophy



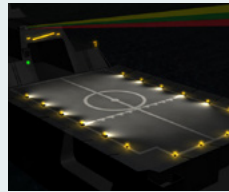
Glamox aims to be the first choice when quality, competence and reliability counts. With our technology and expertise in naval lighting solutions, including marine- and MIL-tested products and systems, we offer everything from a wide portfolio to project engineering and commissioning.

In order to always be able to offer the right product or system for your project, we have developed the Glamox GOOD-BETTER-BEST product philosophy, which is a product portfolio based on three types of specification and price levels.

All three categories (Good-Better-Best) include proven maritime products, but where there are differences in the material used and the technical solutions specified, we've placed them in different price and specification categories. By defining our product portfolio in this way, we've made sure that we can offer a complete range of products that fit with any type of project, regardless of whether it's a large frigate or a small SAR patrol boat.



Navigation lights
Top of the line Aqua Signal navigation light systems with the latest LED and NVG technology are MIL-tested and fulfil all requirements of IMO Anti-Collision Regulations and local regulations.



Helicopter Visual Landing Aid Systems (HVLAS)
LINKSrechts flexible modular design matching customised HVLAS requirements for all needs, all helicopter types and all operation modes



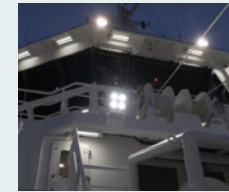
NVG-compatible lighting
Glamox provides NVG-compatible lighting for navigation lights, floodlights, technical lights as well as NVG mode for HVLAS to support helicopter operation during night time.



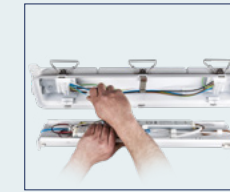
Searchlight systems
Glamox offers an extensive portfolio of searchlights that are capable of meeting very high expectations. The Luminell range includes various technologies, performance levels, and operational features to support your operations.



Floodlights
Stainless steel and seawater-resistant dimmable and NVG-compatible, MIL-tested floodlights with LED technology.



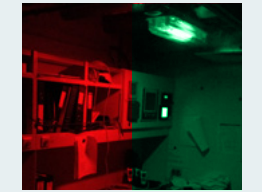
Technical Outdoor and Indoor Lighting
A complete range of MIL-tested LED lighting for marine applications. State-of-the-art LED lights for long lifetime, low power consumption and reduced maintenance.



LED kits
Glamox offers a complete navy range of LED upgrade kits that are fast and easy to install due to the tray concept. All mechanical parts, fixing and cable glands remain unchanged in the luminaire since the new LED kits are installed by removing the diffuser only.



Advanced Naval Lighting System (ANLS)
LINKSrechts turnkey lighting systems for all naval surface vessels. MIL-tested products, excellent performance, LED technology, and intelligent electronics successfully combined.



Night Adaption Lighting
Lighting solutions that efficiently support nighttime operational tasks are part of the Group's product portfolio.



Our lighting solutions

Advanced Submarine Lighting Systems (ASLS)
LINKSrechts LED lighting solutions designed to withstand the toughest submarine environmental requirements.



/ Navigation light systems

Complete lighting and control systems

Our range of navigation lights and navigation light control panels covers the complete range of applications for all types of naval vessels, including patrol boats down to 20 m, as well as NVG-compatible and MIL-tested navigation light systems for large naval ships with MIL standard requirements. In addition, we can also offer navigation lights for vessels below 20 m.

Glamox delivers complete navigation light systems for naval applications with a choice of two different Navigation light series that fulfil patrol boats as well as frigate requirements: NVG-compatible navigation lights for naval applications in our S66N(D) MIL and S76N(D) lights. In addition to our naval navigation lights, we can also offer navigation lights from our standard marine product range in products such as S60, S55 and S70(M). To control our navigation lights, we offer several options of navigation light controllers including the NL95, NL120N and NL121N.

Relevant products for this application

Marine navigation lights – GOOD (No NVG)



Series 55



Series 70



Series 70M

Naval Marine navigation lights – BETTER (NVG)



Series 76N



Series 76ND



Series 76N Arctic



Series 76ND Arctic

Naval MIL-tested navigation lights – BEST (NVG + MIL)



Series 66ND MIL



Series 66N MIL Arctic



Series 66ND MIL Arctic

Navigation light controllers

/ Helicopter Visual Landing Aid System (HVLAS)

A turnkey solution

The Helicopter Visual Landing Aid System (HVLAS) is a flexible modular design to provide the best illumination, optical references, and signal indication during helicopter operations on flight decks. The system can be customised to match all helicopter deck requirements, helicopter types and operating modes (NVG Stage III, HIFR, VERTREP, etc.), including LED glide path indicators, LED horizon reference systems, LED floodlights, as well as LED flight deck lighting.

The HVLAS System is a turnkey solution designed to meet the highest military standards for flight safety in maritime environments for naval use.

- Full integration of all components on a turnkey basis as part of our service and responsibility
- A visual landing aid system basically consists of a modular system made up of state-of-the-art components
- By combining floodlights and deck-edge lights in the same units, you can reduce the total number of luminaires you need, and thus achieve a lower total weight and cost of the lighting installation
- The modular system enables various configurations for different requests on naval and civil vessels
- A glide path Indicator that defines the approach and guides the helicopter towards the helicopter landing deck
- Luminaires designed to be undetectable by radars
- Night vision goggle-compatible





/ Searchlights

Single to fully integrated systems

A searchlight has many different purposes and can be supplied as a single unit for direct operation on a small vessel, or as a fully integrated system for larger ships. A common use of our searchlights is to integrate multiple searchlights into a system where both remote-controlled operation and automatic target tracking can be activated. This type of system is commonly used both onboard ships as well as to secure facilities or border areas on land.

Glamox offers a full range of searchlights, from signalling lights to direct and remote-operated searchlights. The product range includes models with HMI, and LED light sources, which can be supplied with single or dual light source modules, as well as variants with UV/IR filters and an integrated thermal IR camera. Operation is seamless and has unlimited manoeuvrability, the searchlights can be integrated and controlled from third party systems. A naval version with Morse capabilities and integration into the vessel's radar system for target tracking is also available.



/ Open deck lighting

As with all areas onboard a vessel, open deck applications have special requirements for installed equipment, regardless of whether the area supports a specific operation, such as lighting up walkways, embarkment, replenishment at sea, helicopter operation or rescue zones.

We offer a full range of marine as well as MIL-tested lights, in both seawater-resistant aluminium and stainless steel. We also offer fittings in aluminium/zinc-treated steel, but due to the salt content in the air, we recommend this type of fitting to only be used in interior areas.

Relevant products for this application:

- Floodlights, Bow lights and RAS lights
- Technical lights including lights for hazardous zones and emergency areas

/ Light Management Systems (LMS)

A complete lighting solution

A Light Management System (LMS) from Glamox is a complete lighting solution. You define what you need, and we connect lighting solutions based on your specific requirements.

Glamox offers a full range of systems, from basic dimming systems to fully automated turnkey systems with Human Centric Lighting (HCL) and advanced light control functions. We divide our systems into three categories based on their complexity and system features. Relevant solutions for this application:

- Systems with dimming
- Systems with dimming, integrated sensors, HCL functions, and control panels
- ANLS – Advanced Naval Lighting System for surface vessels (a MIL-tested system)



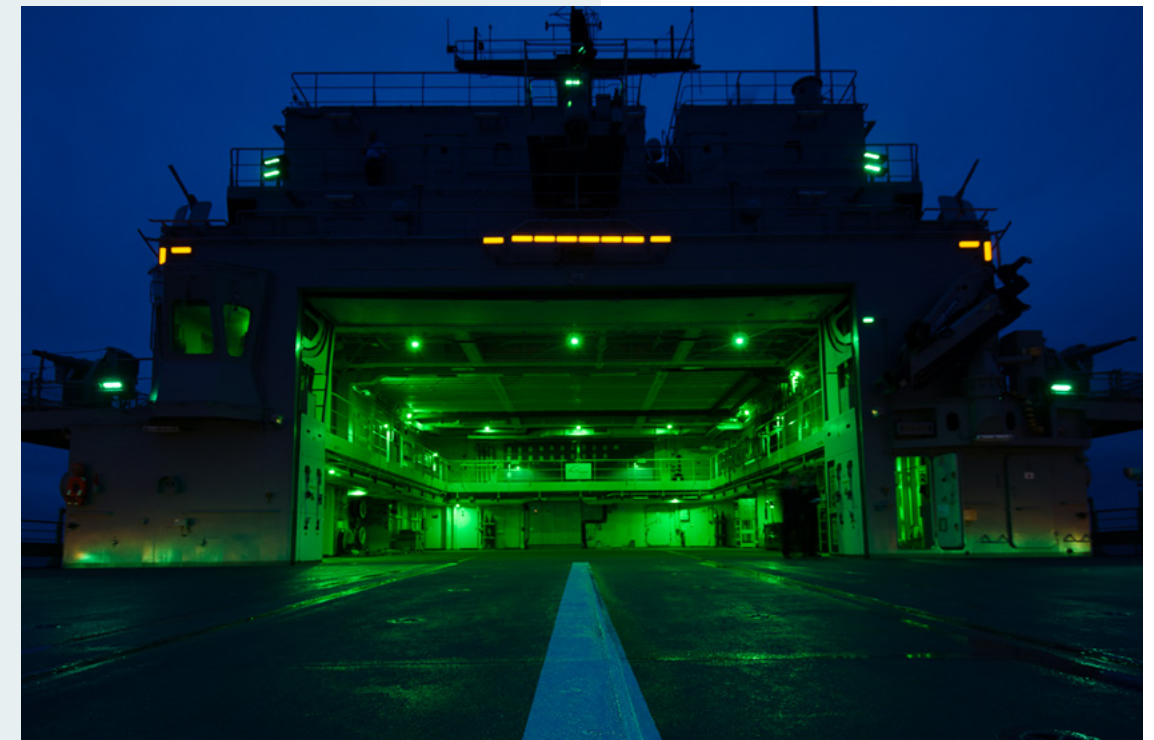
/ Advanced Naval Lighting Systems (ANLS)

A flexible modular system

The requirements for lighting systems on naval vessels are very different compared to lighting on land, and highly specific. The Advanced Naval Lighting Systems for surface vessels (ANLS) are an integrated lighting system solution that was specially designed for operation in naval working environments without natural light.

The ANLS typically consists of indoor and outdoor lighting, as well as signal and navigation lights. On a turnkey basis, the ANLS covers a complete lighting package from the stage of planning with the use of 3D lighting simulations, to engineering design, complete cable planning, and the supply of all required components of the entire lighting system, all the way up to start-up and beyond.

The modular approach of the ANLS can fit with the latest planning of a flexible and modular ship design concept. For each ship area, and with regard to the respective rooms' purposes and scenarios, a specific system is designed and the optimal luminaires and locations are selected and determined.





Next-level connectivity

The importance of sustainable lighting installations within the defence and security sector is widely acknowledged. A Glamox Light Management System (LMS) will allow you to optimise your use of light. Smart sensors and monitoring features allow you to increase energy savings and also extend the lighting installation's lifetime.

They also reduce maintenance costs as well as the carbon footprint. When focusing on

people's needs, lighting solutions can be tailored to accommodate different tasks and purposes, improve the wellbeing of occupants and compensate for lacking natural light.

An LMS system for naval applications can also be used as a silent communication system where lights are used for communicating with the crew.

You define. We connect

The benefits of a Glamox Light Management System

A light management system from Glamox is a great choice for saving energy, monitoring and reviewing your complex, large-scale installations, without setting foot on-site.



Lower life-cycle costs

Glamox Light Management System (LMS) are designed to reduce your energy consumption, maintenance costs and extend the lifetime of the installation.



Easy monitoring

Monitoring one or many offshore installations or vessels is made easy with features such as access to power consumption data, overviews of maintenance and usage data, and emergency functions on lighting installations - all within the reach of your fingertips.



A more productive working environment

Our Light Management Systems can improve people's lives by facilitating lighting overviews for adequate visibility. Furthermore, by implementing Human Centric Lighting solutions, you can improve the sleep, performance and general wellbeing of the people onboard.



Sustainable lighting design

Decrease your ecological footprint and increase your economic sustainability by considering product and system lifetimes, energy efficiency, and avoiding over-lighting (light pollution), which can affect surrounding vessels, installations, the ecosystem and human health.

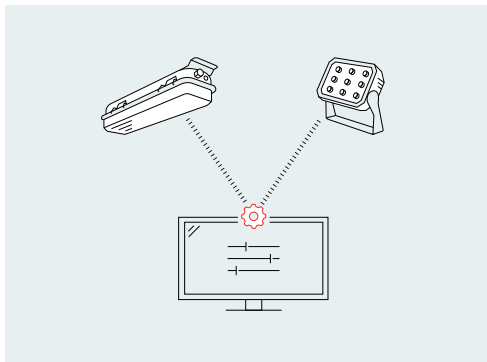
Light Management Systems

Our systems are based on wired or wireless technology and are easy to plan, install, commission, and use.



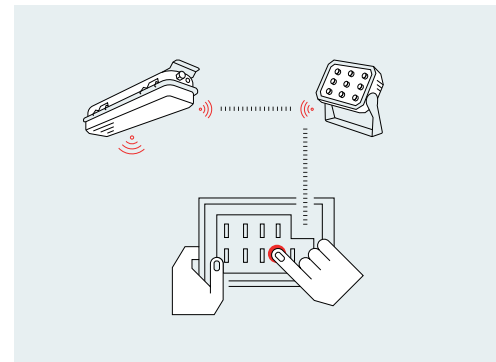
Glamox Connect

Glamox Connect is a cloud-based monitoring dashboard. It was created to manage your lighting installation with access to valuable data visualised in a user-friendly dashboard solution. With actionable insights, you can achieve significant savings.



Ethernet2Dali (E2D)

Create advanced LMS designs and custom user interfaces. E2D is a cabled LMS solution based on our own DALI-2 application controller called Vertex.



Glamox Wireless Radio

An easy-to-use, wireless LMS solution designed for central monitoring. A smart and easy way to connect the complete light installation.





The powerful effect of light

Human Centric Lighting (HCL)

All living beings have an "inner clock" called the circadian rhythm, and humans are no exception. In short, this means that we rise with the sun and go to sleep when it sets. The right light at the right time can influence everything from our sleep to how we feel and perform. That is why Human Centric Lighting (HCL) is beneficial for naval forces with shift and night work in the defence and security sector.

Humans are affected by light not only on a visual level, but also on a biological one. When installing a Human Centric Lighting solution (HCL), you reinforce your circadian rhythm, enhancing your cognitive skills and sense of wellbeing. It is also used to provide the ideal visual working conditions in challenging environments.



You sleep better

Improve your sleep quality by adjusting the hormone balance in your body. This is something everyone can benefit from, but it is especially important for people working night shifts.



You perform better

Glamox HCL can improve performance by enhancing the ability to concentrate, increasing alertness and reducing fatigue, which can lessen the number of errors made at work and, in turn, improve the safety of workers at sea.



You feel better

Users of Glamox HCL solutions report that they feel healthier, happier, and more energetic. This is because human-centric lighting stimulates the natural circadian rhythm, and hence improves your wellbeing.



Because each project is unique, we help you tailor the best approach and Human-Centric Lighting solution to your specific needs. Whether your goal is to keep the workforce focused and alert with cool white light or relaxed with warm dimmed light, or to help workers adjust their circadian rhythms by utilising the effect of melatonin suppression, we have extensive experience in tailoring HCL solutions in cooperation with our clients. In order to ensure that your installation will emit the right light at the right time, we will help you to choose the right luminaires, lighting design and control system that will allow you to automatically change the light settings in a light cycle designed specifically for your space and to achieve your lighting goals.

We can all agree that light affects us, and Human-Centric Lighting is a field of research in rapid development. For nearly 20 years, we have developed Human-Centric Lighting solutions based on the latest research and standards available. To further improve the knowledge of how light can influence people, we are collaborating with a number of external research institutions, and support and contribute to numerous studies.

It's all about creating light for a better life.

/ Sustainability at Glamox

Electric lighting powers our everyday lives. However, it's important to remember that it also accounts for 5% of the world's greenhouse gas emissions and contributes to as much as 15-20% of the world's electricity consumption*.

According to a study conducted by Visual Capitalist (link: <https://www.visualcapitalist.com/anatomy-smart-city/>), 19% of the world's total electricity consumption can be attributed to lighting, and the UN Environment Programme estimates that if these figures are not addressed immediately, that figure is expected to grow by 60% by the year 2030. The time to act is now.

At Glamox, we see it as our responsibility to create lighting solutions that improve the performance and wellbeing of people. We support the sustainability ambitions of our clients by delivering energy-efficient solutions – a key focus throughout Glamox's history. By upgrading existing light installations to efficient and smart luminaires and systems, you can reduce energy consumption by up to 90%.

* Sources

UN Environment Programme

<https://www.unep.org/resources/report/rapid-transition-energy-efficient-lighting-integrated-policy-approach>


U.S. Energy Information Administration

<https://www.eia.gov/tools/faqs/faq.php?id=99&t=3>

Prescriptive Data, Inc. <https://www.prescriptivedata.io/content/chart-of-the-day/lighting-in-cities-account-for-19-of-worlds-total-electricity-consumption>

Visual Capitalist

<https://www.visualcapitalist.com/anatomy-smart-city/>



Glamox has an ambitious goal to achieve net zero by 2030

Our contribution to drop Greenhouse gas emissions to net zero by 2030:

- Increasing circularity within the design and manufacturing processes
- Use of 100% renewable energy in all manufacturing plants
- Screening suppliers to evaluate environmental, social and governance policies
- Eliminating non-recyclable products from packaging
- Zero waste to landfills
- The most energy-efficient lighting solutions
- Long product lifetime through high quality
- Environmentally conscious material choices
- Upgradable, repairable and recyclable products
- Modularity

Investment analysis calculator

Our investment analysis calculator calculates the payback time when investing in an LED installation versus an installation with conventional light sources.

The payback time on your LED upgrade is calculated by sinking your LED upgrade investment costs through the annual savings on your operational costs. This calculation will then give you the payback time for your investment. Since the payback time varies based on the type of product chosen and the vessel specification, Glamox will calculate the exact payback time for each project.

The calculator also provides energy savings figures (in percentages) by choosing LED alternatives.



/ Be ready for the future: LED upgrades

As the move towards a greener future picks up pace, new regulations are pushing the entire shipping industry to act. By upgrading from conventional lighting to LEDs, you can achieve substantial energy savings, while simultaneously reducing carbon emissions, helping you meet the latest marine industry carbon reduction regulations.

Our solutions for the Navy and Coast Guard segment:

Aqua Signal LED Kits
1444 → 1445/1445N LED Kit
1445 → 1445/1445N LED Kit
1056 → 1056N LED Kit
1647 → 1647N LED Kit

Glamox LED Kits
MIR → MIR/MIRN LED Kit
MAX → MAX LED Kit

Downlights
1787 → 1788N LED
CASA → DL41

- LED kits can be installed in under two minutes
- 5 years warranty
- Fastest, safest and the most cost-effective way to upgrade your fluorescent luminaries



Selected references



Glamox has already delivered reams of lighting solutions ordered by navies worldwide. The following references will give an overview of some of our delivered lighting solutions.



Country	Ship class
Argentina	Patrol Vessel
Australia	Coast Guard Patrol Destroyer Frigate Landing Helicopter Dock Patrol Replenishment
Belgium	Mine Sweeper
Brazil	Patrol
Canada	Auxiliary Oil Replenishment Vessel Coast Guard Icebreaker Coast Guard OPV Frigate Maritime Coastal Defence, MCDV Midshore Patrol Vessel, MSPV Patrol Support
Colombia	Frigate Patrol Submarine
Denmark	Frigate Multi Role Patrol
Egypt	Corvette

Country	Ship class
Finland	Corvette Coast Guard
France	Air Craft Carrier Frigate Patrol
Germany	Bundespolizei Patrol Coast Guard Multipurpose Coast Guard Patrol Corvette Frigate Replenishment Submarine
Greece	Submarine Frigate
Italy	Coast Guard Frigate OPV Submarine
Israel	Patrol
Mexico	Corvette
Netherland	Mine Sweeper Supply Support Troop Transport
Norway	Coast Guard Frigate Missile Patrol Boat Signal Intelligence Submarine

Country	Ship class
Philippines	OPV
Portugal	Patrol Submarine
Qatar	Coast Guard
Singapore	Frigate Littoral Mission Vessel Missile Corvette Patrol Vessel Submarine
South Korea	Auxiliary Destroyer Frigate Helicopter Carrier Mine Layer Submarine Support
Spain	Air Craft Carrier Corvette Frigate Submarine
Sweden	Mine Hunter Navy Vessel Patrol Signal Intelligence
Thailand	Frigate Helicopter Carrier Patrol

Country	Ship class
Turkey	Corvette Tank Landing Craft Tank Landing Ship Landing Craft Mechanized Cadett Training Vessel Navy Supply Vessel Submarine
UAE	Corvette Patrol
United Kingdom	Air Craft Carrier Patrol Vessel Naval Support Ship Frigate Mine Sweeper Submarine
United States	Dry Cargo Ammunition Ship Replenishment US Coast Guard USN Barracks Barge USN Escort Tug USN Anchor Handling Tug Supply USCG Coastal Patrol Cutter Transport Barge

The Glamox Group

Glamox is a Norwegian industrial group that develops, manufactures and distributes professional lighting solutions for the global market. Our mission is to provide sustainable lighting solutions that improve the performance and wellbeing of people.

High performance and ease of use

Our solutions are designed to combine high performance and sustainability with simplicity and ease of use, offering a superior customer experience. We make smart use of the latest technology and supply it with generations of experience and true care for our customers and their people.

Quality brands and dedicated support

We offer our solutions through a range of quality lighting brands. Regardless of brand, the close follow-up of each customer is at the heart of our offering. Whether in a production facility, a fishing vessel or an office building, our ambition is to provide lighting that contributes to a better life for the businesses we serve and those who work there.

For more info, see www.glamox.com

