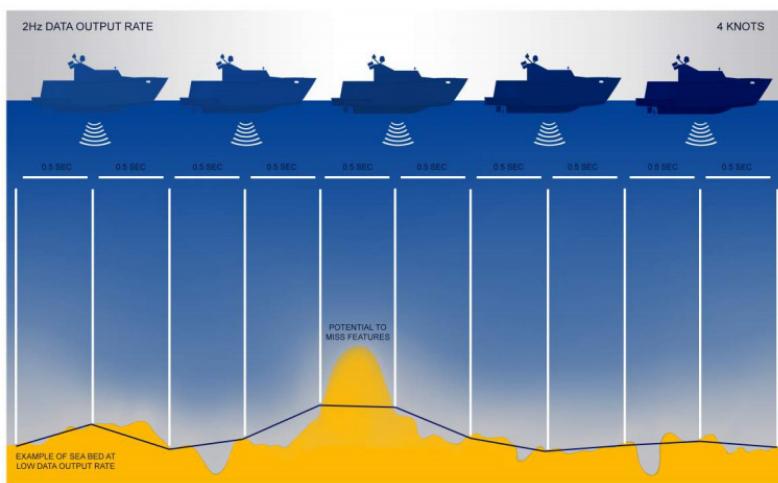


## The Real Importance of a High Echo Sounder Ping Rate

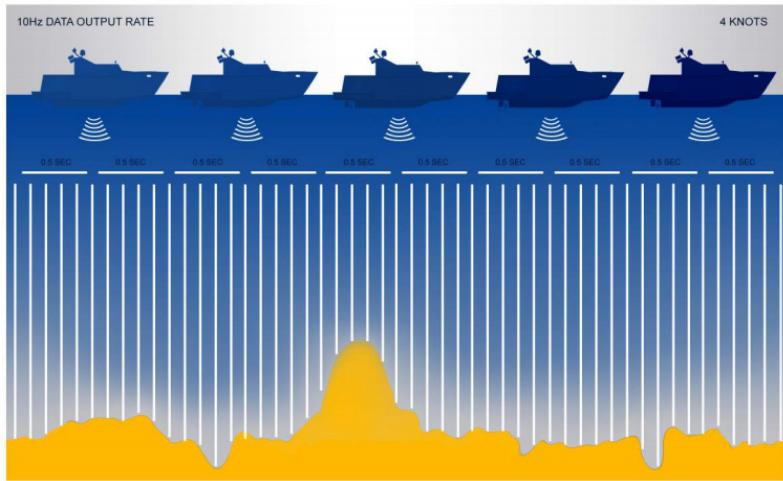
*How the CEESCOPE™ and CEE ECHO™ maximize data quality by using a high ping rate of up to 20 Hz, allowing for substantial data thinning in post processing for difficult survey areas while still retaining good bottom coverage in the final product.*

Echo sounder data is collected from a moving boat, with discrete pings emitted at a certain time interval, which determines the lateral distance between sounding results. The ping rate of an echo sounder is an important but sometimes overlooked parameter. In the first example below, a 2 Hz ping rate at a 4 kt vessel speed places each ping 1 m apart. This is a very sparse level of bottom coverage, even if every sounding result from each ping is good. Features may be missed but crucially, there is no room for bad soundings during data processing. Any missing or unusable results, for example from improper bottom detection, mid-column echoes, or vegetation interference that requires removal of data points will cause gaps in the dataset that may be several meters long – or more. With dense vegetation, there may simply not be enough good soundings to determine where the true bottom lies versus the plant canopy and the results may be completely useless.



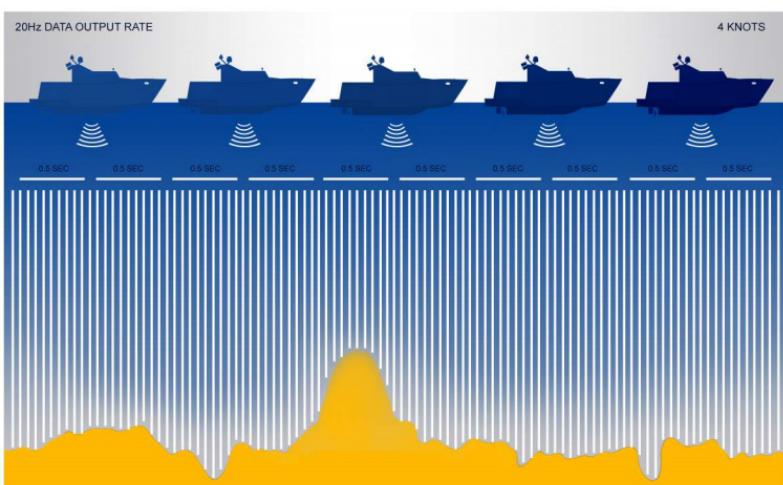
**Figure 1. Soundings collected at a 2 Hz ping rate (basic echo sounder)**

Comparing the first example with an echo sounder pinging at 10 Hz, the sounding points are now spaced 20 cm (7.8") apart. This is a much more acceptable level of bottom coverage for feature detection along the survey track. Even with half of the data points removed, after heavy thinning the data is still likely useable under most circumstances. This is a very significant improvement.



**Figure 2. Soundings collected at a 10 Hz ping rate (CEE-LINE™ CEEPULSE™)**

By doubling the ping rate again to 20 Hz, ping spacing is now down to 10cm (3.9"). While coverage is undoubtedly greater with better bottom detail, further advantages realized are mostly not related to this factor. In survey areas presenting very challenging bottom detection conditions, where a 2 Hz echo sounder would almost certainly be ineffective, a 20 Hz ping rate echo sounder can still provide enough data points to allow the operator to properly identify the "real" bottom, achieve good coverage and an acceptable final product even when many of the soundings are removed. After all, removing 75% of the soundings during processing still leaves 2.5x more data than the 2 Hz echo sounder with no thinning!



**Figure 3. Soundings collected at a 20 Hz ping rate (CEE ECHO™ CEESCOPE™)**

In summary, for surveying in swimming pools, a low ping rate echo sounder is adequate. In real world survey conditions, maximizing ping rate gives the best chance to get a quality survey completed under the widest range of conditions.