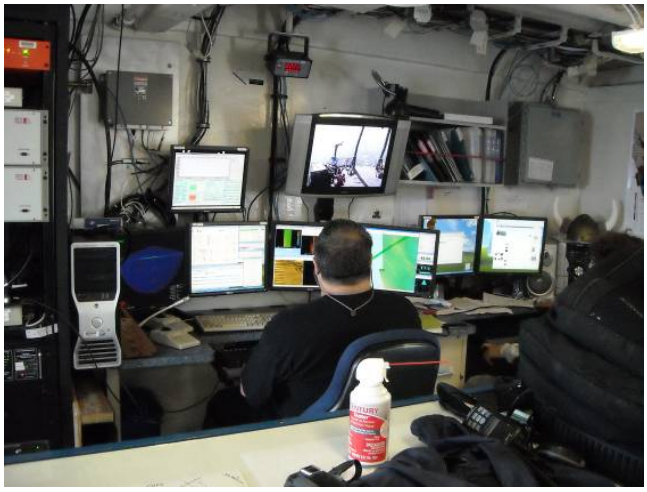
NOAA Teacher at Sea
John Schneider
Onboard NOAA Ship *Fairweather*
July 7 – August 8, 2009

NOAA Teacher at Sea: John E. Schneider
NOAA Ship *Fairweather (S-220)*
Mission: Hydrographic Survey
Geographical Area: Shumagin Islands
Date: July 14, 2009

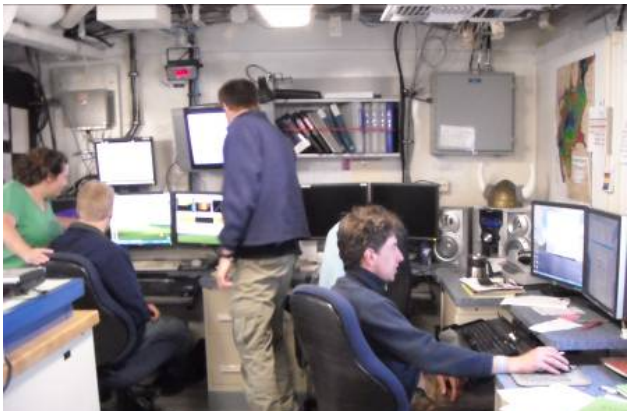
Position
Shumagin Islands

Weather Data from the Bridge
Weather System: light overcast
Wind: light & variable
Sea State: gentle swells



Here I am in the data acquisition chair.

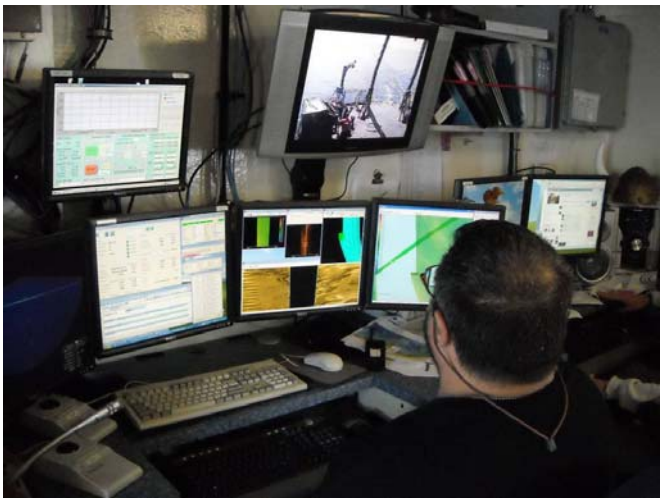
Science and Technology Log
Today I spent quite a few hours in the plot room learning about the methods being used on *Fairweather* for recording bathymetric data. In the picture below and to the right you are looking forward at the starboard side of the Plot Room. From the left are Chief Survey Tech Lynn Morgan, Survey Tech Dave Franksen, survey crew members Damian Manda and Gabriel Schmidbauer. Dave is in the chair that I'm occupying in the shot above.



More data acquisition!

At first, it's a baffling array of monitors and programs and people. There are 11 stations for survey personnel in the plot room and it is operating 24/7 when we are under way. In the adjacent compartment are the FOO (Field Operations Officer) and the CST (Chief Survey Technician.) The FOO on the *Fairweather* is LT Matt Ringel. The future FOO is LT Briana Welton (who will become the FOO when LT Ringel rotates off the ship); and the CST is Lynn Morgan. While the crew is quite casual in addressing one another, there are three individuals who are addressed by their titles. Commanding Officer Doug Baird is addressed as "CO," Executive Officer David Zezula is "XO," and LT Ringel is "FOO." Everyone else on board is addressed by casual names. These three officers and the CST are integral to getting our mission accomplished.

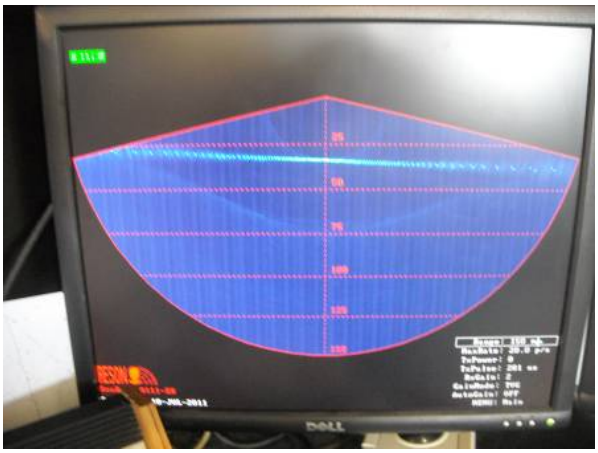
I'll address the monitors I'm viewing from top to bottom and left to right. Once you've sat in the chair it's not terribly difficult to follow what's being displayed . . . but a novice like me isn't able to decode issues that pop up sometimes. Though I sat a 4-hour watch, for the vast majority of that time I had an experienced tech (Will Sauter) very close to help when it was needed. The top right monitor is a closed-circuit TV monitor of the ship's fantail[1] (aft deck.) This is where the remote MVP is deployed from (The MVP is the ship's equivalent of the CTDs[2] we deploy from the launches.) It's on the starboard quarter and is deployed with a couple of mouse clicks from the chair. Its mouse is the white one to the right and its keyboard is the white one.



The data acquisition monitors

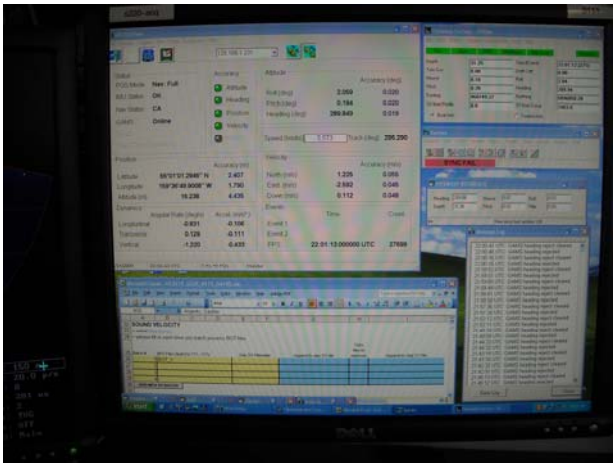
To the left of the closed-circuit TV monitor is the control screen for the MVP. It indicates how deep the "fish" (the sensor) is, the tension on the line, how far behind the ship it is, the GPS accuracy, who is capturing data on the watch and about 20 other parameters. Whenever something is going that involves the ship or its operations, the bridge must be apprised so the Officer of the Watch is on the same page as the survey and boat teams. You key the intercom to the bridge and say something like, "Bridge, we'd like a cast, please." And they will respond "yes," "OK," "affirmative" or something along those lines. Then we follow with "fish is deployed," "fish on the bottom" and "fish is back." The MVP gets a sound-velocity-in-water throughout the water column. It can vary by as much as 10 m/s which affects the recorded distance.

The far monitor you see below is a graphic display of the beam-spread from the 8111 Multi-Beam Echo Sounder. The sounder can cover an angle of 150º (which is 75º to either side of the Nadir[3].) Ideally, this line should show blue dots across from one point of the cone to the other. As you can see, the left side is a bit higher than the right. This could indicate either that the ship is rolling or the bottom is sloped. The control for adjusting the beam is the left roller ball in the top picture. (The right one is for a different MBES.)



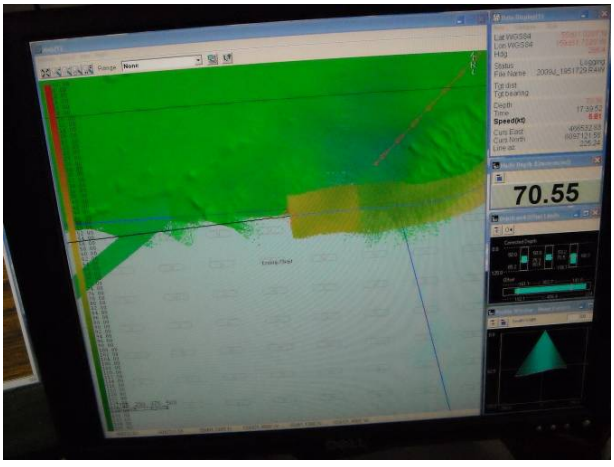
The graphic display of the Multi-Beam Echo Sounder called the beam "cone"

The next 3 displays are all controlled with the black keyboard and mouse on the lower shelf in my lap. The left monitor of these three displays technical data about the ship and MBES. One of



This display shows technical data about the ship and Multi-Beam Echo Sounder.

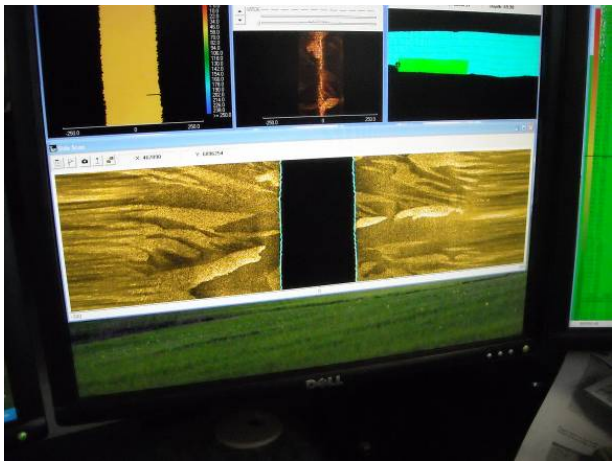
be segregated. One of the Officers (ENS Patricia Raymond) actually got a screen capture of what appear to be whales directly below the ship. I swear you can identify flukes and fins, but maybe that's just wishful thinking on my part. I'd have included it here, but there's just the one copy in plot. The top right in this display shows a minimized version of the path we're "mowing." You can see the most recent data in green. Finally, on the bottom, are the side-scan views of the bottom. In this particular shot it's kind of interesting with what appear to be the remains of glacial moraines and scour on the seafloor.



This screen shows the ship's progress on the polygon.

the devices integrated into the system is an Inertial Motion Sensor which quantifies the amount of roll[4], pitch[5] and yaw[6]. Having this information allows the raw data to be corrected for some environmental factors. Also in the display are accuracy and precision indicators for the GPS positions, personnel on watch, logging verification to begin and cease, and more.

The next display is broken into four subordinate windows. On the top left and center are visuals on the nadir beams directly under the ship. It seemed a bit odd not to simply include the nadir in the bottom half of the display, but the bottom half is processed a bit differently and needs to



This screen depicts various graphic displays of data.

The last screen, on the far right, is the screen showing our progress on the polygon. The recently scanned area shows up in a different color than those previously scanned and every time you update the plot, the colors begin anew. *Fairweather* frequently uses about a 50% overlap to ensure redundancy of data points. On the lower right side of this screen is a graphic of the beams under the ship. It usually looks very much like the image of the "cone" displayed above. The "70.55" indicates the depth (in S.I. Units of meters) and the top right indicates the status of whether we are logging/retaining the data or if it is just reading

it. We don't log when the ship is turning because the data points get too spread out on the outside of the turn.

Personal Log

At first glance, it seems that mastering all of this would be daunting, but the ease and confidence that are displayed by the team show that it can be done. Again, the Professional Learning Community idea comes into play as they collectively debug issues and plan for future advancements in the technology even as they are using what is current. Listening to the technical banter and seeing how that much brainpower is focused on a task is really cool.

Just another day in Paradise!

Having spent most of the day in plot, it was real nice to spend the (endless) evening just watching the ocean around me. When the sun sets at 2315 (11:15 pm) it's cool. When it sets at 2313 behind a mountain island off the coast of Alaska it's unbelievable!

Questions for You to Investigate

- How are your inner ears similar to the Inertial Motion detector?
- How are your semicircular canals contributors to seasickness?

New Terms/Phrases

1. Fantail – The aft deck on the ship. It's where the majority of overboard work is done
2. CTD's – Conductivity/Temperature and Depth sensors
3. Nadir – The beam that runs the shortest distance to the bottom
4. Roll – the left/right rocking of the ship
5. Pitch – the front/back rocking of the ship
6. Yaw – the swinging of the ship to either side of its course (picture a wagging tail)