



We wish to welcome the Navigator to Downeast Maritime Inc:

Downeast Maritime has well over 30 years of training mariners in the mysteries and science of celestial and advanced navigation. Whether that be for USCG licensing through one of our approved training courses or a preparatory course to test at an REC. We strive to encourage and train **any mariner** that is passionate and dedicated wishing to develop the long proven traditional skills of navigation. We have an exemplary written record with all the groups above being in general equally represented.

We have been recognized as a professional member of the U.S. Institute of Navigation as well as being an associate fellow in the Royal Institute of Navigation in London, England and currently, at the time of this writing, are one of only five schools approved in U.S. for this level of training. Our basic and advanced celestial navigation courses, as well as many others, has been approved by the USCG for over 20 years. Others for nearly 30 years. All of our approved instructors have also taught navigation both in the classroom and in practical settings at a Maritime Academy.

Our 1 to 3 persons celestial navigation courses are held both in Maine and Virginia. Virginia being our primary location for all the basic and advanced navigation studies, but can be done in Maine as well. We can also customize courses and times to meet your needs, outside of an approved CG course, and focus as needed on topics of the mariners choice.

So at this point you maybe asking yourself why we are doing celestial navigation in western Virginia and how do we do it in Maine. It's simple, short of being at sea these are some of the best locations to learn celestial navigation using the methods presented below. While digesting this think of Lewis & Clark exploring uncharted lands, Stanley and Livingston in unknown Africa or the Powell expedition in our southwest. These and countless others used these same techniques, that we will be using, for exploring, surveying, and charting with remarkable accuracy. Indeed, if we were on most of the east coast, and working with the sun, we would have roughly only about a 90 degree's arc to work with. Ideally we need 180 degree's. For the star's we are limited to an arc of 180. Here we have a 360 degree horizon all the time and without the light pollution found commonly on the coast in larger communities.

So how do we do it and how different is it from doing it at sea. The first method we will use is called Dip to the Short Sea horizon. We will do all the steps required at sea but using a river, pond or lake. All of which we have an abundance of here. The only difference with this method is the dip correction on our sextant. Instead of using the dip corrections in the nautical almanac we will



be using table 22, vol II, 1981 in Bowditch or a formula. This method can and should be used at sea as well if you are following the coast and need a line of position over land. In other words, only one minor correction is needed, which will require that we know the our height of eye above the water level and our distance from it. We will use a surveyors transit and rod and/or a range finder and GPS system to find this data. At sea one would use a radar or chart and assume you have already measured your height of eye from sea level. The accuracy with this method is extremely good, especially in the learning stages and for practice.

Our second method is to use what we call an artificial horizon. Explorers often used a simple pan filled with mercury. Since this fluid is somewhat problematic we will use molasses, oil or water and may or may not put a piece of high quality glass over it depending on the conditions. You could use this simple method in the middle of the desert on a puddle if needed. But first you may want to check your compass on why you are there. A big advantage to this method is that you can practice your celestial navigation skills at home. A very positive skill set, with only a minor loss in accuracy, compensated by the practice you can get, while becoming very proficient and accurate.

So how is this different than at sea? There is not that much difference at all. It all has to do with how we determine our sextant height sighted to what we will use which is called the sextant height observed. First the dip mentioned above will not be used at all. So that is simple. Our observed height is doubled using this method so we need to divided by 2. Other than that it is mainly technique (super imposing or using limbs in the case of the sun) and which tables we will use, the same as if we are at sea. This method is not recommended for use underway, but that not what we are trying to accomplish here. This is a brilliant training tool every navigator must have.

A third method incorporates much of the above using a high quality mirror. This is a very good method for shooting the stars. It is important to keep in mind that another name for the horizon is the horizontal. Where as our zenith is directly over head, the horizontal, or horizon, is a 90 degree angle to our zenith. So at sea, we would shoot at twilight so we have both the bodies and the horizon visible but are limited to a certain time frame. Using this method, we can shoot at any time the stars are visible from our location on earth. This is a tremendous advantage when in the learning process.

Another method is to use a bubble sextant. This type of instrument creates its own horizon (horizontal) and can be used anytime during darkness and daylight. We will be using a bubble scope on our sextant that has the same capabilities. These types of instruments were commonly used in aircraft,



occasionally by ships but particularly by submarines in WW II when wishing to surface only at night. The accuracy in aircraft was up to 20 or 30 miles, in the hands of an experienced ships navigational officer it often was as little as 5 miles depending on weather conditions. On land, its accuracy is nearly the same as a standard sextant. We will also have available for your inspection U.S. Army Air Force bubble sextants models A-10A & A-12 as well as an aircraft sextant periscope (see instrument list below). Using this method allows us unlimited practice time not restricted to twilight times.

When shooting a sea horizon another common problem is not getting a defined clear horizon due to weather conditions such as haze, fog, clouds and so forth that will affect our accuracy. When we are in the learning process this can be very frustrating. All of the above methods limit this problem considerably. When in the time frame of a course we cannot predict what weather we will be getting. With the tools above we can now move forward with less worry about weather conditions. Of course, clouds, rain, snow would restrict us no matter where or how we are doing our sights. Here in Virginia the weather is generally mild and conducive to our work but keeping your finger crossed would not hurt. In Maine it is colder but our experience shows that it would be rare indeed not to have periods of time that sights can be taken even in the worst months. Further, in Maine, because of the unique jagged coastline, multiple sights can be taken using the actual sea horizon depending on the time of year for some stars and planets, and all the time for the sun.

Celestial navigation in and of itself is not a destination one gets to. Rather it is a life time journey into learning. Naturally there are specific goals we will need to obtain along the way. No matter where you are in this process we can help. Give us a call and we can discuss your goals and the best and most efficient way to obtain them.

Best regards,

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