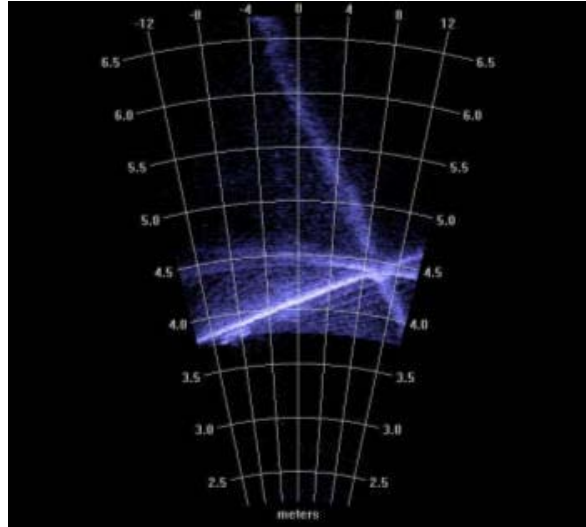
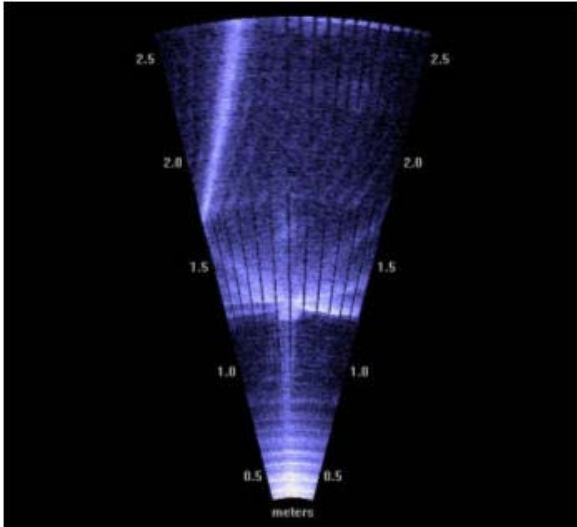


Crosstalk and Reverberation



• I put DIDSON in a tank of water. Above are two example images taken in the tank. In left image, I see "banding" or "spokes" (dark lines running through bright targets that do not really exist). I also see bright returns at ranges less than 0.5 m. In the right image I see arcing around a bright target and lines which diverge from a bright line. What is going on?

Dark Bands and Aliasing

Your system is acting normally in a confined, reverberative environment. The "banding" is unwanted but can be useful to quickly determine real from aliased (in range) targets. If the target has dark, radial lines running through it, it is not real at the range imaged. It is further out and its echoes are from the previous ping. A dark line is due to a decayed reverberation since the last ping in the **previous** frame. The lighter, wide band (seven adjacent narrow bands) are reverberation and aliasing from the rapid pulsing of 8 pings **within** a frame.

Crosstalk

The arcs at constant range are due to crosstalk — echoes returned in the side lobes of beams not "looking" at the target. If the bright target is small and lights up only one main lobe, the crosstalk is seen only in the 11 other beams fired and "listening" simultaneously. This appears as spots evenly spaced along the arc. If the target spans a number of adjacent main lobes, the crosstalk appears as a continuous arc diverging from the target line. Raise the display threshold to hide that crosstalk.

Transmit Reverberation

The brightness seen at ranges less than one meter is due to reverberation within the lens set and transducer itself right after a transmit pulse. You can turn on the TL (transmission loss compensation) to reduce the brightness at short ranges. You can lower the receive gain. Our favorite solution is to make the window start at 1 m!

Reducing these effects

Avoid working in a reverberative tank. Don't point the lens at objects that will be aliased in the frame of interest. Given that you cannot do the above, work with start window, window length, gain, and threshold to minimize these unwanted features. You can also move the sonar around and move the target around to minimize these features. Once you understand the problem, various solutions or partial solutions will come to mind.