

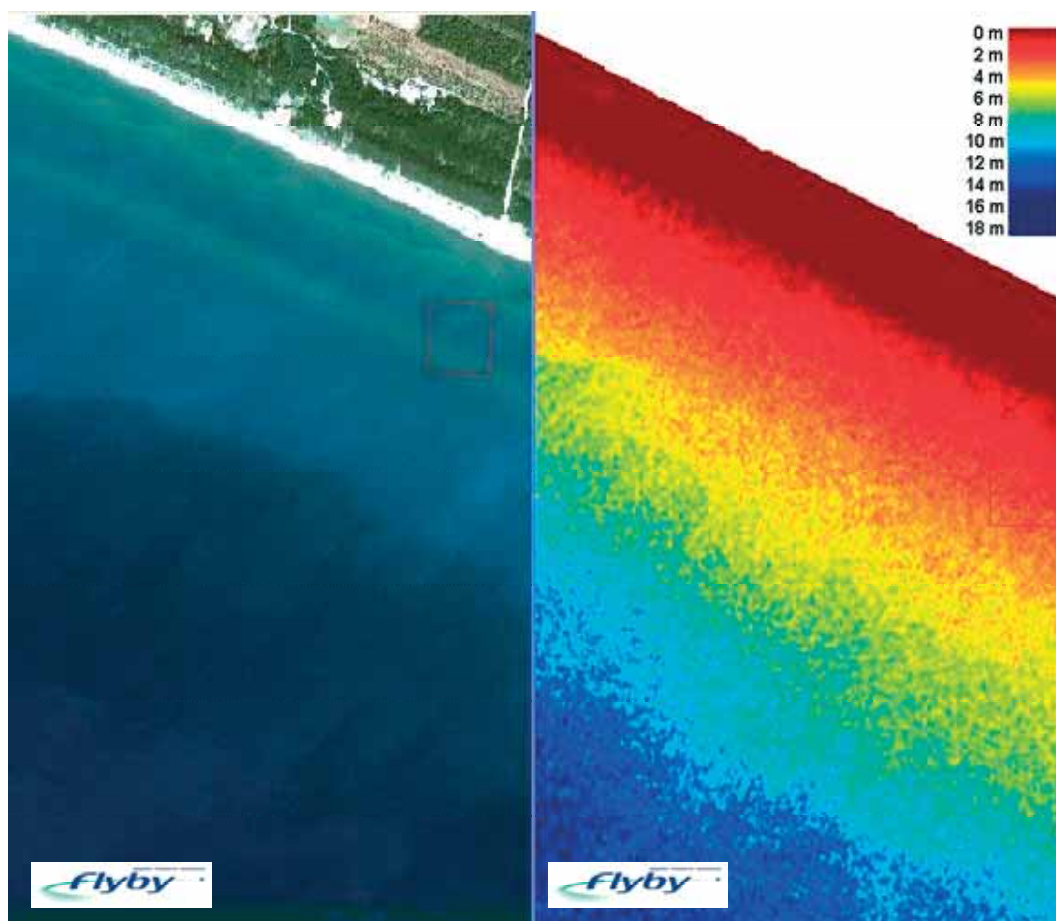
Coastal shallow water bathymetry and coastal erosion

Thanks to the collaboration with the Hydrographic Institute of the Italian Navy (IIMM) and the European Space Agency (ESA), Flyby has developed a new technique of optical multi & hyper-spectral remote sensing for the determination of coastal shallow water bathymetry down to 20 m depth and for the geological and biological classification of seafloor and shore areas along the coastline.

The accuracy of coastal bathymetry and seafloor & coastline classification greatly depends on the spatial resolution and spectral quality of the digital image. Such features are typically better in aerial images than in satellite ones, but even the exploitation of the latter alone offers a satisfactory evaluation in some operative situations.

A bathymetric multi-temporal analysis, based on the comparison of images acquired in different times over the same area, is particularly useful for the evaluation of coastal erosion phenomena and allows the identification of possible events responsible for the process of accumulation or draining of seafloor material.

Coastal bathymetry can be obtained for completely unexplored remote zones without the need of in-situ acquired references, otherwise in-situ measurements can be taken in some points by high precision devices and exploited to increase the bathymetry accuracy for the entire set of points covered by the image.



Bathymetry estimation for coastal sand zone, obtained from multispectral satellite sensor QuickBird (2.4 m resolution). (a) original image; (b) processed image

Coastal shallow water bathymetry and coastal erosion

Measurable parameters (satellite and/or airborne sensor)

- shallow water bathymetry (0 to 20 m)
- geological and biological classification of the seafloor
- geological and biological classification of shore areas along the coastline
- evaluation of sediment transportation and their distribution on the seafloor

Measuring features

High resolution satellite images

Single image coverage:	16.5 km x 16.5 km
Spatial resolution:	2.4 m
Seafloor depth typical accuracy:	0.5 m

High resolution aerial images

Depending on the optical sensor used

Applications

- analysis of coastal erosion phenomena, transport and distribution of sediments, seabed evolution
- analysis of the impact of port infrastructures and dredging works on the seabed and coastline
- coastal nautical cartography
- defence intelligence (Rapid Environmental Assessment)

