

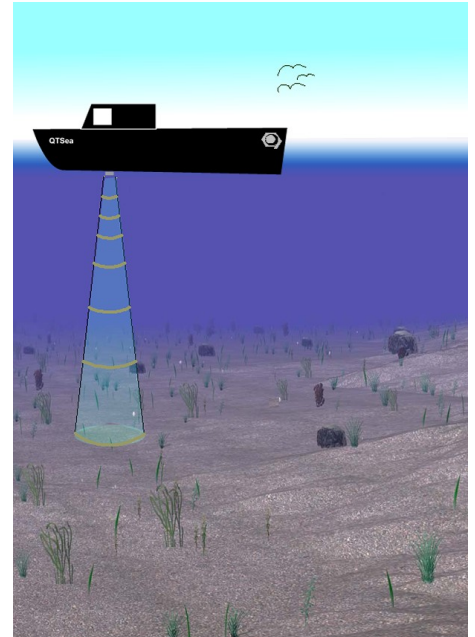
# Acoustic Bottom Classification

for seabed mapping

## The application.....

### Typical applications for automated bottom classification

- ⇒ Delineate and map seabed class boundaries; reliably extrapolate ground-truth point data over extended areas
- ⇒ Quantify habitat for benthic and demersal species of interest
- ⇒ Collect information useful for establishment and maintenance of freshwater and marine sanctuaries and for meeting Essential Fish Habitat mapping requirements
- ⇒ Add bottom-type information to hydrographic surveys
- ⇒ Locate offshore aggregate for on-shore construction
- ⇒ Locate suitable sand for beach replenishment
- ⇒ Manage dredging projects; pre- and post-dredging surveys
- ⇒ Easily monitor sediment transport and other morphological changes on the seabed
- ⇒ Naval mine counter-measure or emplacement surveys; input data for ASW acoustic propagation models; route survey



## The QTC Technology Advantage.....

### Quester Tangent's proven technology, now in use in more than 40 countries globally, provides many advantages

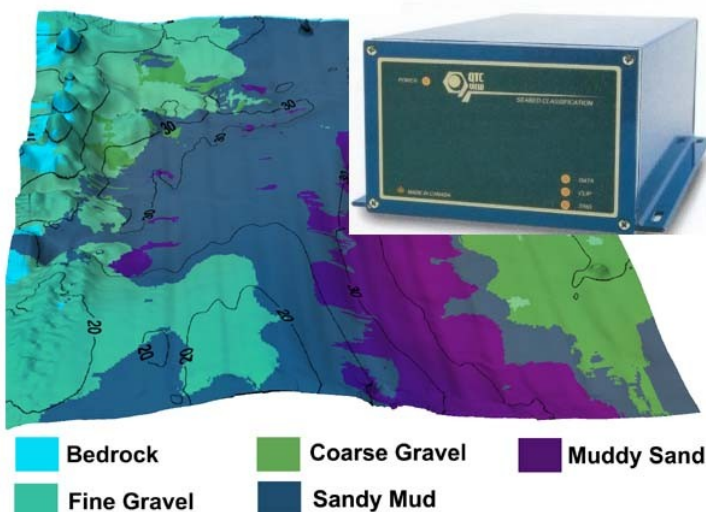
- ⇒ Software-only solutions for multibeam and sidescan sonars, and for suitable digital single beam echo sounders
- ⇒ Single beam classification accuracy and repeatability in less than 1m of water to more than 2km
- ⇒ Turnkey single-beam mapping systems available if required, real-time or post-processing operation
- ⇒ User-defined catalogue and classification schemes in supervised or unsupervised mode
- ⇒ Applicable to marine or fresh water; not affected by turbidity

## A few of our clients.....

### Some users of Quester Tangent's technology

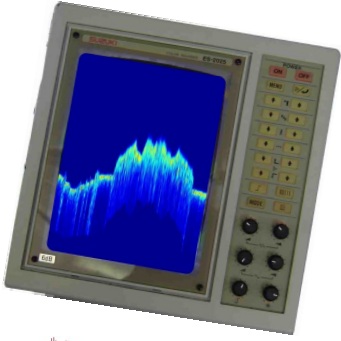
- ⇒ NOAA and National Marine Fisheries Service, USA
- ⇒ US Geological Survey
- ⇒ US Army Corps of Engineers
- ⇒ Fisheries and Oceans Canada
- ⇒ Many universities in the USA, Canada and worldwide
- ⇒ Commercial survey companies such as Fugro, Fathoms, Gardline, Seaside Engineering & Surveying
- ⇒ Many navies and hydrographic survey offices globally

...and many more agencies, institutions, universities, state and federal organizations worldwide.





## A little History.....



For many years marine surveyors manually interpreted depth sounder information to determine bottom type. The signal, an acoustic reflection from the bottom, has a direct relationship with and is a function of the character of the sea, lake or river bed. Classifications were inferred by visual examination of the analogue records. Since the results were highly dependent upon human interpretation they were tedious, inefficient and generally lacked repeatability and resolution.

Today, Quester Tangent provides technology, products and services to use depth sounder information to objectively map bottom type accurately and with good repeatability.



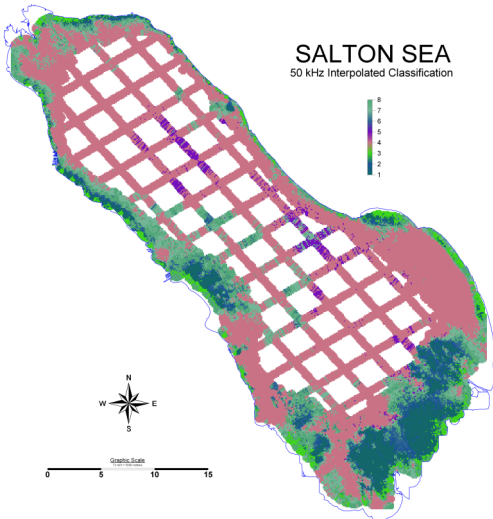
## The Products.....

### *The acoustic classification products provided by Quester Tangent*

- ⇒ Single beam classification data acquisition: QTC VIEW
- ⇒ Single beam real time processing software: QTRT
- ⇒ Single beam data processing software: QTC IMPACT
- ⇒ Multibeam, sidescan and interferometric sonar image data processing software: QTC SWATHVIEW
- ⇒ Data interpolation and visualisation software: QTC CLAMS



## An example.....



### *Seabed Classification for Air Quality*

The Salton Sea, an important wetland and the largest lake in California's Colorado Desert, occupies the Salton Sink basin. Annual average precipitation is less than three inches and 90% of the entire inflow to the sea is agricultural runoff that carries an abundance of salts. Current water levels are threatened by the proposed transfer of water from the Imperial Valley to San Diego as part of the reduction of California's Colorado River use, as well as by the possible reclamation of New River water by Mexico and by increased natural evaporation. The result could be greatly accelerated concentrations of salts and nutrients as well as potential air quality problems caused by dust entrainment.

The **Salton Sea Authority**, with the **US Geological Survey** and the **Bureau of Reclamation**, contracted the collection and processing of seabed classification information on the Salton Sea. Two QTC VIEW systems were used to collect simultaneous dual frequency data. Target sediments included those to 8m/25ft below the shoreline elevation. The area was surveyed with 250 and 500m line

spacing. Water deeper than 8m was surveyed at 3km line spacings. Twenty four survey days were required for the project. During this time over 3 million echoes were collected with sub-meter positioning accuracy. The data were processed in QTC IMPACT and QTC CLAMS. Analyses were undertaken to correlate with ground truth data supplied by the client. The client was supplied with seabed classification maps, seabed complexity maps and final data tables. Sediments shown in the green coloured areas indicate materials potentially prone to air entrainment. The maps will help assign dust entrainment coefficients to future exposed areas should lake levels drop. These coefficients are among the critical parameters required as input to most dust emission models that predict impact to local and regional air quality caused by new dust sources.

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