

**Tutorial:** Multibeam Imaging SONARS: Fundamentals, Use and Specification

**(Approved for 0.4 Continuing Education Units and 4 Professional Development Hours)**

**Instructors:** Mark W. Atherton and Brian Abbott

## **Overview**

Anything underwater, from a diamond ring to a shipwreck, can be located and imaged – the technology exists. They can be found using the right combination of equipment *if* the correct search methodology is employed, *if* those conducting the search understand and apply the right search techniques, and *if* the target of the search is in the search area. Experience has shown it is difficult to find the target of interest when it is not there!

This presentation focuses on underwater search and acoustic visualization techniques as it relates to underwater archeology and marine structures. From a 3000 BC Greek sunken city, documenting the Titanic and other shipwrecks to modern bridges, docks and dams – this tutorial covers a wide range of structures and the challenges faced with their different acoustic geometry.

Side-scan SONAR is an amazing search and survey tool, but how does one visualize the vertical component of the detected target? What about using multibeam and scanning SONAR for the same application? System deployment is one of the biggest issues when trying to visualize an underwater structure. Creative examples used to position SONAR in the optimum geometric position are shown and discussed.

This tutorial brings two people together: the civil engineer/commercial diver with a passion for acoustically documenting archeological sites, and the 39-plus year SONAR operation's "guy" and side-scan and scanning SONAR data analyst. From different ends of the underwater imaging spectrum, they have reached the same conclusions on the importance of educating everyone in the subsea industry on SONAR capabilities and limitations.

## **Instructor Bios:**

**Mark W. Atherton** brings 39 years of underwater imaging, SONAR, commercial diving and ROV experience to this tutorial. From managing million dollar-plus geophysical surveys to searching for and recovering WWII bombs in Trinidad, to volunteering his time to search for and recover victims of drowning - Atherton has "been there/done that." With this expertise, he offers a unique perspective of what it takes to get the job done right!

For the past 28 years, Atherton has fulfilled his other passion – teaching SONAR. As Special Projects Manager for Kongsberg Mesotech Ltd., Mark is involved in all phases of SONAR system development, applications and provides solutions for underwater

imaging problems. He is also the author of Echoes and Images, the Encyclopedia of Side-Scan and Scanning SONAR Operations.

**Brian Abbott** holds degrees in geophysics and civil engineering, a military background and is a commercially trained diver. With 20-plus years in the business, Brian uniquely brings to this tutorial a passion in acoustically documenting underwater structures – any structures. In addition to bridges, docks and dams, he has visualized a 3000 BC sunken city in southern Greece, mapped the Titanic, documented a 15<sup>th</sup> century shipwreck in the Baltic... the list goes on. He is one of the best in the underwater visualization industry. When he isn't traveling the world on archeological expeditions, Abbott has his own company and visualizes commercial underwater structures and contracts part-time to **Kongsberg Mesotech Ltd.** training new system design and training customers.