MSM Offshore Wind Farm Solutions
Mediterráneo Señales Marítimas (MSM) introduces its wide range of products especially designed to mark Offshore Wind Farms, both temporarily (during their construction) and permanently.

Highly-resistant even in the harshest marine conditions and easy to install, those products comply with the applicable standards and requirements, while guaranteeing a high availability and reliability.

Each set of equipment installed on the turbines or platforms consists of several elements connected to one another to configure an aids-to-navigation network, which is monitored and controlled by a global system for the wind farm as a whole.
Marine AtoN and Lighting Equipment

MSM offers one of the largest ranges of Aids to Navigation products (AtoN) especially designed for both TEMPORARY MARKING during the construction phase and PERMANENT MARKING in Offshore Wind Farms. Our products are developed based on the IALA Recommendations resist the harshest environmental conditions, and include both self-contained equipment and equipment to be connected to an external power supply.

In addition to our standard AtoN range, our team of engineers is specialised in the custom design and calculation of signalling system solutions, based on our customers’ requirements as well as the particular features of the location, and in compliance with the applicable legislation; always offering the best solution.
Aviation Obstruction Lights

We propose specific obstruction lights for their installation on wind turbines, all with ICAO and FAA certificates. Those devices are designed for low and medium intensity lighting, based on state-of-the-art LED technology and with a low energy consumption. They are prepared to be synchronised and monitored via GPS-GSM. Our equipment can be supplied with self-contained power systems or with external power supply. MSM’s range also includes a special obstruction light for the safety of hoist operations, i.e. our HELIHOIST Status Light. We can study the solution that is best adapted to each project.

Control and Monitoring Systems

Currently, MSM is the AtoN manufacturer with the greatest offer in the field of monitoring and control. We provide solutions for all existing types of communications: Radio, Satellite, GSM/GPRS, GPS, AIS, Wi-Fi, ADSL, etc. As a complement, we have applications for the identification, supervision and control of wind platforms.

Our Global Netcom Offshore software is a multi-centre control that allows to easily obtain data and interact with remote stations installed in offshore wind platforms, displaying the information in a clear way on a computer screen.

This control centre can be located on a server in the client’s facilities if desired, or on a general server shared by several clients. Thanks to its web-based design, the client only needs an Internet connection to monitor the beacon system.

In addition, we offer a complementary application, called VeTraSur (Vessel Traffic Surveillance Software for Wind Farm), developed entirely by MSM to create alerts and to control the maritime traffic. With this software, our clients can set up warnings for restricted areas of navigation, record collisions identifying the vessels involved, and prevent possible incidents, thus increasing the safety both in the wind farm perimeter and in the general area itself.

Other optional Equipment

MSM offers equipment that complements the beaconing of Offshore Wind Farms including: sound navaids, such as our foghorn and our visibility sensor, sonar transponders, radar systems, monitoring and recording systems with IP cameras integrated in a closed circuit, etc. All this can be completed with monitoring and control units (BUS / IP systems).
Standards and Recommendations

As an Industrial Member of IALA, MSM designs and manufactures all our equipment in accordance with the Recommendations of that organisation. Moreover, our equipment for offshore beaconing has been made taking into account the international regulations of the different countries where this kind of installations are susceptible to be located. Therefore, we offer different beacon alternatives, as well as the possibility, as manufacturers, to customise the required equipment.
Marine AtoN and Lighting Equipment

Permanent Marking

**MBL 160-WF-2**
LED marine flashing lantern with a nominal 2 nm range to mark IPS, providing a great optical efficiency with a low consumption.

**MBL 160-WF-5**
LED marine flashing lantern with a nominal 5 nm range to mark SPS, based on an innovative lens system to obtain the maximum luminous output.

**MBL 400-LD-WF**
LED marine flashing lantern with a nominal 10 nm range, with a great optical efficiency and low consumption, for marking of Isolated WTG, Meteorological Masts and other Individual Structures.

**MSN-10-WF**
The MSM foghorn model MSN-10-WF automatically provides a 360° beam of sound in the horizontal plane, specifically designed to be installed in places with thick fog or in off-shore platforms. Designed as an aid to navigation, it provides an audible range over 2 nautical miles.

**MVS-10-WF**
Visibility sensor designed for general meteorological applications where accurate and reliable visibility measurements are required.

**RBM-3-WF**
The RBM-3 is a latest-generation (frequency-agile) Radar Beacon, which works in the marine X and S radar bands.

**MTA**
The MTA unit is an AIS AtoN transponder device housed in a IP 67 watertight box, providing automatic information on the GPS position of the marine Aid to Navigation.
**Lighting**

**MBL 160-BL-WF**
Boat landing light providing the required safety illumination in landing situations.

**MBL 160-ID-WF**
Flood light fitted with high-intensity LED diodes. Designed to illuminate the identification panel of wind turbines.

**MBL 160-HL-WF**
Heli light fitted with LED diodes using the latest technology to obtain great efficiency. Designed for lighting helicopter corridors.

**MBL 160-HL-WF**
Marking Sign Set, designed for the easy ID marking of offshore wind turbines at night.

**Temporary Solutions**

**MCL 250-WF**
LED marine flashing self-contained lantern for temporary marking applications.

**MSK 160-WF**
Solar kit, conceived to hold a LED marine lantern together with its own solar power supply system in a compact and self-powered array for temporary marking applications.

**EBM 15/30-WF**
Elastomer Buoys are particularly designed for both sheltered and open-sea waters, since they are available in diameters from 1.5 to 3 metres, able to hold heavy moorings. Ideal for temporary beaconing of off-shore wind farms, and to mark the exclusion zone.
Aviation Obstruction Lights

MI Light-WF
Medium Intensity Obstruction Light, with extremely reliable and stabilised light output. It can be adjustable to the specific country requirements (ICAO, CAP 168, BMVBM, CASA, etc.)

HL-WF
Helihoist Status Light located on the nacelle to indicate to pilots the safety status of the wind turbine before any hoist operation.

LI Light-WF
Low-Intensity Tower Light, with extremely reliable and stabilised light output. It can be adjustable to the specific country requirements (ICAO, CAP 168, BMVBM, CASA, etc.)

LI 85-SK-WF
Solar Low-Intensity Tower Obstruction Light Kit. It includes battery and cabinet, solar panel, charge regulator, cables, and obstacle light. Designed to give years of maintenance-free operating time.
Control and Monitoring Systems

**MFGPS**
Position and synchronisation module, it is a device with double function. On the one hand, it is used to determine the buoy positioning and, on the other hand, to synchronise lanterns through a 12-channel GPS receiver.

**MMB 02**
The MMB 02 daughter board is a universal device especially designed for aids-to-navigation equipment monitoring. Due to its versatility, it is ideal for offshore platforms, since all the navaids can be controlled by it.

**GLOBAL NETCOM OFFSHORE**
Remote Monitoring Multicentre provides an easy way to obtain information and interacts with the different remote stations, displaying clearly the data on a computer screen.

**MFAIS**
AIS AtoN transponder devices integrated inside our LED lanterns provide automatic information on the GPS position of the marine navaid.

**MPRO GPS 2000**
Active receiving antenna for the 1575 MHz NAVSTAR GPS Satellite Navigational System for Maritime and Land-mobile use. It is especially designed as the perfect complement of the MFGPS Position and Synchronisation Module.

**VeTraSur**
Vessel Traffic Survey Software to create alerts in restricted areas of navigation, record collisions identifying the vessels, and prevent possible incidents.

**Control Panel**
MSM Control Panel is ready to manage all the functionalities by groups of lighting or of the system as a whole. It can be custom-made adapted to each specification and prepared for remote monitoring.
Other Optional Equipment

MSIC-WF
An IP surveillance camera with embedded image management software, multi-camera recording management, alarm motion detection, etc. Fitted inside our lantern housing, thus providing an IP 68 watertightness degree.

ST-WF
Sonar Transponder for use in offshore wind farms, in order to avoid the collision of a submarine with a pylon.

RADAR
Radar solution that provides all required information for a safety area.
Standards and Recommendations

MSM’s range has been developed based on the IALA Recommendation O-139 on The Marking of Man-Made Offshore Structures, Edition 2 of December 2013.

According to this Recommendation, Isolated Wind Turbine Generator (WTG) or other individual structures (such as meteorological mast or offshore transformer/substation) should be marked with white flashing lights (FL Mo (U) W ≤15s) with a range of 10 nm. For floating structures, it is recommended to consider a larger vertical divergence to maximise visibility.

For groups of structures, Offshore Wind Farms (OWF), the marking should distinguish between Significant Peripheral Structures (SPS), defined as significant points at the periphery of the OWF with a distance between them not exceeding 3 nm, and Intermediate Peripheral Structures (IPS) selected on the periphery of the OWF. The distance between IPSs or the nearest SPS should not exceed 2 nm.

- SPS should be marked with flashing yellow lights with a range of 5 nm, with a Special Mark flash character, and with synchronisation (recommended).
- IPS should be marked with flashing yellow lights with a range of 2 nm, and with a different flash character than SPS.

The lights should be visible from all directions; therefore at least three lanterns should be installed on each structure to be marked to ensure a 360° coverage. In addition to the lights, other AtoNs should be considered, including:

- Fog horn and detector with a minimum range of 2 nm, if required due to the visibility, topography and vessel traffic in the area of the OWF,
- Racon when it is required to identify a particular structure,
- AIS AtoN to enhance the system and provide more safety for maritime traffic.

Additionally, buoys or beacons may be placed for temporary beaconing during the construction and decommissioning of OWF, or permanently to define a specific perimeter, channels through a group of structures, etc. Finally, for more practicality, remote monitoring of the whole system should be considered.

As well as IALA, determining the appropriate system should be done in accordance with local competent authorities. MSM is available to study specific projects and prepare a custom-made solution for every case.

Sample of beaconing a wind farm according to the IALA Recommendation O-139