Teledyne Odom has been producing hydrographic survey equipment for over 25 years, and more recently led the way in the development of low cost multibeam echo sounders. In January of 2012, Teledyne Odom released the MB1, the latest generation of this type of sensor.

For the past 60 years, efficient hydrographic surveying has been achieved using the single beam echo sounder. This device ensonifies a small strip of the sea floor, giving a single accurate depth point for every “ping” of the transducer. Over time the side scan sonar was developed to determine if there was a likelihood of any shoaler depths in-between the lines of single beam data that may present a danger to navigation. This technique is still used today, and is seen as a simple and reliable method of determining the underwater topography.

Over the past 15 years, multibeam technology has become more commonplace in the field of hydrography. This method uses a broad and narrow transmit beam, typically around 120 degrees in swath. The receive beam is then formed, narrow in the across track but broader in the along track. The resulting ensonified area is used to determine the depth of the seafloor within that footprint. By beam forming several receive beams, we can determine many depth points across the track of the vessel with one “ping”. This fills the gap between survey lines that traditionally were left to the side scan sonar, allowing bathymetry to be gathered throughout the entire survey area.

The fiscal challenge
The principal issue that many customers come across with multibeam systems is the unit’s cost. A multibeam by its very nature is a complex device, with precision engineered transmit and receive acoustic arrays and a host of electrical systems to generate and convert the acoustic signals. As a consequence, the price of a multibeam system is around 6 to 10 times the cost of a survey quality precision echo sounder. This left the surveyor with a choice, either survey with a single beam at a lower cost but smaller data rate, or purchase a much more expensive system to meet the customer’s requirements of swath bathymetry.

The solution
In 2007 Teledyne Odom released the ES3 multibeam echo sounder to bridge this gap. Marketed at the customer who has a requirement for swath bathymetry but with a single beam budget, the system proved to be suitable for small survey companies or projects where a more expensive system would be uneconomical.

Over time and as technology improved, the majority of multibeam systems continued to progress into the more expensive end of the market, leaving the lower cost market still in
demand for more capable yet low cost solutions. To meet the requirements of the customers in this market, the Teledyne company MB1 was developed between the offices of Teledyne Odom and Teledyne RD Instruments. Starting from a clean sheet of paper, the system was designed specifically to meet the requirements of the hydrographic surveyor with a view to complying with IHO standards, being simple to operate, give reliable and repeatable data and to maintain the company tradition of building sounders that last.

Constructed from titanium and acetal, the MB1 incorporates many of the features usually seen on more expensive multibeam systems such as user selectable frequency, 24 bit resolution, phase detection, side scan, snippets and full water column data. Perfectly suited to the smaller survey vessel, the MB1 is ideal for an over-the-side mounting arrangement and with future upgrades such as an integrated Hemisphere L1/L2 GPS and heading, the system is designed for easy set up.

During part of the extensive testing schedule of the system on the Mississippi River, company hydrographers identified several objects that had not been mapped in such detail such as sunken barges and tug boats. These images show the utility of the low cost multibeam, as data at this resolution would not be possible with a standard single beam.

Conclusion

Despite single beam bathymetry still having a place in hydrographic survey, the benefits of the multibeam are evident by the expansion of its use, especially over the last five years.

The development of low cost multibeam systems such as the MB1 brings swath bathymetry within reach of many surveyors in a time when more and more customers require a full bathymetric data product.

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