

FROM SEABED CLASSIFICATION TO RAPID TRANSIT

Quester Tangent

This year Quester Tangent registered the trademark 'Making Data Intelligent'. This is the kernel from which its products evolved. From modest beginnings as a contractor to the Canadian Hydrographic Service, Quester Tangent has grown in people and products to become a global supplier of intelligent systems for the marine and rail-transit marketplace.

Situated near Victoria, on southern Vancouver Island in British Columbia, Canada, Quester Tangent Corporation is an engineering design, manufacturing and service company providing data acquisition and safety-critical products and services for the global marine and rail-transit industries. Quester Tangent designs and manufactures monitoring, diagnostic and control products for the transit industry and is a world leader in the application of seabed classification technology for seafloor mapping.

History

Quester Tangent was incorporated in 1983 to commercialise hydrographic positioning and data-acquisition technology. Significant expertise in real-time data handling, systems integration and hydrographic data fusion led to the introduction of hydrographic survey and navigation equipment and hardware, with initial sales to the Canadian government. In 1994 a new company division was established to take core expertise into the light rail-transit industry, resulting in 1995 in the first major contract in this area. In the same year the company diversified its marine business into seabed-classification technology, and today this technology is the prime focus of marine business at Quester Tangent. It has rapidly led to its establishment as an acknowledged world leader in acoustic seabed-classification technology. In 1998 the Marine division launched a major project, in partnership with the Canadian Department of National Defense, to develop seabed classification for multi-beam sonar. This culminated in 2002 in the release of QTC MULTIVIEW software, following fifteen person-years work and the filing of patents in the USA, England, and cooperation with strategic partners such as the Geological Survey of Ireland (see image).

In 2003 ownership changed from the corporation founders to a team consisting of John Neville, Stephen McKay and Bill Collins. The principals have considerable experience in telecommunications, systems engineering and marine geosciences. Over the past three years the corporation also moved from being a research house to having a product-driven agenda. Currently Quester Tangent employs upwards of thirty professional people in its two divisions, including engineers, marine geologists, physicists and commercial specialists. The company has a product-base of over two thousand units in service.

Products and Services

Quester Tangent was the first company in the world to market a bottom-classification system that extracts many features from a recorded echo. Dedication to this technology has given rise to exciting growth in the market and development of an unparalleled suite of digital acoustic seabed-classification products and services with a broad range of applications. All use data acquired by single-beam, multi-beam and side-scan sonar.

The range of products developed and marketed by Quester Tangent includes the QTC VIEW Series 4 and 5. The QTC Series 5 is the latest generation of single-beam seabed-classification technology, allowing classification in water depths of less than 1 metre to greater than 2,000 metres. The system acquires original, raw, bipolar echoes for post-processing in QTC IMPACT, which can also read digital echo data acquired and logged by echo sounders.

Swath classification software uses sophisticated image-texture analysis techniques to provide objective, accurate and repeatable segmentation of the image. QTC MULTIVIEW provides automated classification of multi-beam sonar data, while QTC SIDEVIEW software works with side-scan data. Image backscatter data is processed to turn data into information and create maps of seafloor substrate. Processing can be performed in unsupervised mode for maximum flexibility and information generation. Alternatively, using supervised classification, an existing catalogue can be used for simple and efficient production processing of large volumes of data.

Since the inception of the company, tools for the support of hydrographic survey have been a mainstay. This continues to be the case with

HYDAS software, a bullet-proof data-acquisition and quality-assurance package sold exclusively for naval mapping operations.

QTC CLAMS (Classification and Mapping Software) was conceived to address a gap in bottom-mapping tools for classifying the seabed. Classification can be acoustically derived or generated from other data, such as physical properties of sediment or video classification. It is an essential tool for mappers who want to integrate multiple datasets with objective analysis.

Services

The driver for this business came from the idea that many survey organisations capture raw backscatter data during the normal course of bathymetric mapping whilst very little use is subsequently made of this data due to the time and expertise required to deal with such large datasets. With the advent of Quester Tangent's swath-classification software, the tools are now available to process this data in a production-style environment. Data can be processed for as little as 100USD per gigabyte and the process is very simple: data is placed on our secure server via ftp and in very short order maps of acoustic diversity are produced and returned to the client. This map product provides maximum flexibility for integration of backscatter data with other data products.

Outreach

One of the greatest challenges to the uptake of seabed technology is educating the marketplace. Inevitably, the question arises as to the value of seabed classification. The answer is that our products take a complex backscatter signal and reduce it to a few simple descriptors based on the acoustic properties of the seabed, and then use this to map the distribution of bottom types. Quester Tangent recently commenced sponsoring a series of workshops/tutorials on seabed classification. To date, more than fifteen of these one or two-day sessions have been run, with more than three hundred participants. To expand access to information, a newsletter has also been initiated. With a distribution list of more than two thousand, The Pinger has been enthusiastically received in the community.

Markets

The seabed-classification technology marketed by Quester Tangent enjoys applications in a very wide range of markets, including the following:

- naval: mine countermeasures, anti-submarine warfare, route survey
- environmental mapping: ecosystem analysis, habitat quantification, fisheries management
- ports and harbours: dredging, beach replenishment
- underwater construction: seabed mapping, site surveys
- commercial fisheries: improved productivity, reduction of by-catch.

The Future

The future for Quester Tangent is very bright. The marine products have accomplished a 20% year-on-year growth over the past few years. There is also clearly strong market uptake in the swath-mapping sector, as the community has come to grips with bathymetry mapping and now wants to expand information content to include backscatter-data products.

Quester Tangent's move to take large-volume data-acquisition systems from the marine community into rapid-transit applications has paid dividends, with products now being used by some of the worlds premier transit authorities, New York City, San Francisco, Kuala Lumpur and Vancouver among them.

The success of the basic algorithms for seabed classification has led to other applications. By the time this article goes to press, Quester Tangent and Tenix LADS Corporation will have announced an agreement for the provision of services to classify bathymetric Lidar data from the LADS platform. This will open up airborne mapping to seabed classification and provide a considerable boost for mapping shallow coastal zones worldwide.

Quester Tangent has successfully delivered image-processing technology into the world of medical imaging. The product, known as Autosegment CT, applies unsupervised classification techniques to CT scan images for automatic classification of features for shallow benthic core analysis. The company is also involved in ongoing discussions with the medical community in the field of cancer research for development of prototype software to provide rapid image analysis.