

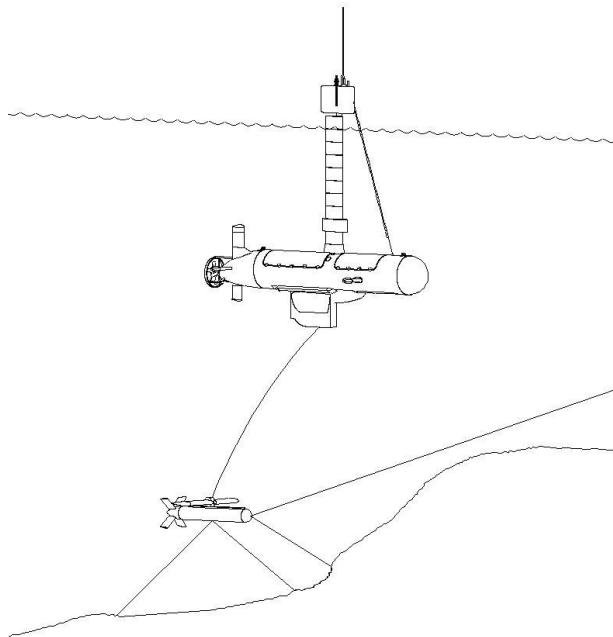
# Forward Looking Bottom Profiling and Obstacle Avoidance

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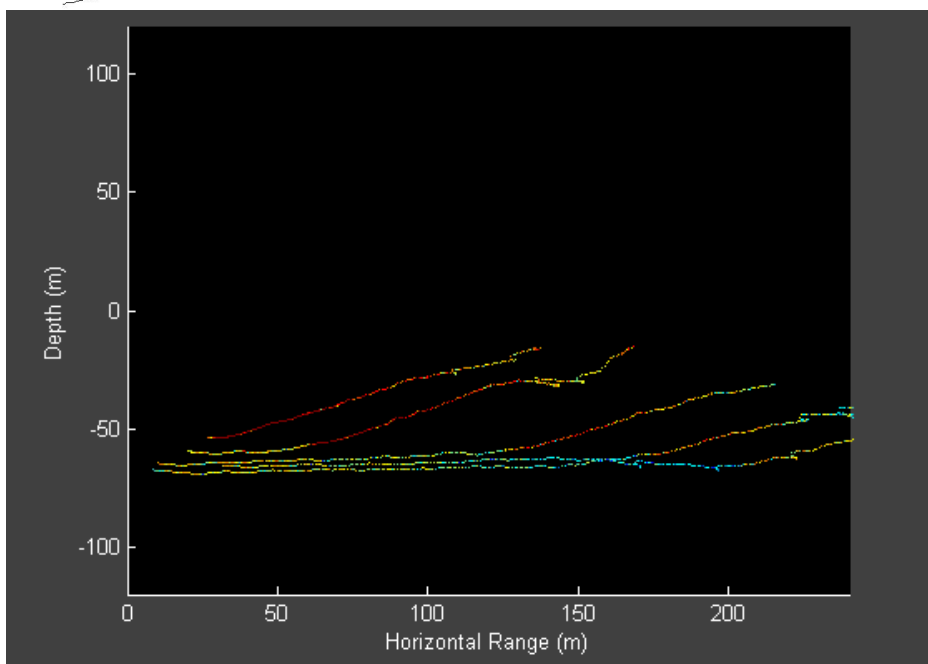
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The same sonar technology that is used in our 3D sidescan to profile the bottom to the side can be used to profile the bottom ahead of a moving platform such as a boat, AUV, ROV, or towfish. The figure below shows a forward profiler mounted on a towfish that is towed from a semi-submersible. In this particular application the towfish is active in the sense that it can be

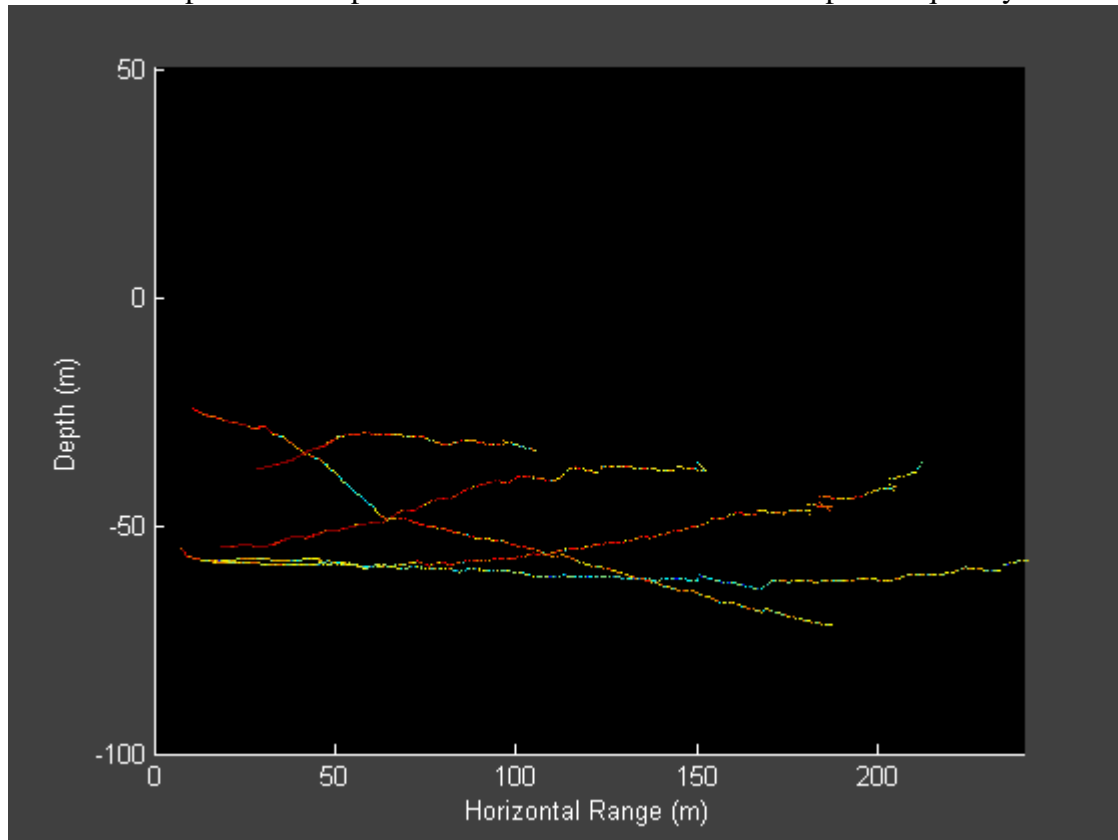
maneuvered from the tow platform. Therefore, if the forward profiler detects a rising bottom, the towfish can be raised to clear it.



The next figure shows a series of five profiles taken 30 seconds apart as a boat carrying our forward looking profiler approaches the shore in Indian Arm near Vancouver B.C. The first profile stretches from 10 m to 210 m, at a depth of 65 m, and then shows a slight rise to about 53 m at 240 m. Each ping after that shows the boat approaching the shore. The color on the profiles represents the backscatter strength with red being the strongest and blue being the weakest.



The following figure shows the bottom as the boat approaches a shoal and goes over it. Again the profiles are generated from our forward looking profiler with the color representing backscatter strength. The first profile shows a relatively flat bottom stretching from 10 m to 240 m horizontally at a depth of 60 m. The next profile stretches to 220 m horizontally and shows a rise to about 35 m. At this point it is not known whether the bottom keeps sloping up or whether the boat can go safely over the shoaling bottom. The third profile shows the rise in the bottom decreasing and it looks like the boat might have safe passage. The fourth profile shows the top of the shoal and that the bottom is starting to slope down again. The fifth profile shows that the boat has now passed the top of the shoal and that the bottom slopes off quickly on the other side.



As indicated above, forward profiling is used to generate knowledge of the lay of the bottom ahead of moving platforms. This knowledge can then be used to make navigation decisions.

## **Commercialization**

We are looking for partners who would like to commercialize this forward looking bottom profiling sonar technology.