UHDAS+CODAS Technical Documentation

This document is a compilation of web pages found in the `UHDAS+CODAS` on-line documentation, located on the Web at http://currents.soest.hawaii.edu. These chapters are independent web pages in the on-line documentation, and represent a reasonable introduction to UHDAS and CODAS for users and operators at sea. Please consult the on-line documentation for more information.

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status: work in progress

Note

This html from this file is to be copied to /home/adcp/www as ADCP_instructions.html. The links are correct for that location. The files with the same name (ADCP_instructions.txt) in UHDAS_webdoc have links locally, to files in the same directory

1 UHDAS: Instructions for ADCP Operators

Related Documents:

UHDAS Gui tour

ADCP Operator Checklists

1.1 Before a cruise:

1) Log in

- log into the ADCP UHDAS computer *currents* as user "adcp"

2) Launch the UHDAS gui by either of the following:

- in a terminal window, execute "UHDAS"

OR

- click on the little ADCP icon on the task bar

A gui tool ("UHDAS") comes up with tabs at the top, starting you in the Control Tab (Control over logging).

3) Click "Start Cruise" to set up for data logging

UHDAS will ask you for a cruise name. Enter something like "nbp0407" or "lmg0413a", (usually matches the ship schedule cruise name). This cruise name is used in several contexts, and must have only upper or lowercase letters, underscore, or digits (not the first character).

Note

If you need to log data to a pre-existing cruise directory (e.g., you only wanted to stop data acquisition temporarily but chose to "End Cruise" as well), you can resume logging to it by giving the same cruise name again and confirming your choice in the UHDAS dialog box that appears. If in doubt, start another cruise leg. See the Control Tab in the Gui Tour for details.

4) Check the ADCP logging paramters.

In the link:UHDAS_Control.html[Control tab], check parameters for the ADCP(s) against the values on the ADCP Operator's checklist.

For instance, you may want to start with Bottom track "OFF", whereas the default may be "ON". Except for bottom tracking, these parameters should not be changed from the default values for routine logging. (See below for details about Bottom Tracking).

Check that the RDI deck units are on.

5) Click "Start Recording" to initiate data collection

The gui will switch over to the Terminal Tab to display a dialog with each of ADCPs as it initializes them in sequence. You can watch the dialog but do not try to use the buttons. The dialog is written to a file in the /home/adcp/log directory.

Note

for Ocean Surveyors
If you get the instrument is hopelessly confused message, which happens on occasion....
(1) A window will pop up telling you to cycle power on the deck unit. Click "OK"
(2) Another message will pop up asking if you want to "Continue logging other data streams". Click "No".
(3) When any terminal window updates have been completed, it will return to the Control tab of UHDAS.
(4) Now **cycle power on the deck unit** (turn off, count to 10, turn on).
(5) Now you can click "Start Recording" to try again. It is possible for the instrument to get confused even after cycling power, so you may have to repeat the sequence.

6) Once recording starts, **green is good**

After logging starts, UHDAS switches over to the Monitor Tab, showing green panels for each data stream being logged.

- Each panel is labeled with the instrument name and the serial port used. Ascii messages are displayed in the panels if the serial stream is ascii. If the serial stream is binary (e.g., ADCP raw pings) the panels contain a timestamp and number of bytes for each message recorded. Small colored buttons in the upper right corner reflect the status of the data being logged.
- If any of the logging panels in the link:UHDAS_Monitor.html[Monitor Tab] do not start acquiring data within a few seconds, check that the appropriate instrument, i.e., one or both of the RDI deck units and the necessary serial navigation devices, are up.
- After about 10 mins, there should be 5-min profile plots that display from the "Plots" tab. After 90 minutes, there should be a plot that displays from the "Average Plots" tab.

1.2 During a cruise

(1) monitoring:

- Green is Good. Look at the panels in the Monitor Tab If everything is logged correctly, there will be no red status warnings.

- Red is Rubbish. If a data stream is lost for some reason (serial port failed, instrument failed) then part of the panel will turn red, as will the button in the top right corner. If this happens, check the instruments and serial cable connections. It may be necessary to change logging ports if one of the ports fails. If any of the physical configuration changes, the configuration file will also have to be altered.
- A **daily email** message will be sent to the ADCP Operator's email account(eg. ET@nbp.usap.gov) containing information about the UHDAS ADCP computer system, logging, and processes. These messages should help in identifying and debugging problems.
- The UHDAS ADCP website (http://currents/adcp) will have figures that are updated regularly. Figures that update every 5 minutes are in the Plots Tab of UHDAS. Figures that update once per hour are in the Average Plots Tab. Figures should be updating regularly. If for some reason the figures quit updating, check the logging panels under the Monitor tab and make sure everything is green. If they are, DON'T ADJUST ANYTHING: the raw data are good, but the processing software hit a glitch for some reason. See link:Troubleshooting/index.html[UHDAS Troubleshooting] for more detail.

> **Note**
>
> Green panels indicate that a serial message was received with a valid checksum. This does not say whether the message is useful. This is usually only a problem with a flaky Ashtech. ADU units can lose their satellites and send messages with lots of commas or zeros, so the panel is green, but the data are worthless. For Ashtech specifically, look at the messages and make sure they are not junk.

(2) Switching Bottom Tracking mode between OFF and ON

- go to the Control tab
- click the button for Bottom Track (for the ADCP of interest) to toggle it. This enters the bottom track command but does not send it to the instrument. Do this before you stop recording to minimize downtime in pinging.
- If "the instrument is hopelessly confused" state is recurring frequently (e.g., when bottom track configuration is changed), you might want to power cycle the OS deck unit after you stop recording (turn off OS deck unit, wait 10 sec, turn deck unit back on).

- Stop recording (wait until UHDAS is back at the CONTROL tab) and start recording with the new parameters. No need to end cruise or exit UHDAS.

- **NB150 Bottom Track: switching between Bottom Track** on and Bottom Track off is a simple toggle.
- **Ocean Surveyor Bottom Track for NB mode: switching** between Bottom Track on and Bottom Track off is a simple toggle.
- **Ocean Surveyor Bottom Track for interleaved mode:** we always want TWO kinds of pings. If Bottom track is off, we want BB and NB pings. If you turn Bottom Track on, please turn NB off (the deepest mode). When you turn Bottom track off, turn NB pings back on (see table at the end of this section).

- click "Stop Recording"
- A pop-up box will ask you [...text...] "Do you want to stop data acquisition? * Click "Yes"
- click "Start Recording" (again, wait a moment for it to think)
- Watch the dialogs as it starts communication with the ADCPs. It is at this point that the new command is sent to the instrument.
- Watch the Monitor tab to ensure that all panels come up green, with scrolling messages in them.
- Click back to the Control tab to verify that bottom tracking has changed status. Then return to the Monitor tab to leave the system with the green panels showing.

EXAMPLE: Ocean Surveyor Bottom Track for interleaved pinging

	Bottom Track OFF (deeper than 500m) **-- default--**	Bottom Track ON (shallower than 500m)
BB pings	ON	ON
NB pings	ON	(off)
Bottom Track	(off)	ON

(3) Data archiving:

UHDAS computers are usually set up with two identical bootable disks, where the ”home“ partition of the second disk acts as a backup location for the data (/disk2/home/data mirrors /home/data).

UHDAS can also write the data to an external disk (eg. USB disk) or an accessible network (nfs) directory on another computer.

The status of the backups should be indicated in the daily ADCP Operator email.

1.3 After a cruise

- go to the Control tab
- click ”Stop Recording“ (wait a minute for it to think)
- click ”End Cruise“. This may take a moment while UHDAS cleans up temporary files from the cruise that is ending.

1.4 Troubleshooting

- Some tips are on the troubleshooting page

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2 Check: What Should Be Updating

2.1 In the UHDAS gui

When a cruise is active and logging is underway, you should see:

- green panels in the Monitor Tab, with updating strings (NMEA strings or byte count) NO RED.

2.2 In the cruise directory:

2.2.1 In '/home/adcp/cruise/raw/'

There should be single-ping data in each ADCP instrument directory (eg. NB150, OS75). Files are *.raw ascii data being updated to each of the serial data directories (eg. gpsnav, gyro, Ashtech)

- TEST THIS with the following command (**"l"** as in "logging")

  ```
  showlast.py -l 12
  ```

- LOOK AT STRINGS with the following command (**"a"** as in "ascii"). This will show the last 6 lines of each data stream logged (or the accompanying log file for binary data such as ADCP)

  ```
  showlast.py -a 6
  ```

2.2.2 In '/home/adcp/cruise/rbin/'

There should be files with very recent (seconds old) timestamps in all "rbin" subdirectories.

- TEST THIS with the following command (**"r"** as in "rbin")

  ```
  showlast.py -r 12
  ```

2.2.3 In '/home/adcp/cruise/gbin/'

There should be files in all subdirectories with timestamps 5-10minutes old.

- TEST THIS with the following command (**"g"** as in "gbin")

  ```
  showlast.py -g 12
  ```

2.3 On the web page 'http://currents/adcp/' (Quick Links)

For each instrument and ping-type combination there will be:

- 5-minute profiles update every 5 minutes
- vector and contour plots update every hour

If after 90 minutes the figures are still not updating, you (the ADCP Operator only) can try the only possible solution: '*start another cruise*'.

- In other words,
  - stop recording
  - end cruise
  - start cruise (add a letter to the original cruise name).
  - start recording

After 10 minutes you should see the profile plots updating; after 90 minutes you should see the vector+topography and contour figures updating. If there is still a problem, email us and we'll try to help:

- For the LMG only
  - Teresa Chereskin (tchereskin@ucsd.edu)
- For All Other Ships:
  - Jules Hummon (hummon@hawaii.edu)
  - Eric Firing (efiring@hawaii.edu)

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3 Automated processing ("repeaters")

3.1 nb150 and os75 (nb pings) example:

- automatically run from /home/adcp/uhdas_tmp **do not run manually**

- Information in /home/adcp/log/DAS_while_logging.log (.log.1, .log.2,...), .warn, .err:
  - time of start and commands are recorded
  - time of execution for each repeater
  - timeout (falling off the stack), errors, and warnings

3.1.1 300sec interval

- 5 minutes: update gbins, make a plot

```
run_lastensq.py -d nb150  --update_gbin --averages --plotens
run_lastensq.py -d os75nb  --update_gbin --averages --plotens
```

3.1.2 1800sec Matlab

- half-hourly -- update CODAS database, make 3-day plots

```
run_quick.py -d nb150  --stdout run_quick_nb150.stdout
run_3dayplots.py -d nb150  --stdout run_3day_nb150.stdout

run_quick.py -d os75nb  --stdout run_quick_os75nb.stdout
run_3dayplots.py -d os75nb  --stdout run_3day_os75nb.stdout
```

3.1.3 3600sec matplotlib

- hourly -- update heading correction plots

```
run_hcorrstats.py --hcorr_inst ashtech -d1 --printstats --plotdh
```

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4 Instrument is ”Hopelessly Confused“

A firmware bug sometimes results in a loss of configuration information inside the instrument. This is usually detected during the dialog with the instrument, after clicking *”Start Recording“*.

Under these conditions, a dialog window will pop up saying something like

---

The ADCP is Hopelessly Confused.

Please cycle power on the deck unit and try again.

This situation is unfortunate, but should NOT require restarting the UHDAS gui, nor should it require rebooting the linux ”currents“ machine.

Cycling power on the deck unit should be sufficient.

> **NOTE:**
> If the firmware is upgraded to 23.16 from 23.11 (what it is probably running) this should take care of the Hopelessly Confused message

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5 Check: UHDAS is unresponsive?

> **NOTE**
> This means the buttons don't respond, or the gui is in some way hung. This is not the same as Hopelessly Confused, which is an actual error triggered by a firmware bug.

5.1 If the UHDAS gui is in a strange state:

(1) kill the "DAS.py" process: - enter 'pkill DAS.py' at the command line

(2) kill the serial logging processes:

- look for the processes,
  - 'ps -ef | grep ser_'
- kill them,
  - 'pkill ser_asc'
  - 'pkill ser_bin'
- look again to make sure they're gone
  - 'ps -ef | grep ser_'

(3) remove the files in /home/adcp/flags

- 'rm /home/adcp/flags/*'

(4) If any DAS* processes cling to life, kill them:

- 'ps -ef | grep DAS'
- 'pkill DAS_while_logging.py'
- 'pkill DAS_while_cruise.py'

(5) Make sure permissions are "all read write" in /dev/tty*

- find the kind of tty (serial) lines we're using:
  - 'grep tty /home/adcp/config/sensor_cfg.py'
- look at the permissions for the typs of serial lines used:
  - 'ls -l /dev/ttyS* ttyn* ttyR*'
- if any do not have all read and all write permission:
  - (as root) 'chmod a+rw /dev/ttyS* ttyn* ttyR*'

(6) OK to restart the UHDAS.

- It should find the present cruise and go straight to the Control Tab.

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6 Check: During installation

6.1 Check these first:

DAS does not start:

- are there warnings or errors? Check /home/adcp/log for *.err and *.warn files
- any mesage in *.warn or *.err will have more information in the matching *.log file

DAS does not start logging:

- **are the serial ports and baud rates all correct? Check /home/adcp/config/sensor_cfg.**
- Check your serial messages: they should all have checksums, they should be coming in at 1Hz. If it is more frequent than that you can subsample the input; BEWARE: Only subsample if data are more frequent than 1Hz, and subsample by a prime number to void aliasing of data streams.
- permissions: * do the appropriate serial ports exist? * do the relevant serial ports all have a+rw permission? * does user adcp have +rw permission in /var/lock?
- is there a directory /home/data that user adcp can write to ?
- are there extra files in /home/adcp/flags??
  1. stop logging, end cruise, kill gui
  2. remove all files from /home/adcp/flags
  3. kill all processes with "matlab", "DAS", or "ser_" in them (but not the license manager)
  4. start gui, try again

Logging starts but there are no plots:

- Is the matlab license manager running?
- Are there files in /var/tmp with the matlab name ("TMW") that are owned by root (or someone other than user "adcp")?

- There should be one entry from this query:
  ps -ef | grep MLM | grep -v grep

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7 Bottom Track Calibration of a new installation

7.1 Scenario:

A transducer is installed, and the ADCP "forward" beam (#3) is oriented at some unknown angle relative to the bow. There *was* a plan, and beam 3 was supposed to be pointing at a specific angle relative to the bow (say 45 deg starboard) but there is no telling if that is what happened.

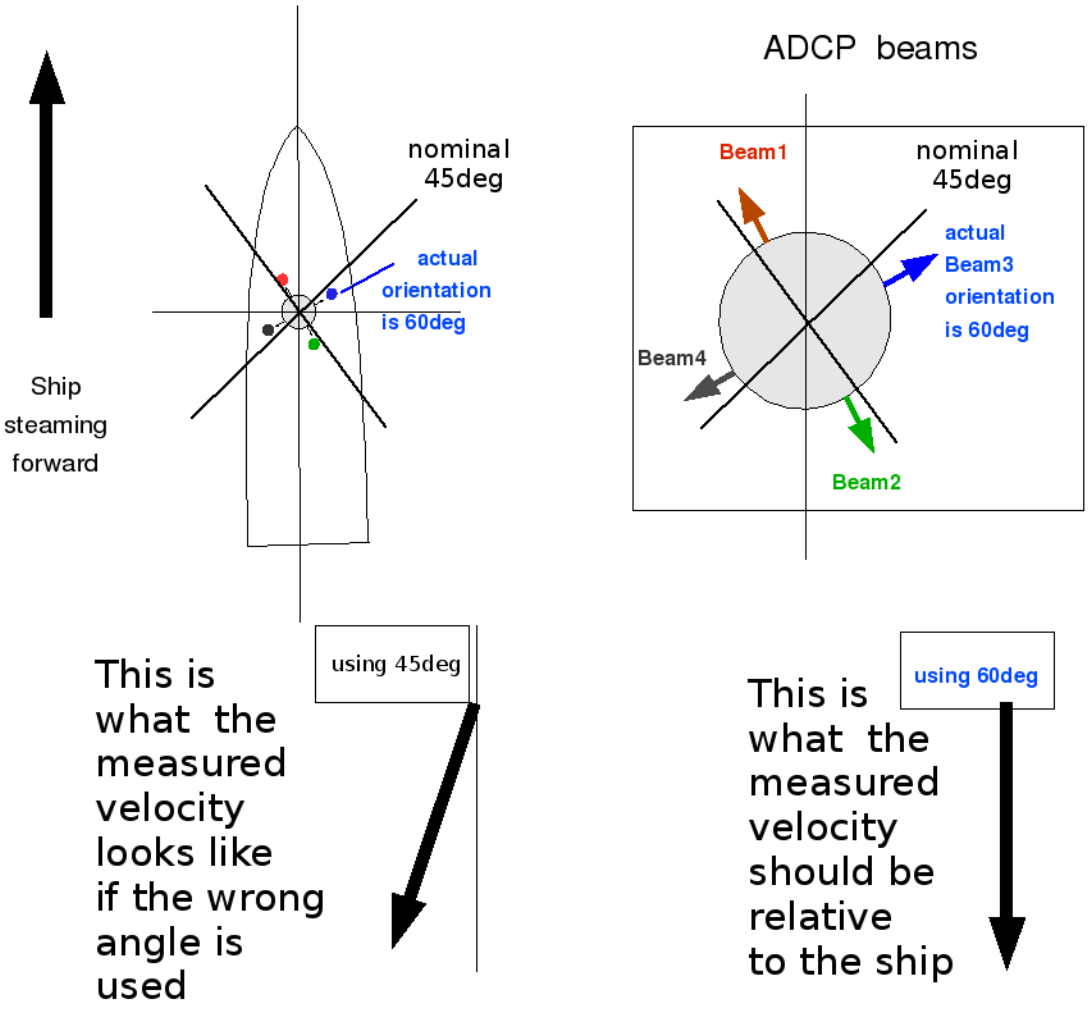
UHDAS needs to know the angle of beam #3 relative to the bow or the ocean velocities will be wrong. An error of a few degrees will result in ocean velocities greater than the ship's speed all pointing off to one side of the ship.

We use a nominal value (our best guess, 45 degrees in this case) and the the ADCP's "bottom track" mode, to calculate the remaining angle between the transducer's beam #3 and ship's bow. That correction is then applied to the processing software, and (if appropriate) the acquisition software "EA" parameter is adjusted.

NOTE:
Always start a new cruise name if calibration values have changed

A little more discussion about the ADCP calculations follows this document.

The figure below shows the angle found by the bottom track calibration procedure



Bottom track calibration is used to determine this residual angle. Follow the instructions to see

- where to find this angle
- what programs to change
- what value to use

7.2 Cautions:

> **NOTE**
> Only an official ADCP operator should modify anything on the ADCP UHDAS acquisition computer (**currents**).

- be sure to turn off Bottom Track mode after the ship is back in deep water
- always use a new cruise name if there is any change to the configuration

7.3 Bottom Track Calibration steps:

7.3.1 (1) Calibration Cruise Track

A good bottom track calibration should include:

- several hours of bottom track data (necessary to get good statistics)
- fixed course over ground or (better yet) a reciprocal track with 3 hours going one direction and 3 hours repeating the track in the opposite direction (allows for additional calibration calculations)
- the ground should be flat
- the depth should be between 20% and 100% of the expected range for the instrument being calibrated
- ship speed should normally be standard transit speed. If the sea state is high, it may be worth slowing down (to 6-8kts) to clean up the data quality.
- it the instrument is an Ocean Surveyor (i.e. capable of pinging in either broadband or narrowband mode), it is best to choose only one mode to interleave with bottom track pings, so as to get good enough statistics in each ensemble.

Often there will be compromises in the cruise track because of other considerations. Do the best you can, but try to get 4-6 hours even if you have to reverse course several times.

You will be able to tell from the amplitude bump in the 5-minute profile figure whether the bottom is in range, even if the velocities are off scale.

The UHDAS processing updates the calibration values every 60 minutes, so it makes sense to wait until the hourly plots (vector and contour plots) update before stopping the calibration run. THis maximizes the amount of collected data used in the calibration calculation. See below for more information about the files that contain the calibration values.

7.3.2 (2) Reading the Correction

UHDAS processing takes place in the /home/data/CRUISE/proc directory in directories that are named for the instrument frequency and ping type. "CRUISE" is the name give to that leg of data collection. For instance, if a new 150kHz Ocean Surveyor was installed on a ship and the first calibration run was called "btcal1", the processing directory for broadband+bottomtrack pinging would be /home/data/btcal1/proc/os150bb.

The file with the bottom track calibration is

```
/home/data/btcal1/proc/os150bb/cal/botmtrk/btcaluv.out
```

Every hour a new calibration calculation (for all the data collected in that cruise leg so far) will be appended to the bottom of the file.

An annotated version of the file is shown here:

```
 ADCP btcal1 step size 1                    # cruise name
   Time range 181.26 to 181.44              # decimal day range
   Calculation done at 2007- 7-11  10:54
    step: 1
    min_depth:  25   max_depth: 1500
    min_speed:  2.0 m/s   max_sig:  2.5 std devs
    max_gap:  0.10 minutes   tol_dt: 0.02 (fraction)
unedited: 130 points                              # num-
ber of BT points
edited:   117 points, 2.0 min speed, 2.5 max dev # num-
ber of good BT points
            median     mean      std
amplitude   1.0038   1.0037   0.0032             # scale fac-
tor = small
```

```
phase      45.3184  45.2997   0.2687  # <-----Bottom Track phase cal-
ibration
```

The file above is a good solid bottom track calibration. It was over 4 hours long in water ranging from 50-100m. The mean and median phase are very close (within 0.3deg is good) and the standard deviation is small (under 0.4 is good).

CONCLUSION: The Bottom track calibration correction is 45.3 degrees. Although the *plan* was to have beam #3 pointing at 45deg, it needs a 45.3 degree correction back to near zero -- beam #3 is actually facing nearly forward. This does not necessarily reduce data quality. Under normal conditions, it would not be worth returning to port to get the transducer rotated by 45deg.

7.3.3 (3) Applying Correction: for Processing ("h_align")

The following file contains the line specifying the angle of the transducer relative to the hull. This file is in the Matlab language, and is a template file (so we have the double-underscores at the end of the name).

```
/home/adcp/config/cruise_proc.m__
```

There will be a little piece of code like this for each instrument.

The line of interest is the variable *h_align*.

These lines will say something like this ("%" are comments in matlab)

```
%%%=========================================
%%  OS150 processing parameters
os150.ducer_depth  = 5;
os150.h_align = 45.0;   % 45.0 - (xx.x)
                        % where xx.x is from cal/botmtrk/btcaluv.out
                        % nominally 45 to starboard
% To change calibration, replace x.xx with the "phase" value from
%    /home/data/CRUISE/proc/os150bb/cal/botmtrk/btcaluv.out
%    in the next line, and remove the comment sign.

% os150.h_align = 45.0 - (x.xx);
```

Note that the instructions indicate that the bottom track calibration value should go inside the parentheses. In this example, the specification for h_align would be (you can let Matlab do the math):

```
%%%=========================================
%%  OS150 processing parameters
os150.ducer_depth  = 5;
os150.h_align = 45.0 - (45.3);
```

Here is another example for an instrument that is already calibrated:

```
%%  OS75 processing parameters
os75.ducer_depth  = 5;
os75.h_align = -42.6;     % -42.0 -
(0.6)  (where xx.x is from cal/watertrack)
                          % nominally 45 to ** port **
```

NOTE

Make sure no lines are broken when editing. Keep things on one line if they start that way.

7.3.4 (4) Applying Correction: for Acquisition ("EA")

If the instrument is a Workhorse, Broadband, or Ocean Surveyor, another value needs to be changed. This value is important, because if it is wrong, you can actually lose data. The file is tricky, because it is written in Python, which is very fussy about syntax. The file is:

```
/home/adcp/config/sensor_cfg.py
```

This is actually a python program that defines data structures with information about the instruments, special commands, data baud rates, and all the serial port information for acquisition.

NOTE:
Save a copy before you edit this file. If, after editing, UHDAS fails to start, look in /home/adcp/flags for *.err files and try to figure out what you broke while editing the file.

NOTE
Make sure no lines are broken when editing. Keep things on one line if they start that way

The layout of the file is

(1) **ADCP information for** ADCP 1 # <------- contains EA (for WH, BB and OS) ADCP 2 # <------- contains EA (for WH, BB and OS)

(2) **serial communication information for** ADCP 1 # must be first ADCP 2 # must be second gyro # no particular gps # order for these ashtech # (or posmv, seapath, etc)

You need to go to the first block and identify the instrument being calibrated and find the relevant chunk fo code. For example:

```
{ 'instrument'  :  'os150',
   'setup'       :  'rdi_setup',
   'terminal'    :  'oswh_term',
   'defaultcmd'  :  'os150_default.cmd',
   'commands'    :  ('EA+04500',),           ##<---
bt cal affects this
   'datatypes'   :  ('os150bb','os150nb'),
   'wakeup_baud' :  9600},
```

When UHDAS is started, it read this file. The "btcal1" test run used a value of 45 degrees (see above). We know this needs to be closer to zero. Change the 'commands' line to read:

```
'commands'    :  ('EA+00000',),    ##<--- bt cal affects this
```

THE EA command needs to be within a couple of degrees of the "correct" value, but it does not have to be perfect. To make it easier to remember and to read, you might consider "to the nearest degree" or "to the nearest 5 degree".

7.4 Restarting Acqusiition

All the changes above can be made while logging is underway, because the configuration information has already been used and applied to the present cruise leg.

however to apply these changes to new data, you must

- stop logging
- end cruise
- kill gui
- start UHDAS gui (reads sensor_cfg.py)
- start a new cruise (reads cruise_proc.m__)
- start pinging

Whether you do more calibration runs is probably up to you.

NOTE: Always start a new cruise leg if you change any sensor inputs (eg. different GPS sensor) or calibration value

7.5 Checking your work

- are figures updating? Are velocities in the 5-minute plot under 1m/s?
- after an hour, are the vectors closer to zero? not all pointed off to one side?
- after an hour, (if bottom track is ON) is the phase in the cal/botmtrk/btcaluv.out file under smaller than 1 degree? smaller than 0.5? (even better)

7.6 Appendix: Getting Earth coordinates from beam coordinates

In order to obtain ocean velocities from the ADCP, the processing code needs to perform the following steps:

(1) transform beam coordinates into horizontal+vertical

This transformation uses the fact that the instrument has 4 beams, which are pointing down, whether the faces are convex (eg. LADCP) or concave (eg. NB150), the beam angle with the vertical (eg. 30deg). This transformation results in a coordinate system with "forward" oriented along the RDI ADCP beam #3. These values are all accessible from within the instrument's firmware or (in the case of an NB150) can be specified. This step has no calibration

(2) align instrument with ship hull (**requires calibration**)

Beam 3 is often oriented at 45deg relative to the ship. A recommended installation configuration has beam 3 pointing 45deg starboard of the bow (as shown link:beam_orientation.png[here]).

(3) align ship with geographic north

The final rotation step is to know the angle between the ship and geographic north. UHDAS uses the gyro as the primary heading device for this purpose, because gyros are a reliable source of reasonable heading. However, an error of 1degree for most ships underway, causes a cross-track error in the ocean velocity of about 10cm/s. Since this is a significant fraction of most open-ocean signals, it is important to correct the gyro headings to better values (eg. POSMV, Seapath, Ashtech).

(4) take out ship velocity

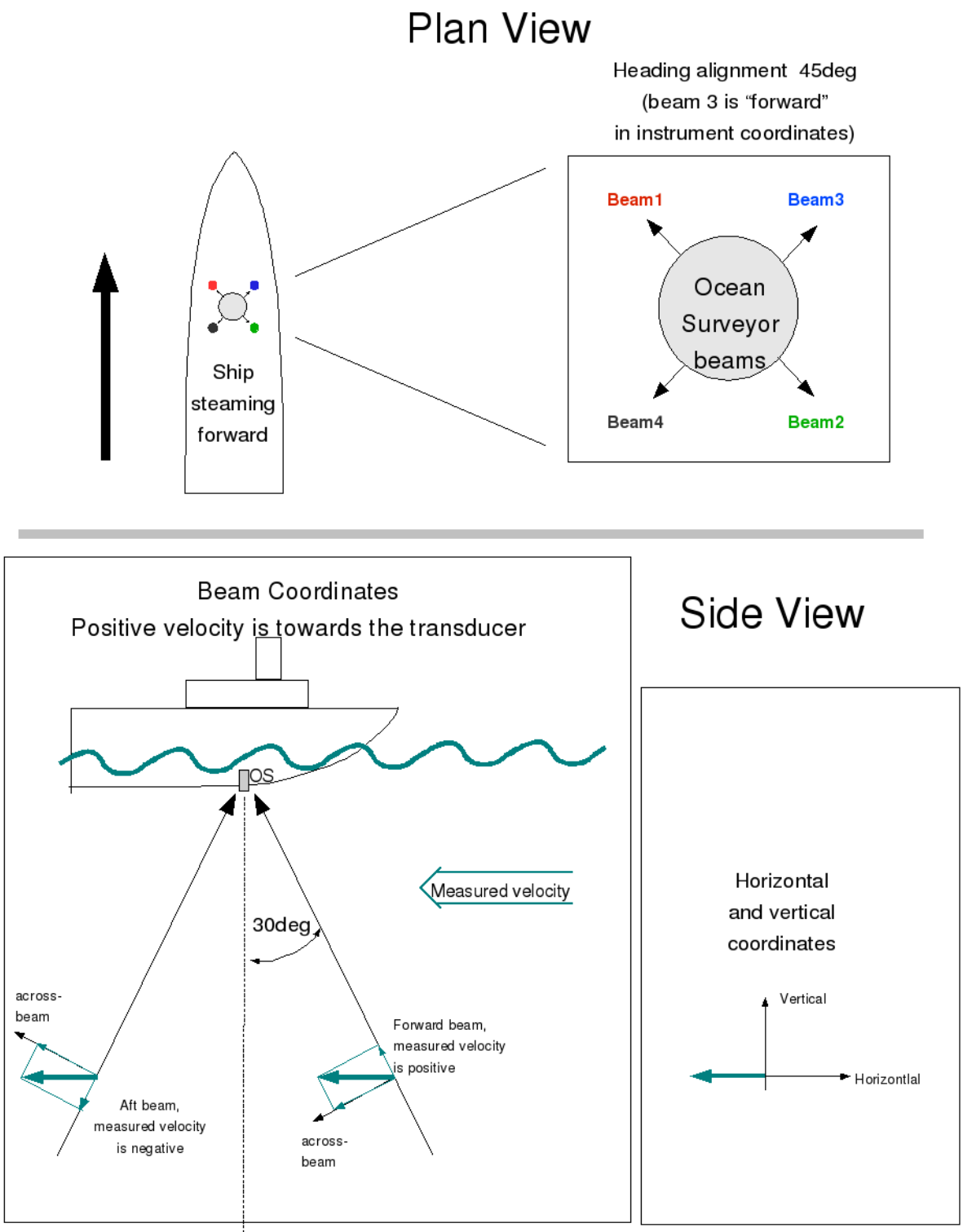
The ADCP measures velocities relative to the ship. Now that those velocities have been rotated into earth coordinates, the last step is to get the ocean velocities, not the measured velocities. This requires removing the velocity of the ship (the moving platform).

Step #2 above is the one we focus on when we talk about "bottom track calibration". The ground isn't moving so if we use "bottom track mode" to gather ADCP data, we can determine the angle in #2 directly.

This angle is used in the acquisition in two places

- in the processing software (called ”h_align“)
- if OS or BB (not NB) this must also be specified in the comands sent to the instrument, or DATA LOSS may occur. This is the EA command.

7.7 Beam Orientation Diagram (Ocean Surveyor)



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8 UHDAS serial port access (gui)

8.1 Description of tk_terminal.py

The UHDAS computer has a terminal emulation program for access to serial ports. The program allows the user "adcp" to

- choose a serial port
- change baud rate
- change parity, stop bit, [etc]
- send commands
- view data on the specified serial port
- capture a dialog or incoming messages

This program is written in python and tk and is accessed on the command line as:

```
tk_terminal.py
/home/currents/programs/uhdas/serial/tk_terminal.py
```

This program can be run to assess ascii serial data streams or to communicate with an Ocean Surveyor, Workhorse, or Broadband RDI ADCP. To communicate with an NB150, use **rditerm.py**

NOTE:
Do not run this program to access an serial port which is in use by UHDAS. To see a list of configured ports, type:
grep tty /home/adcp/config/sensor_cfg.py

It is safest to use this program when the UHDAS gui is not running but if you are *sure* a given port is not in use, you can interact with that port using this program even if UHDAS is running.

UHDAS locks the serial ports so it will not be confused. Do not use tk_terminal.py to access any ports listed here:

```
ls /var/lock/tty*
```

Tk_terminal.py should not allow you to choose a serial port that is locked, but it is always safest to check. Error messages are written to the terminal window which called the program.

8.2 How to use

(1) Type on the command line

```
tk_terminal.py
```

(2) **Choose the port**

Use the Port menu to choose the Device. For example the first on-board serial port is called /dev/ttyS0. You will probably not need to use View/Set, but if you need to change parity for instance, that is where to do it.

(3) **Choose the Baud rate**

Use the Baud menu to choose baud rate.

(4) **Connect to the port**

Under the File menu, choose **Connect to Port**. This opens the port for communication.

(5) **Saving input**

If the serial port is connected to a device with serial messages spewing forth, you should see those in the tk_terminal window. To stop the flow, choose **Disconnect** from the File menu.

The rest of the menu options under the File menu are related to saving input. You can

- clear the screen ("clear")
- save what exists there ("save previous")
- start a log file ("start saving")
- stop a log file ("stop saving")
- close the connection ("Disconnect")

(6) **Sending Commands**

There are two kinds of commands that can be sent to an instrument

- **BREAK**

  This is a long pulse sent (to instrument such as an ADCP) to wake it up. After the serial port is set up, you can send a break to an instrument under the Command menu

- **ascii commands**

  Use: for instance, running diagnostic tests on an ADCP or (in desparation) sending commands to an Ashtech. To send an ascii command to an instrument, type the command in the bottom panel where it says "Transmit line:", then send it by hitting the <return> key.

(7) **ADCP troubleshooting**

Most RDI ADCPs allow you to start figuring out the commands they know by typing a **?** (question mark). If you type a **?** you will see what kinds of commands they know.

For example, the diagnostic tests on the ocean surveyor are usually commands that start with "P". You can send **P?** to see what they are.

WARNING:
DO NOT PING OCEAN SURVEYOR IN AIR

A similar approach works with a BB or Workhorse ADCP. Type type **?**, look for a menu item for tests, and type that letter followed by **?**. NB150 is much more cryptic and you have to read the manual

NOTE:
It is OK to ping **fixed** transducers in air, (BB300, NB150 or Workhorse)