OPTONAVAL

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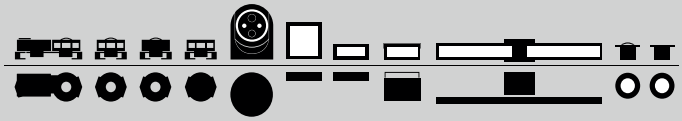
NAVAL
SOLUTIONS



HELICOPTER VISUAL LANDING AID SYSTEM

SAFE LANDINGS - PRECISION GUIDANCE, CLEAR VISION.

PURPOSE BUILT FOR **NAVAL** VESSELS

FOR **DAY & NIGHT OPERATIONS**

ADVANCED **CONTROL & MONITORING**

CUTTING-EDGE **LED-TECHNOLOGY**

OPTONAVAL

OPTONAVAL GmbH, headquartered in Hamburg — the heart of Germany's maritime industry — was founded by specialists in Helicopter Visual Landing Aid Systems. Driven by the vision of developing innovative and customised products that meet the highest standards in design and technology — specifically for naval applications.

As a leading expert in helicopter operations, OPTONAVAL supports its customers from the initial engineering, to the project implementation and final acceptance, to ensure safe helicopter operations with equipment that meet the latest and highest MIL- and NATO-standards.

Beyond lighting solutions, OPTONAVAL offers integrated data and communication packages to ensure total helideck control for seamless operations.

COMPLIANT AND INNOVATIVE DESIGN

EXPERT
Market leading naval solutions for offshore landing with NATO-Standard, ICAO and CAP 437 compliance

INNOVATIONS
Advanced control and monitoring

DAY & NIGHT
NVIS expertise for enhanced night operations

SYSTEM DESIGN
Cutting-edge LED technology

SERVICE AND REFITS
Customised, low maintenance solutions and quick actions

SINGLE-SOURCE SOLUTION

FULL **RESPONSIBILITY**
INNOVATIVE QUALITY
DEDICATED **SUPPORT**

OVERALL SYSTEM RESPONSIBILITY

OPTONAVAL takes full responsibility for the HVLAS on board. Engineering, production and commissioning remains in one hand.

MATCHING QUALITY AND INNOVATION

Each individual OPTONAVAL product meets the highest demands in quality and function. Built with the latest LED technology, revolutionary sensor and control systems.

MODERNISATIONS AND REFITS

Upgrades of Naval Vessels are facilitated by using OPTONAVAL's modular equipment. Flexible integration with design tailored to customer standards.

DEDICATED TO CUSTOMER SUPPORT

Comprehensive ILS package on hand. Further on, OPTONAVAL experts are available to analyse and solve any problem. Prepared to assist remotely or on board whenever needed.

MONITORING

HELICOPTER OPERATIONS

2

CONTROL & MONITORING SYSTEM

SURVEILLANCE | SUPPORT | SYSTEM INTEGRATION

The OPTONAVAL software interface, developed by the company‘s in-house engineers, enhances the user-experience and safe operation of its Helicopter Visual Landing Aid System. In addition to its intuitive design and basic functionality, the application offers customisable modules with numerous features tailored specifically for Naval Vessels.

INTUITIVE GRAPHICAL USER INTERFACE

Easy to operate, co-designed by naval helicopter pilots

SHIP HELICOPTER OPERATION LIMITS

SHOL and weather data can be implemented, enabling safe and smooth operations with ships and helicopters

SERVICE MODULES

Integration of peripheral helideck service components with a well-organised modular structure

MAINTENANCE

Condition monitoring for predictive maintenance and tracking of maintenance history

SECURITY

Fully independent closed system with interfaces only when necessary — ensuring maximum security

PROVEN DESIGN
BUILT TO ENDURE

DESIGN DRIVEN BY FUNCTION

- Cutting-edge LED technology, dimmable in over 65k steps
- Equipped with health monitoring sensors, to minimise maintenance
- Certified products according to military standards
- Withstanding harshest conditions
- Smart weight saving cabling
- Able to operate with Night Vision Goggles
- Customisation to all special requirements
- In use on various naval vessels around the world, NATO and non-NATO

GLIDE PATH INDICATOR

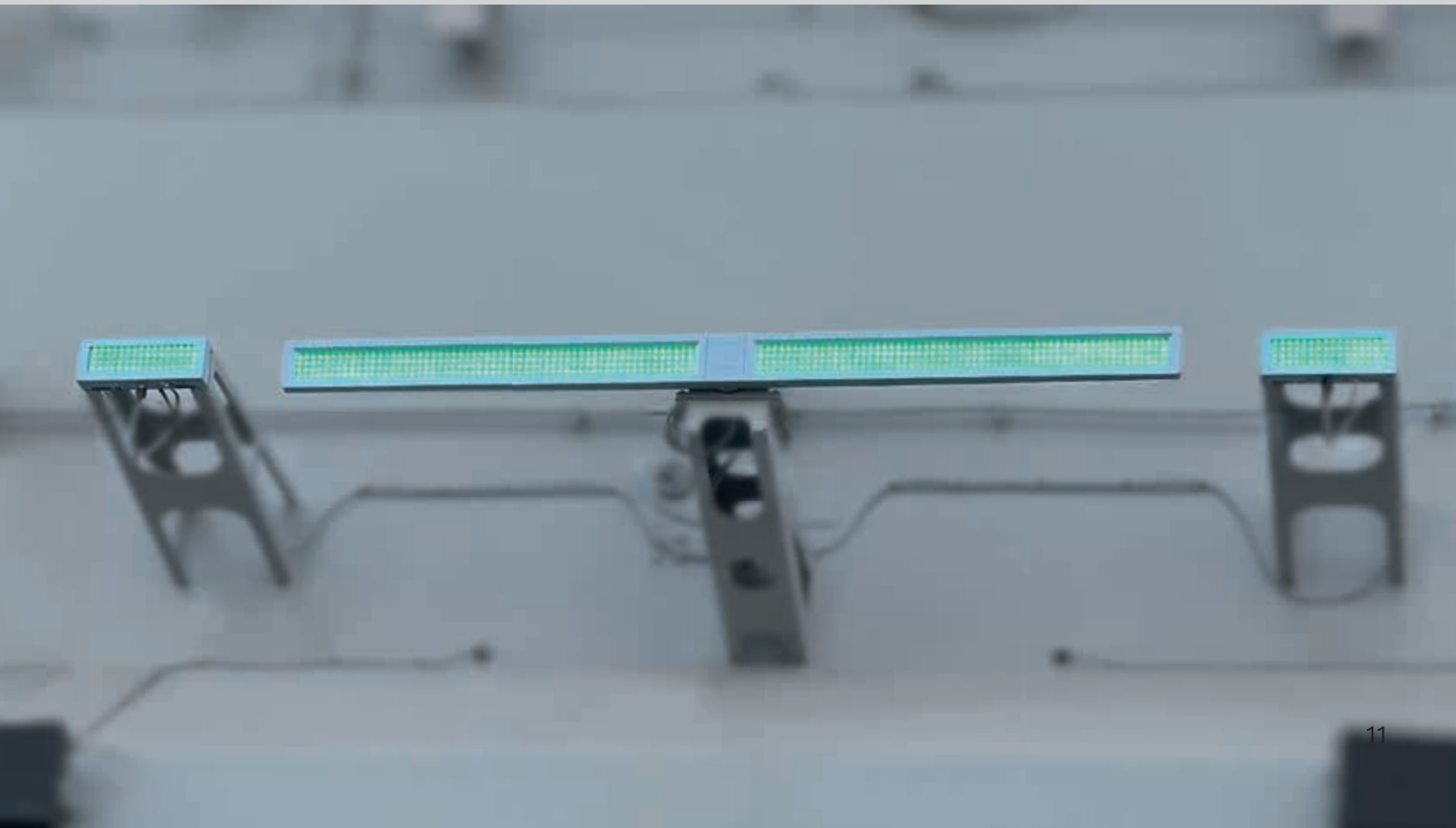
SAFE GUIDANCE | SELF CALIBRATED

- Motion-stabilised glide path according to STANAG 1236
- Guiding the pilot from up to 5 NM distance, showing the right angle of approach
- Two redundant light projection units and two integrated inertial measurement units
- Adjusting the vertical axis up to 180° to the direction of approach
- Roll and pitch stabilisation up to ±45°
- Self-aligned, no interface to ship’s gyro
- Design focus on lowest maintenance
- NVD-FYGR SGSI type

HORIZON REFERENCE SYSTEM

MOTION STABILISED ASSISTANCE

- Providing roll motion information to the pilot
- Oscillating bar with fixed reference lights
- Stabilised by powerful actuator and own inertial measurement unit
- Self-aligned, no interface to ship’s gyro
- Counteracts ship’s roll motions of up to ±30°
- LED-matrix can be combined with wave-off alarms



COMBINED FLOOD, DECK EDGE & SERVICE LIGHT

VARIOUS FUNCTIONS | ONE HOUSING | UNIQUE DESIGN

- Deck edge lights and full deck lighting in one unit
- Evenly and clearly illuminated deck, dazzle-free for the pilot
- One component for multiple applications, e.g. also as T-Line Light and Service Light
- Low maintenance, reducing ILS effort
- Deckfinder™ can be integrated for guidance of unmanned aircrafts

DECK FLOOD | DECK EDGE | HELICOPTER SERVICE | HANGAR WASH | LINE **LIGHT**

UNIVERSAL INDICATOR LIGHT

MULTIPLE PURPOSES | STANDARDISED ENGINEERING

- Various applications packed in an identical housing
- Light colour, intensity and flash rates adapted to the purpose
- Reducing spare parts and ILS effort
- Reliable and durable

OBSTRUCTION | WAVE-OFF | HOMING BEACON | VERTREP | HIFR **LIGHT**

FLUSH SOLUTIONS

SEAMLESSLY INTEGRATED | REFINED AMBIENCE

- Incorporated sensors in each component
- Edge lighting and full deck illumination in one integrated solution
- Uniform and glare-free light field for safe pilot operations
- Flexible functionality
  - Deck Edge Light — from abt. 0° or 45° (horizontal) upwards
  - Line-Up Light — VERTREP Solution
- Low-maintenance design reduces inspection and service effort

DECK EDGE | LINE UP | VERTREP | LINE **LIGHT**

SERVICE & MATRIX LIGHTS

EXCELLENT ILLUMINATION | CLEAR SIGNAL COMMUNICATION

- Compact and adaptable installation on hull, hangar or superstructure
- Available with symbols or custom configurations for versatile communication
- Supporting crew operations day and night, in all weather conditions
- Designed for harsh maritime conditions — durable and resistant
- Easy integration into complete deck lighting systems

STOP & GO | HANGAR CONTOUR | WASH FLOOD | OVERHEAD FLOOD **LIGHT**

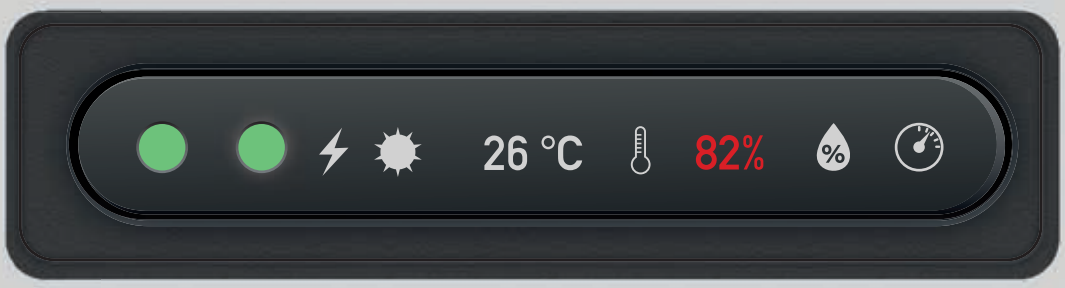
HEALTH **MONITORING**

Reliable performance begins with knowing the condition of the system. Optonaval's integrated health monitoring technology provides continuous insight into each lighting component.

Built-in sensors track key parameters and detect early signs of degradation in realtime before failures occur. This enables maintenance teams to act only when necessary, making servicing smarter, more targeted, and less disruptive.

Condition-based servicing reduces downtime, extends component life, and delivers substantial savings by cutting costs, effort, and complexity across the system lifecycle.

System status and alerts can also interface with existing onboard infrastructure — ensuring seamless integration into ship-wide diagnostic or alarm systems. This intelligent monitoring reflects Optonaval's design philosophy: Lighting systems that are robust, high-performing, and efficient to operate and maintain.



NVIS CAPABILITIES

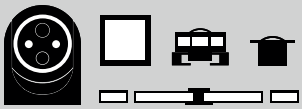
Night vision compatibility is essential for operations in low-light or covert environments. Optonaval's dual-mode lighting system seamlessly switches between standard and NVG-compatible modes, ensuring adaptability across mission profiles.

Meeting stringent military standards, the lights deliver reliable performance without compromising night vision. NVG-friendly design minimises visible light interference and preserves equipment integrity.

All components are tested in Optonaval's in-house light laboratory, where each LED is assessed for spectrum, intensity, and beam uniformity. This ensures compliance with NVIS requirements and optimises optical output — reducing blooming, glare, or spectral overlap.

Designed for system-level integration, Optonaval's lights work seamlessly with cockpit, bridge, and control environments. An intuitive control panel enables fast, reliable mode switching, giving operators full control without distraction.

The result: A lighting solution that not only meets the standards on paper but performs flawlessly in the field.



STANDARDS & TESTS

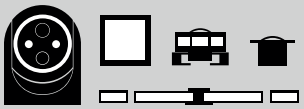
Optonaval's systems are designed and tested in accordance with demanding naval and maritime standards. This ensures reliable performance in the harshest sea conditions during critical flight deck operations.

KEY QUALIFICATIONS

- **Shock resistance:** BV0230 class B calculated 90 G min. to 296 G max.
- **Electromagnetic compatibility:** Acc. to MIL-STD-461G, IEC 60533
- **Vibration:** Acc. to MIL-STD-810H
- **Environmental protection:** IEC 60529 (IP56–67), operating under -32 °C to +49 °C
- **Electrical installations:** IEC 60092 series

ALIGNED WITH NATIONAL & INTERNATIONAL REGULATIONS

- **HOSTAC** (Helicopter Operations from Ships other than Aircraft Carriers)
- **ICAO**, **CAP 437**
- **NATO STANAGs** (e.g. 1236, 1445, 4370)
- **NATO MPP** (Minimum Performance Parameters)
- **DMS 4900-1**



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