

DIODON HP30 - A MICRO-UAS FOR MARITIME & NAVAL OPERATIONS

GENERAL PRESENTATION OF THE DIODON HP30 DRONE SYSTEM

The DIODON HP30 is a 2-kg semi-rigid aerial drone natively conceived for maritime and aquatic environments. Built with the feedback from marine special forces and first responders, it is 100% waterproof and may be integrated from Rigid-Hull Inflatable Boats to patrol vessels to provide day and night ISR capabilities to improve situational awareness.



FIGURE 1 - DIODON HP30 PICTURE

Equipped with top of the range EO/IR sensors and thanks to its unique maritime capabilities, the DIODON HP30 enables embarked teams to make the best tactical choices, always. As an easy and robust optronics ISR tactical system, it is adapted to a large range of operations at sea, on the coastline, in harbours, as well as internal waters and flooded areas.



FIGURE 2 - DIODON HP30 DEPLOYMENT FROM A RESCUE BOAT



FIGURE 3 - EO DIODON HP30 EMBARKED IMAGE IN A SHORELINE SEARCH AND RESCUE OPERATION



FIGURE 4 - THERMAL DIODON HP30 EMBARKED IMAGE OF A PATROL BOAT

The system is deployable in stand-alone or may be further integrated in ships' Command & Control systems to reduce cognitive load during operations. Discover the DIODON HP30 in a NARCOPS scenario: <https://youtu.be/Jb69qQLUbXc>.

Freeing the operator from "drone in the water" preoccupations, the amphibious nature of the system opens the door to new tactical schemes and the development of bespoke capabilities¹.

¹ Like is the case for Submarine Launched Unmanned Aerial Systems: https://youtu.be/yjpiiX_Ah_8

UNIQUE OPERATIONAL CAPABILITIES OF THE DIODON HP30 SYSTEM

The DIODON HP30 system is a quadrotor microdrone (<2 kg) natively conceived to meet the harsh and demanding deployment capabilities required for the use in maritime and aquatic environments (high-seas, coastal areas, rivers, lakes, water reserves, flooded areas ...).



FIGURE 5 - DIODON HP30 MODELISATION

Its nominal high-definition day/night payload integrates a 640x512 thermal sensor (highest resolution available for this size of drones), enabling the drone to provide unparalleled added-value, even during low-light or night-time operation.

The system (drone, ground control station, piloting interface & maintenance equipment) was designed in direct relation with maritime operators, to ensure operational relevance and various uses at sea that traditional land-air UAV of this category cannot offer. Thus, the drone:

- Is 100% waterproof and resistant to submersion: wave, flip, voluntary or involuntary immersion, ...
- Takes off and lands on water thanks to its architecture and positive buoyancy
- Is robust to chocs for use in demanding environments thanks to its semi-rigid arms with pneumatic compartment, its carbon/kevlar structure and its military-grade connectors
- May be carried and deployed at sea, notably from small boats and from a backpack, allowing a quick and easy deployment and mission reconfiguration (waterproof external battery changeable under extreme weather conditions in a few seconds)
- May be operated by day as by night
- Is piloted by a waterproof Ground Control Station, resistant to chocs, and whose ergonomics and piloting interface are adapted to small boats and harsh terrains.

From a small boat, the DIODON HP30 is deployable by dropping it in the water and may be recovered by hand or by a navy hook alongside the gunnels of the boat. Should the boat be offering an elementary landing surface, the drone resists to harsh landings (thanks to the structure acting as a bumper).

The assurance on operational effectiveness in the different stages - take-off, flight, return to launch, return to operator/ship, return to designated coordinates, landing ... - is guaranteed by a specifically navalized embarked software.

For instance, should the drone end-up flipped upside down by a wave during the deployment phase, the drone will automatically analyse/detect its situation and initiate a procedure using its propulsion to flip back into take-off position: <https://youtu.be/uWr0BjSuuHM>.

Compared to its land-air equivalents, the DIODON HP30 has an advantageous signature and audio signature, thanks to its unique structure absorbing part of the rotor vibrations.

The upkeep of the system after every use is extremely simple and limited: rinsing with fresh water, external lubrication of the rotors. The same goes for maintenance operations, such as changing the propulsion groups, replacing the innertubes/arms, that may be done by the operator on the field in a few minutes thanks to the "lego" structure.

The ground control station and its mission system are conceived for a deployment from a small boat. Waterproof, resistant to pressure, key functions of the controller are designed for the use-case (robust use with gloves, ...). If needed, the day/night video feed may be broadcasted by wire connection on the controller's main case. Likewise, the antennas may be deported to provide visibility inside the wheelhouse.



FIGURE 6 - DIODON GCS MK.2 WATERPROOF CONTROLLER



FIGURE 7 - DIODON HYSTRIX PILOTING INTERFACE

Thanks to its maritime capabilities and characteristics, the DIODON HP30 is an easy and robust optronics detection & surveillance tactical system adapted to a large range of operations at sea, on the coastline, in harbours, as well as internal waters and flooded areas.

Its operational frameworks are the following:

- ISR during surveillance and control operation relative to government activities at sea and in coastal areas,
- ISR for sea-to-shore operations,
- ISR support for specialised boarding teams,
- ISR for emergency relief at sea or on land,
- ISR during pollution response operations,
- Rapid ISR for assistance to ships in distress.

Its amphibious nature also opens the door to new tactical schemes (mobile/fix observation point on the coastline, use as a dead sensor, ...). More generally, it totally frees from "drone in the water" preoccupations, with all the relative effects on training or use in complex disturbed environments (weather uncertainty, electromagnetic fields, ...). <https://youtu.be/sprqLNN2Vxg>.



FIGURE 8 - PICTURE OF THE DIODON HP30 FLOATING WAITING FOR TAKE-OFF

DIODON HP30'S MAIN SPECIFICATIONS

Autonomy	30 minutes
Range	2 nautical miles (~4 km)
Sensor	EO/IR (640x512)
Setup time	60 seconds
Environment conditions of use	Sea state 4; 25 knots of wind (Beaufort 6 - up to Beaufort 7 in wind gusts)
Waterproof level	IP56 (drone) - IP67 (controller)
Buoyancy	Positive, semi-rigid structure
Temperature range	-5° C to +40° C
Weight	1,995 Kg
Dimensions flight-ready	500 x 600 x 200 mm
Dimensions folded	240 x 380 x 120 mm
Safety	No data stored on the drone/up to AES 256 encryption.
Manufacturing	Made in France - no critical Chinese components integrated.