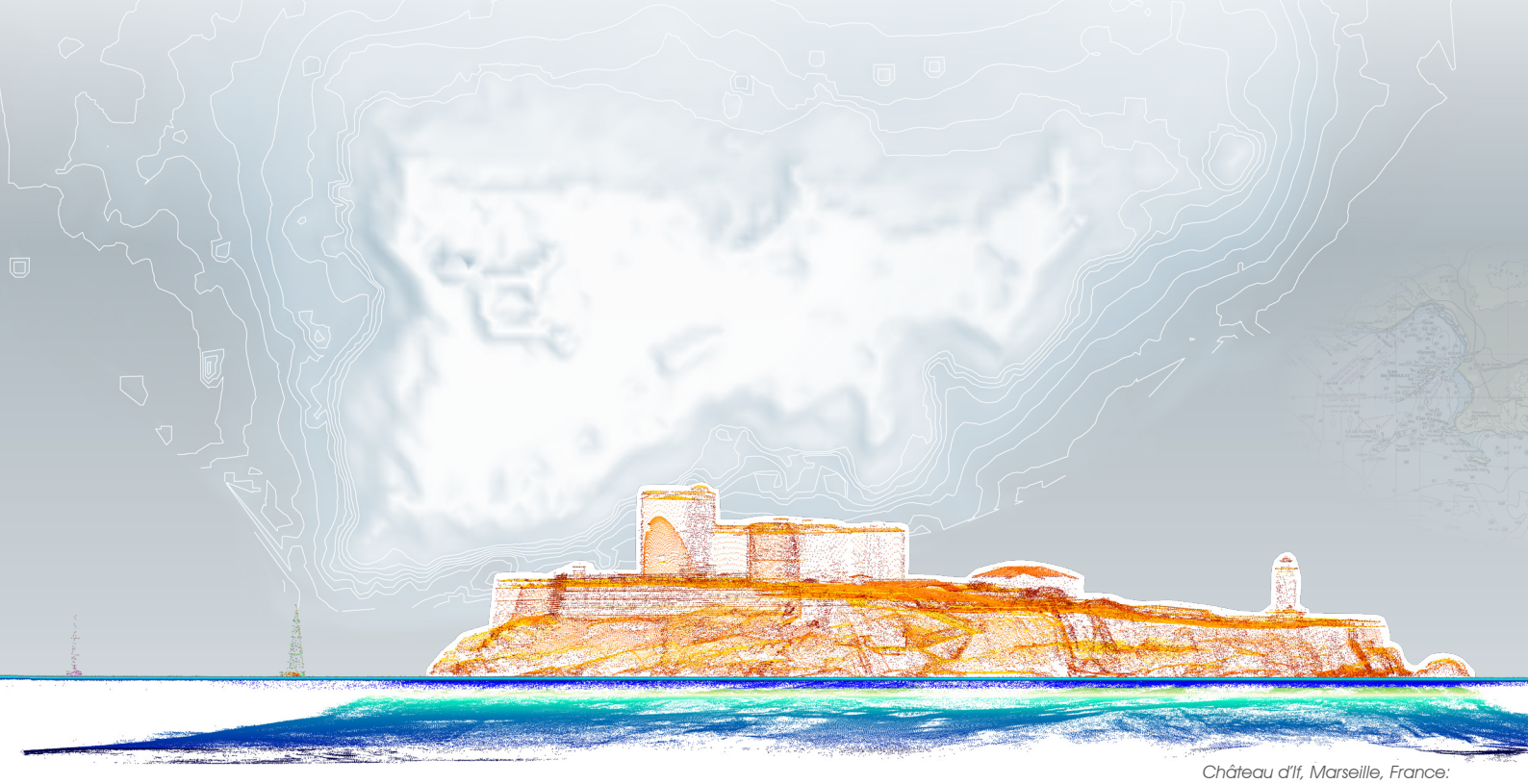
RIEGL LiDAR TECHNOLOGY for Airborne Topo-Bathymetry



Château d'If, Marseille, France:
3D topo-bathymetric data acquired with RIEGL VQ-840-G

Where water meets land, changes take place. Close monitoring of these is a necessity. In shallow water, however, surveying from a boat becomes a challenge. This is where Airborne Lidar Bathymetry (ALB) is of significant advantage. The strengths of LiDAR technology in a hydrographic context are the collection of seamless data sets that span the land/water interface, enabling high-resolution surveying of both above and below water surface topology with high efficiency.

DISCOVER RIEGL's TOPO-BATHYMETRICS SENSORS & SYSTEMS

RIEGL VQ-840-GL
Extra lightweight topo-bathymetric airborne laser scanner for integration on UAVs

RIEGL VQ-840-G
Topo-Bathymetric airborne laser scanner for integration on UAVs or helicopters

RIEGL VQ-880-GH
Highly efficient, fully integrated topo-bathymetric airborne laser scanning system with compact form factor for helicopters

RIEGL VQ-880-GII
Highly efficient, fully integrated topo-bathymetric airborne laser scanning system for use in fixed wing aircraft, compatible with stabilizing mounts

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RIEGL®

Coastal Mapping

Efficiency for wide areas ...

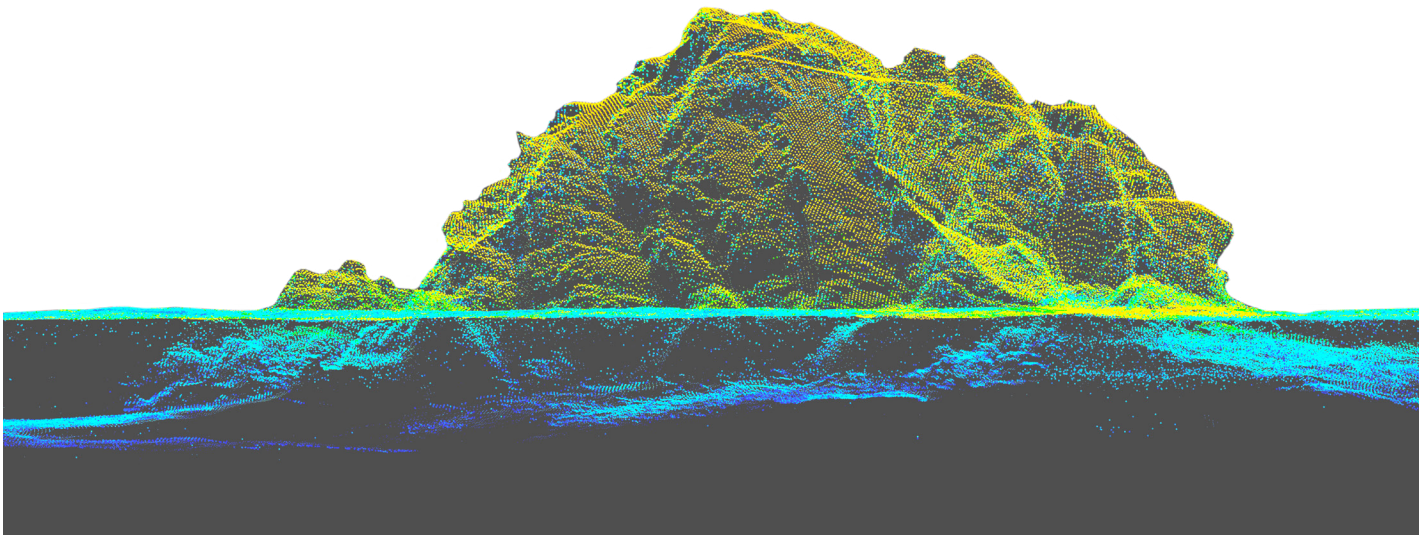
ALB is the technology of choice for surveying shallow water zones in coastal areas. In a single data acquisition mission both terrestrial and submarine topography of a shoreline are covered. *RIEGL* provides several topo-bathymetric system models for integration with crewed fixed-wing aircraft and helicopters.

These sophisticated dual channel systems employ multiple laser wavelengths to improve ranging performance, depth penetration and enhance resolution of targets above and below the water surface. Subject to water turbidity and bottom reflectance characteristics, the *RIEGL* VQ-880-GII and the *RIEGL* VQ-880-GH provide depth ranges of ~1.5 Secchi depths.

... and unrivalled detail for smaller scale projects

Dynamic coastal environments where, for example, washout or erosion occur, require regular monitoring of change. These survey missions are typically carried out at more frequent intervals – and sometimes at shorter notice – than perhaps larger area projects. At the same time, applications such as harbor infrastructure management, dredging and weather-related change that may affect the habitat of marine animals or submarine vegetation often demand much higher levels of spatial detail. Close-up aerial surveys by drone or crewed aircraft flown at low altitude (below 500 ft) allow detailed and comprehensive mapping and subsequent analysis of complex environments, enabling localization and identification of submerged targets, be it artificial structures, topographic features, or vegetation.

The quality of bathymetric LiDAR data from low altitude airborne surveying excels in detail and can be seamlessly merged with sonar data in deeper depth zones. For installation on drone and/or crewed platforms, *RIEGL's* VQ-840-G and VQ-840-GL compact topo-bathymetric laser scanners provide depth performance of up to 2 Secchi depths, making these systems the perfect remote-sensing solution for hydrographic and bathymetric tasks. They are also ideally suited to provide complementing data as part of large-scale and deepwater surveys conducted using other surveying methods.

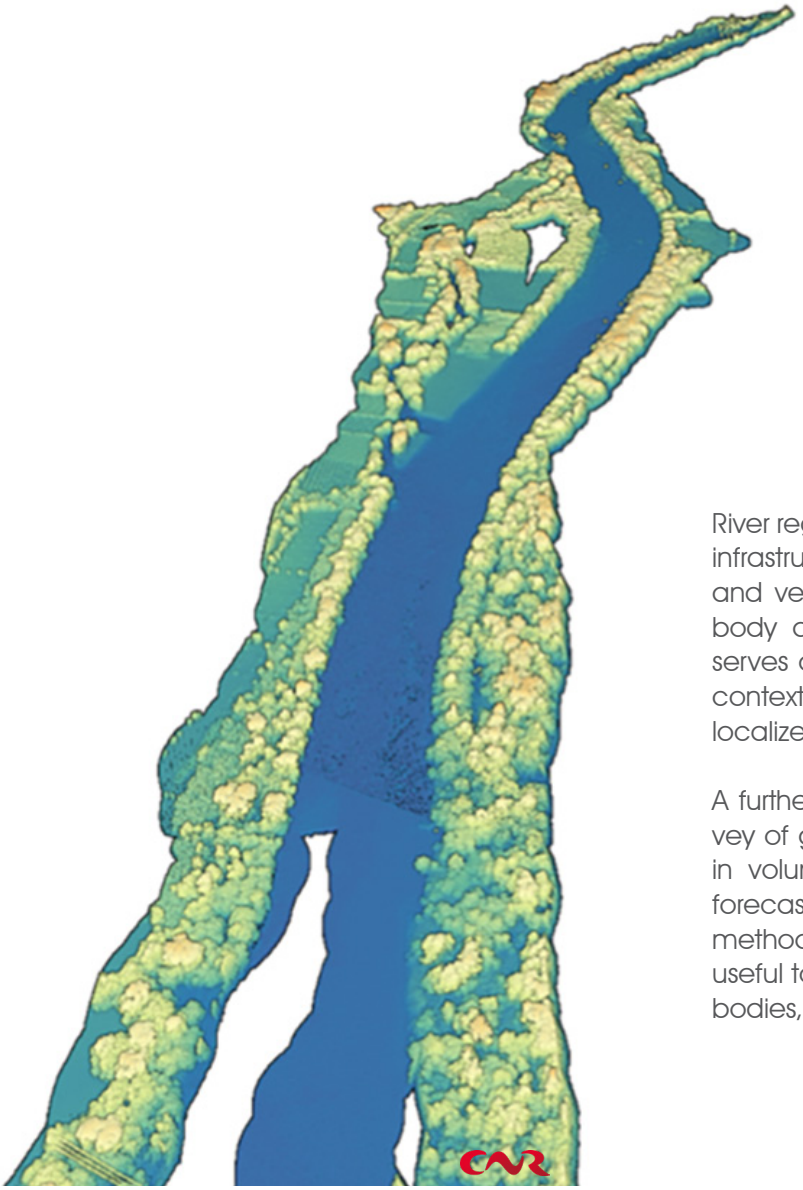


Inland Water Survey

Natural habitat monitoring

Rivers, alluvial forests, lakes, and floodplains represent a special challenge for surveying because of limited navigability for boats and the significant effort and risk to surveyors conducting manual depth measurement. ALB is therefore an effective alternative. It also provides high-fidelity data sets of complex structures – thanks to its multi-target-resolution capability that increases vertical density and object detail for a very accurate 3D representation of the environment. It is also very effective at penetrating dense vegetation to acquire ground points.

Topo-bathymetric LiDAR provides a comprehensive survey of such ever-changing hybrid landscapes that have to be monitored in order to observe the evolution – or endangerment – of natural habitats. A topo-bathymetric map of an alluvial landscape allows simulation of flood events and serves as a basis for developing comprehensive mitigation strategies.



Hydro engineering applications

River regulation, canals, dams, and other water-related infrastructure such as bridges, roads, railroads, buildings and vegetation in the immediate vicinity of a water-body demand rigorous monitoring for change. ALB serves as a basis for regular maintenance tasks in this context. Topo-bathymetric area maps are also used to localize and visualize necessary interventions.

A further task for airborne bathymetric LiDAR is the survey of gravel ponds and water reservoir basins for use in volumetric calculation for reservoir capacity and forecasts. The complementary use of other surveying methods (e.g., single beam and multi-beam sonar), is useful to provide wholly complete coverages of water-bodies, even in adverse collection conditions.

Topo-bathymetric LiDAR data acquisition and processing software

RIEGL's dedicated software suite for data acquisition and processing supports mission preparation and parameter optimization, as well as data management and storage. In post-processing, RiHYDRO tools support data classification, generation of a water surface models, and the application of water refraction correction according to refraction indices. Full waveform processing and waveform averaging can be optionally applied to maximize depth penetration success.

software

RiPARAMETER
software to assist ALS system operators in setting parameters for data acquisition

data sheet

RiACQUIRE
data acquisition software for ALS & MLS scanner systems

data sheet

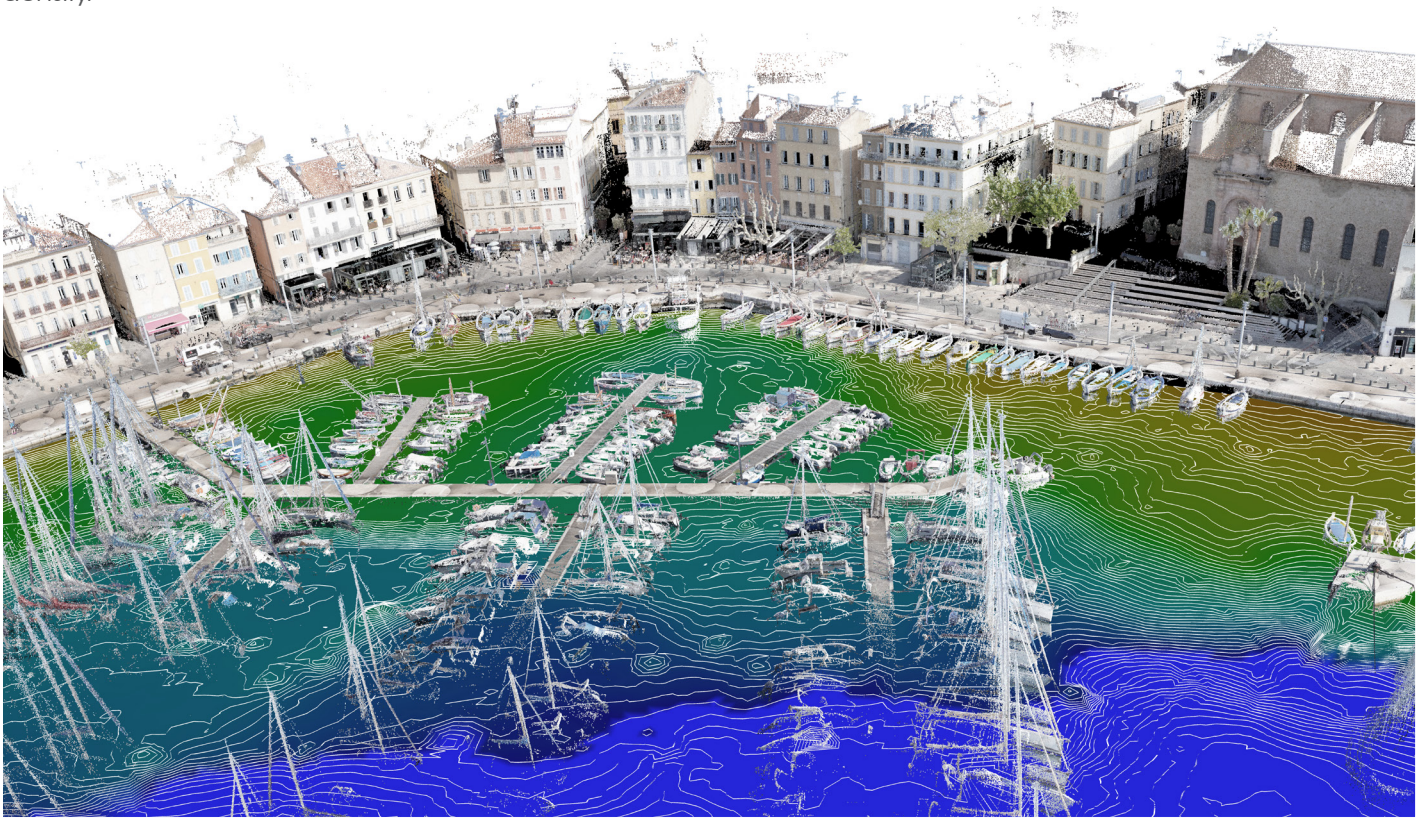
RiPROCESS
data processing software for RIEGL kinematic scan data

data sheet

RiHYDRO
airborne data processing software addon for commercial hydrograhpic and bathymetric surveying

Data fusion

Explore the potential of comprehensive datasets: Merge airborne topo-bathymetric LiDAR with topographic high resolution 3D terrestrial LiDAR or with data from other acquisition sources to create even more information density.



Example: Combination of terrestrial LiDAR point cloud data with airborne topo bathymetric LiDAR data to show isobath lines and submerged harbor infrastructure features.

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