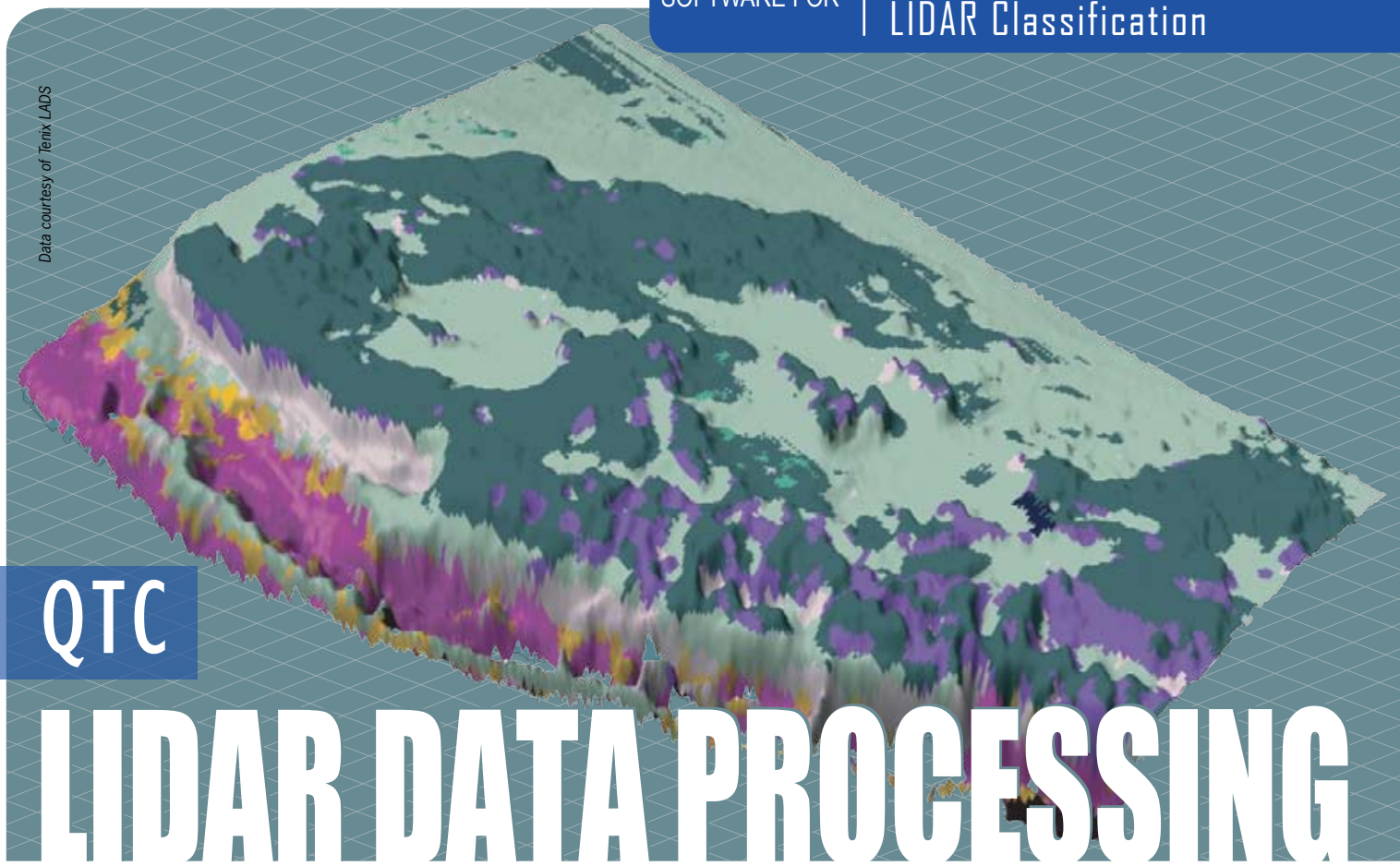
SOFTWARE FOR | LIDAR Classification



Data courtesy of Tenix LADS

QTC LIDAR DATA PROCESSING

LIDAR Reflectivity Processing for Seabed Classification

LIDAR (Light Detection And Ranging) is a method of detecting distant objects and determining their position or other characteristics by analysis of pulsed laser light reflected from their surfaces. While airborne LIDAR is applied in coastal environments to produce accurate, high resolution bathymetry and topography maps, the reflectivity data can also be used for characterising seabed material and features.

LIDAR classification parallels that of acoustic seabed classification. The classification process automatically divides a LIDAR image into classes based on image reflectivity. Classes typically include material type (sand, gravel, mud etc) and features (ripple marks, bedrock, seagrass etc). The classes are assembled into a catalogue and rapidly generate a layer of information to complement bathymetry and other data types.

Developed by Quester Tangent, LIDAR classification is based on the many years of experience embodied in the company's proven seabed classification products for swath and single beam classification. It adds value to traditional charting and interpretation methods, providing a final output file that is consistent with Quester Tangent's other classification products.

- **Automated classification of LIDAR survey data; saves time and improves objectivity**
- **Adds value to traditional methods by repeatable, accurate and objective pattern recognition**
- **Easy to use software provides for both supervised and unsupervised classification**
- **Suite of algorithms respond to reflectivity and its texture to produce accurate discrimination of sediment and bottom features**
- **Seabed relief and slope are used to further discriminate among seabed types**
- **Computer assisted filtering and quality control of supporting data**
- **Output file is simple ASCII data and shares a common format with all Quester Tangent classification products**

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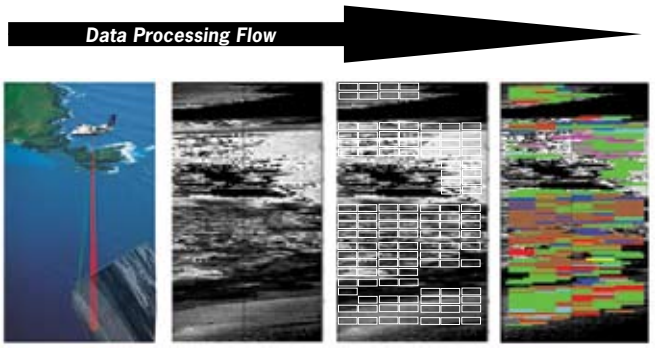
LIDAR Data Processing

Processing LIDAR Reflectivity Data for Seabed Classification



APPLICATIONS

Fisheries management, habitat assessment and environmental monitoring

Coastal zone management

Dredging and port construction

Hydrographic and route surveys

Military: Mine Counter Measures

Options for Data Output Include:

Comma Delimited ASCII
Geotiff
ESRI Shape Files

Feature Extraction Algorithms

Basic Statistics

Mean, standard deviation, and higher moments are indicative of reflectivity, depth changes and interface roughness

Quantile and Histogram

These measure the distribution of reflectivity at low resolution

Fast Fourier Transforms

FFTs are used to find power spectra, which describe statistical characteristics on many resolution scales

Ratios based on Power Spectra

Ratios of log-normalised power in various frequency bands provide good discrimination for classifying images

Grey-Level Co-occurence Matrices

GLCMs describe amplitude changes over selected distances and directions among pixels in the reflectivity image. These second-order statistics are widely used to assess texture

Fractal Dimension

Fractal dimension is a sensitive measure of the distribution and structure of both reflectivity and depth variations

Slope

A plane is fitted to the bathymetry near each LIDAR footprint. Slope discriminates well between soft sediments, well packed sediments, and rocks

QUESTERTANGENT™

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