

Survey Equipment on the NOAA FAIRWEATHER
By: Matthew Brown, Summer Intern 2005

The acquisition of hydrographic data aboard the FAIRWEATHER is a very systematic operation involving several phases; these steps are the planning, acquiring, and processing of raw data into useful information.

The planning phase of data collection is reliant upon certain information, such as the lack of modern surveys, natural changes to the bottom, new man made features, changes in traffic patterns, and the revenue generated by that area. Once an area is designated as an area in need of surveying, it is placed on the survey list. After this initial step, survey technicians must ensure that there are tide gauges in the area, with a radius that covers the entire surveying area. If there are no gauges in the area, the next step would be for the FAIRWEATHER crew to install tide gauges themselves on nearby land. The information from the gauges determines the height of water at a certain time in a specific location. This is crucial to the information that is going to be put on a chart which often displays depths at mean lower low water. The number of tide gauges to be placed depends on the size of the area to be surveyed, and the distance between the respective gauges. Simultaneously to getting tide gauge readings, the officers of the FAIRWEATHER and the survey team plot out the best routes and estimated times of arrival (ETA) to each position. The survey area is divided into different sheets that will be assigned to various officers and survey crew members for acquisition and processing.

Accurate data acquisition involves diligent work by survey technicians and equipment in good condition. The POS/MV is connected to two GPS satellite receivers on the ship's flying-bridge. These two receivers get data from a minimum of four satellites rotating in space. Three satellites are for positioning and one is for time. The two satellite receivers work directly with the IMU (Inertial Measurement Unit) system located in compartment 5 of the ship. The IMU uses a fiber optic gyro that monitors and records the ship's movement: rolling, pitching, heading (yaw) and heaving. The IMU and The POS/MV are considered one unit. This unit works simultaneously with the ship's multi-beam echo-sounders. The FAIRWEATHER is equipped with two multi-beam eco-sounders under its hull. The most commonly used multi-beam eco sounder is the Reson 8111, meant for depths ranging between (5-500 m). The transducers emit 101 sound waves across a 150 degree swath. The sound velocity in the respective water column is measured by the MVP (Moving Vessel Profiler), which is also referred to as the "Fish". All of which are necessary in understanding how the sound waves are refracted, and the speed at which they travel back to, and are received by the multi-beam eco-sounder.

Processing extremely large amounts of raw data requires several complex computer software programs and a lot of time put in by survey technicians. To ensure accurate results, the data collected is "cleaned" for accuracy and easier interpretation. Technicians remove 'fliers' which is inaccurate data. This is then filtered for important information such as high peaks, rocks and shoal areas. The data is then checked for quality and is published in today's nautical charts and is also available in 3-D imaging.