MOLIT: a new buoy for monitoring coastal waters from surface to sea bottom.

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The general awareness of environmental problems, especially in coastal waters, requires a reinforcement of the monitoring. The littoral and estuaries present a challenge to water quality management. The development of the automated measuring stations constitutes one of the major instruments in the installation and the extension of the coastal monitoring networks. It is a component working in a very demanding environment. Ensuring a continuous service, the buoys must withstand the extreme efforts and the accumulation of fatigue.

The coastal waters are stratified; that means water quality must be sampled from the surface to the sea bottom. In this very demanding environment, with large tide in shallow waters, strong currents, breaking waves, a new type of buoy and mooring has been designed and tested. The quality of the data and the cost of the maintenance have been investigated.

This buoy can be towed (or retrieved) on site by means of a local boat of convenience. It is moored by means of an umbilical. Any kind of sensor can be connected on an automated flow through system. Some sensors can be kept under water, especially chemical sensors which use reagents. The design of the buoy has been modified in order to facilitate the maintenance operation on board which is compulsory to an operational system.

In this context, the connection between the bottom and the buoy (the mooring line) become an essential component of which the behaviour and reliability must be without failure.

Intensive numerical simulations, and laboratory tests have been done to qualified the design of the umbilical. The behaviour of the buoy has been measured in wave tank. The umbilical is a bundle of hoses and electric cables protected by a polyurethane sheath. We can now offer a qualified solution to monitor water at any points from surface to sea bottom.

As the water is pumped on the buoy in a system protected from the environment (and against the bio fouling) a large number of parameters can be monitored continuously. The umbilical combine the following functions; mooring line, transportation of the water toward the sensors in the buoy, and electrical connection of the sensors fitted along the anchoring line. All the anchoring, the maintenance and the service operations have been reviewed in order to decrease the overall cost. The buoy can be connected to internet through mobile phone. Under remote control, this new infrastructure can be used to test in real environment any kind of sensors or instruments.