

# CALHYB: Design of a Lidar / Hyperspectral light aerial system for hydrographic mapping from UAV

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A new system for mapping the shallow water zone, called CALHYB and co-funded by the French MoD, is currently being developed by a consortium of organizations including Hytech-imaging, ENSTA Bretagne, and Lumibird. CALHYB is designed to be integrated on a UAV. The system will be based on a coupling between i) a passive hyperspectral imager sensor making it possible to produce bathymetry and bottom nature maps by inverting the radiative transfer model in the water column; ii) a bathymetric laser profiler making it possible to locally calibrate the bathymetric maps derived from the hyperspectral imager; and iii) an incident light sensor to provide robustness to lighting conditions.

The project should make it possible to overcome the identified limits of the operational use of AHB (Airborne Hyperspectral Bathymetry), thanks to the joint use of a laser profiler in the green, while maintaining the system compact enough to allow its integration on a UAV.

The main innovation lies in the coupling between an active sensor producing a low density of bathymetric measurements with high precision, and particularly without bias, with a passive hyperspectral sensor producing a high spatial density of bathymetric measurements with high relative precision but which can locally present bias. The latest technological developments in terms of the compactness of these two types of sensors should also make it possible to create the first coupled sensor of this type that can be integrated into an aerial drone.

The CALHYB system targets dual applications: REA (Rapid Environment Assessment) function in coastal areas for Defense applications, hydrographic and environmental mapping in the civil field.

