



## Floating Meteorological Mast

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### Summary

The floating meteorological mast is a floating spar buoy-type structure developed in order to monitor the environmental variables in deep water locations. Main actions over the structure are aerodynamic and hydrodynamic forces. Stability is a critical aspect of the structure, the design is performed by means of theoretical models, finite elements, CFD and laboratory tests with scaled models. Up to now three prototypes have been designed and developed, and are currently operative. Third prototype is nowadays under certification process in order to be completely commercial.

**Keywords:** Spar; buoy; floating; mast; meteorological; metmast; idermar; meteo.

### 1. Introduction

The structure consists of a floating substructure that holds a meteorological mast, which allows the characterization of the marine wind resource through an exhaustive measurement of the different physical variables involved (wind speed, wind direction, temperature, atmospheric pressure, etc.). The system is completed with devices that allow the remote control of both data monitoring and system security. The power needed to keep all this equipment working is generated at the floating structure itself, giving it an energetic self-autonomy.

### 2. Structure description

The structure scheme is a spar buoy one. The main structure is a steel tapered cylinder attached to three anchors. It includes three catenary-type moorings distributed in a 120° scheme and attached to

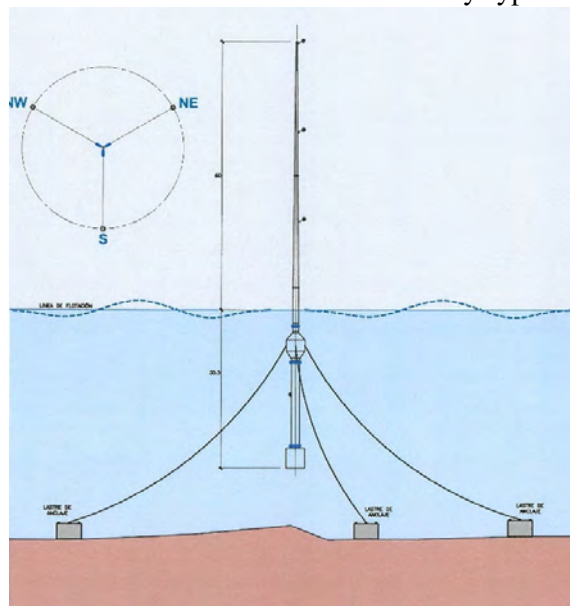


Fig. 1: Structural scheme.

the submerged anchors. The anchors are basically concrete cubes enough weighted to hold the structure in position against wind, waves, current and tidal loading. The length of the moorings varies between 150 and 450 m depending on the prototype, environment conditions and location. Below the water line and close to it resides the major body (floater). Its function is to supply the buoyancy force over the center of gravity in order to provide the whole structure with the necessary stability.

The “ballast” body is a cylinder situated at the bottom of the structure. Its objective is to act as a counterweight to the buoyancy force. The ballast body is usually filled with sand. Floater and ballast are joined by means of a cylindrical body called “shaft” which can be partially filled with air or water, thus permitting the regulation of the net buoyancy force and floating level of the structure.

Over the floater we can find the so called “upper