

# **Underway Geophysics Lab Cookbook**

## **U/W Watchstander Guide**

Updated Leg 203

### **Introduction**

Welcome to the Underway Geophysics Lab. Your job as an U/W Watchstander is to verify the normal operation of our geophysical equipment while the ship is underway. Your responsibilities lie in monitoring three areas, the navigation system (WinFrog), depth recording and the magnetometer and will be described below. If at any time you encounter problems or have questions, do not hesitate to call the U/W tech, the LO or ALO.

### **Crossover**

When you arrive in the Underway Lab, everything should be set up and running. Take a few minutes when you arrive on shift to crossover with the offgoing watchstander. Verify the depth range, check logsheets, find out which magnetometer is deployed (port or starboard) if any. Discuss any problems or changes. Find the ship's position on the chart and water depth to verify that the range on the PDR is correct.

### **U/W Log Sheets**

Fill out the log sheets with the GMT time, depth, magnetometer field value and any comments. Initial the sheet at the time you come on shift. If you start a new page, fill out the information at the top incrementing the page number and changing the date or Julian Day if necessary. Place completed sheets in the appropriate place.

### **U/W Watch Program**

The U/W Watch program runs on the Winfrog 2 PC. The functions of the program will be discussed as it relates to the sections below. Similar to the WinFrog, if the data is not updating, the program has crashed and will need to be restarted. The U/W Tech will give you instructions on how to restart the program.

### **Computers**

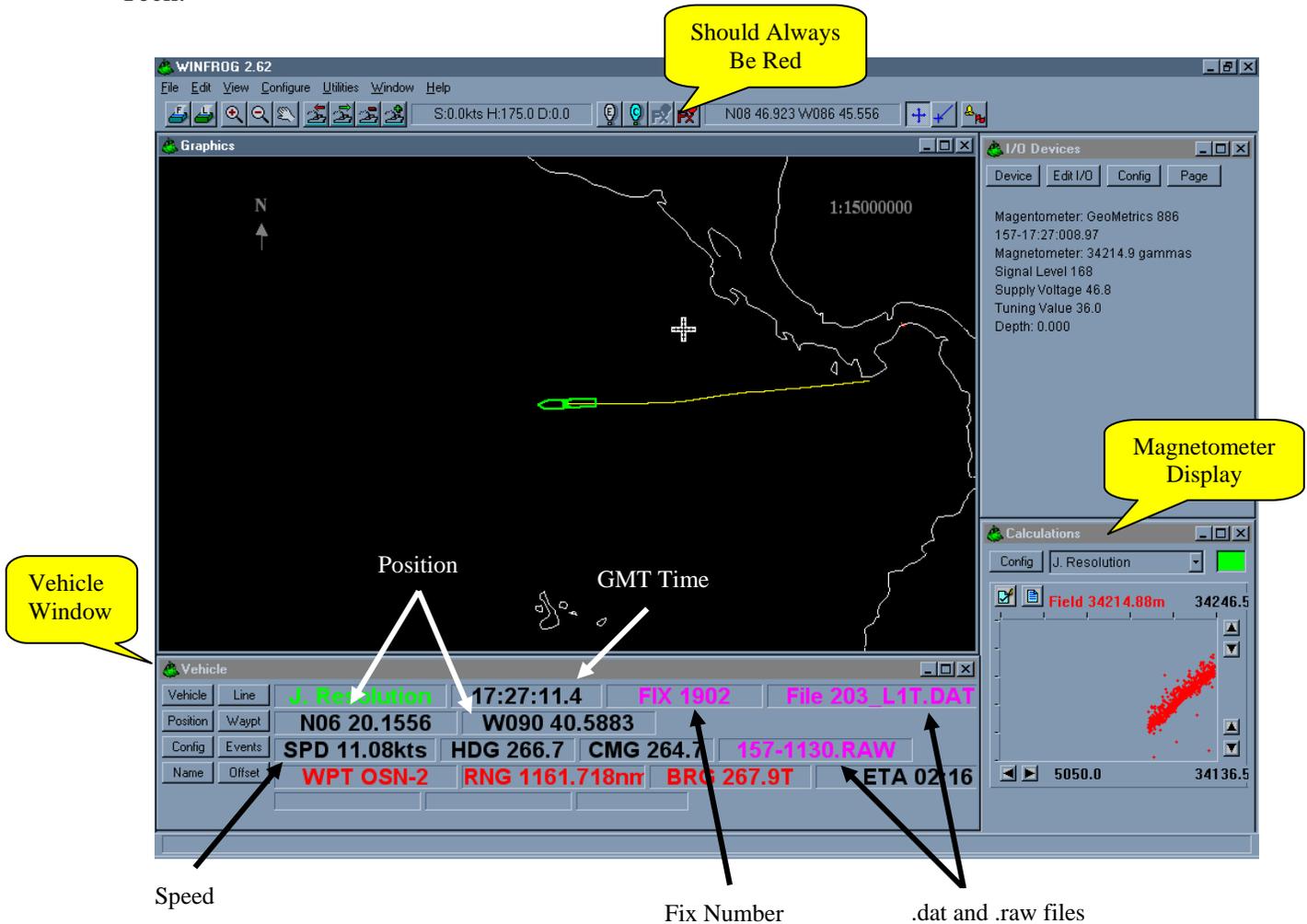
Please only use the Macintosh computer for non-U/W purposes. Groupwise, Microsoft Office and a DVD player among others are loaded on the machine. All other computers are dedicated to U/W functions and data collection.

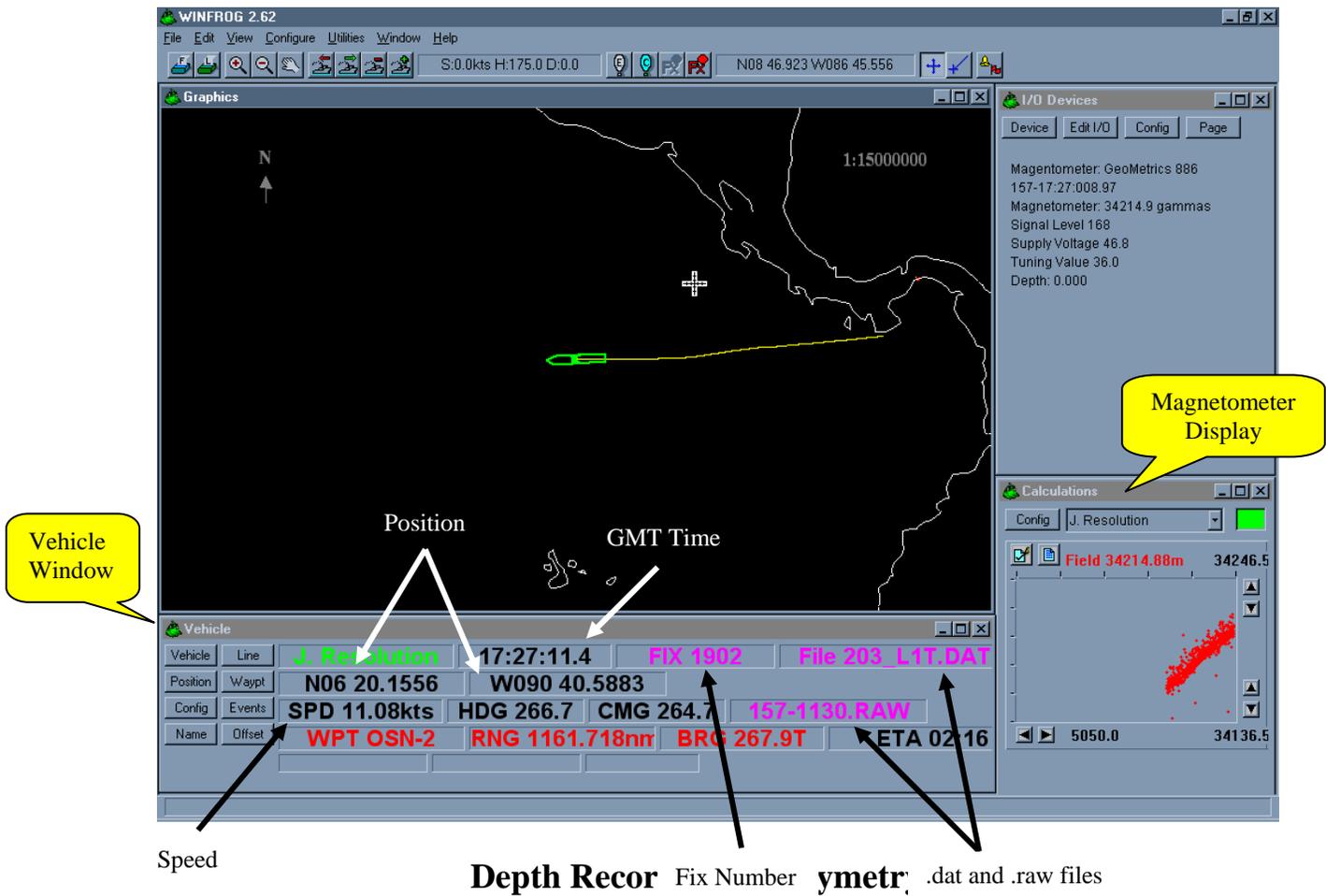
## Navigation (WinFrog)

The navigation system we use is called WinFrog and is run on the Winfrog 1 PC. WinFrog allows us to monitor the ship's position on a geographical display while giving us the position, range, bearing etc. ODP obtains our navigational data from GPS receivers independent of the ones the Bridge uses so if something goes wrong, don't worry, they will know where we are. When you arrive in the lab for your shift, please do the following,

- Verify that the numbers in the Vehicle Window are updating every second or so and that the fix number changes every minute. If the numbers are frozen or the position numbers (Lat, Long) are yellow, the program has crashed or lost the GPS signal. Notify the U/W Tech immediately.
- Verify that there are ".dat" and ".raw" files listed in the Vehicle Window.
- Verify that the button on the top icon bar is red.
- Check the ship's speed periodically, if the speed drops below 7 knots, the magnetometer, if deployed, will need to be brought in (see section below on magnetometer)

The ship should remain in the center of the screen. You may use the zoom functions but please do not change any of the other settings without proper instruction and approval from the U/W Tech.





A 3.5 kHz and 12 kHz precision depth recorders (PDRs) are used to determine water depth. The depth information is plotted on thermal recorders. A calibrated depth meter mounted on the 3.5 kHz recorder is used to read the depth directly from the printed record. Depths are recorded on a log sheet then entered into an Excel spreadsheet. Below is a description of the underway procedure.

### Setting the Range

Depending on what the water depth is, the 3.5 kHz PDR must be set to the appropriate depth range. The ranges are 0-750 m, 750-1500 m, 1500-2250 m and so on. For each depth range the PDR sends out a different pattern of sound pulses or “chirps” optimized for that water depth. For example, if the water depth is 2000 m, the range should be set on 1500-2250 m. As the seafloor is printed on the recorder, the range on the recorder is 1500-2250 m. The depth range is changed manually on the U/W Watch program under the “3.5 PDR” tab by simply selecting the appropriate depth range button (see illustration). If the PDR is set on the incorrect range, the record will look discontinuous with blank lines in it (picket fence, see example on recorder) and if the depth range is off by more than one range, it is possible no record will print.

### **Changing the Range**

If the depth of the seafloor increases or decreases out of the current range setting you will need to change the depth range on the PDR. For example, if the current range is 1500-2250 m and the depth increases beyond 2250 m the depth record will print to the edge of the page on the right side then continue printing starting on the left side of the page. From that point, the new range on the recorder is 2250-3000 m. Change the depth range on the U/W Watch program to 2250-3000 m. Manually annotate the printed record with the range change (i.e. C/R 2250-3000). Record the range change on the log sheet.

### **Note on Ranges**

The bottom 75 m of ranges 0-750 m and 750-1500 m does not print. If the seafloor moves into the bottom 75 m you can change to the next lowest range and the seafloor may print. Be aware that the bottom of all of the other ranges may display the “picket fence” pattern, don’t worry.

### **Depth Check**

The 12 kHz PDR should always be set on Depth Check which means the total depth range on the recorder goes from 0 m on the left to 6000 m on the right. Hold the 0-6000 m paper scale bar up to the record to find which range the water depth is in. The 3.5 kHz should be set on that range. If the 12 kHz PDR is not in use or the signal is hard to see, depth check can be performed on the 3.5 kHz PDR in a similar fashion.

### **Recording the Depth**

With the digital depth meter set on the appropriate depth range, move the scale to where the shallowest reflection crosses the 5 minute line. Read the depth off the red meter. Record the depth on the log sheet every 5 minutes. Enter the depths into the Excel spreadsheet that is located on the desktop of the Winfrog 2 computer and save the file.

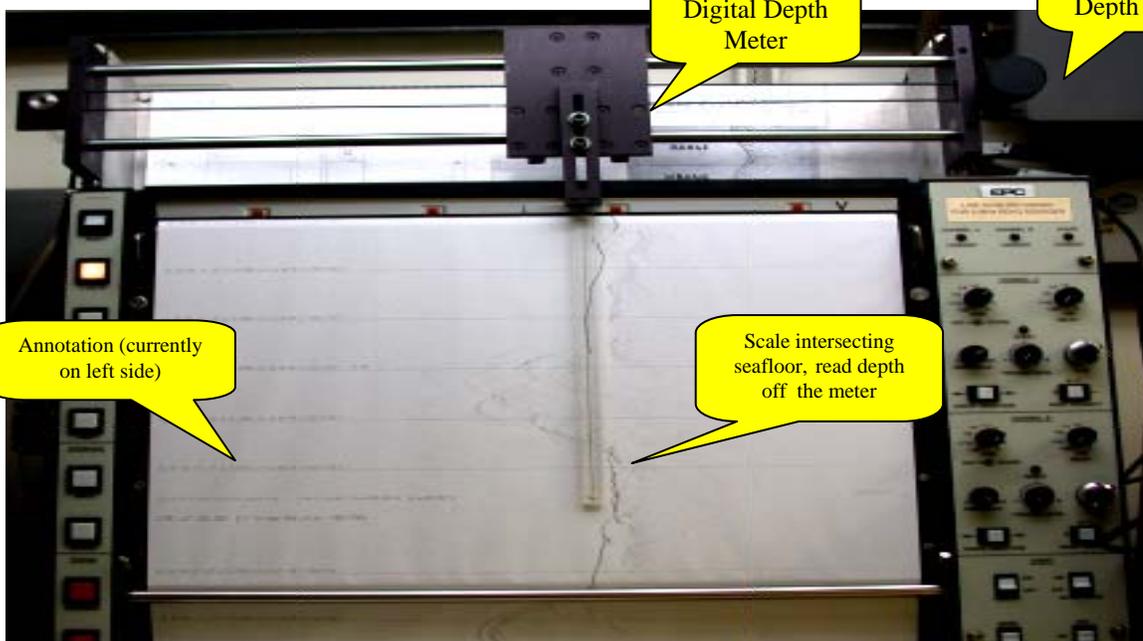
## Selecting or Changing Range



Click to set depth range program or do a depth check

Current depth program

## 3.5 kHz PDR Recorder



Digital Depth Meter

Turn knob to move Digital Depth Meter

Annotation (currently on left side)

Scale intersecting seafloor, read depth off the meter

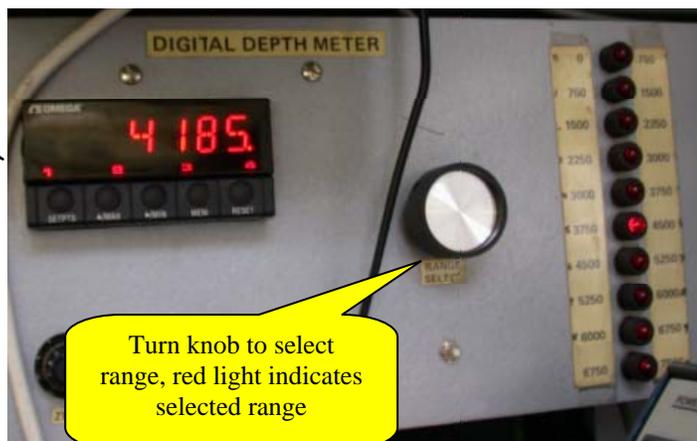
← Shallower

Deeper →

← Current Range 3750-4500 m →

## Digital Depth Meter

Depth at position of scale on recorder

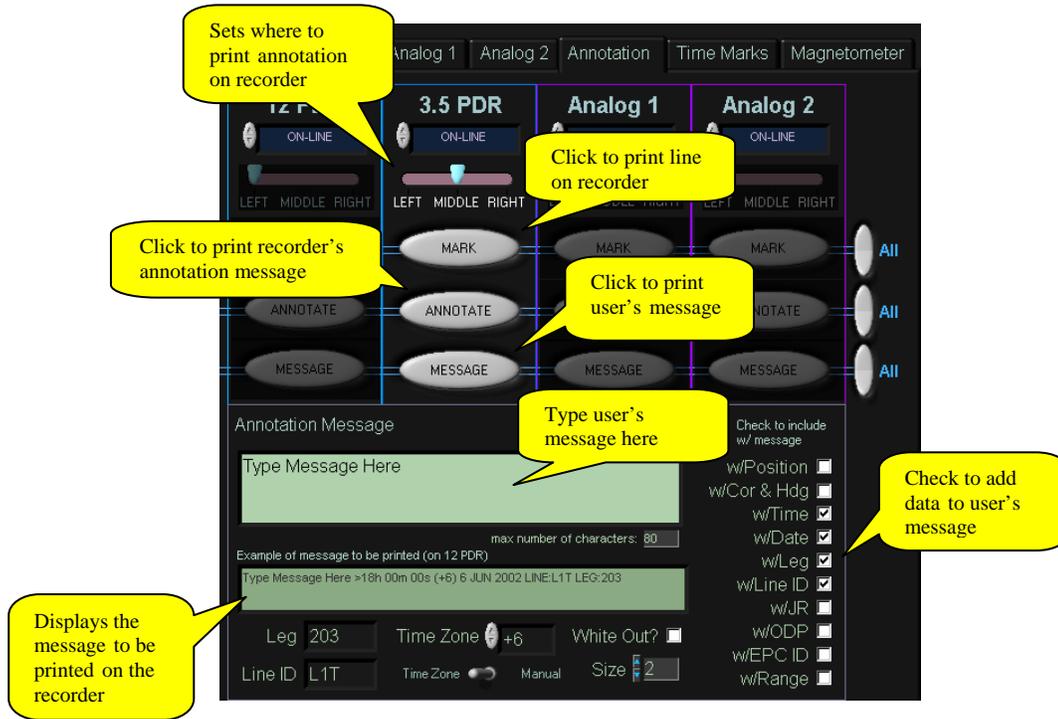


Turn knob to select range, red light indicates selected range

Ranges

## Recorder Annotations

The 3.5 kHz recorder is set to print lines and annotates the record with time and position every 5 minutes. The 12 kHz prints every 30 minutes. The annotation can be printed on the left side, center or right side of the paper. Avoid printing the annotation over the depth record. Change the position of the annotation on the U/W Watch program under the “Annotation” tab.



## Paper Change

If a pink line appears on the edge of the paper it is time for the paper to be changed. Please call the U/W Tech or one of the ETs.

## Magnetometer

First, check to see if a magnetometer (maggie) is deployed, if not, no worries, if so, keep reading. Maggie data is displayed in two places, on the WinFrog display and on the U/W Watch program where the data is also saved. Please do the following,

- Verify that the data is being collected.
- Record the Field value every half hour on the U/W log sheets.
- The data should plot as a narrow band. If there is a lot of scatter in the data then the magnetometer needs to be tuned. Notify the U/W Tech.
- Verify that our speed is above 7 knots. The maggie is towed 500 m aft of the shift so it is important that we maintain our speed or it will sink.
- Verify that our water depth is greater than 500 m.

### Deployment and Recovery

You may have to deploy or recover the maggie during your shift. The Bridge may call you and ask that the maggie be brought in if the ship is going to slow down, turn or the water depth shallows. If it is necessary to recover the maggie or you are given the OK by the Bridge to deploy the maggie, do the following,

- Call the U/W Tech, LO or ALO immediately
- If you are ever involved in deploying or recovering the maggie, always do the following,  
Notify the Bridge  
Have the power to the maggie OFF.  
Make a note on the U/W logsheet (i.e. Port Maggie Out, Maggie In).

