Introduction

The demand for up-to-date, accurate, and high resolution topographic data of coastal zones is increasing, since spatial information of harbor structures, river estuaries, and littoral zones above and below water is required for construction projects, hydrographic analysis, traffic safety, and environmental concerns. For these fields of applications, RIEGL offers airborne and ship-borne mobile laser scanners and laser scanning systems. Due to their high measurement rates, they deliver dense point clouds of land, buildings, vegetation, sea surface, and seafloor.

Specially developed for marine purposes, the mobile laser scanning system VMY-250-MARINE is the ideal instrument for surveying harbors, facilities, bridges, and coastlines from survey vessels. This contribution will give insight into the technical principle, the workflow, and present results of various projects done with these instruments.

Airborne topographic-bathymetric laser scanning

The VQ-820-G is a high performance laser scanner designed for high-resolution mapping of shallow waters with low turbidity.

- **Wavelength**: 532 nm (visible green light)
- **Measurement range**: 200 m (30 x 144)
- **Laser range accuracy**: height ground
- **Scanning direction**: spherical
- **FOV**: 120°
- **Beam divergence**: 1 milliradian
- **Laser energy**: up to 200 mJ
- **Laser power**: 500 mW
- **Max speed**: up to 300 km/h
- **Data rate**: up to 4 pulses in the air

Water surface models – examples

4. Scan containing white caps, high waves and a motor boat

Results

- **Florida Keys**
- **Athletic Sea**

Conclusion and outlook

The airborne topo-bathymetric laser scanner VQ-820-G and the mobile mapping system VMY-250-MARINE are RIEGL’s first laser scanning solutions dedicated to hydrographic surveying, both yielding highly dense and accurate 3D point clouds.

The VQ-820-G allows the efficient survey of shallow waters (both marine and maritime areas) including the adjacent land surface. The VMY-250-MARINE mobile laser scanning system is specifically developed for marine applications. It may be easily integrated into a given hydrographic survey system in order to acquire spatial data both above laser scanner and shallow (multibeam echo sounder) water surface, which is important for a seamless survey of objects within the water-land transition area (e.g. bridge pillars or quay walls).

Modernization of shipborne data acquisition using the hydrographic software package QINSy® GPS

- **Water surface topography**
  - Classification of water surface points may be done automatically or manually
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- **Water surface models**
  - Automatically classified water surface points – examples
  - Typical profiles crossing coastline

- **Results**
  - Florida Keys
  - Athletic Sea

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Due to the growing demand for spatial data in coastal areas and encouraged by enthusiastic feedback obtained from its customers, RIEGL will further advance technology development in this field.