Single Beam Offsets – Course Made Good Vs Heading

By John Lindberg

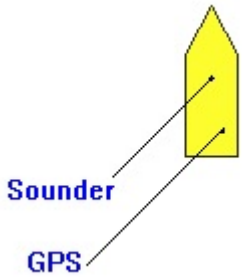
HYPACK's Customer Support Group gets a lot of questions regarding hardware offsets. While we try to keep things simple (offset everything to the center of mass of the vessel), there are always some exceptions to the rule.

For example, the majority of our customers use a simple GPS/echosounder setup and not much else.

When using a simple single beam echosounder/single antenna GPS setup, it is always best to mount the GPS antenna directly over the echosounder transducer. This eliminates any horizontal offsets whatsoever. Why should you do this? While the reason is fairly simple it may not be so evident at first. So I will attempt to show a few examples of what happens if you use horizontal offsets in a simple gps/echosounder setup.

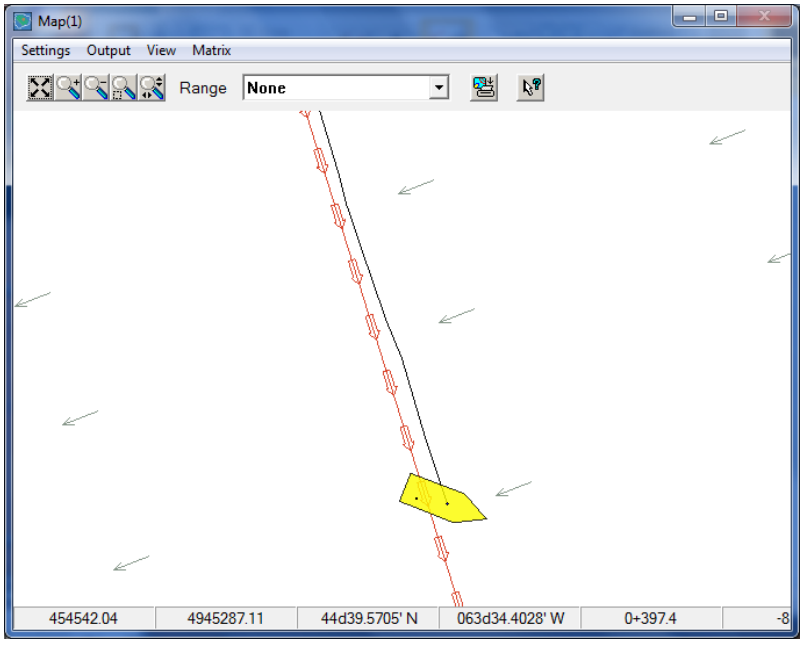
In Figure 1 the gps is offset about 14' behind and 3' starboard from the transducer position.

FIGURE 1. *GPS Offset from Transducer*



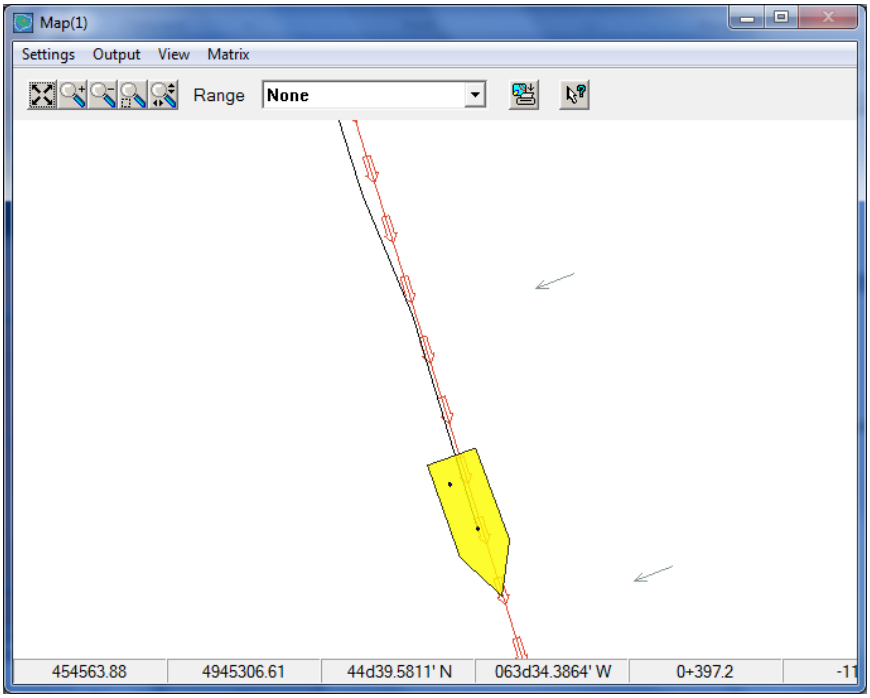
The survey is a cross-sectional survey of a river with a relatively strong current. As the survey boat is conducting the survey you will notice the boat is crabbing across the river, pointing in the direction opposite the current, in an attempt to stay on the planned line (see Figure 2).

FIGURE 2. *Survey Boat Crabbing Down the Line*



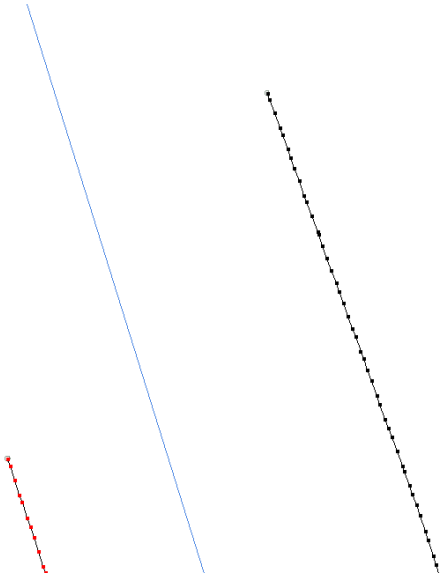
While the boat is actually pointing toward the starboard side, this is actually what is happening to the collected data (Figure 3:

FIGURE 3. *The records Sounding Positions*



Since there is no actual heading device, the GPS is calculating course made good, not heading. If the GPS antenna was directly over the transducer there would be no problem with the heading. But since the GPS antenna is offset from the transducer, the actual placement of the sounding will be incorrect. Look at Figure 4:

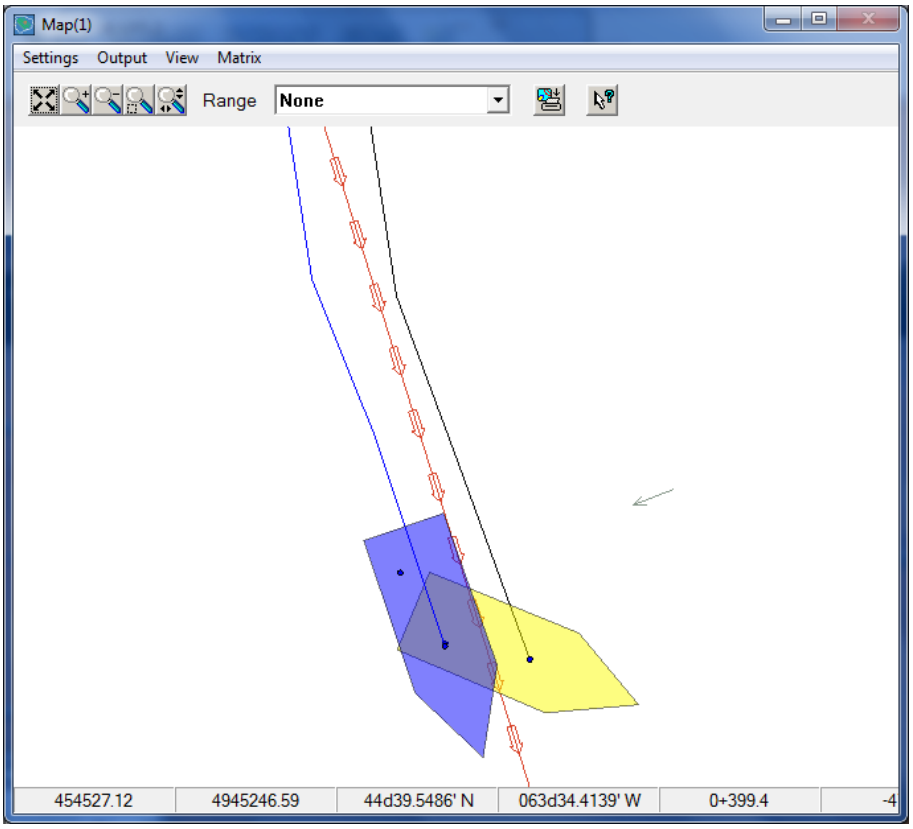
FIGURE 4. *Course Made (red) vs Logging with a Heading Device (black)*



In this example the difference in sounding positions is 11'! The red soundings are based on course made good and the black soundings were logged using a heading device.

Figure 5 shows what is happening with the vessel.

FIGURE 5. *Course Made Good (yellow) vs Heading Device (blue)*



The blue boat is using course made good, while the yellow boat is using a heading device. Notice how far the track is off.

As shown in the examples above, it is best to place the GPS antenna directly above the echosounder transducer. If this is impossible to do with your vessel, you should strongly consider some sort of heading device, like a dual antenna GPS or a gyro.