Huntington Ingalls Industries

Technical Note
KMHYD-TNOTE-0059, Rev 0.1
Seaglider File Formats Manual for Rev E Gliders

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Created from KMHYD-Tmpl-7231, Rev E

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Table of Contents

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List of Figures

1. Introduction

1.1. Conventions

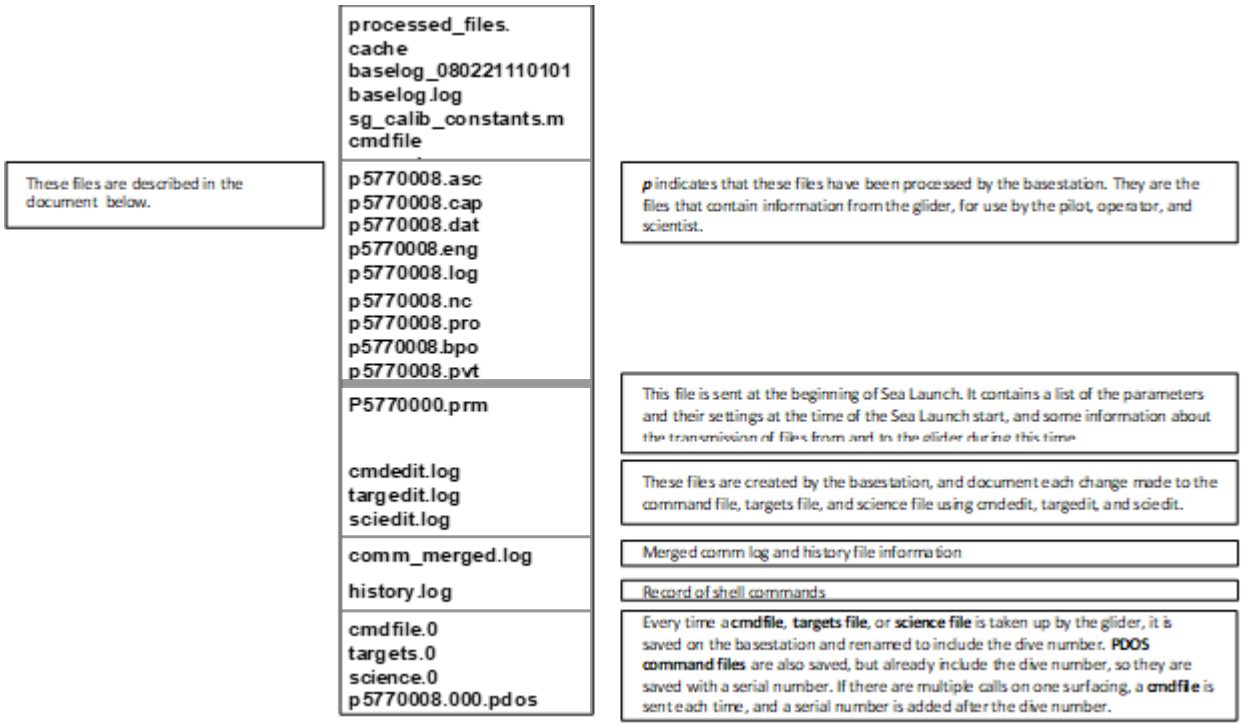
Example files are given in bold Courier font. Direct annotations of files are given in smaller font. Parameters are in UPPER CASE BOLD font and have a preceding $. File names that are used in Seaglider command, control, or operations are given in lowercase bold font. Documents and sections of documents are italicized.

> 577 is used throughout this document as a placeholder for Seaglider serial number, and 8 is used as a placeholder for dive number. Many file names include a three digit Seaglider serial number, followed by a four digit dive number, both with preceding zeros (e.g. p5770008.log). Numerals after the dot in a file name are represented by 0's and, when additional numerals are needed, 9's. Because they represent various meanings, numerals after the dot are always annotated the first time the file name appears, and in the file description heading.

1.2. Introduction

This manual is designed to help the Seaglider user identify and interpret files he or she will encounter on the basestation. It is to be used in conjunction with the Seaglider User's Guide, Piloting Parameters Manual, and Extended PicoDOS Reference Manual.

Figure 1: List of Files Located on the Basestation



These files are intermediates found on the basestation. They are used to create the processed files documented in this manual. Characters in the file names indicate the following:
st : The file is from a self-test. If from a normal dive, this prefix will be *sg*
b: has had duplicate sections removed "Bogue Syndrome processing"
1a: has been stripped of the padding characters added for transmission from the Seaglider.
u: uncompressed
z: zipped
r: raw; a reconstruction of the raw ASCII text file on the glider
x: The following sequence number is in the hexadecimal system

st0055du.1a.x00
st0055du.r
st0055du.x00

st0055lu.1a.x00
st0055lu.x00

st0055kz.1a.x02
st0055kz.1a.x03
st0055kz.b.1a.x04
st0055kz.b.x04
st0055kz.r
st0055kz.x00
st0055kz.x01

st0055kz.x00.PARTIAL.1

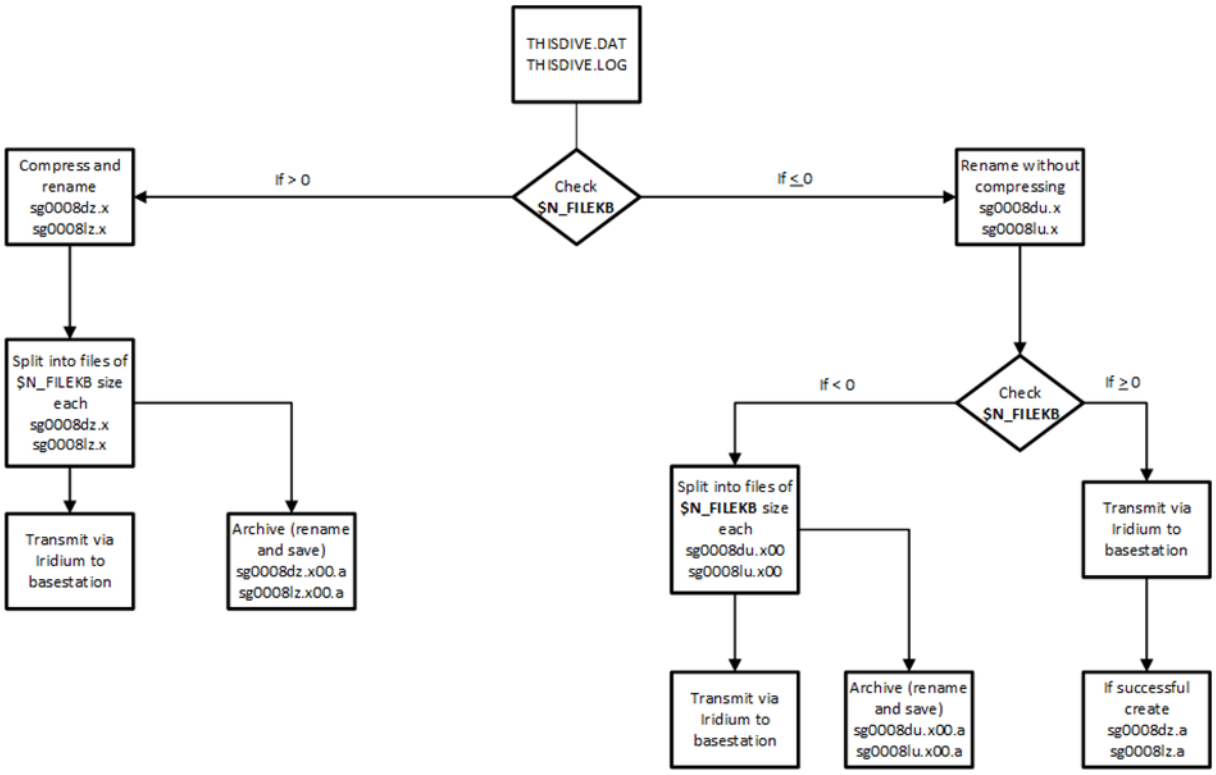
d indicates that these intermediate files will be used to create a data file.

l indicates that these intermediate files will be used to create a log file.

k indicates that these intermediate files will be used to create a capture file.

Partial files appear when the basestation does not receive a complete file from the Seaglider and is unable to process it. Transmission errors are addressed in the Communications Log section of this document, and in the Seaglider User's Guide.

Figure 2: Data Flow Map



2. File Descriptions

2.1. Processed Files

2.1.1. Log File (p5770008.log)

One log file is made for each dive. The first portion of the data is a list of the Seaglider parameters and their values for that dive. See the Parameter Reference Manual for more information. The second section, beginning with the entry $GPS1, contains information concerning the pre-dive period at the surface. The $GC-labeled lines describe motor actions (pitch, roll, or VBD), one line per motor move. The information listed after the $GC lines are data collected at the end of the dive (surface maneuver data, final temperature reading, etc.). Not all Seagliders will report all the lines that appear in the example given here, because the devices installed vary among Seagliders.

Example Log File

```
version: 67.00          Seaglider operating code version
glider: 577             Seaglider serial number
mission: 2              Mission number counter, settable by pilot or launch operator or automatically incremented by software
dive: 8                 Dive number
start: 8 22 119 0 30 49 Date and time (UTC) when the log file was initiated; time is from the glider's clock
                        Seconds (UTC, starting with 0
                        Minutes (UTC) starting with 0
                        Hours (UTC) starting with 0
                        Years after 1900
                        Day
                        Mont
```

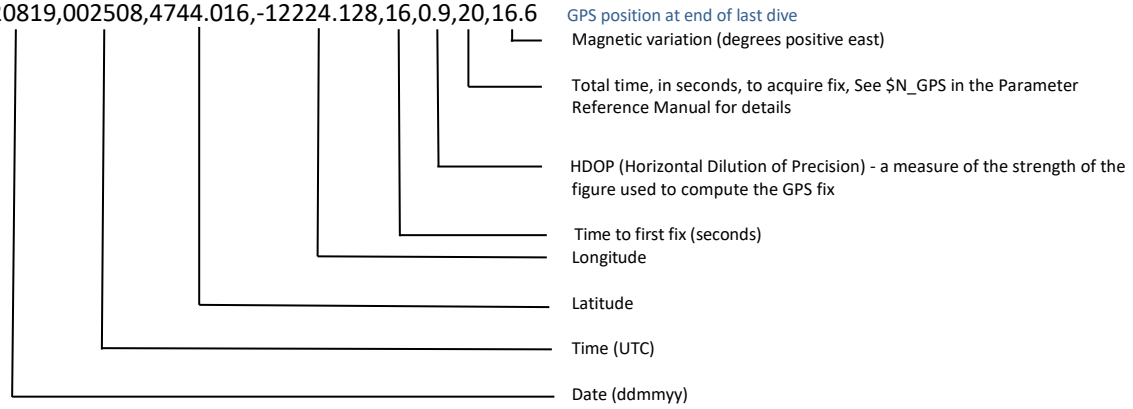
```
data:                   Glider parameters
$ID,577                 See the Parameter Reference Manual for information on parameters reported in the log file
$MISSION,2
$DIVE,8
$N_DIVES,10
$STOP_T,8221921
$D_SURF,3
$D_FLARE,3
$D_TGT,150
$D_ABORT,250
$D_NO_BLEED,90
$D_BOOST,0
$T_BOOST,0
$D_FINISH,0
$D_PITCH,0
$D_SAFE,0
$D_CALL,0
$SURFACE_URGENCY,0
$SURFACE_URGENCY_TRY,0
$SURFACE_URGENCY_FORCE,0
```

$T_DIVE,50
$T_MISSION,65
$T_ABORT,90
$T_TURN,500
$T_TURN_SAMPINT,5
$T_NO_W,120
$T_LOITER,0
$T_EPIRB,0
$USE_BATHY,0
$USE_ICE,0
$ICE_FREEZE_MARGIN,0.30000001
$D_OFFGRID,100
$RELAUNCH,0
$APOGEE_PITCH,-5
$MAX_BUOY,150
$GLIDE_SLOPE,30
$SPEED_FACTOR,1
$RHO,1.0232
$MASS,52715
$NAV_MODE,2
$FERRY_MAX,45
$KALMAN_USE,2
$HD_A,0.0038360001
$HD_B,0.010078
$HD_C,9.8500004e-06
$HEADING,-1
$ESCAPE_HEADING,0
$ESCAPE_HEADING_DELTA,10
$FIX_MISSING_TIMEOUT,0
$TGT_DEFAULT_LAT,4743.3999
$TGT_DEFAULT_LON,-12224.2
$TGT_AUTO_DEFAULT,0
$SM_CC,230
$N_FILEKB,8
$FILEMGR,0
$CALL_NDIVES,1
$COMM_SEQ,0
$PROTOCOL,9
$N_NOCOMM,2
$NOCOMM_ACTION,259
$N_NOSURFACE,0
$UPLOAD_DIVES_MAX,-1
$CALL_TRIES,5
$CALL_WAIT,60
$CAPUPLOAD,1
$CAPMAXSIZE,400000
$T_GPS,15
$N_GPS,100840
$T_RSLEEP,3

$STROBE,0
$RAFOS_PEAK_OFFSET,0
$RAFOS_CORR_THRESH,0
$RAFOS_HIT_WINDOW,0
$RAFOS_MMODEM,0
$PITCH_MIN,228
$PITCH_MAX,3874
$C_PITCH,2880
$PITCH_DBAND,0.0099999998
$PITCH_CNV,0.003125763
$PITCH_GAIN,30
$PITCH_TIMEOUT,25
$PITCH_MAXERRORS,1
$PITCH_ADJ_GAIN,0.029999999
$PITCH_ADJ_DBAND,1
$PITCH_W_GAIN,0
$PITCH_W_DBAND,0
$ROLL_MIN,247
$ROLL_MAX,3862
$ROLL_DEG,40
$C_ROLL_DIVE,1800
$C_ROLL_CLIMB,1600
$HEAD_ERRBAND,10
$ROLL_CNV,0.028270001
$ROLL_TIMEOUT,15
$ROLL_MAXERRORS,1
$ROLL_ADJ_GAIN,0
$ROLL_ADJ_DBAND,0
$VBD_MIN,600
$VBD_MAX,3960
$C_VBD,3050
$VBD_DBAND,2
$VBD_CNV,-0.245296
$VBD_LP_IGNORE,0
$VBD_TIMEOUT,720
$PITCH_VBD_SHIFT,0.0012300001
$UNCOM_BLEED,60
$VBD_MAXERRORS,1
$W_ADJ_DBAND,0
$DBDW,0
$LOITER_W_DBAND,0
$LOITER_DBDW,0
$LOITER_D_TOP,0
$LOITER_D_BOTTOM,0
$LOITER_N_DIVE,0
$SHORTING_PLUG,1
$AH0_24V,310
$AH0_10V,0
$MINV_24V,11.5

$MINV_10V,10
$MAXI_24V,3
$MAXI_10V,2
$FG_AHR_10V,0.46508381
$FG_AHR_24V,3.5513461
$PHONE_SUPPLY,2
$PRESSURE_YINT,-173.44926
$PRESSURE_SLOPE,0.0001098948
$COMPASS_USE,0
$ALTIM_PING_FIT,0
$ALTIM_TOP_PING_RANGE,20
$ALTIM_BOTTOM_TURN_MARGIN,15
$ALTIM_TOP_TURN_MARGIN,0
$ALTIM_TOP_MIN_OBSTACLE,1
$ALTIM_PING_DEPTH,120
$ALTIM_PING_DELTA,5
$ALTIM_FREQUENCY,13
$ALTIM_PULSE,3
$ALTIM_SENSITIVITY,2
$XPDR_VALID,5
$XPDR_INHIBIT,90
$INT_PRESSURE_SLOPE,1.9639999e-06
$INT_PRESSURE_YINT,-2.6300001
$DEEPGLIDER,0
$MOTHERBOARD,6
$DEVICE1,10
$DEVICE2,39
$DEVICE3,-1
$DEVICE4,-1
$DEVICE5,-1
$DEVICE6,-1
$LOGGERS,0
$LOGGERDEVICE1,-1
$LOGGERDEVICE2,-1
$LOGGERDEVICE3,-1
$LOGGERDEVICE4,-1
$COMPASS_DEVICE,18
$COMPASS2_DEVICE,-1
$PHONE_DEVICE,33
$GPS_DEVICE,16
$RAFOS_DEVICE,-1
$XPDR_DEVICE,5
$SIM_W,0
$SEABIRD_T_G,0.0042976378
$SEABIRD_T_H,0.00062287902
$SEABIRD_T_I,2.2045748e-05
$SEABIRD_T_J,2.2003178e-06
$SEABIRD_C_G,-10.194997
$SEABIRD_C_H,1.1881508

$SEABIRD_C_I,-0.0016671934
$SEABIRD_C_J,0.00022997263
$GPS1,220819,002508,4744.016,-12224.128,16,0.9,20,16.6 GPS position at end of last dive



$_CALLS,1 Total number of calls attempted to connect to the basestation on the previous surfacing

$_SM_DEPTHo,0.89 Glider measured depth, in meters, while the glider is at the surface at the end of the previous dive

$_SM_ANGLEo,-68.1 Glider measured angle, in degrees, at the surface at the end of the previous dive

$GPS2,220819,003029,4744.001,-12224.130,17,0.9,19,16.6 GPS position just prior to the start of the just completed dive; the format is the same as that for GPS1 above.

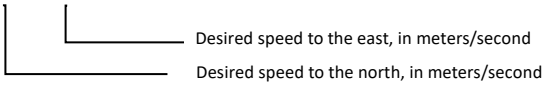
$SPEED_LIMITS,0.173,0.261 The minimum and maximum horizontal speed attainable by the Seaglider on this dive, in meters per second. These values are based on the minimum and maximum dive angles and the allowable buoyancy force. The minimum speed corresponds to the maximum dive angle; the maximum speed is obtained as the minimum value of the horizontal speed.

$TGT_NAME,C1 Name of the active target of this dive. See the Targets File section for details.

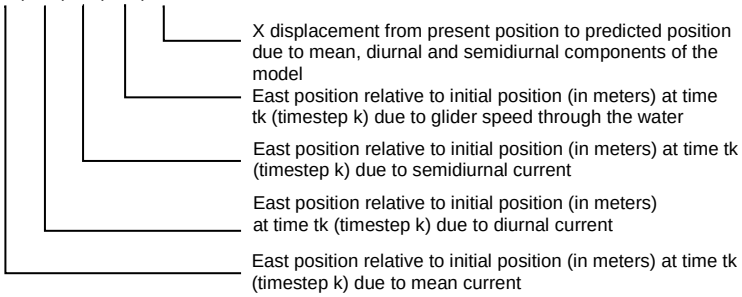
$TGT_LATLONG,4744.200,-12224.000 Latitude and longitude for the target position of this dive. Same format as GPS1

$TGT_RADIUS,200.000 Radius for the active target for this dive, in meters

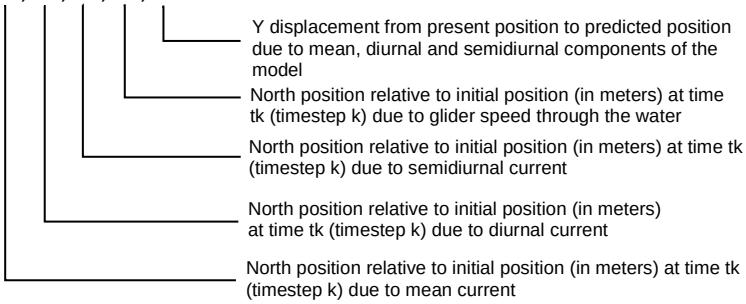
$KALMAN_CONTROL,0.000,0.000 Desired glider speeds to north and east, from which heading is derived



$KALMAN_X,0.0,0.0,0.0,0.0,0.0



$KALMAN_Y,0.0,0.0,0.0,0.0,0.0



$MHEAD_RNG_PITCHd_Wd,358.1,402,-18.2,-10.000,-20.99

$D_GRID,150 Depth to the apogee maneuver, as read from the currently active bathymetry map (meters)

$GCHEAD,st_secs,flags,vbd_ctl,pitch_ctl,roll_ctl,vbd_ad_start,vbd_pot1_ad_start,vbd_pot2_ad_start,pitch_ad_start,roll_ad_start,depth,ob_vertv,data_pts,end_secs,vbd_secs,pitch_secs,roll_secs,vbd_i,pitch_i,roll_i,vbd_ad,vbd_pot1_ad,vbd_pot2_ad,pitch_ad,roll_ad,vbd_errors,pitch_errors,roll_errors,vbd_volts,pitch_volts,roll_volts

st_secs: Elapsed time from the start of the dive to the start of GC

flags: Describes what action occurred in Active mode

```
GCPHASE_PITCH=1,        ///< (1) change pitch in Active
GCPHASE_VBD=2,          ///< (2) change buoyancy in Active
GCPHASE_ROLL=4,         ///< (3) start (and end) turns in Active
GCPHASE_TURNING=8,      ///< (4) track turns in Passive
//NOT_USED=16
GCPHASE_VBD_W_ADJ = 32,
GCPHASE_PITCH_W_ADJ = 64,
GCPHASE_PITCH_ADJ = 128,
GCPHASE_ROLL_POS = 256,
GCPHASE_ROLL_NEG = 512,
GCPHASE_ROLL_CENTER = 1024,
GCPHASE_PITCH_POS = 2048,
GCPHASE_PITCH_NEG = 4096,
GCPHASE_VBD_PUMP = 8192,
GCPHASE_VBD_BLEED = 16384
```

Example: Moved to negative pitch angle
GCPHASE_PITCH + GCPHASE_PITCH_ADJ + GCPHASE_PITCG_NEG = 1 + 128 + 4096 = 4225
→ convert to binary = 0001 0000 1000 0001

vbd_ctl:	Position of the VBD, in cc, relative to $C_VBD (positive buoyant)
pitch_ctl:	Position of the pitch mass, in centimeters, relative to the $C_PITCH (positive aft)
roll_ctl:	Position of the roll, in degrees, relative to the $C_ROLL
vbd_ad_start	Average position of vbd linear potentiometers 1 and 2, in AD counts, at the beginning of the motor move
vbd_pot1_ad_start:	Position of the vbd linear potentiometer 1, in AD counts, at the beginning of the motor move
pitch_ad_start:	Position of the pitch motor, in AD counts, at the beginning of the motor move
roll_ad_start:	Position of the roll motor, in AD counts, at the beginning of the motor move
depth:	Depth at the start of GC, in meters
ob_vertv:	Observed vertical velocity, in centimeters/second
data_pts:	Number of data records collected thus far in the dive
end_secs:	Elapsed time from the start of the dive to the end of GC
vbd_secs;	Number of seconds the VBD was on
pitch_secs:	Number of seconds the pitch motor was on
roll_secs:	Number of seconds the roll motor was on

vbd_i:	Average current used by the VBD, in amps
pitch_i:	Average current used by the pitch motor, in amps
roll_i:	Average current used by the roll motor, in amps
vbd_ad:	Position of the VBD motor, in AD counts, at the end of the motor move
vbd_pot1_ad:	Position of the vbd linear potentiometer 1, in AD counts, at the end of the motor move
vbd_pot2_ad:	Position of the vbd linear potentiometer 2, in AD counts, at the end of the motor move
pitch_ad:	Position of the pitch motor, in AD counts, at the end of the motor move
roll_ad:	Position of the roll motor, in AD counts, at the end of the motor move
vbd_errors:	Number of VBD errors (timeouts) during this motor move
pitch_errors:	Number of pitch motor errors (timeouts) during this motor move n
roll_errors:	Number of roll motor errors (timeouts) during this motor move
vbd_volts:	Minimum observed voltage during the VBD motor move. The value is 28.83 (high) if the pitch motor did not move in this active period.
pitch_volts:	Minimum observed voltage during the pitch motor move. The value is 28.83 (high) if the pitch motor did not move in this active period.
roll_volts:	Minimum observed voltage during the roll motor move. The value is 28.83 (high) if the roll motor did not move in this active period.

$STATE,1,end surface,CONTROL_FINISHED_OK

Statement expected with normal completion of the surface phase of the dive

$STATE,1,begin dive

Start of glider bleeding oil and beginning descent phase of dive
Use $GCHEAD above to decode the GC lines below

$GC,1.97,2,-146.60,-
0.79,0.00,2051.2,2099.4,2003.0,212.9,1859.1,0.00,0.00,0,54.77,51.55,0.00,0.00,0.005,0.000,0.000,3405.75,3415.75,3395.75,
213.25,1858.88,0,0,0,14.92,30.00,30.00
$GC,55.01,551,-146.60,-0.79,-40.00,3404.6,3415.6,3393.7,213.0,1858.9,3.30,-
5.09,10,82.10,5.51,13.94,2.57,0.009,0.307,0.072,3648.62,3674.94,3622.31,2625.06,361.44,0,0,0,15.10,14.99,15.00
$GC,294.74,1028,-146.60,-0.79,0.00,3651.8,3684.2,3619.4,2625.6,361.0,36.27,-
14.03,58,300.19,0.00,0.00,2.42,0.000,0.000,0.042,3652.66,3685.25,3620.06,2617.81,1841.38,0,0,0,30.00,30.00,15.44
$GC,359.71,261,-146.60,-0.79,40.00,3650.2,3681.2,3619.1,2618.5,1841.1,44.13,-
11.27,71,365.29,0.00,0.05,2.37,0.000,0.328,0.068,3650.97,3680.62,3621.31,2619.31,3235.19,0,0,0,30.00,15.36,15.31
$GC,414.75,1157,-146.60,-0.83,0.00,3647.7,3676.2,3619.1,2620.6,3235.2,49.86,-
10.38,82,420.38,0.00,0.08,2.43,0.000,0.179,0.049,3648.59,3676.75,3620.44,2584.38,1762.44,0,0,0,30.00,15.16,15.43
$GC,479.77,645,-146.60,-0.76,-40.00,3648.1,3678.2,3618.0,2584.1,1762.1,57.47,-
11.95,89,484.49,0.00,0.25,2.39,0.000,0.183,0.071,3649.53,3679.69,3619.38,2638.25,358.81,0,0,0,30.00,15.37,15.32
$GC,539.79,1060,-146.60,-0.76,0.00,3650.6,3683.4,3617.8,2637.9,358.6,63.58,-
9.97,95,544.39,0.00,0.00,2.41,0.000,0.000,0.042,3651.44,3683.88,3619.00,2629.50,1845.31,0,0,0,30.00,30.00,15.63
$GC,669.84,161,-146.60,-0.79,0.00,3649.3,3681.2,3617.5,2630.0,1845.8,76.42,-
9.55,108,671.27,0.00,0.05,0.00,0.000,0.207,0.000,3651.28,3683.00,3619.56,2591.62,1847.44,0,0,0,30.00,15.50,30.00
$GC,789.85,645,-146.60,-0.75,-40.00,3649.6,3681.3,3617.9,2592.1,1847.2,89.82,-
11.23,120,794.60,0.00,0.25,2.54,0.000,0.186,0.070,3651.31,3682.75,3619.88,2643.69,361.56,0,0,0,30.00,15.37,15.31
$GC,873.98,1028,-146.60,-0.75,0.00,3651.1,3684.2,3617.9,2643.2,361.4,98.82,-
10.22,128,880.12,0.00,0.00,2.40,0.000,0.000,0.042,3652.28,3685.56,3619.00,2637.19,1842.44,0,0,0,30.00,30.00,15.68
$GC,999.92,161,-146.60,-0.80,0.00,3650.1,3682.2,3617.9,2637.3,1842.8,110.21,-
8.73,141,1001.35,0.00,0.09,0.00,0.000,0.142,0.000,3650.41,3681.94,3618.88,2596.62,1844.94,0,0,0,30.00,15.53,30.00
$GC,1119.91,517,-146.60,-0.80,-40.00,3649.9,3682.1,3617.8,2596.9,1845.1,123.49,-
11.24,153,1124.66,0.00,0.13,2.54,0.000,0.203,0.071,3651.41,3683.50,3619.31,2626.31,360.12,0,0,0,30.00,15.40,15.32
$GC,1199.93,1028,-146.60,-0.80,0.00,3651.3,3684.4,3618.1,2625.3,360.4,132.37,-
11.02,161,1204.55,0.00,0.00,2.40,0.000,0.000,0.042,3650.72,3684.00,3617.44,2617.81,1841.62,0,0,0,30.00,30.00,15.67
$GC,1329.96,517,-146.60,-0.80,-40.00,3650.2,3682.4,3618.1,2617.2,1843.9,146.16,-
10.37,174,1334.69,0.00,0.03,2.52,0.000,0.377,0.070,3651.91,3683.88,3619.94,2624.38,360.12,0,0,0,30.00,15.45,15.35
$STATE,1369,end dive,TARGET_DEPTH_EXCEEDED

Glider reached target depth triggered by either $D_TGT, **$ALTIM_BOTTOM_TURN_MARGIN**, or bathymap, whichever bottom detector is in use. If more than one method of bottom detection is turned on, the one with the shallowest depth setting triggers the TARGET_DEPTH_EXCEEDED action.

$STATE,1369,begin apogee

Glider making itself neutral in the water; roll is net to neutral, then pitch is set to a slightly negative value, often -5 deg using $APOGEE_PITCH to keep the glider moving slightly forward and finally VBD pumps to neutral.

$GC,1373.02,3,0.00,-0.17,0.00,3651.0,3684.0,3618.1,2617.9,1652.7,150.54,-10.69,178,1473.38,97.18,1.03,0.13,1.385,0.165,0.141,3047.69,3093.19,3002.19,2829.50,1556.69,0,0,0,10.85,15.33,15.10

$STATE,1473,end apogee,CONTROL_FINISHED_OK

Statement expected with normal completion of the apogee phase of the dive

$STATE,1473,begin climb

Glider starting ascent by pumping buoyancy to the same amount as it bled at the start of the dive using **$MAX_BUOY**
Use **$GCHEAD** above to decode the GC lines below

$GC,1473.69,519,146.60,0.79,-40.00,3049.6,3094.7,3004.5,2829.1,1557.0,153.07,0.00,188,1583.81,101.19,1.43,2.37,1.359,0.093,0.078,2451.59,2511.94,2391.25,3146.00,226.19,0,0,0,11.75,15.14,14.91

$GC,1611.44,1157,146.60,0.61,0.00,2452.2,2511.9,2392.6,3146.5,225.4,140.34,13.73,202,1616.18,0.00,0.41,2.35,0.000,0.232,0.041,2452.34,2512.31,2392.38,3070.31,1651.06,0,0,0,30.00,15.00,15.18

$GC,1741.43,1,146.60,0.61,0.00,2452.3,2512.1,2392.5,3069.9,1652.4,125.21,11.43,215,1742.86,0.00,0.01,0.00,0.000,0.327,0.000,2450.31,2510.88,2389.75,3076.19,1652.56,0,0,0,30.00,30.36,30.00

$GC,1861.44,516,146.60,0.61,-40.00,2452.2,2511.9,2392.4,3076.4,1652.5,111.62,11.02,227,1866.04,0.00,0.00,2.48,0.000,0.000,0.078,2452.62,2512.81,2392.44,3080.19,224.38,0,0,0,30.00,30.00,15.45

$GC,1905.56,1029,146.60,0.61,0.00,2452.2,2511.2,2393.1,3080.5,224.0,106.26,12.06,231,1911.82,0.00,0.05,2.31,0.000,0.294,0.039,2453.75,2513.38,2394.12,3069.62,1658.19,0,0,0,30.00,15.27,15.52

$GC,2031.47,1,146.60,0.61,0.00,2452.2,2511.9,2392.4,3069.6,1659.4,92.58,10.52,244,2032.90,0.00,0.03,0.00,0.000,0.310,0.000,2451.94,2511.88,2392.00,3087.19,1658.81,0,0,0,30.00,15.43,30.00

$GC,2151.52,645,146.60,0.57,-40.00,2452.2,2511.9,2392.5,3086.2,1658.9,79.09,11.23,256,2156.26,0.00,0.16,2.47,0.000,0.241,0.079,2452.66,2512.19,2393.12,3063.31,224.19,0,0,0,30.00,15.31,15.30

$GC,2191.51,1028,146.60,0.57,0.00,2452.2,2512.1,2392.3,3062.6,224.6,74.53,11.71,260,2196.09,0.00,0.00,2.30,0.000,0.000,0.040,2452.25,2512.38,2392.12,3060.81,1646.38,0,0,0,30.00,30.00,15.61

$GC,2321.54,0,146.60,0.57,0.00,2452.3,2512.0,2392.6,3061.3,1647.9,59.95,11.11,273,2322.87,0.00,0.00,0.00,0.000,0.000,0.000,2449.91,2509.56,2390.25,3061.56,1647.88,0,0,0,30.00,30.00,30.00

$GC,2441.58,35,173.41,0.60,0.00,2452.3,2512.1,2392.4,3061.6,1647.9,48.76,8.77,286,2463.11,20.42,0.05,0.00,1.169,0.252,0.000,2341.22,2402.88,2279.56,3086.69,1648.31,0,0,0,11.25,15.49,30.00

$GC,2521.61,645,173.41,0.57,-40.00,2342.4,2402.8,2282.1,3086.0,1647.5,39.90,11.83,302,2527.20,0.00,0.16,2.46,0.000,0.239,0.079,2343.00,2402.62,2283.38,3059.12,225.50,0,0,0,30.00,15.39,15.39

$GC,2566.62,1157,173.41,0.63,0.00,2342.9,2403.2,2282.5,3060.1,225.5,34.79,11.26,311,2572.19,0.00,0.10,2.31,0.000,0.146,0.040,2344.53,2404.56,2284.50,3097.25,1650.31,0,0,0,30.00,15.26,15.54

$GC,2631.65,389,173.41,0.58,40.00,2343.0,2403.1,2282.9,3096.8,1651.9,27.17,11.71,324,2637.23,0.00,0.20,2.34,0.000,0.218,0.065,2344.28,2404.69,2283.88,3056.75,3039.12,0,0,0,30.00,15.38,15.39

$GC,2705.59,1191,179.44,0.65,0.00,2342.3,2402.3,2282.3,3056.7,3039.8,19.99,9.72,338,2713.99,2.83,0.12,2.48,0.187,0.132,0.055,2317.62,2378.25,2257.00,3098.50,1564.56,0,0,0,15.27,15.37,15.45

$GC,2773.34,679,194.11,0.60,-40.00,2318.1,2377.4,2258.9,3098.0,1565.1,13.26,9.33,352,2784.04,6.48,0.17,2.30,0.756,0.238,0.083,2259.06,2321.25,2196.88,3068.94,225.12,0,0,0,11.57,15.36,15.41

$GC,2813.32,1029,194.11,0.60,0.00,2257.6,2319.9,2195.3,3068.8,225.4,9.32,10.13,360,2818.87,0.00,0.00,2.29,0.000,0.050,0.039,2259.97,2323.06,2196.88,3068.81,1653.06,0,0,0,30.00,30.36,15.62

$GC,2848.31,261,194.11,0.60,40.00,2257.7,2320.3,2195.0,3068.2,1654.9,5.81,10.05,367,2853.90,0.00,0.00,2.33,0.000,0.044,0.064,2259.19,2321.25,2197.12,3069.50,3038.81,0,0,0,30.00,30.36,15.48

$STATE,2878,end climb,SURFACE_DEPTH_REACHED Glider has reached depth **$D_SURF**

$STATE,2878,begin surface coast

Glider calculates how many more science samples need to be taken before reaching the surface based on desired vertical velocity and science sensor sample rate and collects that number of samples

$FINISH,-0.2,1.012077

Glider depth and water density at the completion of science sample collection

$STATE,2908,end surface coast,CONTROL_FINISHED_OK

Statement expected with normal completion of the surface coast

$STATE,2908,begin surface

Glider begins surface maneuver, rolling to neutral if needed, pitching nose down and pumping VBD to **$SM_CC**

$SM_CCo,2943.96,14.52,0.903,0,2108.9,2155.2,2062.6,230.85

Surface maneuver VBD status

- 230.85 — VBD position at the end of the surface maneuver (SM) pump, in AD
- 2062.6 — VBD linpot2 position, in AD counts
- 2155.2 — VBD linpot1 position, in AD counts
- 2108.9 — VBD position (average of linpot1 and linpot2), in AD counts
- 0 — Total number of VBD errors during last SM pump
- 0.903 — Average VBD current during the last SM pump, in amps
- 14.52 — Time it took to complete the last SM pump, in seconds.
- 2943.96 — Time from the start of the dive to the start of the SM pump, in seconds.

$SM_GC,2.85,14.52,12.77,2.08,0.903,0.064,0.052,2108.9,2155.2,2062.6,213.5,1764.6,0,0,0,11.44,15.46,15.63

- 15.63 — Minimum voltage during
- 15.46 — Minimum voltage during last Pitch move, in volts.
- 11.44 — Minimum voltage during last VBD move, in volts.
- 0 — Number of Roll errors during last move
- 0 — Number of Pitch errors during last move
- 0 — Number of VBD errors during last move
- 1764.6 — Present Roll position, in AD counts
- 213.5 — Present Pitch position, in AD counts
- 2062.6 — Present VBD LinPot2 position, in AD
- 2155.2 — Present VBD LinPot1 position, in AD
- 2108.9 — Present VBD position, average of LinPot 1 and LinPot 2, in AD counts
- 0.052 — Average Roll current during surface maneuver, in amps
- 0.064 — Average Pitch current during surface maneuver, in amps
- 0.903 — Average VBD current during surface maneuver, in amps
- 2.08 — Time to complete the Roll surface maneuver, in seconds
- 12.77 — Time to complete the Pitch surface maneuver, in seconds
- 14.52 — Time to complete the VBD surface maneuver pump, in seconds
- 2.85 — Glider depth when $D_SURF is triggered, in meters

$SUPER,59,70,254,1,0,0

Supervisor status

- 0 — RESET
- 0 — FORCED
- 254 — 7302
- 1 — P2
- 0 — P1
- 70 — P0

$IRIDIUM_FIX,4745.33,-12219.67,210819,233405

- HHMMSS (if this value is incorrect it is likely that the epoch in iridium.c needs to be updated)
- DDMMYY (if this value is incorrect it is likely that the epoch in iridium.c needs to be updated)
- Longitude in degrees, decimal minutes (east in positive)
- Latitude in degrees, decimal minutes (north is positive)

$TCM_TEMP,17.10 Last temperature measurement from the compass

$XPDR_PINGS,4 Number of times the transponder commanded a ping during the dive

$ALTIM_TOP_PING,20.0,19.6 Altimeter response information if valid response received when attempting to detect the surface

- Distance between the glider's transducer and the sensed surface, in meters
- Depth of the glider at the time of the altimeter response, in meters

$ALTIM_BOTTOM_PING,120.2,67.6 Altimeter response information if valid response received when attempting to detect the bottom

- Distance between the glider's transducer and the sensed bottom, in meters
- Depth of the glider at the time of the altimeter response, in meters

$HUMID,52.58 Internal humidity measured when the .log file is finalized, in %

$TEMP,13.38 Internal temperature measured when the .log file is finalized, in degrees

$INTERNAL_PRESSURE,9.02823 Measured when the .log file is finalized, in psia

$24V_AH,14.48,6.297 Main battery pack voltage and Ahr status

- Number of main battery amp hours consumed since battery gauge reset
- Minimum voltage seen on the main battery pack during the dive

$10V_AH,15.00,0.000 Secondary battery pack voltage and Ahr status

- Number of secondary battery amp hours consumed since battery gauge reset

Note: In 15V systems where the main and secondary battery packs are bussed together, the number of amp hours consumed is recorded under the main

- Minimum voltage seen on the secondary battery pack during the dive.

$FG_AHR_24Vo,3.609 Cumulative A-hr consumed from the 24V pack as tracked by the supervisor fuel gauge. The value listed here reflects the fuel gauge state at the beginning of the dive. Note that for 15V shared bus systems, this output contains the cumulative A-hr consumed by the glider.

$FG_AHR_10Vo,0.476 Cumulative A-hr consumed from the 10V pack as tracked by the supervisor fuel gauge. The value listed here reflects the fuel gauge state at the beginning of the dive. For 15V shared bus systems, this line is reported as 0. The cumulative A-hr consumed by the glider are reported in FD_AHR_24Vo line.

$DEVICES,VBD_pump,Pitch_motor,Roll_motor,Iridium,Transponder_ping,GPS,Core,LPSleep,Compass,RAFOS,Transponder,Compass2

Provides the "column map" for the $DEVICE_SECS and $DEVICE_MAMPS data in the next lines.

$DEVICE_SECS,299.695,31.560,62.105,256.022,1.750,30.485,1605.400,1654.120,933.272,0.000,3.000,0.000

Cumulative number of seconds each device was on during the last dive

$DEVICE_MAMPS,1385.224,376.952,141.448,224.502,420.000,22.400,7.150,2.190,18.590,0.000,30.000,0.000

Current values used to calculate battery usage, in milli-Amps

Reports a measured value (Iridium, motors etc.) or a value from the CURRENTS file (sensors) or a hardcoded value (if not measured and not in the CURRENTS file)

$SENSORS,SBE_CT,WL_BBFL2,nil,nil,nil,nil,nil,nil,nil,nil

List of the science sensors in the order of their slot assignment

$SENSOR_SECS,424.093,812.619,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000

Cumulative number of seconds each sensor was powered on during the previous dive

$SENSOR_MAMPS,28.340,105.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000

Reports a measured current value, in milliamps, or a value from the CURRENTS file or a hardcoded value (if not measured and not in the CURRENTS file) for each sensor

$MEM,1170424,32,13824,59 SD card memory status

- Number of blocks allocated
- Number of bytes allocated
- Number of blocks free
- Number of bytes free

$DATA_FILE_SIZE,20648,379

- Number of data samples taken during the dive
- Total size of the data file in bytes

$CAP_FILE_SIZE,143605,0

- Number of critical capture lines
- .cap file size in bytes

$SDSIZE,3931136,3921184

- Available free space on the SD card, in
- Total capacity of the SD card, in kilobytes

$SDFILEDIR,44,1

- Number of directories on SD card
- Number of files on SD card

$ERRORS,0,0,0,0,0,0,1,0,0,0,0,0,0,0,0,0,0 Summary of errors and timeouts that occurred during the dive

- Logger 4 timeouts during dive
- Logger 3 timeouts during dive
- Logger 2 timeouts during dive
- Logger 1 timeouts during dive
- Sensor 6 timeouts during dive
- Sensor 5 timeouts during dive
- Sensor 4 timeouts during dive
- Sensor 3 timeouts during dive
- Sensor 2 timeouts during dive
- Sensor 1 timeouts during dive
- Compass timeouts during dive
- GPS timeouts during dive
- VBD retries during dive
- Roll retries during dive
- Pitch retries during dive
- VBD errors during dive
- Roll errors during dive
- Pitch errors during dive

$CURRENT,0.151,189.3,1 Calculated Depth Averaged Current (DAC). Output when **$NAV_MODE,2**.

- Validation value
- Depth Averaged Current direction, in degrees
- Depth Averaged Current magnitude, in meters

$GPS,220819,012030,4744.160,-12224.095,16,0.9,30,16.6 GPS position obtained at the end of the current dive, same format as GPS1 and GPS2

2.1.2. Data File (p5770008.dat)

The **.dat file** is an ASCII text file generated by the Seaglider and transmitted to the basestation for further processing. The first line is the only actual value; all following lines are differences. It serves as the primary conduit for the science data collected by the Seaglider. Each **data file** covers one dive of information. The format is designed to minimize transmission size and, while clear text, is not intended for direct use by users.

The numbers in the data file can be interpreted by the column titles listed in the "columns" line at the beginning of the file. The meaning of each column title is summarized below. The first 10columns ("rec" through "curr2") are always present. The remaining columns depend on parameter settings and the science sensor payload installed on the individual glider.

rec: the record number of the individual sample
elaps_tms: time since the start of the dive, in seconds times 100
depth: depth, in centimeters, at the start of the sample
heading: vehicle heading at the start of the sample, in degrees (magnetic) times 10 pitch:
vehicle pitch angle at the start of the sample, in degrees times 10, positive up
roll: vehicle roll at the start of the sample, in degrees times 10, positive starboard wing down
volt1: Most recent voltage measurement from the secondary (10V) battery pack, in volts times 100
volt2: Most recent voltage measurement from the primary (24V) battery pack, in volts times 100
curr1: Most recent current measurement from the secondary (10V) battery pack, in mA
curr2: Most recent current measurement from the primary (24V) battery pack, in mA
mag.x Only present in .dat file when $COMPASS_USE,4 (collecting raw compass data)
mag.y Only present in .dat file when $COMPASS_USE,4 (collecting raw compass data)
mag.z Only present in .dat file when $COMPASS_USE,4 (collecting raw compass data)

……
Examples of output in columns 14 and higher. Content and number of columns is glider dependent.
CT Sail
sbe.TempFreq: temperature, in cycle counts of 4 MHz, in 255 cycles of signal frequency
sbe.CondFreq: conductivity, in cycle counts of 4 MHz, in 255 cycles of signal frequency

Aanderaa DO model 4330
aa4330.O2: oxygen concentration, in µM times 1000
aa4330.AirSat: air saturation, in % times 1000
aa4330.Temp: temperature, in degrees C times 1000
aa4330.CalPhase: in degrees times 1000
aa4330.TCPhase: in degrees times 1000

WET Labs ECO Triplet model bbfl2
wlbbfl2.BB1ref: backscatter 1 reference, in A/D counts
wlbbfl2.BB1sig: backscatter 1 data, in A/D counts
wlbbfl2.FL1ref: fluorescence 1 reference, in A/D counts
wlbbfl2.FL1sig: fluorescence 1 data, in A/D counts
wlbbfl2.FL2ref: fluorescence 2 reference, in A/D counts
wlbbfl2.FL2sig: fluorescence 2 data, in A/D counts
wlbbfl2.temp: temperature, in A/D counts

Biospherical Instruments PAR
qsp.PARuV: photosynthetically active radiation, in uV

.dat file example

```
version: 67.00
glider: 577
mission: 1
dive: 8
start: 6 12 119 23 1 42
columns: rec,elaps_tms,depth,heading,pitch,roll,volt1,volt2,curr1,curr2,sbect.TempFreq,sbect.CondFreq,
data:
0 6433 67 3342 -641 37 1491 1488 9 9 3815040 6166167
1 4969 3 -35 -19 -11 0 0 32 3 -236 -466
1 4974 4 8 -16 -29 0 0 -33 -3 428 243
1 5000 6 31 16 8 0 0 1 0 -200 -94
1 5250 7 23 -8 6 0 0 0 -2 671 75
1 4966 21 18 2 -4 0 0 31 4 -4861 -652
1 4967 15 -14 -34 16 0 0 -33 -2 -8325 -4506
1 5000 32 28 -18 -9 0 0 0 0 -1422 -1501
```

2.1.3. ASCII File (p5770008.asc)

The .asc, or ASCII, files are created on the basestation. They are the reconstituted (uncompressed, reassembled, and differentially summed) versions of the data (.dat) files created on the Seaglider. See the Data File section (2.1.2) for a description of the column names. The first 10 columns are always present, while the remaining columns vary, depending on the installed sensors. The entry NaN indicates that there was no sample returned for that sensor. Either the sensor was not installed, or the sensor was not enabled for that sample/deployment, as controlled by the Science File. The entry 9999 indicates that an installed and enabled sensor did not respond when queried by the glider. This could indicate a sensor failure and should be investigated.

The ASCII file for the .dat file example in section 2.1.2 in below.

```
version: 67.00
glider: 577
mission: 1
dive: 8
basestation_version: 2.11
start: 06 12 119 23 01 42
columns: rec,elaps_tms,depth,heading,pitch,rolle,volt1,volt2,curr1,curr2,sbect.TempFreq,sbect.CondFreq
data:
0 6433 67 3342 -641 37 1491 1488 9 9 3815040 6166167
1 11402 70 3307 -660 26 1491 1488 41 12 3814804 6165701
2 16376 74 3315 -676 -3 1491 1488 8 9 3815232 6165944
3 21376 80 3346 -660 5 1491 1488 9 9 3815032 6165850
4 26626 87 3369 -668 11 1491 1488 9 7 3815703 6165925
5 31592 108 3387 -666 7 1491 1488 40 11 3810842 6165273
6 36559 123 3373 -700 23 1491 1488 7 9 3802517 6160767
7 41559 155 3401 -718 14 1491 1488 7 9 3801095 6159266
8 46527 194 3502 -755 -25 1491 1488 42 9 3789023 6158615
```

2.1.4. Engineering File (p5770008.eng)

The .eng, or engineering, files are created on the basestation. They restate data contained in the .dat and .asc files, but with the Seaglider control state and attitude observations converted into engineering units. The column titles are described below. The first 11 columns are always present, while the remaining columns vary, depending on the installed sensors.

elaps_t_0000: Time, in seconds, since 0000UTC of the current day
elaps_t: Time, in seconds, since the start of the dive
depth: Depth, in centimeters, at the start of the sample
head: Vehicle heading, in degrees magnetic
pitchAng: Vehicle pitch at the start of the sample, in degrees; positive nose-up
rollAng: Vehicle roll at the start of the sample, in degrees; positive starboard wing down (rolled to starboard)
rec: Record/sample number
volt1: Most recent voltage measurement from the secondary (10V) battery pack, in volts times 100
volt2: Most recent voltage measurement from the primary (24V) battery pack, in volts times 100
curr1: Most recent current measurement from the secondary (10V) battery pack, in mA
curr2: Most recent current measurement from the primary (24V) battery pack, in mA
sbect.condFreq: Conductivity frequency, in Hertz.
sbect.tempFreq: Temperature frequency, in Hertz.
sbe43.O2Freq: Oxygen concentration (in Hertz)
aa4330.O2: oxygen concentration, in µM
aa4330.AirSat: air saturation, in %
aa4330.Temp: temperature, in degrees C
aa4330.CalPhase: in degrees
aa4330.TCPhase: in degrees
wlbbfl2.BB1ref: backscatter 1 reference, in A/D counts
wlbbfl2.BB1sig: backscatter 1 data, in A/D counts
wlbbfl2.FL1ref: fluorescence 1 reference, in A/D counts
wlbbfl2.FL1sig: fluorescence 1 data, in A/D counts
wlbbfl2.FL2ref: : fluorescence 2 reference, in A/D counts
wlbbfl2.FL2sig: fluorescence 2 data, in A/D counts
wlbbfl2.temp: temperature, in A/D counts
qsp.PARuV: photosynthetically active radiation, in V

mag.x Only present in .dat file when $COMPASS_USE,4 (collecting raw compass data)
mag.y Only present in .dat file when $COMPASS_USE,4 (collecting raw compass data)
mag.z Only present in .dat file when $COMPASS_USE,4 (collecting raw compass data)

The Engineering file for the .dat file example in section 2.1.2 is below.

```
%version: 67.00
%glider: 577
%mission: 1
%dive: 8
%basestation_version: 2.11
%start: 06 12 119 23 01 42
%columns: elaps_t_0000,elaps_t,depth,head,pitchAng,rollAng,rec,volt1,volt2,curr1,curr2,sbect.condFreq,sbect.tempFreq
%data:
82908.433 6.433 67.000 334.200 -64.100 3.700 0.000 1491.000 1488.000 9.000 9.000 6166.167 3815.040
82913.402 11.402 70.000 330.700 -66.000 2.600 1.000 1491.000 1488.000 41.000 12.000 6165.701 3814.804
82918.376 16.376 74.000 331.500 -67.600 -0.300 2.000 1491.000 1488.000 8.000 9.000 6165.944 3815.232
82923.376 21.376 80.000 334.600 -66.000 0.500 3.000 1491.000 1488.000 9.000 9.000 6165.850 3815.032
82928.626 26.626 87.000 336.900 -66.800 1.100 4.000 1491.000 1488.000 9.000 7.000 6165.925 3815.703
82933.592 31.592 108.000 338.700 -66.600 0.700 5.000 1491.000 1488.000 40.000 11.000 6165.273 3810.842
82938.559 36.559 123.000 337.300 -70.000 2.300 6.000 1491.000 1488.000 7.000 9.000 6160.767 3802.517
82943.559 41.559 155.000 340.100 -71.800 1.400 7.000 1491.000 1488.000 7.000 9.000 6159.266 3801.095
```

2.1.5. Profiles File (p5770008.pro)

The .pro files contain the scientific data that was acquired during the dive, such as temperature and salinity. Generation of this file is specified in the glider_logout file if generation of a .pro file is desired for all gliders on a basestation or in the .logout file located in a glider's home directory if the .pro file is to be generated only for that glider. The data columns in this file are:

elapsed_time: time, in seconds, since the beginning of the dive (before the first sample is taken); the variable name for this data is elapsed_time_s_v
pressure: pressure, in decibars; the variable name for this data is pressure_v
depth: depth, in meters; the variable name for this data is sg_depth_m_v
temperature: raw temperature, in degrees C, the variable name for this data is temp_cor_v
temperature_qc: QC'd temperature, the variable name for this data is temp_cor_qc_v; refer to the Quality Control Manual for an explanation of the qc values
conductivity: raw conductivity, in S/m, corrected for 1st order time lag (response time of sensor); the variable name for this data is cond_cor_v
conductivity_qc: QC'd conductivity, the variable name for this data is cond_cor_qc_v; refer to the Quality Control Manual for an explanation of the qc values
salinity: salinity, calculated; the variable name for this data is salin_cor_v
salinity_qc: QC'd salinity, in PSU; the variable name for this data is salin_cor_qc_v
sigmaT: density at the current temperature; the variable name for this data is sigma_t_v
latitude: estimated latitude, in decimal degrees. This position is a rough estimate based on the position at the surface, and the depth-averaged current, not an actual GPS or other reading. The variable name for this data is dive_pos_lat_dd_v.
longitude: estimated longitude, in decimal degrees. This position is a rough estimate based on the position at the surface, and the depth-averaged current, not an actual GPS or other reading. The variable name for this data is dive_pos_lon_dd_v.

2.1.6. Binned Profiles File (p5770008.bpo)

This is the same data as in the .pro files, but here it is "binned", or averaged, into depth intervals specified by the user in the glider_logout file if generation of a .bpo file is desired for all gliders on a basestation or in the .logout file located in a glider's home directory if the .bpo file is to be generated only for that glider.

2.1.7. Capture File (p5770008.cap)

The capture file contains information about all the actions the Seaglider took during the dive. It captures the output written to the console while the Seaglider is operating. Capture files are a great source of information on the glider's performance, especially in error analysis and debugging.

The format of the capture file is not as hard and fast as other file formats, but it usually conforms to that shown below.

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Example Capture File

2759.044,SSYS,N,uploading complete capture due to CAPUPLOAD — Beginning process to upload the .cap (capture) file to the basestation as commanded by the parameter **$CAPUPLOAD,1**

Compressing THISDIVE.KAP to sg0007kz.x... — The first step in the capture file upload: compress the file THISDIVE.KAP and rename it to the just completed dive number; in this case dive 7. A 'K' is used instead of a 'C' in the file name because C is a reserved character.

- sg = Raw glider data files begin with sg
- 0007 = dive number 7
- k = capture file
- Z = zipped file
- .x… = the number of $N_FILEKB sized segments the THISDIVE.KAP was split into in preparation for

2773.926,SSYS,N,Capture file opened — The glider opens and closes each segment of the capture file in preparation for sending them and the .dat (data) and .log (log) files to the basestation.

Compressing THISDIVE.DAT to sg0007dz.x... — Glider compressing and renaming THISDJVE.DAT following 1.2.2 Data Flow Map.

Compressing THISDIVE.LOG to sg0007lz.x... — Glider compressing and renaming THISDJVE.LOG following 1.2.2 Data Flow Map

2777.992,HCF8,N,file 'sg0007dz.x00' opened... — Opening and closing of each compressed data file segment (dz), capture file segment (kz), and log file segment (lz); Dive 7 had one data file segment, 6 capture

2778.253,HCF8,N,file 'sg0007dz.x00' has 6674 bytes, closed... — file segments, and 1 log file segment

2778.463,HCF8,N,file 'sg0007kz.x00' opened...
2778.704,HCF8,N,file 'sg0007kz.x00' has 8192 bytes, closed...
2778.784,HCF8,N,file 'sg0007kz.x01' opened...
2779.022,HCF8,N,file 'sg0007kz.x01' has 8192 bytes, closed...
2779.103,HCF8,N,file 'sg0007kz.x02' opened...
2779.341,HCF8,N,file 'sg0007kz.x02' has 8192 bytes, closed...
2779.421,HCF8,N,file 'sg0007kz.x03' opened...
2779.660,HCF8,N,file 'sg0007kz.x03' has 8192 bytes, closed...
2779.740,HCF8,N,file 'sg0007kz.x04' opened...
2779.979,HCF8,N,file 'sg0007kz.x04' has 8192 bytes, closed...
2780.065,HCF8,N,file 'sg0007kz.x05' opened...
2780.138,HCF8,N,file 'sg0007kz.x05' has 433 bytes, closed...
2780.408,HCF8,N,file 'sg0007lz.x00' opened...
2780.572,HCF8,N,file 'sg0007lz.x00' has 4220 bytes, closed...

2781.523,HBATT,N,24V batt pack voltage = 14.97V (min 14.50V) — Present no load 24V battery pack voltage measurement with the lowest voltage measured on this battery pack, in (V).

2781.531,HBATT,N,10V batt pack voltage = 15.00V (min 14.97V) — Present no load 10V battery pack voltage measurement with the lowest voltage measured on this battery pack in (V).

2782.571,SDIVE,N,Measuring depth & angle for 1 sec... done. — Glider measures the depth of its pressure sensor and angle before calling the

2784.070,SDIVE,N,Measured depth: 0.95m angle: -71.48deg — basestation; depth value around 1m and angles of at least 60 degrees nose down are good.

2784.080,SSURF,N,Trying call 0... — The number of calls a glider attempts to make to the basestation is specified by parameter $CALL_TRIES

2784.084,SSURF,N,Calling phone number: 881600005257 — The phone number the glider is calling; the 88 indicates it is an Iridium number

2786.707,HPHONE,N,initializing RUDICS connection — The type of connection the glider is trying to make with the basestation; the options are RUDICS (internet based) or PSTN (phone/Iridium modem). RUDICS is the preferred method of communication with the basestation.

2801.811,HPHONE,N,Phone registered — The glider's Iridium modem has successfully registered with the Iridium network.

2810.202,HPHONE,N,Iridium signal strength: 5 — Iridium signal strength; range from 0 to 5 with 5 being the best; a call cannot be completed if the signal strength is zero

2810.208,HPHONE,N,cnt_NoComm:0 callCycle:0 smsLastCallCycle:-1 — Summary of the last SMS call cycle

- Count of unsuccessful call attempts
- Call cycle counter: 0 indicates the call was made during the first
- A flag: -1 indicates no SMS need be sent, ≥ 0 indicates either a SMS was sent or needs to be sent the

2810.249,HPHONE,N,Iridium geolocation: 47.755489 -122.327896 Wed Aug 21 23:34:05 2019 — Location obtained by the Iridium system; can be +/- 20 km or more from actual glider position; do not use as glider location

2817.183,HPHONE,N,dialing succeeded — Glider successfully dialed the basestation number

2831.116,SSURF,N,Logged in... — Glider successfully logged into its home directory on the basestation

2832.811,SSURF,N,Receiving cmdfile... Glider uploading the cmdfile on from the basestation
2832.816,SSURF,N,Sending cmd rawsend cmdfile
2834.573,SSURF,N,received 16 of 16 for cmdfile
2834.743,SSURF,N,Transmission succeeded...
2834.772,HST4,N,Updating parameter $C_VBD to 3050 Glider acknowledging the parameter changes found in the just uploaded cmdfile
2834.786,SDIVE,N,Parsed command: $GO Glider acknowledging the directive at the end of the just uploaded cmdfile
2838.382,SSURF,N,Sending cmd rawrcv sg0007lz.x00 Transfer of cmdfile from the glider to the basestation
(4220 bytes)(Receiving sg0007lz.x00 on basestation)
2845.144,SSURF,N,sent 4220 of 4220 of sg0007lz.x00, EOF=1 Confirmation of the complete log file transfer

- End of File: 1 = the file was read to the end, 0 = the file was not read to the end
- File segment number
- lz = zipped .log file
- 0007 = Dive number 7
- sg = raw dive data
- Number of bytes transferred from the glider to the basestation
- Normal output mode; other options are C (critical), D (debug), E (error), W
- Surface maneuvers
- Elapsed time since the start of the dive, in seconds

2853.914,SSURF,N,Transmission succeeded... Zipped log file successfully transferred to the
2855.662,SSURF,N,Sending cmd rawrcv sg0007dz.x00 Transfer of zipped data file from the glider to the basestation
(6674 bytes)(Receiving sg0007dz.x00 on basestation)
2868.936,SSURF,N,sent 6674 of 6674 of sg0007dz.x00, EOF=1
2880.369,SSURF,N,Transmission succeeded...
2881.940,SSURF,N,Sending cmd rawrcv sg0007kz.x00 Transfer of zipped capture file from the glider to the basestation
(8192 bytes)(Receiving sg0007kz.x00 on basestation)
2901.118,SSURF,N,sent 8192 of 8192 of sg0007kz.x00, EOF=0 Zipped capture file segment 00 transferred to the basestation; EOF=0 indicates that the complete capture file has not been transferred; in subsequent lines segments 01 – 05 are transferred; after segment 05 is transferred EOF=1 indicating that the complete capture file has now been transferred to the basestation
2908.355,SSURF,N,Transmission succeeded...
2909.944,SSURF,N,Sending cmd rawrcv sg0007kz.x01
(8192 bytes)(Receiving sg0007kz.x01 on basestation)
2929.108,SSURF,N,sent 8192 of 8192 of sg0007kz.x01, EOF=0
2936.508,SSURF,N,Transmission succeeded...
2938.185,SSURF,N,Sending cmd rawrcv sg0007kz.x02
(8192 bytes)(Receiving sg0007kz.x02 on basestation)
2958.076,SSURF,N,sent 8192 of 8192 of sg0007kz.x02, EOF=0
2965.586,SSURF,N,Transmission succeeded...
2967.264,SSURF,N,Sending cmd rawrcv sg0007kz.x03
(8192 bytes)(Receiving sg0007kz.x03 on basestation)
2986.509,SSURF,N,sent 8192 of 8192 of sg0007kz.x03, EOF=0
2994.217,SSURF,N,Transmission succeeded...
2995.806,SSURF,N,Sending cmd rawrcv sg0007kz.x04
(8192 bytes)(Receiving sg0007kz.x04 on basestation)
3015.132,SSURF,N,sent 8192 of 8192 of sg0007kz.x04, EOF=0
3022.567,SSURF,N,Transmission succeeded...
3024.165,SSURF,N,Sending cmd rawrcv sg0007kz.x05
(433 bytes)(Receiving sg0007kz.x05 on basestation)
3025.880,SSURF,N,sent 433 of 433 of sg0007kz.x05, EOF=1
3028.055,SSURF,N,Transmission succeeded...
3029.682,SSURF,N,logout... All files have been transferred to and from the glider and the glider has logged off the basestation. This triggers the basestation to process the files just transferred to it from the glider and generate .asc, .eng, .pvt and .nc files.
3034.514,HPHONE,N,phone on 256022 ms, avg mA=224.5, max mA=455.5 Phone statistics from the most recent call by the glider to the basestation

- Maximum current draw of the Iridium phone during the last call
- Average current draw of the Iridium phone during the last call
- Time the Iridium phone was on during the last call
- Normal output mode
- Iridium modem activity
- Elapsed time since the start of the dive, in seconds

3034.533,SUSR,N,stop time 2019-08-22 @ 21h (1566507600) — **$STOP_T** parameter value, time in UTC, (1566507600) = time, in seconds, since January 1, 1970
3034.539,SDIVE,N,Measuring depth & angle for 10 sec... done. — Beginning of glider actions to start next dive
3048.789,SDIVE,N,Measured depth: 0.89m angle: -68.06deg
3050.075,HGPS,N,Acquiring GPS fix (10,8,40) — Acquiring GPS fix based on parameter **$N_GPS**
3052.361,HGPS,N,VGPS: no data received
3053.137,HGPS,N,VVVVVVVVVVVVVVAAA — Acquisition of GPS fix: V = validate/verify; A = acquired/accepted
3079.000,HGPS,N,sync sentence $GPRMC,003038,A,4744.0009,N,12224.1308,W,000.0,000.0,220819,016.6,E*6A — Note: this line is continued below

- Checksum data
- Magnetic variation, in degrees
- Date, ddmmyyyy
- Track angle. In degrees
- Speed over ground, in knots
- Direction: west/east
- Longitude in degrees decimal
- Direction: north/south
- Latitude in degrees decimal minutes
- Status; A = Active, V = Void
- Time of acquisition, in UTC
- NMEA version of essential gps position (p) velocity (v) and time (t) data. RMC = Recommended Minimum sentence C
- Normal output mode
- GPS activity
- Elapsed time since the start of the dive, in seconds

(k=102162), was_high=0, spin=0set 2019/08/22 00:30:39 — Continuation of line above

- Date and time stamp for this action
- Time it took for the PPS to go low again, in seconds
- Indicates presence or absence of PPS voltage when attempting to sync the clock; 0 = PPS voltage absent, 1 = PPS voltage present
- Number of CPU cycles it took to sync the glider's clock with the GPS in the line above

3079.121,HSUPER,N,accum RTC time Thu Aug 22 00:24:47 2019
3079.171,HSUPER,N,RTC time Thu Aug 22 00:30:39 2019
3079.264,HSUPER,N,0,0,time set to (1566433839) Thu Aug 22 00:30:39 2019
3079.316,HSUPER,N,RTC time Thu Aug 22 00:30:39 2019
3079.326,HGPS,N,220819 003029 4744.0015 -12224.1299 hdop=0.9 cog=0.0 sog=0.0 hpe=8.5 n=8 17/19 seconds

- First fix time/Final fix time
- Number of satellites
- Horizontal Position Error, in
- Speed Over Ground
- Course Over Ground, in degrees
- Horizontal Dilution Of Precision
- Longitude, in degrees decimal minutes, positive = east, negative = west
- Latitude, in degrees decimal minutes, positive = north, negative = south
- Time, in UTC
- Date, ddmmyyyy

3079.891,SNAV,N,obstacles=b184.4,t0.5,s183.9 — Altimeter data from previous dive

- Bottom obstacle depth, in meters
- Surface obstacle depth, in meters
- Distance between surface and bottom obstacle, in meters
- Normal output mode
- Navigation activity
- Elapsed time since the start of the dive, in seconds

3079.898,SDIVE,N,Target [C1] bearing 23.73 degT, range 402.38 meters — The target the glider will head to on the upcoming dive

3079.908,SDIVE,N,Grid depth = 150.0, target depth = 150.0 — Dive depth specified by **$D_TGT**

3079.916,SDIVE,N,wDesired = -0.100 — The desired vertical velocity determined by parameters $D_TGT and T_DIVE

3082.083,HXPDR,N,Tried 1 times to respond to command $C1 — Testing transponder function

3086.367,HXPDR,N,max range = 90.000000 m, timeout = 120 ms

3087.884,SDIVE,N,speed limits = 0.17, 0.26 — Vertical velocity speed limits calculated by the glider in m/s

3087.905,SNAV,N,applying set correction -9.1 deg (steer 14.7) — Correction is taken from the Depth Averaged Current (DAC) measured in the previous dive and is applied to the bearing calculated above for the upcoming dive

3087.914,SDIVE,N,DesiredHead = 358.08, range = 402.4, glide angle -20.99 — Desired heading is the magnetic heading; magnetic heading is calculated by taking the bearing and correcting for DAC if it is measured and magnetic deviation

3088.010,HROLL,N,+ move commanded from -1.07 deg (1762.19) to 0.00 deg (1800.00)... — +: the mass shifter direction of movement is increasing AD counts; "-": the mass shifter direction of movement is decreasing AD counts

3088.711,HROLL,N,0.0 deg (ad: 1800.44) mA=43 V=15.57 P=6364done. — P=pressure, in AD counts

3088.898,HROLL,N,Roll completed from -1.07 deg (1762.19) to 1.67 deg (1859.06) dest 1800.00 took 0.1 sec 97mA (416mA peak) 15.5V (15.5Vmin) 1139.71 AD/sec 17 ticks

2102.0 2006.1 214.2 1763.6 21.6 15.7 6365 96.2 -68.2 2.9 — The Motor Motion Data: summarizes the last motion that occurred

- 2.9 — Present Roll position, in degrees
- -68.2 — Present Pitch position, in degrees
- 96.2 — Present Heading position, in degrees
- 6365 — External pressure, in AD counts (psi = (AD counts * **$PRESSURE_SLOPE**) + **$PRESSURE_YINT**)
- 15.7 — Present measured voltage, in V
- 21.6 — Present measured current draw, in mA
- 1763.6 — Present Roll position, in AD counts
- 214.2 — Present Pitch position, in AD counts
- 2006.1 — Present VBD LinPot2 position, in AD
- 2102.0 — Present VBD LinPot1 position, in AD

3088.987,SDIVE,N,pitch angle=-18.2deg (pitch -0.6cm), force=-150.0gm (VBD -146.6cc) — Desired glider pitch angle for the upcoming dive with the distance the mass shifter must move from neutral to achieve this angle in (). Desired force (thrust or negative buoyancy) in grams to make the glider dive with the number of cc's of oil moved into the reservoir to obtain the desired force in gm.

3088.996,HST4,N,Updating parameter $DIVE to 8 — Dive number changed from 7 (just completed dive) to 8 (about to start)

Time in seconds reset to zero, indicating the start of a new dive (Dive 8)

0.010,SSURF,N,Dive started Thu Aug 22 00:30:49 2019 — Date and time (UTC) of dive start

(1566433849) — Time of dive start in seconds since January 1, 1970

0.020,SSENSOR,N,Changing to bin 15.0() at 0.00m: sec=5.0s gc=30.0s sensors=11 pressure=1 compass=1 timeout=10.00

Science file sample protocol for 0 to 15m; see section 2.4.1 for science file example

0.144,SSURF,N,Initializing data file — Opening the .dat file

0.211,SSURF,N,Initializing log file — Opening the .log file

0.648,HST4,N,Updating parameter $FG_AHR_24V to 3.5513461

0.663,HST4,N,Updating parameter $FG_AHR_10V to 0.46508381

0.679,HSUPER,N,adding 36618.859 mA-s to 24V FG: 3.5513461 A-hr (count=458, dt=229.00)

- 229.00 — Accumulator count/rate, in seconds
- 458 — Accumulator count; the number of times that the A-hr use values have been calculated
- 36618.859 — conversion for mA-s to A-hr: 1 A-Hr = 3600 A-s = 3600 Coulombs;
- 3.5513461 — 36618.859 mA-s = 36.618 A-s;
- 36.618 A-s / (3600 A-s/A-hr) = 0.01017 A-hr;
- N — Normal output mode
- HSUPER — Supervisor processor activity
- 0.679 — Elapsed time since the start of the dive, in seconds

0.689,HSUPER,N,adding 4666.861 mA-s to 10V FG: 0.4650838 A-hr
1.121,HSUPER,N,status P0=59,P1=70,P2=254,7302=1,FORCED=0,RESET=0,ERRORS=0 Supervisor status; each value is derived from a bit mask
1.172,HSUPER,N,RTC time Thu Aug 22 00:30:49 2019
1.178,SSURF,N,Starting dive at 1s
1.182,SSURF,N,Leaving surface state
1.222,SDIVE,N,Entering dive state
1.262,SSURF,N,Starting dive 8, ice=0, dives since last call=1, urgency=0 Note: Hydroid Seaglider code does not have under ice capabilities

- urgency: Set by parameter **$SURFACE_URGENCY**
  - 0 = not urgent
  - 1 = urgent
  - 2 = urgent_forced
- dives since last call: Number of dives, including present one, since last phone call
- ice: Set by parameter **$USE_ICE**
  - 0 = always surface
  - 1 = unlikely ice
  - 2 = probably ice
  - 3 = always ice

1.820,SSENSOR,N,Changing to bin 15.0() at 0.00m: sec=5.0s gc=30.0s sensors=11 pressure=1 compass=1 timeout=10.00

Science file sample protocol for 0 to 15m; see section 2.4.1 for science file example

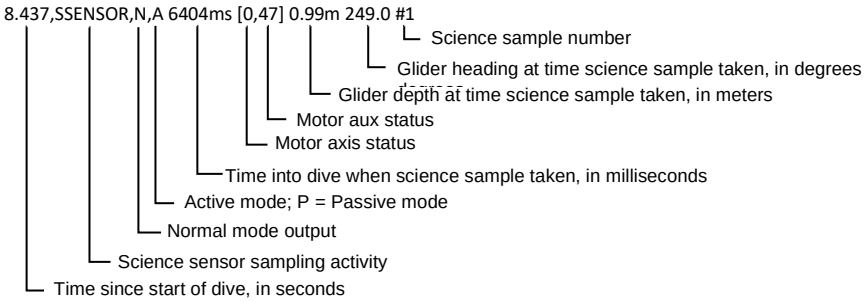
1.850,SMOTOR,N,Start active
1.991,SDIVE,N,$GC,1.97,2,-146.60,-0.79,0.00,2051.2,2099.4,2003.0,212.9,1859.1,0.00,0.00,0, ... Describes what action occurred in Active mode

- Elapsed time since the start of the dive, in seconds
- Dive activity
- Normal output mode
- Elapsed time from the start of the dive to the start of GC
- Guidance & Control (GC) flag; describes what action occurred in Active mode

```
GCPHASE_PITCH=1,          ///< (1) change pitch in Active
GCPHASE_VBD=2,            ///< (2) change buoyancy in Active
GCPHASE_ROLL=4,           ///< (3) start (and end) turns in Active
GCPHASE_TURNING=8,        ///< (4) track turns in Passive
//NOT_USED=16
GCPHASE_VBD_W_ADJ = 32,
GCPHASE_PITCH_W_ADJ = 64,
GCPHASE_PITCH_ADJ = 128,
GCPHASE_ROLL_POS = 256,
GCPHASE_ROLL_NEG = 512,
GCPHASE_ROLL_CENTER = 1024,
GCPHASE_PITCH_POS = 2048,
GCPHASE_PITCH_NEG = 4096,
GCPHASE_VBD_PUMP = 8192,
GCPHASE_VBD_BLEED = 16384
```

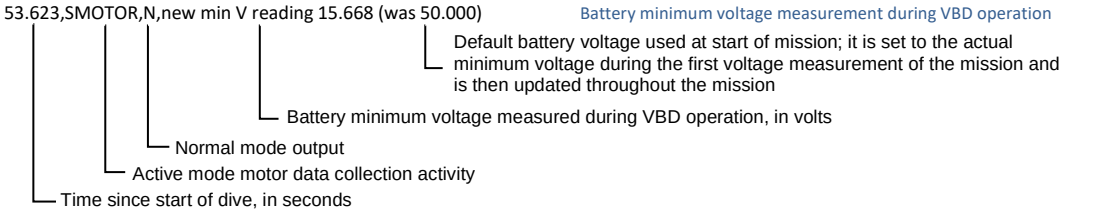
Example: Moved to negative pitch angle
GCPHASE_PITCH + GCPHASE_PITCH_ADJ + GCPHASE_PITCG_NEG = 1 + 128 + 4096 = 4225
→ convert to binary = 0001 0000 1000 0001

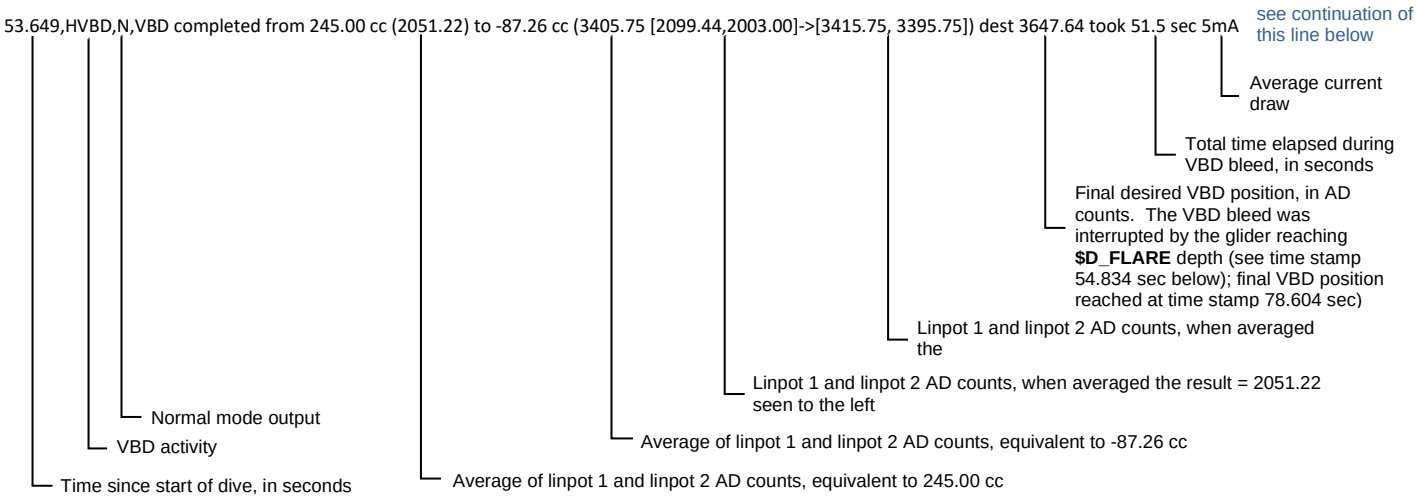
- VBD position, in cc of oil
- Pitch position, in centimeters
- Roll position, in deg
- Position of the VBD motor, in AD counts, at the end of the motor move
- Position of the vbd linear potentiometer 1, in AD counts, at the end of the motor
- Position of the vbd linear potentiometer 2, in AD counts, at the end of the motor
- Present Pitch position, in AD counts
- Present Roll position, in AD counts
- Glider depth, in meters
- GliderStatus.w * 100 (vertical velocity), in meters
- Number of data points collected so far

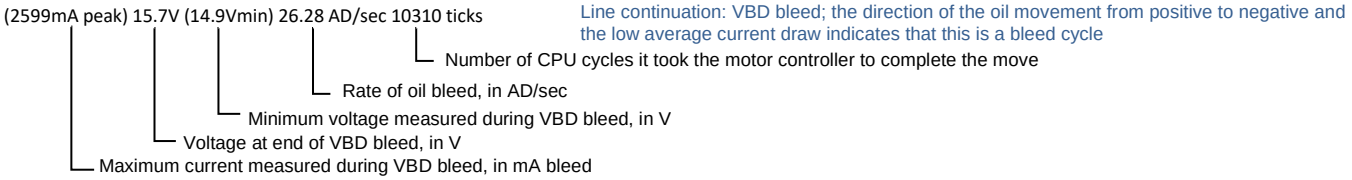


13.437,SSENSOR,N,A 11405ms [0,47] 1.05m 246.3 #2
18.438,SSENSOR,N,A 16644ms [0,47] 1.11m 244.9 #3
23.437,SSENSOR,N,A 21608ms [0,47] 1.27m 249.8 #4
28.439,SSENSOR,N,A 26576ms [0,47] 1.51m 244.8 #5
33.438,SSENSOR,N,A 31576ms [0,47] 1.84m 245.4 #6
38.437,SSENSOR,N,A 36544ms [0,47] 2.22m 245.4 #7
43.437,SSENSOR,N,A 41514ms [0,47] 2.52m 249.2 #8
48.437,SSENSOR,N,A 46514ms [0,47] 2.86m 250.4 #9
53.437,SSENSOR,N,A 51482ms [0,47] 3.30m 249.9 #10
53.473,SMOTOR,N,move not completed, stopping

This is a check to make sure the VBD motor has stopped before any new motor movement is started







2101.8 2008.2 213.0 1860.6 2598.7 13.6 6366 98.1 -67.1 1.4 Motor Motion Data

2122.7 2043.2 213.3 1861.2 5.0 15.8 6371 91.7 -67.6 7.8
2147.4 2072.2 213.4 1861.0 5.0 15.8 6371 92.9 -67.4 6.8

-
- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output
-

3336.2 3315.0 213.2 1860.8 5.0 15.8 6485 88.2 -74.8 3.1
3366.2 3347.9 213.3 1860.6 5.0 15.5 6490 89.6 -74.2 3.6
3398.3 3377.5 213.4 1860.8 5.0 15.6 6498 89.1 -74.3 3.9
54.785,SDIVE,N,end $GC ,54.77,51.55,0.00,0.00,0.005,0.000,0.000,3405.75,3415.75,3395.75,213.25,1858.88,0,0,0,14.92,30.00,30.00

- Guidance & Control (GC) values at end of last motor move
- Roll minimum voltage on last move, in V; 30V is default value until first roll voltage measurement is made
- Pitch minimum voltage on last move, in V; 30V is default value until first pitch voltage measurement is made
- VBD minimum voltage on last move, in V
- Number of roll errors on last
- Number of pitch errors on last
- Number of VBD errors on last
- Present roll position, in AD
- Present pitch position, in AD
- Present VBD LinPot2 position, in AD
- Present VBD LinPot1 position, in AD
- Present VBD position, in AD counts (average of LinPot 1 and LinPot 2 AD counts)
- Roll current on last move, in
- Pitch current on last move, in
- VBD current on last move, in
- Roll duration on last move, in seconds
- Pitch duration on last move, in
- VBD duration on last move, in seconds (negative indicates bleeding)
- Elapsed time from the start of the dive to the end of GC
- Normal mode output
- Dive activity
- Time since start of dive, in seconds

54.834,SDIVE,N,Exiting active after 10 samples, ret=FLARE_DEPTH_REACHED
54.883,HVBD,N, wObserved = -0.051
54.889,SDIVE,N,wObs=-0.051, wDes=-0.100, changing VBD -146.6 -> -253.8 (dBdw=2235.6), actual=-146.6 (MAX_BUOY)

- vertical velocity, in m/s (negative = glider descending)
- glider calculated thrust adjustment to obtained desired vertical velocity
- Thrust limit set by the pilot, in cc oil
- A gain term used to adjust buoyancy to achieve desired vertical speed, in grams/m/s; see Parameter Guide for more details on using $DBDW
- Desired thrust calculated by the glider, in cc oil
- Desired vertical velocity calculated by the glider based on $D_TGT and $T_DIVE, in m/s
- Observed vertical velocity calculated by the glider based on actual change in depth over time, in m/s
- Normal mode output
- Dive activity
- Time since start of dive, in seconds

54.903,SMOTOR,N,Start active — Starting active movement of VBD and/or pitch and/or roll system for guidance and control; Active movement is indicated by the A in the line time stamped 58.437.

55.032,SDIVE,N,$GC,55.01,551,-146.60,-0.79,-40.00,3404.6,3415.6,3393.7,213.0,1858.9,3.30,-5.09,10, ...
58.437,SSENSOR,N,A 56482ms [0,47] 3.92m 249.8 #11 — Science Sampling
63.440,SSENSOR,N,A 61483ms [0,47] 4.74m 254.8 #12
68.437,SSENSOR,N,A 66451ms [0,47] 5.74m 266.4 #13
73.436,SSENSOR,N,A 71435ms [0,47] 6.55m 275.0 #14
78.437,SSENSOR,N,A 76435ms [0,0] 7.20m 279.5 #15
78.561,SMOTOR,N,new min V reading 15.151 (was 15.668)
78.579,HPITCH,N,Pitch completed from -8.34 cm (213.00) to -0.80 cm (2625.06) dest 2628.04 took 13.9 sec 307mA (654mA peak) 15.2V (15.0Vmin) 173.03 AD/sec 2788 ticks
78.604,HVBD,N,VBD completed from -86.99 cc (3404.62) to -146.84 cc (3648.62 [3415.56,3393.69]->[3674.94, 3622.31]) dest 3647.64 took 5.5 sec 9mA (2666mA peak) 15.7V (15.1Vmin) 44.28 AD/sec 1102 ticks — completed the VBD bleed begun at the start of the dive but interrupted by the need to change the vehicle pitch at **$D_FLARE** depth in line above
78.634,HROLL,N,Roll completed from 1.66 deg (1858.88) to -40.67 deg (361.44) dest 385.07 took 2.6 sec 72mA (1180mA peak) 15.5V (15.0Vmin) 582.66 AD/sec 514 ticks
3417.7 3396.0 213.2 1860.1 35.0 15.8 6516 88.0 -74.0 4.2 — Motor Motion Data
3417.0 3396.4 227.7 1860.4 319.7 15.1 6516 86.9 -72.7 4.6
3418.6 3397.0 244.2 1859.4 348.1 15.1 6518 87.7 -73.8 3.6

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output
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3674.4 3624.4 2630.3 532.9 75.5 15.4 6701 85.1 -25.1 -2.6
3675.2 3624.2 2629.8 476.3 80.4 15.4 6699 84.5 -24.4 -3.0
3675.1 3624.0 2630.5 421.0 83.8 15.4 6700 84.5 -24.4 -3.0
82.123,SDIVE,N,end $GC ,82.10,5.51,13.94,2.57,0.009,0.307,0.072,3648.62,3674.94,3622.31,2625.06,361.44,0,0,0,15.10,14.99,15.00
82.177,SDIVE,N,Exiting active after 5 samples, ret=CONTROL_FINISHED_OK — vehicle roll completed from neutral to -40.67 degrees
82.185,SDIVE,N,Passive turn... — glider maintains roll to -40.67 degrees until the desired heading or **$T_TURN** time is reached; the passive movement is indicated by the P in the line time stamped 84.442

84.442,SSENSOR,N,P 82467ms 7.81m 285.0 #16 — Science Sampling
89.444,SSENSOR,N,P 87435ms 8.37m 290.3 #17
94.446,SSENSOR,N,P 92408ms 8.91m 293.0 #18

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- Indicates Science Sampling records #19-25
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134.461,SSENSOR,N,P 132482ms 13.77m 310.6 #26
139.463,SSENSOR,N,P 137452ms 14.44m 314.4 #27
144.465,SSENSOR,N,P 142435ms 15.07m 315.1 #28
144.498,SSENSOR,N,Changing to bin 50.0() at 15.07m: sec=5.0s gc=60.0s sensors=11 pressure=1 compass=1 timeout=10.00
Science file sample protocol for 15.01 to 50m; see section 2.4.1 for science file example

149.468,SSENSOR,N,P 147436ms 15.70m 317.2 #29
154.470,SSENSOR,N,P 152673ms 16.40m 319.7 #30
159.472,SSENSOR,N,P 157607ms 17.02m 323.2 #31

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- Indicates Science Sampling records #32-55
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284.518,SSENSOR,N,P 282560ms 34.86m 352.1 #56
289.522,SSENSOR,N,P 287530ms 35.56m 354.9 #57
294.522,SSENSOR,N,P 292498ms 36.27m 358.3 #58
294.558,SDIVE,N,Exiting passive after 43 samples, ret=CONTROL_FINISHED_OK
294.621,SDIVE,N,Done passive turn...
294.625,HVBD,N, wObserved = -0.140
294.629,SMOTOR,N,Start active

294.753,SDIVE,N,$GC,294.74,1028,-146.60,-0.79,0.00,3651.8,3684.2,3619.4,2625.6,361.0,36.27,-14.03,58, ...
299.528,SSENSOR,N,A 297498ms [0,0] 37.04m 0.7 #59
299.671,HROLL,N,Roll completed from -40.68 deg (361.00) to 1.17 deg (1841.38) dest 1800.00 took 2.4 sec 42mA (414mA peak) 15.7V (15.4Vmin) 611.73 AD/sec 484 ticks
3684.9 3620.4 2629.5 361.0 28.1 15.8 8275 123.3 -20.2 -14.6 Motor Motion Data
3685.6 3621.8 2630.4 414.1 43.9 15.7 8282 118.6 -19.9 -16.3
3686.4 3620.2 2630.2 473.7 38.8 15.7 8279 124.0 -19.2 -16.1

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output

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3685.4 3623.9 2624.6 1676.4 54.4 15.6 8289 118.9 -19.4 -11.8
3685.9 3620.8 2623.2 1735.8 54.9 15.5 8292 117.6 -19.0 -10.9
3685.8 3621.6 2623.8 1792.0 47.1 15.5 8289 117.4 -19.3 -11.1
300.210,SDIVE,N,end $GC ,300.19,0.00,0.00,2.42,0.000,0.000,0.042,3652.66,3685.25,3620.06,2617.81,1841.38,0,0,0,30.00,30.00,15.44
300.315,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
304.525,SSENSOR,N,P 302738ms 37.61m 2.3 #60 Science Sampling
309.525,SSENSOR,N,P 307701ms 38.28m 4.5 #61
314.528,SSENSOR,N,P 312669ms 38.91m 6.5 #62

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- Indicates Science Sampling records #63-68

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349.542,SSENSOR,N,P 347513ms 43.03m 15.2 #69
354.544,SSENSOR,N,P 352752ms 43.61m 16.1 #70
359.546,SSENSOR,N,P 357701ms 44.13m 17.3 #71
359.576,SDIVE,N,turn rate during steady passive flight = 0.235 deg/s
359.583,SDIVE,N,Exiting passive after 12 samples, ret=CONTROL_FINISHED_OK
359.591,HVBD,N, wObserved = -0.113
359.595,SMOTOR,N,Start active
359.732,SDIVE,N,$GC,359.71,261,-146.60,-0.79,40.00,3650.2,3681.2,3619.1,2618.5,1841.1,44.13,-11.27,71, ...
364.552,SSENSOR,N,A 362654ms [0,0] 44.65m 17.7 #72
364.695,HPITCH,N,Pitch completed from -0.82 cm (2618.50) to -0.81 cm (2619.31) dest 2628.04 took 0.0 sec 328mA (650mA peak) 15.4V (15.4Vmin) 18.06 AD/sec 9 ticks
364.718,HROLL,N,Roll completed from 1.16 deg (1841.06) to 40.57 deg (3235.19) dest 3214.93 took 2.4 sec 68mA (437mA peak) 15.6V (15.3Vmin) 588.24 AD/sec 474 ticks
3682.0 3620.5 2621.8 1842.8 38.1 15.9 8696 107.4 -19.1 1.6 Motor Motion Data
3683.5 3621.1 2628.4 1843.3 89.5 15.4 8687 107.4 -19.1 1.6
3682.2 3622.3 2634.8 1895.4 44.8 15.6 8695 103.6 -18.9 2.3

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3681.2 3623.2 2627.8 3064.6 78.9 15.6 8703 101.7 -19.5 7.2
3681.8 3620.6 2627.1 3123.4 79.4 15.6 8705 101.3 -19.4 7.2
3682.0 3621.1 2625.9 3178.2 84.5 15.4 8702 100.9 -19.4 8.3
365.314,SDIVE,N,end $GC ,365.29,0.00,0.05,2.37,0.000,0.328,0.068,3650.97,3680.62,3621.31,2619.31,3235.19,0,0,0,30.00,15.36,15.31
365.364,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
365.372,SDIVE,N,Passive turn...
369.548,SSENSOR,N,P 367638ms 45.15m 16.0 #73 Science Sampling
374.550,SSENSOR,N,P 372607ms 45.66m 14.4 #74
379.551,SSENSOR,N,P 377591ms 46.22m 11.6 #75

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- Indicates Science Sampling records #76-79

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404.562,SSENSOR,N,P 402767ms 48.80m 2.2 #80
409.563,SSENSOR,N,P 407715ms 49.35m 0.1 #81
414.565,SSENSOR,N,P 412685ms 49.86m 357.6 #82
414.601,SDIVE,N,Exiting passive after 10 samples, ret=CONTROL_FINISHED_OK
414.609,SDIVE,N,Done passive turn...
414.614,HVBD,N, wObserved = -0.104
414.621,SDIVE,N,pitch desired=-18.22, observed=-16.67, adj=-0.046 cm
414.628,SDIVE,N,new pitch ctl position=-0.654 (nominal=-0.607 cm)
414.635,SMOTOR,N,Start active
414.772,SDIVE,N,$GC,414.75,1157,-146.60,-0.83,0.00,3647.7,3676.2,3619.1,2620.6,3235.2,49.86,-10.38,82, ...
419.571,SSENSOR,N,A 417685ms [0,0] 50.44m 356.0 #83

419.717,HPITCH,N,Pitch completed from -0.81 cm (2620.62) to -0.92 cm (2584.38) dest 2613.19 took 0.1 sec 179mA (626mA peak) 15.3V (15.2Vmin) 483.33 AD/sec 15 ticks
419.741,HROLL,N,Roll completed from 40.57 deg (3235.19) to -1.06 deg (1762.44) dest 1800.00 took 2.4 sec 49mA (420mA peak) 15.6V (15.4Vmin) 604.83 AD/sec 487 ticks
3677.6 3619.5 2623.7 3236.6 21.6 15.8 8995 92.2 -16.4 19.4 Motor Motion Data
3679.5 3622.0 2625.5 3193.9 38.5 15.7 9006 92.0 -15.9 19.4
3675.6 3621.5 2626.9 3134.4 41.7 15.7 9001 92.2 -15.8 18.9

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output

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3678.0 3622.1 2625.8 1873.4 60.7 15.5 9011 94.3 -16.3 14.3
3678.1 3621.4 2624.8 1816.4 61.7 15.4 9007 94.9 -15.8 14.2
3678.1 3621.5 2625.4 1794.2 58.1 15.5 9012 94.8 -16.2 14.0
420.396,SDIVE,N,end $GC ,420.38,0.00,0.08,2.43,0.000,0.179,0.049,3648.59,3676.75,3620.44,2584.38,1762.44,0,0,0,30.00,15.16,15.43
420.451,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
420.461,SSENSOR,N,Changing to bin 1000.0() at 50.44m: sec=10.0s gc=120.0s sensors=11 pressure=1 compass=1 timeout=10.00
Science file sample protocol for 50.01 to 1000m; see section 2.4.1 for science file example

429.567,SSENSOR,N,P 427623ms 51.50m 353.9 #84 Science Sampling
439.568,SSENSOR,N,P 437560ms 52.81m 349.6 #85
449.571,SSENSOR,N,P 447748ms 54.04m 342.4 #86
459.573,SSENSOR,N,P 457685ms 55.23m 335.6 #87
469.575,SSENSOR,N,P 467623ms 56.39m 331.7 #88
479.577,SSENSOR,N,P 477544ms 57.47m 330.6 #89
479.606,SDIVE,N,turn rate during steady passive flight = -0.633 deg/s
479.614,SDIVE,N,Exiting passive after 6 samples, ret=CONTROL_FINISHED_OK
479.623,HVBD,N, wObserved = -0.119
479.628,SDIVE,N,pitch desired=-18.22, observed=-20.61, adj=0.072 cm observed glider pitch angle is steeper than desired
479.636,SDIVE,N,new pitch ctl position=-0.582 (nominal=-0.607 cm) adjustment of mass shifter position to reach desired pitch angle
479.644,SMOTOR,N,Start active
479.793,SDIVE,N,$GC,479.77,645,-146.60,-0.76,-40.00,3648.1,3678.2,3618.0,2584.1,1762.1,57.47,-11.95,89, ...
483.725,SSENSOR,N,A 482544ms [0,0] 58.13m 331.3 T
483.850,HPITCH,N,Pitch completed from -0.92 cm (2584.12) to -0.76 cm (2638.25) dest 2636.11 took 0.3 sec 183mA (642mA peak) 15.4V (15.4Vmin) 212.25 AD/sec 51 ticks
483.875,HROLL,N,Roll completed from -1.07 deg (1762.12) to -40.74 deg (358.81) dest 385.07 took 2.4 sec 71mA (432mA peak) 15.6V (15.3Vmin) 587.16 AD/sec 478 ticks
3681.1 3620.7 2589.3 1764.1 27.5 15.9 9421 96.8 -20.4 3.3 Motor Motion Data
3680.5 3620.6 2605.8 1763.9 160.6 15.4 9409 97.4 -20.6 1.9
3679.2 3619.6 2625.0 1764.8 157.4 15.4 9411 97.5 -20.6 1.6

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3680.2 3620.4 2642.8 545.4 79.3 15.5 9421 99.3 -20.5 -1.3
3680.2 3620.1 2642.1 487.2 81.7 15.5 9416 99.9 -20.3 -2.8
3680.6 3620.1 2643.1 431.2 85.7 15.5 9422 100.3 -20.5 -2.9

484.513,SDIVE,N,end $GC ,484.49,0.00,0.25,2.39,0.000,0.183,0.071,3649.53,3679.69,3619.38,2638.25,358.81,0,0,0,30.00,15.37,15.32
484.564,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
484.571,SDIVE,N,Passive turn...
489.580,SSENSOR,N,P 487784ms 58.60m 334.4 #90

Science sampling and G&C measurement occur once every 10 seconds based on science file settings for this depth

493.724,SSENSOR,N,P 492748ms 59.11m 336.4 T

T denotes a G&C measurement (no science sampling) while glider is turning, interval determined by **$T_TURN_SAMPINT**, set to 5 seconds for this dive

499.583,SSENSOR,N,P 497716ms 59.60m 338.8 #91
503.728,SSENSOR,N,P 502716ms 60.09m 341.3 T
509.586,SSENSOR,N,P 507685ms 60.58m 344.0 #92
513.732,SSENSOR,N,P 512669ms 61.11m 346.5 T
519.590,SSENSOR,N,P 517668ms 61.56m 350.1 #93
523.736,SSENSOR,N,P 522638ms 62.03m 352.0 T
529.594,SSENSOR,N,P 527591ms 62.52m 354.5 #94
533.739,SSENSOR,N,P 532591ms 63.03m 355.9 T
539.598,SSENSOR,N,P 537562ms 63.58m 358.5 #95
539.627,SDIVE,N,Exiting passive after 11 samples, ret=CONTROL_FINISHED_OK
539.635,SDIVE,N,Done passive turn...
539.640,HVBD,N, wObserved = -0.100
539.646,SDIVE,N,wObs=-0.100, wDes=-0.100, changing VBD -146.6 -> -147.2 (dBdw=2235.6), actual=-146.6 (MAX_BUOY)
539.660,SMOTOR,N,Start active
539.809,SDIVE,N,$GC,539.79,1060,-146.60,-0.76,0.00,3650.6,3683.4,3617.8,2637.9,358.6,63.58,-9.97,95, ...
543.747,SSENSOR,N,A 542763ms [0,0] 64.10m 359.7 T
543.869,HROLL,N,Roll completed from -40.75 deg (358.56) to 1.28 deg (1845.31) dest 1800.00 took 2.4 sec 42mA (419mA peak) 15.7V (15.6Vmin) 616.91 AD/sec 482 ticks
3685.6 3619.9 2642.2 358.8 20.8 15.9 9739 122.1 -18.6 -14.4

Motor Motion Data

3685.6 3619.4 2642.7 412.9 43.7 15.7 9732 121.4 -18.2 -15.6
3685.6 3620.2 2642.8 473.2 38.8 15.7 9736 120.9 -18.3 -15.2

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output

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3682.9 3620.4 2637.6 1680.7 46.7 15.7 9753 115.0 -18.2 -11.1
3685.4 3619.8 2635.4 1739.9 52.0 15.7 9751 114.9 -18.5 -10.4
3685.6 3619.4 2635.4 1798.1 50.4 15.6 9744 114.9 -18.4 -10.7
544.410,SDIVE,N,end $GC ,544.39,0.00,0.00,2.41,0.000,0.000,0.042,3651.44,3683.88,3619.00,2629.50,1845.31,0,0,0,30.00,30.00,15.63
544.517,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
549.600,SSENSOR,N,P 547732ms 64.61m 0.5 #96

Science Sampling

559.602,SSENSOR,N,P 557668ms 65.63m 2.7 #97
569.604,SSENSOR,N,P 567607ms 66.67m 2.5 #98

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- Indicates Science Sampling records #99-105

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649.620,SSENSOR,N,P 647763ms 74.55m 357.3 #106
659.622,SSENSOR,N,P 657701ms 75.50m 356.7 #107
669.624,SSENSOR,N,P 667622ms 76.42m 357.0 #108
669.653,SDIVE,N,turn rate during steady passive flight = 0.055 deg/s
669.661,SDIVE,N,Exiting passive after 13 samples, ret=CONTROL_FINISHED_OK
669.668,HVBD,N, wObserved = -0.095
669.674,SDIVE,N,wObs=-0.095, wDes=-0.100, changing VBD -146.6 -> -156.5 (dBdw=2235.6), actual=-146.6 (MAX_BUOY)
669.690,SDIVE,N,pitch desired=-18.22, observed=-17.19, adj=-0.031 cm
669.699,SDIVE,N,new pitch ctl position=-0.613 (nominal=-0.607 cm)
669.706,SMOTOR,N,Start active
669.861,SDIVE,N,$GC,669.84,161,-146.60,-0.79,0.00,3649.3,3681.2,3617.5,2630.0,1845.8,76.42,-9.55,108, ...
671.071,SDIVE,N,exiting active w/o sampling due to early move complete
671.193,HPITCH,N,Pitch completed from -0.78 cm (2630.00) to -0.90 cm (2591.62) dest 2626.21 took 0.1 sec 207mA (625mA peak) 15.6V (15.5Vmin) 697.73 AD/sec 11 ticks
3683.2 3619.8 2633.8 1847.3 24.6 15.9 10424 102.4 -17.3 1.5

671.291,SDIVE,N,end $GC ,671.27,0.00,0.05,0.00,0.000,0.207,0.000,3651.28,3683.00,3619.56,2591.62,1847.44,0,0,0,30.00,15.50,30.00
671.345,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
679.625,SSENSOR,N,P 677794ms 77.42m 355.2 #109 Science Sampling
689.626,SSENSOR,N,P 687684ms 78.52m 353.8 #110
699.628,SSENSOR,N,P 697592ms 79.67m 353.0 #111

- Indicates Science Sampling records #112-117

769.641,SSENSOR,N,P 767623ms 87.57m 336.5 #118
779.644,SSENSOR,N,P 777810ms 88.68m 334.1 #119
789.645,SSENSOR,N,P 787716ms 89.82m 331.5 #120
789.675,SDIVE,N,turn rate during steady passive flight = -0.328 deg/s
789.683,SDIVE,N,Exiting passive after 12 samples, ret=CONTROL_FINISHED_OK
789.691,HVBD,N, wObserved = -0.112
789.698,SDIVE,N,pitch desired=-18.22, observed=-19.81, adj=0.048 cm
789.706,SDIVE,N,new pitch ctl position=-0.565 (nominal=-0.607 cm)
789.712,SMOTOR,N,Start active
789.868,SDIVE,N,$GC,789.85,645,-146.60,-0.75,-40.00,3649.6,3681.3,3617.9,2592.1,1847.2,89.82,-11.23,120, ...
793.794,SSENSOR,N,A 792684ms [0,0] 90.47m 330.4 T
793.917,HPITCH,N,Pitch completed from -0.90 cm (2592.12) to -0.74 cm (2643.69) dest 2641.54 took 0.2 sec 186mA (633mA peak) 15.4V (15.4Vmin) 210.46 AD/sec 49 ticks
793.942,HROLL,N,Roll completed from 1.34 deg (1847.25) to -40.66 deg (361.56) dest 385.07 took 2.5 sec 70mA (430mA peak) 15.6V (15.3Vmin) 584.92 AD/sec 508 ticks
3682.9 3619.5 2596.1 1849.4 31.5 15.9 11142 96.8 -20.1 2.8 Motor Motion Data
3682.7 3620.4 2613.7 1849.1 165.4 15.4 11142 96.3 -20.4 3.0
3682.6 3622.1 2633.8 1849.0 163.7 15.4 11150 96.3 -20.3 3.4

- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output

3683.1 3620.4 2647.6 517.2 91.1 15.5 11152 98.3 -19.9 -1.3
3683.5 3620.4 2647.3 459.8 77.8 15.5 11155 98.3 -19.9 -1.3
3682.8 3620.2 2647.9 405.3 84.1 15.5 11153 98.3 -19.9 -1.3
794.619,SDIVE,N,end $GC ,794.60,0.00,0.25,2.54,0.000,0.186,0.070,3651.31,3682.75,3619.88,2643.69,361.56,0,0,0,30.00,15.37,15.31
794.668,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
794.675,SDIVE,N,Passive turn...
799.648,SSENSOR,N,P 797685ms 90.97m 330.7 #121 Science Sampling
803.792,SSENSOR,N,P 802638ms 91.53m 330.9 T
809.652,SSENSOR,N,P 807623ms 92.05m 332.2 #122

- Indicates Science Sampling records #123-127

863.817,SSENSOR,N,P 862638ms 97.82m 354.2 T
869.676,SSENSOR,N,P 867891ms 98.37m 356.8 #128
873.821,SSENSOR,N,P 872840ms 98.82m 358.8 T
873.830,SDIVE,N,Exiting passive after 16 samples, ret=CONTROL_FINISHED_OK
873.837,SDIVE,N,Done passive turn...
873.842,HVBD,N, wObserved = -0.102
873.846,SMOTOR,N,Start active
874.001,SDIVE,N,$GC,873.98,1028,-146.60,-0.75,0.00,3651.1,3684.2,3617.9,2643.2,361.4,98.82,-10.22,128, ...
879.465,SSENSOR,N,A 877559ms [0,0] 99.34m 360.0 #129
879.609,HROLL,N,Roll completed from -40.67 deg (361.44) to 1.20 deg (1842.44) dest 1800.00 took 2.4 sec 42mA (421mA peak) 15.7V (15.7Vmin) 617.08 AD/sec 480 ticks
3685.2 3620.2 2646.8 361.5 18.0 15.9 11616 119.6 -17.4 -14.9 Motor Motion Data
3688.1 3619.1 2645.5 415.6 41.7 15.7 11615 118.9 -17.6 -15.1
3685.2 3621.0 2648.4 475.5 42.6 15.7 11619 118.4 -17.2 -15.7

- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output

3684.2 3619.3 2644.9 1623.8 53.6 15.7 11624 113.7 -17.4 -11.6
3686.5 3618.7 2642.2 1684.1 47.6 15.7 11631 114.2 -17.4 -11.1
3686.7 3620.2 2642.1 1742.2 50.3 15.7 11631 113.9 -17.4 -10.8
880.133,SDIVE,N,end $GC ,880.12,0.00,0.00,2.40,0.000,0.000,0.042,3652.28,3685.56,3619.00,2637.19,1842.44,0,0,0,30.00,30.00,15.68
880.184,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
889.678,SSENSOR,N,P 887748ms 100.32m 1.4 #130 Science Sampling
899.680,SSENSOR,N,P 897685ms 101.26m 2.1 #131
909.682,SSENSOR,N,P 907873ms 102.17m 2.1 #132

- Indicates Science Sampling records #133-138

979.696,SSENSOR,N,P 977841ms 108.41m 359.2 #139
989.698,SSENSOR,N,P 987779ms 109.30m 358.3 #140
999.700,SSENSOR,N,P 997701ms 110.21m 358.0 #141
999.729,SDIVE,N,turn rate during steady passive flight = -0.067 deg/s
999.737,SDIVE,N,Exiting passive after 12 samples, ret=CONTROL_FINISHED_OK
999.746,HVBD,N, wObserved = -0.087
999.751,SDIVE,N,wObs=-0.087, wDes=-0.100, changing VBD -146.6 -> -174.3 (dBdw=2235.6), actual=-146.6 (MAX_BUOY)
999.767,SDIVE,N,pitch desired=-18.22, observed=-16.47, adj=-0.053 cm
999.776,SDIVE,N,new pitch ctl position=-0.618 (nominal=-0.607 cm)
999.783,SMOTOR,N,Start active
999.933,SDIVE,N,$GC,999.92,161,-146.60,-0.80,0.00,3650.1,3682.2,3617.9,2637.3,1842.8,110.21,-8.73,141, ...
1001.142,SDIVE,N,exiting active w/o sampling due to early move complete
1001.266,HPITCH,N,Pitch completed from -0.76 cm (2637.31) to -0.89 cm (2596.62) dest 2624.73 took 0.1 sec 142mA (617mA peak) 15.6V (15.5Vmin) 428.29 AD/sec 19 ticks
3683.6 3619.6 2641.2 1844.3 25.7 15.9 12229 101.5 -16.9 1.6
1001.365,SDIVE,N,end $GC ,1001.35,0.00,0.09,0.00,0.000,0.142,0.000,3650.41,3681.94,3618.88,2596.62,1844.94,0,0,0,30.00,15.53,30.00
1001.420,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
1009.701,SSENSOR,N,P 1007872ms 111.22m 354.0 #142 Science Sampling
1019.703,SSENSOR,N,P 1017762ms 112.31m 350.9 #143
1029.704,SSENSOR,N,P 1027668ms 113.41m 347.9 #144
1039.706,SSENSOR,N,P 1037856ms 114.56m 345.7 #145
1049.708,SSENSOR,N,P 1047793ms 115.66m 342.9 #146
1059.709,SSENSOR,N,P 1057732ms 116.75m 339.5 #147
1069.711,SSENSOR,N,P 1067676ms 117.85m 336.9 #148
1079.714,SSENSOR,N,P 1077856ms 118.98m 334.9 #149
1089.715,SSENSOR,N,P 1087778ms 120.16m 333.0 #150
1089.736,HXPDR,N,ranging at 120.164070 meters Altimeter activated by **$ALTIIM_PING_DEPTH**
1091.903,HXPDR,N,Tried 1 times to respond to command $C1
1092.985,HXPDR,N,range = 64.715248
1095.567,HXPDR,N,range1 = 64.715248, range2 = 70.544998, depth = 120.164070, bottom = 187.794189 Two range values must be returned for the glider to accept the average of the distance to bottom values

- Total water depth calculated from average of range 1 and 2 distances + vehicle depth, in m
- Vehicle depth when altimeter saw bottom, in m
- Second distance measurement to bottom from present glider location in the water column, in m
- First distance measurement to bottom from present glider location in the water column, in m
- Normal mode output
- Transponder activity
- Time since start of dive, in seconds

1099.716,SSENSOR,N,P 1097762ms 121.26m 330.8 #151
1109.718,SSENSOR,N,P 1107684ms 122.39m 328.6 #152

1119.720,SSENSOR,N,P 1117872ms 123.49m 325.8 #153
1119.750,SDIVE,N,turn rate during steady passive flight = -0.285 deg/s
1119.758,SDIVE,N,Exiting passive after 12 samples, ret=CONTROL_FINISHED_OK
1119.767,HVBD,N, wObserved = -0.112
1119.772,SMOTOR,N,Start active
1119.927,SDIVE,N,$GC,1119.91,517,-146.60,-0.80,-40.00,3649.9,3682.1,3617.8,2596.9,1845.1,123.49,-11.24,153, ...
1123.870,SSENSOR,N,A 1122840ms [0,0] 124.17m 326.5 T
1123.993,HPITCH,N,Pitch completed from -0.88 cm (2596.94) to -0.79 cm (2626.31) dest 2624.73 took 0.1 sec 203mA (635mA peak) 15.5V (15.4Vmin) 225.96 AD/sec 26 ticks
1124.017,HROLL,N,Roll completed from 1.27 deg (1845.06) to -40.71 deg (360.12) dest 385.07 took 2.5 sec 71mA (428mA peak) 15.6V (15.3Vmin) 585.77 AD/sec 507 ticks
3683.1 3619.2 2600.6 1846.6 35.4 16.0 12944 93.7 -19.5 2.7 Motor Motion Data
3682.9 3620.1 2618.3 1847.8 158.3 15.4 12947 93.8 -19.5 2.5
3683.0 3620.1 2624.4 1847.4 70.2 15.5 12951 93.8 -19.5 2.5

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output
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3684.1 3620.1 2630.0 513.8 89.7 15.6 12956 96.1 -18.9 -2.2
3684.2 3620.4 2630.3 456.3 82.4 15.6 12957 96.0 -18.9 -2.4
3684.0 3620.6 2629.9 401.6 87.1 15.5 12954 96.7 -19.0 -2.7
1124.675,SDIVE,N,end $GC ,1124.66,0.00,0.13,2.54,0.000,0.203,0.071,3651.41,3683.50,3619.31,2626.31,360.12,0,0,0,30.00,15.40,15.32
1124.725,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
1124.733,SDIVE,N,Passive turn...
1129.722,SSENSOR,N,P 1127840ms 124.63m 328.9 #154 Science Sampling
1133.867,SSENSOR,N,P 1132793ms 125.20m 331.2 T
1139.726,SSENSOR,N,P 1137762ms 125.77m 333.8 #155

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- Indicates Science Sampling records #156-159
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1189.746,SSENSOR,N,P 1187779ms 131.25m 355.9 #160
1193.891,SSENSOR,N,P 1192778ms 131.84m 357.9 T
1199.750,SSENSOR,N,P 1197731ms 132.37m 0.4 #161
1199.779,SDIVE,N,Exiting passive after 15 samples, ret=CONTROL_FINISHED_OK
1199.787,SDIVE,N,Done passive turn...
1199.792,HVBD,N, wObserved = -0.110
1199.796,SMOTOR,N,Start active
1199.951,SDIVE,N,$GC,1199.93,1028,-146.60,-0.80,0.00,3651.3,3684.4,3618.1,2625.3,360.4,132.37,-11.02,161, ...
1203.898,SSENSOR,N,A 1202707ms [0,0] 133.04m 1.8 T
1204.024,HROLL,N,Roll completed from -40.70 deg (360.44) to 1.18 deg (1841.62) dest 1800.00 took 2.4 sec 42mA (420mA peak) 15.7V (15.7Vmin) 615.88 AD/sec 481 ticks
3684.7 3620.2 2629.9 360.1 16.2 16.0 13424 121.6 -18.6 -14.5 Motor Motion Data
3686.2 3618.9 2629.6 415.2 40.6 15.7 13421 122.9 -18.2 -16.1
3685.6 3618.6 2629.5 475.1 42.4 15.7 13426 122.9 -18.4 -15.6

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output
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3685.6 3621.1 2623.6 1682.4 51.2 15.7 13433 117.5 -18.9 -11.4
3685.9 3619.8 2622.2 1741.8 51.2 15.7 13434 117.5 -18.9 -11.4
3685.8 3619.9 2622.5 1799.3 51.9 15.7 13427 117.5 -18.9 -11.4
1204.566,SDIVE,N,end $GC ,1204.55,0.00,0.00,2.40,0.000,0.000,0.042,3650.72,3684.00,3617.44,2617.81,1841.62,0,0,0,30.00,30.00,15.67
1204.692,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
1209.751,SSENSOR,N,P 1207934ms 133.52m 1.7 #162 Science Sampling
1219.753,SSENSOR,N,P 1217872ms 134.57m 3.0 #163
1229.755,SSENSOR,N,P 1227809ms 135.59m 5.5 #164

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- Indicates Science Sampling records #165-171

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1309.771,SSENSOR,N,P 1307965ms 144.09m 346.1 #172
1319.773,SSENSOR,N,P 1317904ms 145.15m 344.4 #173
1329.775,SSENSOR,N,P 1327840ms 146.16m 342.2 #174
1329.810,SDIVE,N,turn rate during steady passive flight = -0.330 deg/s
1329.818,SDIVE,N,Exiting passive after 13 samples, ret=CONTROL_FINISHED_OK
1329.827,HVBD,N, wObserved = -0.104
1329.832,SMOTOR,N,Start active
1329.980,SDIVE,N,$GC,1329.96,517,-146.60,-0.80,-40.00,3650.2,3682.4,3618.1,2617.2,1843.9,146.16,-10.37,174, ...
1333.924,SSENSOR,N,A 1332840ms [0,0] 146.80m 342.1 T
1334.046,HPITCH,N,Pitch completed from -0.82 cm (2617.19) to -0.80 cm (2624.38) dest 2624.73 took 0.0 sec 377mA (666mA peak) 15.6V (15.4Vmin) 239.58 AD/sec
6 ticks
1334.071,HROLL,N,Roll completed from 1.24 deg (1843.94) to -40.71 deg (360.12) dest 385.07 took 2.5 sec 70mA (439mA peak) 15.6V (15.4Vmin) 588.81 AD/sec 504
ticks
3684.1 3619.8 2621.4 1845.2   31.0   16.0 14157  99.1 -17.9   1.1
3683.9 3619.6 2625.5 1845.6  103.1   15.5 14163  99.1 -17.9   1.1
3684.2 3618.9 2630.9 1798.7   61.3   15.6 14156  99.1 -17.9   1.1
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Motor Motion Data

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3684.2 3619.8 2629.8  506.4   86.5   15.6 14164 101.9 -17.7  -2.9
3684.9 3620.5 2629.6  449.0   90.0   15.6 14165 101.7 -17.7  -3.3
3684.6 3620.4 2629.4  393.9   85.0   15.5 14164 102.8 -17.9  -3.6
1334.711,SDIVE,N,end $GC ,1334.69,0.00,0.03,2.52,0.000,0.377,0.070,3651.91,3683.88,3619.94,2624.38,360.12,0,0,0,30.00,15.45,15.35
1334.761,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
1334.769,SDIVE,N,Passive turn...
1339.777,SSENSOR,N,P 1337809ms 147.23m 343.8 #175
1343.921,SSENSOR,N,P 1342778ms 147.80m 345.5 T
1349.781,SSENSOR,N,P 1347762ms 148.36m 348.0 #176
1353.926,SSENSOR,N,P 1352740ms 148.88m 350.0 T
1359.785,SSENSOR,N,P 1357950ms 149.48m 352.5 #177
1363.930,SSENSOR,N,P 1362903ms 149.99m 354.7 T
1369.789,SSENSOR,N,P 1367903ms 150.54m 357.6 #178
1369.826,SDIVE,N,Exiting passive after 7 samples, ret=TARGET_DEPTH_EXCEEDED
1369.833,SDIVE,N,Done passive turn...
1369.838,SDIVE,N,Leaving dive state due to TARGET_DEPTH_EXCEEDED
1369.882,SDIVE,N,Entering apogee state
1369.924,SDIVE,N,Going neutral at apogee at 150.54 meters
1370.011,HROLL,N,+ move commanded from -35.05 deg (360.06) to 0.00 deg (1600.00)...
1370.712,HROLL,N,-27.6 deg (ad: 622.50) mA=38 V=15.74 P=14391done.
1372.418,HROLL,N,Roll completed from -35.05 deg (360.06) to 1.00 deg (1635.38) dest 1600.00 took 2.0 sec 41mA (422mA peak) 15.7V (15.7Vmin) 626.69 AD/sec
407 ticks
3685.6 3619.6 2628.7  360.1   16.9   16.0 14387 120.4 -18.8 -13.8
3685.3 3620.1 2630.3  414.4   41.1   15.7 14390 115.1 -18.3 -15.2
3686.1 3620.1 2629.8  475.7   43.3   15.7 14392 120.1 -18.5 -15.0
```

$D_TGT, bathymetry map depth or $ALTIM_BOTTOM_TURN_MARGIN reached

Glider will roll to neutral if needed, pitch up to $APOGEE_PITCH, and pump the VBD to neutral buoyancy ($C_VBD)

Roll to neutral

Motor Motion Data

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3686.1 3620.4 2623.8 1461.8   44.4   15.7 14400 115.9 -18.7 -12.0
3685.4 3620.4 2623.4 1522.8   46.0   15.7 14404 115.9 -18.7 -12.0
3685.6 3620.2 2622.9 1582.6   47.1   15.7 14400 115.9 -18.7 -12.0
```

1372.875,SDIVE,N,entering active for apogee pump
1372.881,SMOTOR,N,Start active
1373.036,SDIVE,N,$GC,1373.02,3,0.00,-0.17,0.00,3651.0,3684.0,3618.1,2617.9,1652.7,150.54,-10.69,178, ...
1379.793,SSENSOR,N,A 1377840ms [12,47] 151.70m 359.5 #179 Science Sampling
1389.795,SSENSOR,N,A 1387778ms [12,47] 152.08m 0.3 #180
1399.795,SSENSOR,N,A 1397965ms [12,47] 152.24m 2.6 #181

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- Indicates Science Sampling records #182-185

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1449.795,SSENSOR,N,A 1447872ms [12,47] 152.96m 7.1 #186
1459.797,SSENSOR,N,A 1457778ms [12,47] 153.05m 8.5 #187
1469.797,SSENSOR,N,A 1467971ms [12,47] 153.07m 9.8 #188
1470.830,SDIVE,N,exiting active w/o sampling due to early move complete
1470.923,SMOTOR,N,new min V reading 14.791 (was 15.151)
1470.951,HPITCH,N,Pitch completed from -0.82 cm (2617.94) to -0.16 cm (2829.50) dest 2826.68 took 1.0 sec 165mA (659mA peak) 15.4V (15.3Vmin) 204.41 AD/sec 207 ticks Pitch to $APOGEE_PITCH
1470.974,HVBD,N,VBD completed from -147.43 cc (3651.03) to 0.57 cc (3047.69 [3684.00,3618.06]->[3093.19, 3002.19]) dest 3050.00 took 97.2 sec 1385mA (5126mA peak) 14.8V (10.9Vmin) 6.21 AD/sec 19437 ticks Pump to $C_VBD
1471.005,HROLL,N,Roll completed from 1.49 deg (1652.69) to -1.22 deg (1556.69) dest 1600.00 took 0.1 sec 141mA (760mA peak) 15.2V (15.1Vmin) 738.46 AD/sec 26 ticks Glider preparing to enter climb phase and changes roll center from $C_ROLL_DIVE to $C_ROLL_CLIMB
3684.9 3619.2 2621.3 1653.9 27.3 16.0 14407 111.6 -18.7 -7.4 Motor Motion Data
3686.9 3621.4 2639.6 1654.0 162.5 15.4 14418 110.3 -18.9 -6.3
3683.8 3619.3 2658.8 1655.1 164.0 15.3 14413 110.8 -19.0 -6.6

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output

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3099.4 3007.8 2831.1 1657.4 1451.3 14.6 14502 78.4 -2.0 1.0
3097.3 3005.9 2831.8 1657.2 759.6 14.8 14503 79.5 -3.3 1.1
3096.9 3006.2 2832.3 1613.4 66.2 15.3 14499 68.9 -2.3 1.3
1473.406,SDIVE,N,end $GC ,1473.38,97.18,1.03,0.13,1.385,0.165,0.141,3047.69,3093.19,3002.19,2829.50,1556.69,0,0,0,10.85,15.33,15.10
1473.461,SDIVE,N,Exiting active after 11 samples, ret=CONTROL_FINISHED_OK
1473.469,SDIVE,N,Leaving Apogee state due to CONTROL_FINISHED_OK
1473.512,SDIVE,N,Entering climb state
1473.555,SDIVE,N,Going up from 153.07 meters ... VBDctl=147
1473.561,SMOTOR,N,Start active
1473.704,SDIVE,N,$GC,1473.69,519,146.60,0.79,-40.00,3049.6,3094.7,3004.5,2829.1,1557.0,153.07,0.00,188, ...
1473.939,SSENSOR,N,Changing to bin 1000.0() at 153.07m: sec=10.0s gc=120.0s sensors=11 pressure=1 compass=1 timeout=10.00
Science file sample protocol for 15.01 to 1000m; see section 2.4.1 for science file example

1473.962,SSENSOR,N,sleep negative: wake=1566435321.551, now=1566435322.985 Clock update
1473.971,SSENSOR,N,new wake=1566435322.994
1475.480,SSENSOR,N,A 1474231ms [8,47] 153.08m 10.9 T Science Sampling
1481.226,SSENSOR,N,A 1479231ms [12,47] 152.99m 12.2 #189
1485.369,SSENSOR,N,A 1484200ms [12,47] 152.62m 11.7 T

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- Indicates Science Sampling records #190-198

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1575.369,SSENSOR,N,A 1574215ms [12,47] 145.25m 14.2 T
1580.635,SSENSOR,N,A 1578684ms [0,0] 144.55m 12.5 #199
1580.753,SMOTOR,N,new min V reading 14.480 (was 14.791)
1580.781,HPITCH,N,Pitch completed from -0.16 cm (2829.12) to 0.83 cm (3146.00) dest 3131.96 took 1.4 sec 93mA (610mA peak) 15.2V (15.1Vmin) 221.59 AD/sec 286 ticks Glider pitches node up
1580.805,HVBD,N,VBD completed from 0.10 cc (3049.59) to 146.79 cc (2451.59 [3094.69,3004.50]->[2511.94, 2391.25]) dest 2452.36 took 101.2 sec 1359mA (5128mA peak) 14.5V (11.7Vmin) 5.91 AD/sec 20239 ticks Glider pumps to positive value of **$MAX_BUOY**

1580.835,HROLL,N,Roll completed from -1.22 deg (1557.00) to -38.84 deg (226.19) dest 247.00 took 2.4 sec 78mA (774mA peak) 15.1V (14.9Vmin) 562.71 AD/sec 473 ticks Glider rolls to get to desired heading
3097.4 3006.9 2831.9 1558.2 23.0 15.4 14498 67.8 -2.5 -0.2 Motor Motion Data
3097.4 3008.1 2851.6 1557.8 84.2 15.3 14496 68.8 -2.4 -0.1
3097.1 3008.1 2873.3 1558.0 75.0 15.3 14498 69.1 -2.7 -0.2

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output
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2514.7 2394.6 3150.3 386.2 86.3 15.1 14060 25.5 22.4 -3.5
2515.4 2392.9 3150.9 332.7 89.0 15.1 14062 24.6 22.7 -4.1
2515.5 2393.8 3149.9 281.3 86.6 15.1 14061 23.3 22.9 -5.2
1583.833,SDIVE,N,end $GC ,1583.81,101.19,1.43,2.37,1.359,0.093,0.078,2451.59,2511.94,2391.25,3146.00,226.19,0,0,0,11.75,15.14,14.91
1583.883,SDIVE,N,Exiting active after 22 samples, ret=CONTROL_FINISHED_OK
1583.891,SDIVE,N,Passive turn...
1585.461,SSENSOR,N,P 1584184ms 143.83m 10.5 T
1591.223,SSENSOR,N,P 1589187ms 143.13m 7.5 #200
1595.367,SSENSOR,N,P 1594425ms 142.42m 4.9 T
1601.225,SSENSOR,N,P 1599387ms 141.73m 1.0 #201
1605.369,SSENSOR,N,P 1604340ms 141.03m 358.4 T
1611.227,SSENSOR,N,P 1609340ms 140.34m 354.4 #202
1611.261,SDIVE,N,Exiting passive after 6 samples, ret=CONTROL_FINISHED_OK
1611.269,SDIVE,N,Done passive turn...
1611.275,HVBD,N, wObserved = 0.137
1611.281,SDIVE,N,pitch desired=18.22, observed=24.04, adj=-0.175 cm
1611.289,SDIVE,N,new pitch ctl position=0.433 (nominal=0.607 cm)
1611.296,SMOTOR,N,Start active
1611.458,SDIVE,N,$GC,1611.44,1157,146.60,0.61,0.00,2452.2,2511.9,2392.6,3146.5,225.4,140.34,13.73,202, ...
1615.375,SSENSOR,N,A 1614293ms [0,0] 139.68m 352.4 T
1615.500,HPITCH,N,Pitch completed from 0.83 cm (3146.50) to 0.59 cm (3070.31) dest 3076.10 took 0.4 sec 232mA (608mA peak) 15.0V (15.0Vmin) 185.82 AD/sec 82 ticks
1615.523,HROLL,N,Roll completed from -38.86 deg (225.44) to 1.44 deg (1651.06) dest 1600.00 took 2.3 sec 41mA (404mA peak) 15.3V (15.2Vmin) 606.65 AD/sec 470 ticks
2515.2 2395.6 3149.0 225.8 25.6 15.4 13804 12.8 23.6 -16.8 Motor Motion Data
2514.8 2396.5 3150.8 276.6 43.1 15.3 13812 12.7 23.8 -17.9
2514.9 2396.8 3150.9 333.0 37.6 15.3 13808 12.7 23.8 -17.9

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2515.4 2396.6 3116.6 1651.6 226.2 15.0 13782 23.7 23.9 -12.5
2515.2 2396.2 3097.0 1652.9 223.2 15.0 13781 24.8 23.6 -11.9
2515.4 2396.3 3078.6 1653.2 207.0 15.0 13782 25.5 23.4 -11.3
1616.205,SDIVE,N,end $GC ,1616.18,0.00,0.41,2.35,0.000,0.232,0.041,2452.34,2512.31,2392.38,3070.31,1651.06,0,0,0,30.00,15.00,15.18
1616.254,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
1621.228,SSENSOR,N,P 1619278ms 138.84m 350.6 #203 Science Sampling
1631.229,SSENSOR,N,P 1629215ms 137.67m 348.7 #204
1641.230,SSENSOR,N,P 1639403ms 136.52m 348.8 #205

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- Indicates Science Sampling records #206-212
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1721.237,SSENSOR,N,P 1719293ms 127.51m 358.6 #213
1731.239,SSENSOR,N,P 1729247ms 126.38m 359.0 #214
1741.240,SSENSOR,N,P 1739434ms 125.21m 359.3 #215
1741.270,SDIVE,N,turn rate during steady passive flight = 0.072 deg/s
1741.278,SDIVE,N,Exiting passive after 13 samples, ret=CONTROL_FINISHED_OK
1741.287,HVBD,N, wObserved = 0.114

1741.291,SMOTOR,N,Start active
1741.445,SDIVE,N,$GC,1741.43,1,146.60,0.61,0.00,2452.3,2512.1,2392.5,3069.9,1652.4,125.21,11.43,215, ...
1742.655,SDIVE,N,exiting active w/o sampling due to early move complete
1742.777,HPITCH,N,Pitch completed from 0.59 cm (3069.94) to 0.61 cm (3076.19) dest 3076.10 took 0.0 sec 327mA (616mA peak) 15.5V (30.4Vmin) 625.00 AD/sec 2 ticks
2515.1 2395.6 3073.5 1654.5 38.9 15.6 12999 41.7 18.5 -0.8
1742.875,SDIVE,N,end $GC ,1742.86,0.00,0.01,0.00,0.000,0.327,0.000,2450.31,2510.88,2389.75,3076.19,1652.56,0,0,0,30.00,30.36,30.00
1742.929,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
1751.241,SSENSOR,N,P 1749356ms 124.06m 0.2 #216 Science Sampling
1761.242,SSENSOR,N,P 1759262ms 122.90m 0.1 #217
1771.243,SSENSOR,N,P 1769457ms 121.69m 1.3 #218

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- Indicates Science Sampling records #219-224

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1841.250,SSENSOR,N,P 1839231ms 113.80m 21.5 #225
1851.250,SSENSOR,N,P 1849403ms 112.66m 23.0 #226
1861.251,SSENSOR,N,P 1859325ms 111.62m 22.2 #227
1861.281,SDIVE,N,turn rate during steady passive flight = 0.302 deg/s
1861.289,SDIVE,N,Exiting passive after 12 samples, ret=CONTROL_FINISHED_OK
1861.297,HVBD,N, wObserved = 0.110
1861.301,SMOTOR,N,Start active
1861.461,SDIVE,N,$GC,1861.44,516,146.60,0.61,-40.00,2452.2,2511.9,2392.4,3076.4,1652.5,111.62,11.02,227, ...
1865.402,SSENSOR,N,A 1864293ms [0,0] 111.13m 22.2 T
1865.527,HROLL,N,Roll completed from 1.48 deg (1652.50) to -38.89 deg (224.38) dest 247.00 took 2.5 sec 78mA (417mA peak) 15.5V (15.4Vmin) 574.70 AD/sec 497 ticks
2515.2 2395.6 3079.0 1654.0 26.7 15.7 12272 28.4 18.2 0.6 Motor Motion Data
2515.1 2395.8 3080.4 1608.4 65.1 15.5 12272 29.1 17.9 0.5
2515.1 2394.8 3080.1 1551.8 49.8 15.6 12278 29.2 18.5 0.8

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output

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2513.8 2395.2 3086.1 399.0 90.4 15.5 12264 22.4 18.7 -3.5
2515.5 2395.7 3083.7 342.9 89.4 15.5 12257 22.2 18.1 -3.5
2515.2 2396.1 3084.6 289.2 97.0 15.4 12254 21.5 18.2 -4.0
1866.064,SDIVE,N,end $GC ,1866.04,0.00,0.00,2.48,0.000,0.000,0.078,2452.62,2512.81,2392.44,3080.19,224.38,0,0,0,30.00,30.00,15.45
1866.180,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
1866.188,SDIVE,N,Passive turn...
1871.254,SSENSOR,N,P 1869309ms 110.45m 20.1 #228 Science Sampling
1875.400,SSENSOR,N,P 1874277ms 109.89m 17.2 T
1881.258,SSENSOR,N,P 1879247ms 109.29m 13.5 #229
1885.075,SSENSOR,N,P 1884246ms 108.67m 10.7 T
1891.262,SSENSOR,N,P 1889226ms 108.07m 6.1 #230
1895.407,SSENSOR,N,P 1894434ms 107.44m 3.4 T
1901.265,SSENSOR,N,P 1899403ms 106.84m 359.4 #231
1905.411,SSENSOR,N,P 1904402ms 106.26m 356.7 T
1905.419,SDIVE,N,Exiting passive after 8 samples, ret=CONTROL_FINISHED_OK
1905.427,SDIVE,N,Done passive turn...
1905.432,HVBD,N, wObserved = 0.121
1905.437,SMOTOR,N,Start active
1905.580,SDIVE,N,$GC,1905.56,1029,146.60,0.61,0.00,2452.2,2511.2,2393.1,3080.5,224.0,106.26,12.06,231, ...
1911.058,SSENSOR,N,A 1909121ms [0,0] 105.65m 353.3 #232
1911.204,HPITCH,N,Pitch completed from 0.63 cm (3080.50) to 0.59 cm (3069.62) dest 3076.10 took 0.1 sec 294mA (621mA peak) 15.3V (15.3Vmin) 217.50 AD/sec 10 ticks
1911.227,HROLL,N,Roll completed from -38.90 deg (224.00) to 1.64 deg (1658.19) dest 1600.00 took 2.3 sec 39mA (417mA peak) 15.6V (15.5Vmin) 620.86 AD/sec 462 ticks
2515.8 2395.6 3083.5 224.2 22.8 15.8 11995 15.1 18.8 -15.9 Motor Motion Data
2516.9 2396.2 3082.6 274.4 45.4 15.6 11992 15.1 19.0 -16.5

2516.9 2396.4 3084.7 334.2 38.5 15.6 11989 15.0 18.5 -16.4

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output

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2516.3 2395.9 3084.1 1536.8 44.0 15.6 11978 23.6 18.8 -12.5
2516.5 2397.2 3085.0 1596.6 48.4 15.6 11981 24.5 18.9 -11.9
2515.2 2396.4 3084.6 1605.1 53.5 15.6 11978 24.5 18.9 -11.9
1911.836,SDIVE,N,end $GC ,1911.82,0.00,0.05,2.31,0.000,0.294,0.039,2453.75,2513.38,2394.12,3069.62,1658.19,0,0,0,30.00,15.27,15.52
1911.886,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
1921.270,SSENSOR,N,P 1919309ms 104.48m 351.3 #233 Science Sampling
1931.272,SSENSOR,N,P 1929236ms 103.37m 350.1 #234
1941.274,SSENSOR,N,P 1939417ms 102.18m 348.2 #235

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- Indicates Science Sampling records #236-241

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2011.288,SSENSOR,N,P 2009251ms 94.67m 355.5 #242
2021.290,SSENSOR,N,P 2019434ms 93.62m 357.2 #243
2031.291,SSENSOR,N,P 2029355ms 92.58m 357.7 #244
2031.322,SDIVE,N,turn rate during steady passive flight = 0.154 deg/s
2031.330,SDIVE,N,Exiting passive after 12 samples, ret=CONTROL_FINISHED_OK
2031.337,HVBD,N, wObserved = 0.105
2031.342,SMOTOR,N,Start active
2031.491,SDIVE,N,$GC,2031.47,1,146.60,0.61,0.00,2452.2,2511.9,2392.4,3069.6,1659.4,92.58,10.52,244, ...
2032.700,SDIVE,N,exiting active w/o sampling due to early move complete
2032.821,HPITCH,N,Pitch completed from 0.59 cm (3069.56) to 0.65 cm (3087.19) dest 3076.10 took 0.0 sec 310mA (629mA peak) 15.5V (15.4Vmin) 587.50 AD/sec 6 ticks
2514.8 2395.4 3072.8 1660.7 41.7 15.8 11262 43.5 18.1 0.4
2032.918,SDIVE,N,end $GC ,2032.90,0.00,0.03,0.00,0.000,0.310,0.000,2451.94,2511.88,2392.00,3087.19,1658.81,0,0,0,30.00,15.43,30.00
2032.983,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
2041.293,SSENSOR,N,P 2039258ms 91.53m 357.0 #245 Science Sampling
2051.295,SSENSOR,N,P 2049433ms 90.37m 355.9 #246
2061.298,SSENSOR,N,P 2059372ms 89.22m 354.6 #247

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- Indicates Science Sampling records #248-253

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2131.312,SSENSOR,N,P 2129450ms 81.37m 5.4 #254
2141.314,SSENSOR,N,P 2139371ms 80.23m 8.5 #255
2151.316,SSENSOR,N,P 2149293ms 79.09m 11.6 #256
2151.345,SDIVE,N,turn rate during steady passive flight = 0.281 deg/s
2151.353,SDIVE,N,Exiting passive after 12 samples, ret=CONTROL_FINISHED_OK
2151.361,HVBD,N, wObserved = 0.112
2151.368,SDIVE,N,pitch desired=18.22, observed=19.66, adj=-0.043 cm
2151.375,SDIVE,N,new pitch ctl position=0.389 (nominal=0.607 cm)
2151.383,SMOTOR,N,Start active
2151.538,SDIVE,N,$GC,2151.52,645,146.60,0.57,-40.00,2452.2,2511.9,2392.5,3086.2,1658.9,79.09,11.23,256, ...
2155.465,SSENSOR,N,A 2154274ms [0,0] 78.65m 12.2 T
2155.590,HPITCH,N,Pitch completed from 0.64 cm (3086.25) to 0.57 cm (3063.31) dest 3062.30 took 0.2 sec 241mA (615mA peak) 15.4V (15.3Vmin) 147.98 AD/sec 31 ticks
2155.615,HROLL,N,Roll completed from 1.66 deg (1658.88) to -38.89 deg (224.19) dest 247.00 took 2.5 sec 79mA (436mA peak) 15.6V (15.3Vmin) 579.67 AD/sec 495 ticks
2515.2 2395.9 3090.8 1660.8 45.3 15.9 10538 35.6 18.9 1.1 Motor Motion Data
2515.6 2396.2 3075.1 1661.4 197.0 15.4 10539 35.8 19.0 1.7
2514.9 2396.2 3063.4 1660.9 86.2 15.4 10530 37.5 18.7 1.1

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output
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2515.4 2396.6 3065.5 395.0 89.1 15.5 10518 29.3 18.3 -3.5
2515.4 2396.2 3065.8 338.8 87.2 15.5 10516 29.1 18.4 -2.9
2515.5 2395.8 3065.8 285.9 93.0 15.5 10517 28.6 18.7 -3.7
2156.281,SDIVE,N,end $GC ,2156.26,0.00,0.16,2.47,0.000,0.241,0.079,2452.66,2512.19,2393.12,3063.31,224.19,0,0,0,30.00,15.31,15.30
2156.331,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
2156.338,SDIVE,N,Passive turn...
2161.318,SSENSOR,N,P 2159282ms 77.97m 11.5 #257 Science Sampling
2165.463,SSENSOR,N,P 2164517ms 77.40m 9.3 T
2171.322,SSENSOR,N,P 2169480ms 76.83m 6.7 #258
2175.467,SSENSOR,N,P 2174449ms 76.28m 4.9 T
2181.326,SSENSOR,N,P 2179434ms 75.70m 2.1 #259
2185.470,SSENSOR,N,P 2184403ms 75.10m 359.9 T
2191.330,SSENSOR,N,P 2189387ms 74.53m 356.4 #260
2191.359,SDIVE,N,Exiting passive after 7 samples, ret=CONTROL_FINISHED_OK
2191.367,SDIVE,N,Done passive turn...
2191.373,HVBD,N, wObserved = 0.117
2191.376,SMOTOR,N,Start active
2191.524,SDIVE,N,$GC,2191.51,1028,146.60,0.57,0.00,2452.2,2512.1,2392.3,3062.6,224.6,74.53,11.71,260, ...
2195.479,SSENSOR,N,A 2194387ms [0,0] 73.95m 354.2 T
2195.605,HROLL,N,Roll completed from -38.88 deg (224.56) to 1.31 deg (1646.38) dest 1600.00 took 2.3 sec 40mA (414mA peak) 15.7V (15.6Vmin) 618.18 AD/sec 460 ticks
2515.2 2395.6 3065.9 224.7 22.8 15.9 10291 16.3 17.1 -15.9 Motor Motion Data
2515.8 2395.9 3067.0 275.7 45.3 15.7 10296 16.4 16.8 -16.6
2515.4 2396.4 3066.2 334.2 41.1 15.7 10284 16.5 16.7 -16.7
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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output
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2516.7 2397.1 3065.1 1417.8 39.7 15.7 10283 23.6 17.0 -12.9
2515.7 2396.9 3064.6 1478.2 46.7 15.7 10276 24.2 16.8 -12.7
2516.4 2394.7 3064.0 1541.0 41.0 15.7 10279 25.1 16.6 -12.3
2196.110,SDIVE,N,end $GC ,2196.09,0.00,0.00,2.30,0.000,0.000,0.040,2452.25,2512.38,2392.12,3060.81,1646.38,0,0,0,30.00,30.00,15.61
2196.165,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
2201.332,SSENSOR,N,P 2199356ms 73.38m 352.5 #261 Science Sampling
2211.334,SSENSOR,N,P 2209547ms 72.21m 349.5 #262
2221.335,SSENSOR,N,P 2219480ms 71.12m 348.6 #263
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- Indicates Science Sampling records #264-270
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2301.351,SSENSOR,N,P 2299465ms 62.12m 347.0 #271
2311.353,SSENSOR,N,P 2309372ms 61.03m 348.1 #272
2321.356,SSENSOR,N,P 2319563ms 59.95m 348.6 #273
2321.385,SDIVE,N,turn rate during steady passive flight = -0.004 deg/s
2321.393,SDIVE,N,Exiting passive after 13 samples, ret=CONTROL_FINISHED_OK
2321.402,HVBD,N, wObserved = 0.111
2321.406,SMOTOR,N,Start active
2321.554,SDIVE,N,$GC,2321.54,0,146.60,0.57,0.00,2452.3,2512.0,2392.6,3061.3,1647.9,59.95,11.11,273, ...
2322.751,SDIVE,N,exiting active w/o sampling due to early move complete
2322.878,SMOTOR,N,empty report Indicates no pitch, roll or VBD movement detected
2322.890,SDIVE,N,end $GC ,2322.87,0.00,0.00,0.00,0.000,0.000,0.000,2449.91,2509.56,2390.25,3061.56,1647.88,0,0,0,30.00,30.00,30.00
2322.940,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
2331.358,SSENSOR,N,P 2329480ms 58.93m 348.0 #274 Science Sampling
2341.360,SSENSOR,N,P 2339403ms 57.93m 347.0 #275
2351.361,SSENSOR,N,P 2349340ms 56.99m 343.2 #276

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- Indicates Science Sampling records #277-281

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2411.373,SSENSOR,N,P 2409403ms 51.39m 348.5 #282
2421.375,SSENSOR,N,P 2419580ms 50.48m 349.0 #283
2431.376,SSENSOR,N,P 2429511ms 49.65m 351.3 #284
2431.409,SSENSOR,N,Changing to bin 50.0() at 49.65m: sec=5.0s gc=60.0s sensors=11 pressure=1 compass=1 timeout=10.00
Science file sample protocol for 15.01 to 50m; see section 2.4.1 for science file example

2436.378,SSENSOR,N,P 2434481ms 49.18m 353.3 #285
2441.379,SSENSOR,N,P 2439449ms 48.76m 355.4 #286
2441.416,SDIVE,N,turn rate during steady passive flight = 0.257 deg/s
2441.423,SDIVE,N,Exiting passive after 13 samples, ret=CONTROL_FINISHED_OK
2441.432,HVBD,N, wObserved = 0.088
2441.438,SDIVE,N,wObs=0.088, wDes=0.100, changing VBD 146.6 -> 173.4 (dBdw=2235.6)
2441.449,SMOTOR,N,Start active
2441.598,SDIVE,N,$GC,2441.58,35,173.41,0.60,0.00,2452.3,2512.1,2392.4,3061.6,1647.9,48.76,8.77,286, ...
2446.386,SSENSOR,N,A 2444450ms [12,47] 48.43m 357.4 #287
2451.386,SSENSOR,N,A 2449417ms [12,47] 47.98m 359.6 #288
2456.386,SSENSOR,N,A 2454387ms [12,47] 47.46m 1.9 #289
2461.386,SSENSOR,N,A 2459387ms [12,47] 46.95m 4.1 #290
2462.424,SDIVE,N,exiting active w/o sampling due to early move complete
2462.537,HPITCH,N,Pitch completed from 0.57 cm (3061.62) to 0.65 cm (3086.69) dest 3072.84 took 0.0 sec 252mA (642mA peak) 15.6V (15.5Vmin) 556.94 AD/sec 9 ticks
2462.561,HVBD,N,VBD completed from 146.62 cc (2452.28) to 173.86 cc (2341.22 [2512.12,2392.44]->[2402.88, 2279.56]) dest 2343.07 took 20.4 sec 1169mA (5125mA peak) 14.9V (11.2Vmin) 5.44 AD/sec 4085 ticks
2514.6 2395.5 3064.2 1649.1 42.6 15.9 8912 46.0 17.0 1.0 Motor Motion Data
2515.2 2396.5 3072.6 1649.1 37.9 15.6 8915 55.6 17.2 1.1
2512.7 2395.1 3089.9 1649.8 276.3 15.2 8917 48.4 16.8 1.2

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2420.9 2299.6 3089.1 1649.4 1276.1 14.9 8816 49.9 18.7 1.9
2416.0 2292.6 3089.3 1649.5 1279.3 14.9 8814 49.3 18.9 1.8
2409.1 2286.4 3089.4 1649.4 1291.7 14.9 8812 48.8 18.8 1.4
2463.125,SDIVE,N,end $GC ,2463.11,20.42,0.05,0.00,1.169,0.252,0.000,2341.22,2402.88,2279.56,3086.69,1648.31,0,0,0,11.25,15.49,30.00
2463.175,SDIVE,N,Exiting active after 5 samples, ret=CONTROL_FINISHED_OK
2466.383,SSENSOR,N,P 2464355ms 46.30m 5.7 #291 Science Sampling
2471.384,SSENSOR,N,P 2469575ms 45.75m 7.1 #292
2476.387,SSENSOR,N,P 2474528ms 45.19m 8.9 #293

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- Indicates Science Sampling records #294-299

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2511.401,SSENSOR,N,P 2509371ms 41.08m 26.3 #300
2516.404,SSENSOR,N,P 2514611ms 40.46m 27.6 #301
2521.405,SSENSOR,N,P 2519559ms 39.90m 29.0 #302
2521.440,SDIVE,N,turn rate during steady passive flight = 0.533 deg/s
2521.448,SDIVE,N,Exiting passive after 12 samples, ret=CONTROL_FINISHED_OK
2521.457,HVBD,N, wObserved = 0.118
2521.462,SDIVE,N,pitch desired=18.22, observed=19.31, adj=-0.033 cm
2521.471,SDIVE,N,new pitch ctl position=0.357 (nominal=0.607 cm)
2521.478,SMOTOR,N,Start active
2521.627,SDIVE,N,$GC,2521.61,645,173.41,0.57,-40.00,2342.4,2402.8,2282.1,3086.0,1647.5,39.90,11.83,302, ...
2526.411,SSENSOR,N,A 2524528ms [0,0] 39.40m 29.3 #303
2526.557,HPITCH,N,Pitch completed from 0.64 cm (3086.00) to 0.56 cm (3059.12) dest 3062.40 took 0.2 sec 239mA (617mA peak) 15.4V (15.4Vmin) 173.39 AD/sec

31 ticks
2526.581,HROLL,N,Roll completed from 1.34 deg (1647.50) to -38.86 deg (225.50) dest 247.00 took 2.5 sec 79mA (442mA peak) 15.6V (15.4Vmin) 576.88 AD/sec 493 ticks
2407.0 2284.7 3089.6 1650.3 27.8 15.8 8444 24.9 18.8 1.0 Motor Motion Data
2407.1 2285.6 3072.9 1649.5 192.7 15.4 8437 26.4 18.0 1.4
2405.5 2285.9 3062.9 1649.8 85.0 15.5 8435 26.7 19.1 1.1

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output
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2406.4 2285.9 3063.7 389.9 92.5 15.5 8419 18.9 18.7 -3.2
2406.7 2286.0 3063.7 333.1 92.5 15.5 8421 18.2 17.9 -3.5
2406.2 2286.1 3063.5 280.7 90.3 15.5 8414 17.3 18.5 -4.4
2527.219,SDIVE,N,end $GC ,2527.20,0.00,0.16,2.46,0.000,0.239,0.079,2343.00,2402.62,2283.38,3059.12,225.50,0,0,0,30.00,15.39,15.39
2527.274,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
2527.282,SDIVE,N,Passive turn...
2531.407,SSENSOR,N,P 2529528ms 38.75m 27.4 #304 Science Sampling
2536.409,SSENSOR,N,P 2534496ms 38.17m 24.5 #305
2541.411,SSENSOR,N,P 2539465ms 37.60m 20.9 #306
2546.413,SSENSOR,N,P 2544465ms 37.06m 16.6 #307
2551.415,SSENSOR,N,P 2549434ms 36.47m 11.5 #308
2556.417,SSENSOR,N,P 2554418ms 35.94m 6.1 #309
2561.419,SSENSOR,N,P 2559402ms 35.39m 0.4 #310
2566.421,SSENSOR,N,P 2564640ms 34.79m 353.0 #311
2566.452,SDIVE,N,Exiting passive after 8 samples, ret=CONTROL_FINISHED_OK
2566.459,SDIVE,N,Done passive turn...
2566.464,HVBD,N, wObserved = 0.113
2566.470,SDIVE,N,pitch desired=18.22, observed=16.23, adj=0.060 cm
2566.479,SDIVE,N,new pitch ctl position=0.417 (nominal=0.607 cm)
2566.486,SMOTOR,N,Start active
2566.635,SDIVE,N,$GC,2566.62,1157,173.41,0.63,0.00,2342.9,2403.2,2282.5,3060.1,225.5,34.79,11.26,311, ...
2571.428,SSENSOR,N,A 2569606ms [0,0] 34.28m 346.6 #312
2571.574,HPITCH,N,Pitch completed from 0.56 cm (3060.12) to 0.68 cm (3097.25) dest 3081.49 took 0.1 sec 146mA (645mA peak) 15.4V (15.3Vmin) 371.25 AD/sec 20 ticks
2571.598,HROLL,N,Roll completed from -38.86 deg (225.50) to 1.42 deg (1650.31) dest 1600.00 took 2.3 sec 40mA (418mA peak) 15.7V (15.5Vmin) 618.14 AD/sec 461 ticks
2405.8 2285.1 3062.6 225.5 16.1 15.8 8161 18.0 15.6 -16.8 Motor Motion Data
2406.4 2286.6 3063.4 274.6 45.8 15.7 8165 18.0 15.6 -16.8
2406.6 2285.3 3063.3 333.0 39.9 15.7 8165 18.0 15.6 -16.8

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output
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2405.8 2287.6 3063.9 1537.9 43.4 15.7 8154 28.9 15.4 -12.8
2406.3 2286.2 3063.2 1600.2 47.4 15.5 8149 29.4 15.1 -12.3
2406.6 2285.8 3063.2 1604.6 43.5 15.6 8150 29.4 15.1 -12.3
2572.207,SDIVE,N,end $GC ,2572.19,0.00,0.10,2.31,0.000,0.146,0.040,2344.53,2404.56,2284.50,3097.25,1650.31,0,0,0,30.00,15.26,15.54
2572.257,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
2576.423,SSENSOR,N,P 2574575ms 33.69m 342.1 #313 Science Sampling
2581.426,SSENSOR,N,P 2579575ms 33.09m 338.3 #314
2586.428,SSENSOR,N,P 2584543ms 32.47m 333.6 #315

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- Indicates Science Sampling records #294-299
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2621.444,SSENSOR,N,P 2619621ms 28.39m 320.9 #322
2626.446,SSENSOR,N,P 2624605ms 27.80m 319.6 #323
2631.448,SSENSOR,N,P 2629605ms 27.17m 318.7 #324

2631.478,SDIVE,N,turn rate during steady passive flight = -0.325 deg/s
2631.485,SDIVE,N,Exiting passive after 12 samples, ret=CONTROL_FINISHED_OK
2631.494,HVBD,N, wObserved = 0.117
2631.500,SDIVE,N,pitch desired=18.22, observed=19.84, adj=-0.049 cm
2631.508,SDIVE,N,new pitch ctl position=0.368 (nominal=0.607 cm)
2631.515,SMOTOR,N,Start active
2631.669,SDIVE,N,$GC,2631.65,389,173.41,0.58,40.00,2343.0,2403.1,2282.9,3096.8,1651.9,27.17,11.71,324, ...
2636.454,SSENSOR,N,A 2634574ms [0,0] 26.70m 318.7 #325
2636.598,HPITCH,N,Pitch completed from 0.68 cm (3096.81) to 0.55 cm (3056.75) dest 3065.91 took 0.2 sec 218mA (620mA peak) 15.4V (15.4Vmin) 200.31 AD/sec 40 ticks
2636.623,HROLL,N,Roll completed from 1.47 deg (1651.94) to 40.68 deg (3039.12) dest 3014.93 took 2.3 sec 65mA (435mA peak) 15.6V (15.4Vmin) 594.08 AD/sec 467 ticks
2406.6 2285.6 3100.9 1653.6 28.5 15.9 7759 47.6 18.6 -0.2 Motor Motion Data
2405.8 2286.4 3084.2 1653.6 180.4 15.4 7755 48.9 18.4 0.3
2406.3 2286.3 3064.6 1654.2 81.6 15.4 7752 49.1 19.0 0.7

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output

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2406.3 2286.0 3060.7 2883.6 87.7 15.5 7737 52.1 18.1 4.6
2406.2 2286.1 3060.8 2939.2 89.0 15.5 7737 52.4 18.5 5.0
2406.2 2285.9 3060.3 2997.6 87.5 15.5 7738 53.0 18.1 5.4
2637.248,SDIVE,N,end $GC ,2637.23,0.00,0.20,2.34,0.000,0.218,0.065,2344.28,2404.69,2283.88,3056.75,3039.12,0,0,0,30.00,15.38,15.39
2637.297,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
2637.305,SDIVE,N,Passive turn...
2641.450,SSENSOR,N,P 2639542ms 26.01m 321.4 #326 Science Sampling
2646.452,SSENSOR,N,P 2644527ms 25.44m 325.1 #327
2651.454,SSENSOR,N,P 2649481ms 24.91m 328.4 #328

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- Indicates Science Sampling records #329-335

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2691.469,SSENSOR,N,P 2689527ms 20.91m 352.4 #336
2696.471,SSENSOR,N,P 2694511ms 20.42m 355.2 #337
2701.473,SSENSOR,N,P 2699481ms 19.99m 359.3 #338
2701.494,HXPDR,N,ranging to surface at 19.986671 meters
2701.500,HXPDR,N,ranging at 19.986671 meters
2703.668,HXPDR,N,Tried 1 times to respond to command $C1
2704.750,HXPDR,N,range = 19.608749
2705.384,HXPDR,N,surface detect 0.377922 m
2705.406,SDIVE,N,Exiting passive after 13 samples, ret=CONTROL_FINISHED_OK
2705.414,SDIVE,N,Done passive turn...
2705.418,HVBD,N, wObserved = 0.097
2705.424,SDIVE,N,wObs=0.097, wDes=0.100, changing VBD 173.4 -> 179.4 (dBdw=2235.6)
2705.437,SDIVE,N,pitch desired=18.22, observed=16.29, adj=0.058 cm
2705.445,SDIVE,N,new pitch ctl position=0.426 (nominal=0.607 cm)
2705.452,SMOTOR,N,Start active
2705.607,SDIVE,N,$GC,2705.59,1191,179.44,0.65,0.00,2342.3,2402.3,2282.3,3056.7,3039.8,19.99,9.72,338, ...
2705.840,SSENSOR,N,sleep negative: wake=1566436553.226, now=1566436554.859
2705.859,SSENSOR,N,new wake=1566436554.879
2708.122,SSENSOR,N,A 2706277ms [0,47] 19.45m 3.5 #339
2713.117,SSENSOR,N,A 2711231ms [0,0] 19.02m 5.6 #340
2713.251,HPITCH,N,Pitch completed from 0.55 cm (3056.69) to 0.68 cm (3098.50) dest 3086.82 took 0.1 sec 132mA (633mA peak) 15.5V (15.4Vmin) 348.44 AD/sec 24 ticks
2713.276,HVBD,N,VBD completed from 173.59 cc (2342.31) to 179.65 cc (2317.62 [2402.31,2282.31]->[2378.25, 2257.00]) dest 2318.46 took 2.8 sec 187mA (538mA peak) 15.4V (15.3Vmin) 8.74 AD/sec 565 ticks
2713.306,HROLL,N,Roll completed from 40.70 deg (3039.81) to -1.00 deg (1564.56) dest 1600.00 took 2.5 sec 55mA (414mA peak) 15.5V (15.5Vmin) 594.86 AD/sec 496 ticks
2405.2 2285.4 3060.1 3041.9 25.7 15.7 7346 61.8 16.4 18.0 Motor Motion Data

2405.7 2286.1 3060.3 2997.8 38.5 15.6 7347 62.0 16.1 18.4
2405.8 2285.9 3060.5 2936.2 37.0 15.6 7350 61.8 16.1 18.4

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2405.4 2286.2 3087.1 1567.6 26.5 15.7 7342 55.9 15.8 11.2
2395.0 2277.1 3102.1 1566.8 184.7 15.4 7336 50.3 16.2 6.6
2387.0 2265.8 3101.9 1567.1 204.2 15.4 7331 45.9 17.4 3.6
2714.005,SDIVE,N,end $GC ,2713.99,2.83,0.12,2.48,0.187,0.132,0.055,2317.62,2378.25,2257.00,3098.50,1564.56,0,0,0,15.27,15.37,15.45
2714.061,SDIVE,N,Exiting active after 2 samples, ret=CONTROL_FINISHED_OK
2718.113,SSENSOR,N,P 2716231ms 18.43m 8.0 #341 Science Sampling
2723.113,SSENSOR,N,P 2721200ms 17.91m 10.1 #342
2728.115,SSENSOR,N,P 2726168ms 17.47m 11.5 #343
2733.116,SSENSOR,N,P 2731168ms 17.00m 12.7 #344
2738.117,SSENSOR,N,P 2736136ms 16.49m 14.1 #345
2743.118,SSENSOR,N,P 2741106ms 16.07m 15.1 #346
2748.118,SSENSOR,N,P 2746106ms 15.61m 16.3 #347
2753.120,SSENSOR,N,P 2751083ms 15.18m 16.6 #348
2758.120,SSENSOR,N,P 2756292ms 14.68m 17.1 #349
2758.152,SSENSOR,N,Changing to bin 15.0() at 14.68m: sec=5.0s gc=30.0s sensors=11 pressure=1 compass=1 timeout=10.00
Science file sample protocol for 0 to 15m; see section 2.4.1 for science file example

2763.122,SSENSOR,N,P 2761278ms 14.22m 16.6 #350
2768.122,SSENSOR,N,P 2766277ms 13.73m 16.0 #351
2773.123,SSENSOR,N,P 2771231ms 13.26m 15.8 #352
2773.153,SDIVE,N,turn rate during steady passive flight = 0.057 deg/s
2773.161,SDIVE,N,Exiting passive after 12 samples, ret=CONTROL_FINISHED_OK
2773.168,HVBD,N, wObserved = 0.093
2773.175,SDIVE,N,wObs=0.093, wDes=0.100, changing VBD 179.4 -> 194.1 (dBdw=2235.6)
2773.187,SDIVE,N,pitch desired=18.22, observed=20.26, adj=-0.061 cm
2773.196,SDIVE,N,new pitch ctl position=0.365 (nominal=0.607 cm)
2773.203,SMOTOR,N,Start active
2773.356,SDIVE,N,$GC,2773.34,679,194.11,0.60,-40.00,2318.1,2377.4,2258.9,3098.0,1565.1,13.26,9.33,352, ...
2778.128,SSENSOR,N,A 2776183ms [12,47] 12.87m 16.0 #353
2783.128,SSENSOR,N,A 2781168ms [0,0] 12.39m 16.2 #354
2783.269,HPITCH,N,Pitch completed from 0.68 cm (3098.00) to 0.59 cm (3068.94) dest 3073.03 took 0.2 sec 238mA (625mA peak) 15.4V (15.4Vmin) 176.14 AD/sec 33 ticks
2783.293,HVBD,N,VBD completed from 179.53 cc (2318.12) to 194.01 cc (2259.06 [2377.38,2258.88]->[2321.25, 2196.88]) dest 2258.67 took 6.5 sec 756mA (5125mA peak) 15.1V (11.6Vmin) 9.11 AD/sec 1296 ticks
2783.325,HROLL,N,Roll completed from -0.99 deg (1565.06) to -38.87 deg (225.12) dest 247.00 took 2.3 sec 83mA (671mA peak) 15.6V (15.4Vmin) 582.58 AD/sec 460 ticks
2380.6 2261.1 3100.8 1565.4 35.7 15.9 7010 31.4 18.8 0.6 Motor Motion Data
2380.1 2262.6 3085.5 1566.0 210.2 15.4 7014 33.0 19.3 0.3
2380.2 2262.8 3072.5 1565.4 62.5 15.4 7012 32.6 18.4 0.5

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2323.5 2198.2 3071.2 409.8 88.5 15.6 6967 27.6 17.2 -3.1
2323.5 2198.1 3071.9 352.6 93.4 15.6 6968 26.5 17.7 -3.8
2323.1 2198.1 3072.5 299.1 94.8 15.6 6970 25.9 18.1 -4.2
2784.059,SDIVE,N,end $GC ,2784.04,6.48,0.17,2.30,0.756,0.238,0.083,2259.06,2321.25,2196.88,3068.94,225.12,0,0,0,11.57,15.36,15.41
2784.109,SDIVE,N,Exiting active after 2 samples, ret=CONTROL_FINISHED_OK
2784.117,SDIVE,N,Passive turn...
2788.125,SSENSOR,N,P 2786121ms 11.85m 14.4 #355
2793.125,SSENSOR,N,P 2791088ms 11.32m 11.9 #356
2798.126,SSENSOR,N,P 2796088ms 10.82m 8.5 #357
2803.127,SSENSOR,N,P 2801313ms 10.32m 3.9 #358

2808.128,SSENSOR,N,P 2806292ms 9.81m 359.5 #359
2813.130,SSENSOR,N,P 2811277ms 9.32m 355.3 #360
2813.160,SDIVE,N,Exiting passive after 6 samples, ret=CONTROL_FINISHED_OK
2813.167,SDIVE,N,Done passive turn...
2813.172,HVBD,N, wObserved = 0.101
2813.177,SMOTOR,N,Start active
2813.335,SDIVE,N,$GC,2813.32,1029,194.11,0.60,0.00,2257.6,2319.9,2195.3,3068.8,225.4,9.32,10.13,360, ...
2818.135,SSENSOR,N,A 2816277ms [0,0] 8.79m 351.9 #361
2818.278,HPITCH,N,Pitch completed from 0.59 cm (3068.75) to 0.59 cm (3068.81) dest 3073.03 took 0.0 sec 50mA (50mA peak) 15.7V (30.4Vmin) 12.50 AD/sec 1 ticks
2818.301,HROLL,N,Roll completed from -38.86 deg (225.38) to 1.50 deg (1653.06) dest 1600.00 took 2.3 sec 39mA (418mA peak) 15.7V (15.6Vmin) 623.44 AD/sec 458 ticks
2322.9 2198.0 3071.7 225.6 28.0 15.8 6800 16.8 16.9 -15.8 Motor Motion Data
2323.2 2198.5 3074.2 275.6 45.6 15.7 6801 16.2 16.7 -16.6
2322.9 2199.4 3073.2 335.8 43.0 15.7 6801 18.0 16.6 -15.8

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2323.9 2199.5 3073.0 1485.9 43.8 15.7 6786 23.7 16.6 -13.5
2324.3 2198.4 3072.2 1548.2 46.2 15.7 6791 27.2 16.8 -11.8
2323.7 2198.7 3073.1 1604.4 50.2 15.7 6784 27.7 16.8 -11.8
2818.892,SDIVE,N,end $GC ,2818.87,0.00,0.00,2.29,0.000,0.050,0.039,2259.97,2323.06,2196.88,3068.81,1653.06,0,0,0,30.00,30.36,15.62
2818.948,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
2823.131,SSENSOR,N,P 2821247ms 8.27m 350.2 #362
2828.133,SSENSOR,N,P 2826214ms 7.79m 348.6 #363
2833.133,SSENSOR,N,P 2831214ms 7.25m 347.3 #364
2838.134,SSENSOR,N,P 2836183ms 6.75m 346.8 #365
2843.135,SSENSOR,N,P 2841168ms 6.29m 346.5 #366
2848.136,SSENSOR,N,P 2846167ms 5.81m 345.7 #367
2848.166,SDIVE,N,turn rate during steady passive flight = -0.194 deg/s
2848.173,SDIVE,N,Exiting passive after 6 samples, ret=CONTROL_FINISHED_OK
2848.182,HVBD,N, wObserved = 0.100
2848.186,SMOTOR,N,Start active
2848.330,SDIVE,N,$GC,2848.31,261,194.11,0.60,40.00,2257.7,2320.3,2195.0,3068.2,1654.9,5.81,10.05,367, ...
2853.142,SSENSOR,N,A 2851137ms [0,0] 5.34m 345.3 #368
2853.287,HPITCH,N,Pitch completed from 0.59 cm (3068.25) to 0.59 cm (3069.50) dest 3073.03 took 0.0 sec 44mA (44mA peak) 15.9V (30.4Vmin) 250.00 AD/sec 1 ticks
2853.311,HROLL,N,Roll completed from 1.55 deg (1654.88) to 40.68 deg (3038.81) dest 3014.93 took 2.3 sec 64mA (473mA peak) 15.7V (15.5Vmin) 595.24 AD/sec 465 ticks
2323.0 2198.3 3072.6 1656.1 44.4 15.9 6619 48.1 17.7 0.4 Motor Motion Data
2323.0 2198.8 3071.7 1655.2 187.4 15.8 6614 48.1 17.7 0.4
2323.6 2199.8 3073.4 1708.8 41.8 15.7 6617 48.7 17.2 1.3

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output

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2323.1 2198.9 3074.1 2889.7 89.5 15.6 6606 53.5 17.1 5.2
2322.1 2198.0 3075.5 2947.0 88.9 15.6 6603 53.5 17.1 5.2
2323.0 2199.1 3073.1 3003.4 85.9 15.5 6614 55.0 17.3 7.2
2853.916,SDIVE,N,end $GC ,2853.90,0.00,0.00,2.33,0.000,0.044,0.064,2259.19,2321.25,2197.12,3069.50,3038.81,0,0,0,30.00,30.36,15.48
2853.966,SDIVE,N,Exiting active after 1 samples, ret=CONTROL_FINISHED_OK
2853.974,SDIVE,N,Passive turn...
2858.139,SSENSOR,N,P 2856101ms 4.80m 345.7 #369
2863.139,SSENSOR,N,P 2861102ms 4.26m 347.2 #370
2868.140,SSENSOR,N,P 2866343ms 3.68m 348.6 #371
2873.141,SSENSOR,N,P 2871293ms 3.16m 348.8 #372
2878.143,SSENSOR,N,P 2876262ms 2.60m 348.3 #373
2878.172,SDIVE,N,Exiting passive after 5 samples, ret=SURFACE_DEPTH_REACHED

2878.180,SDIVE,N,Done passive turn...
2878.185,SDIVE,N,Leaving climb state due to SURFACE_DEPTH_REACHED
2878.229,SDIVE,N,Entering surface coast state
2878.272,SDIVE,N,Reached SD, Wo = 0.105171, 6 more points Collecting 6 more science samples before entering surface state at time stamp 2908.282 below
2883.144,SSENSOR,N,P 2881262ms 2.06m 347.4 #374
2888.145,SSENSOR,N,P 2886230ms 1.48m 346.6 #375
2893.146,SSENSOR,N,P 2891199ms 0.92m 345.2 #376
2898.147,SSENSOR,N,P 2896199ms 0.36m 347.4 #377
2903.147,SSENSOR,N,P 2901168ms -0.19m 349.5 #378
2908.148,SSENSOR,N,P 2906137ms -0.21m 351.6 #379
2908.177,SDIVE,N,Exiting passive after 6 samples, ret=CONTROL_FINISHED_OK
2908.195,SSURF,N,D_SURF: T = 14.4924, S = 16.7913, rho = 1012.08 Surface temperature, salinity, and density
2908.240,SDIVE,N,Leaving coast to surface state
2908.282,SSURF,N,Entering surface state
2908.410,HSUPER,N,status P0=51,P1=70,P2=254,7302=1,FORCED=0,RESET=0,ERRORS=0
2908.461,SSURF,N,Starting surface maneuver... Glider is nose up
2908.565,SSURF,N,disabling surface maneuver aborts
2908.820,SSURF,N,d= -0.23m
2908.904,HROLL,N,- move commanded from 35.02 deg (3038.75) to 0.00 deg (1800.00)...
2909.606,HROLL,N,27.9 deg (ad: 2786.94) mA=36 V=15.73 P=6304done.
2911.803,HROLL,N,Roll completed from 35.02 deg (3038.75) to -1.00 deg (1764.62) dest 1800.00 took 2.1 sec 52mA (414mA peak) 15.7V (15.6Vmin) 614.04 AD/sec 415 ticks Glider rolls to neutral
2321.8 2197.9 3072.1 3041.4 26.2 15.9 6301 76.8 3.5 17.4 Motor Motion Data
2322.3 2198.8 3072.9 2994.7 36.2 15.7 6303 77.2 1.7 18.9
2322.1 2199.0 3073.5 2934.2 44.2 15.7 6302 77.1 1.6 19.8

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output
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2322.1 2198.4 3073.3 1959.1 61.7 15.7 6302 75.7 1.8 15.9
2322.2 2198.8 3073.4 1898.5 65.7 15.7 6303 76.1 1.7 15.2
2322.1 2199.4 3073.4 1840.2 63.9 15.7 6301 75.9 1.7 15.0
2912.337,HPITCH,N,- move commanded from 0.59 cm (3069.75) to -8.29 cm (228.00)...
2913.039,HPITCH,N,0.3 cm (ad: 2984.31) mA=68 V=15.62 P=6299
2923.160,HPITCH,N,-6.8 cm (ad: 706.38) mA=50 V=15.68 P=6346done.
2925.850,HPITCH,N,Pitch completed from 0.59 cm (3069.75) to -8.33 cm (213.50) dest 228.00 took 12.8 sec 64mA (639mA peak) 15.7V (15.5Vmin) 223.58 AD/sec 2555 ticks Mass shifter moves full forward to pitch glider nose down
2321.6 2197.9 3072.8 1766.4 33.4 15.9 6304 76.8 0.8 13.0 Motor Motion Data
2322.5 2198.9 3054.2 1765.6 63.0 15.6 6304 77.0 0.4 13.1
2322.4 2198.6 3032.9 1765.2 66.1 15.6 6300 76.7 0.6 12.6

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output
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2321.0 2199.2 289.1 1764.9 60.9 15.7 6364 98.5 -53.4 3.2
2320.2 2198.8 267.1 1765.0 91.4 15.6 6363 97.6 -54.2 3.1
2320.8 2198.9 244.7 1765.1 79.8 15.6 6367 97.6 -54.2 3.1
2928.608,HVBD,N,- move commanded from 194.25 cc (2258.09) to 230.00 cc (2112.36)...
2929.311,HVBD,N,194.4 cc (ad: 2257.53 [2311.38,2203.69]) mA=88 V=15.57 P=6419
2939.416,HVBD,N,219.6 cc (ad: 2154.56 [2202.12,2107.00]) mA=1052 V=14.97 P=6477done.
2943.616,HVBD,N,VBD completed from 194.25 cc (2258.09) to 230.85 cc (2108.88 [2314.88,2201.31]->[2155.19, 2062.56]) dest 2112.36 took 14.5 sec 903mA (5125mA peak) 15.1V (11.4Vmin) 10.27 AD/sec 2905 ticks Glider VBD pumps to $SM_CC to get antenna out of the water
2317.5 2204.4 213.3 1764.9 14.8 15.9 6407 61.1 -73.7 0.4 Motor Motion Data
2304.2 2198.4 213.6 1764.8 90.9 15.6 6425 61.9 -74.3 -0.8
2292.2 2189.2 213.6 1764.8 91.6 15.6 6431 63.2 -74.7 -3.8

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- Indicates this instance of Motor Motion Data has been reduced to the first and last 3 lines of output

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2187.0 2092.9  213.6 1764.5  997.4   15.0  6476  55.0 -73.2   3.1
2176.5 2082.7  213.4 1764.6 1015.8   15.0  6472  55.2 -74.1   3.2
2166.6 2072.3  213.8 1764.9 1188.3   15.0  6476  55.4 -72.6   3.8
2944.386,SSURF,N,Depth at end of surface maneuver = 2.847465
2944.498,SSURF,N,Finished surface maneuver...
2944.636,HSUPER,N,status P0=59,P1=70,P2=254,7302=1,FORCED=0,RESET=0,ERRORS=0
2946.810,HXPDR,N,Tried 1 times to respond to command $C1
2948.615,HST4,N,STM32 state: Normal (2MHz)
2948.620,SPOWER,N,All devices are off.
2949.958,HBATT,N,24V batt pack voltage = 14.97V (min 14.48V)
2949.965,HBATT,N,10V batt pack voltage = 15.00V (min 15.00V)
2950.405,HST4,N,Updating parameter $FG_AHR_24V to 3.6089623
2950.419,HST4,N,Updating parameter $FG_AHR_10V to 0.47591311
2950.436,HSUPER,N,adding 207418.750 mA-s to 24V FG: 3.6089623 A-hr (count=3466, dt=1733.00)
2950.448,HSUPER,N,adding 38985.479 mA-s to 10V FG: 0.4759131 A-hr
2951.964,HGPS,N,Acquiring GPS fix (10,8,40)
2954.250,HGPS,N,VGPS: no data received
2955.051,HGPS,N,VVVVVVVVVVVVAAAAAAAAAAAAAAA
2991.000,HGPS,N,sync sentence $GPRMC,012039,A,4744.1576,N,12224.0958,W,000.0,000.0,220819,016.6,E*69
 (k=93430), was_high=0, spin=0set 2019/08/22 01:20:40
2991.061,HSUPER,N,accum RTC time Thu Aug 22 01:19:59 2019
2991.112,HSUPER,N,RTC time Thu Aug 22 01:20:39 2019
2991.205,HSUPER,N,0,0,time set to (1566436840) Thu Aug 22 01:20:40 2019
2991.256,HSUPER,N,RTC time Thu Aug 22 01:20:41 2019
2991.266,HGPS,N,220819 012030 4744.1597 -12224.0947 hdop=0.9 cog=0.0 sog=0.0 hpe=8.9 n=10 16/30 seconds
2991.834,SNAV,N,depth averaged current valid = 0.151 @ 189.31 deg
2991.965,SSYS,N,Capture file closed
```

Depth of pressure sensor; Glider waits 60 seconds after the pitch maneuver to begin establishing communications with the basestation to allow the vehicle oscillations caused by the vehicle change from nose up to nose down to dampen

DAC value present in .cap file when **$NAV_MODE,2**; output as magnitude in m/s and direction in deg

After this capture file is close, a new capture file with the next dive number is opened and the file renaming and data transfer to the basestation of this dive's data is recorded in the new file

2.1.8. NetCDF File (p5770008.nc)

The netCDF file captures all processed files (i.e. .cap, .log and .eng), and is self-documenting. Read-write access to netCDF files is provided by the software libraries supplied by UCAR (University Corporation for Atmospheric Research). The netCDF file is meant primarily for sharing data between scientific users. This is a common data format and is supported by MATLAB. Open source tools available for Linux & Windows machines allow for reading the contents of the file.

The NetCDF file (.nc) is generated on the basestation and captures all the raw data collected during a dive as well as the output from data QA/QC checks done on the basestation. This file is used to generate the dive plots used by the pilots to trim the glider during flight. Information on the QA/QC process is in the Seaglider Quality Control Manual.

2.1.9. Private File (p5770008.pvt)

.pvt, or Private, files are created on the basestation. They contain data (glider password, basestation main and alternate phone numbers) that were originally in the logfile and could pose a security problem if propagated off the basestation (as the logfile may well be). Thus, the data is stripped from the log file and placed in the matched .pvt file.

Example .pvt file

```
version: 67.00
glider: 577
mission: 2
dive: 8
start: 8 22 119 0 30 49
data:
$PASSWD,XXXXXXXXXX
$TEL_NUM,881600000000
$ALT_TEL_NUM,881600000001
```

2.2. Processing Control Files

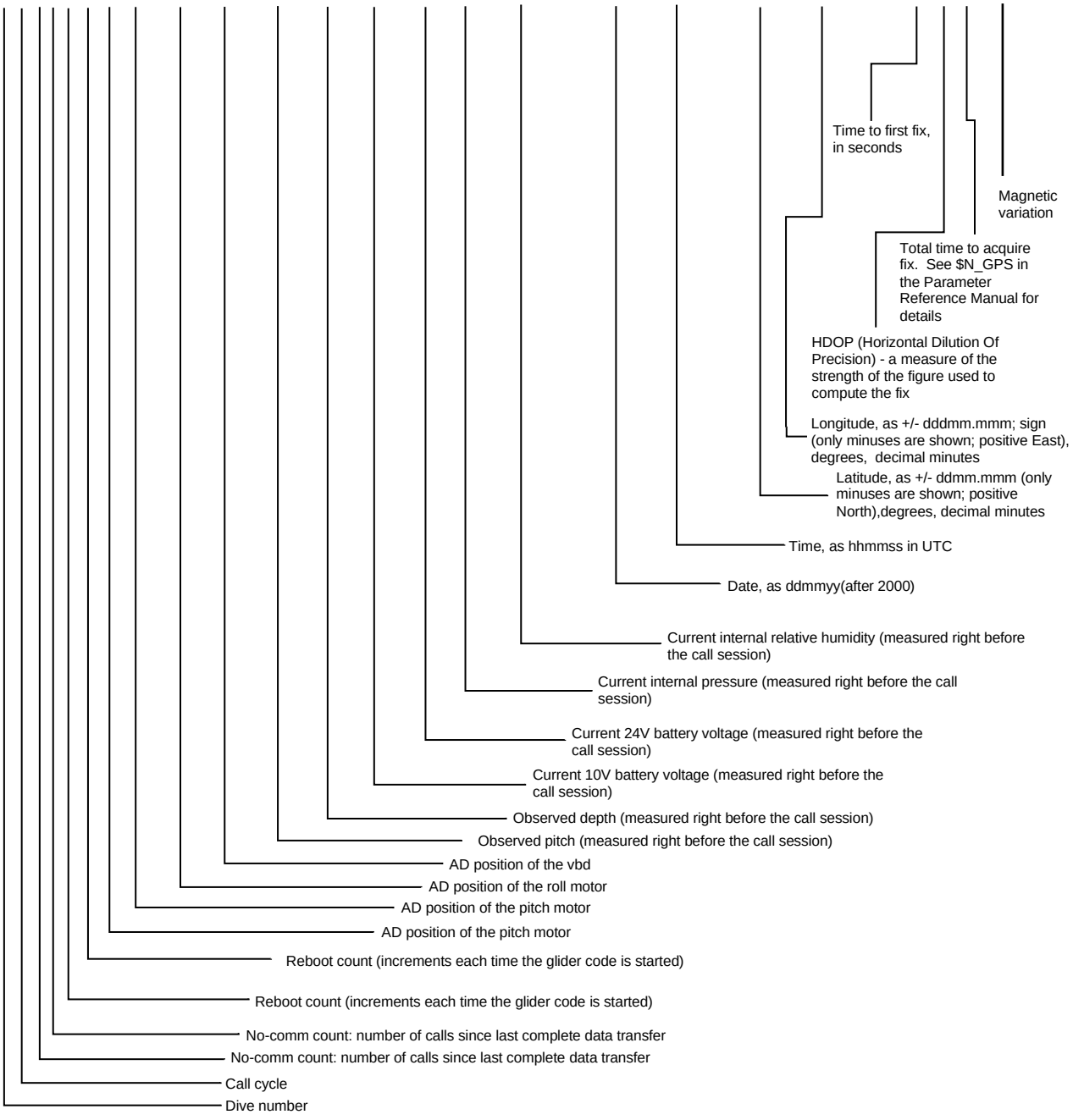
This section includes files that are used by the pilot to monitor and, when necessary, modify, how the basestation processes Seaglider data.

2.2.1. Communications Log (comm.log)

The "comm log" file is appended during each communication session, and so is a complete record of the Seaglider's communications with the basestation over an entire deployment. It is a plain-text file that resides in the Seaglider's home directory. Running tail -f comm.log in the Seaglider's home directory during (or while waiting for) communication sessions is a useful monitor of the glider surfacing.

comm.log header

Connected at Thu Aug 22 01:21:43 UTC 2019
logged in
8:0:1:0:2:58:0:214:1764:2109:-69.24:0.90:15.00:15.01:9.03:52.62 GPS,220819,012030,4744.160,-12224.095,16,0.9,30,16.6



Example of comm.log with raw data transfer using flow control.

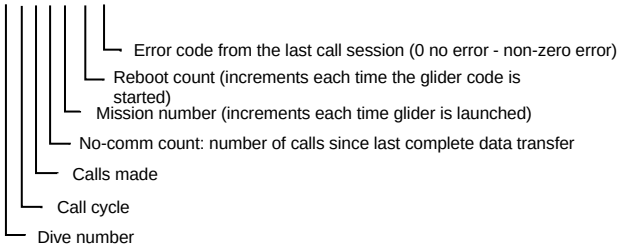
```
ver=67.00,rev=NEMO_RC2,frag=8,launch=210819:171128
Iridium bars: 5 geolocation: 4744.966797,-12226.797852,220819,002613
Thu Aug 22 01:21:55 2019 [sg577] Sending 4 bytes of cmdfile
Thu Aug 22 01:21:55 2019 [sg577] Sent 4 bytes of cmdfile
Parsed GO from cmdfile
Thu Aug 22 01:22:01 2019 [sg577] ready to receive sg0008lz.x00
Thu Aug 22 01:22:03 2019 [sg577] received four size bytes 0 0 18 94
Thu Aug 22 01:22:03 2019 [sg577] Receiving 4702 bytes of sg0008lz.x00
Thu Aug 22 01:22:17 2019 [sg577] Received 4702 bytes of sg0008lz.x00 (355.4 Bps)
Thu Aug 22 01:22:20 2019 [sg577] ready to receive sg0008dz.x00
Thu Aug 22 01:22:22 2019 [sg577] received four size bytes 0 0 27 113
Thu Aug 22 01:22:22 2019 [sg577] Receiving 7025 bytes of sg0008dz.x00
Thu Aug 22 01:22:42 2019 [sg577] Received 7025 bytes of sg0008dz.x00 (348.5 Bps)
Thu Aug 22 01:22:45 2019 [sg577] ready to receive sg0008kz.x00
Thu Aug 22 01:22:47 2019 [sg577] received four size bytes 0 0 32 0
Thu Aug 22 01:22:47 2019 [sg577] Receiving 8192 bytes of sg0008kz.x00
Thu Aug 22 01:23:10 2019 [sg577] Received 8192 bytes of sg0008kz.x00 (350.1 Bps)
Thu Aug 22 01:23:14 2019 [sg577] ready to receive sg0008kz.x01
Thu Aug 22 01:23:16 2019 [sg577] received four size bytes 0 0 32 0
Thu Aug 22 01:23:16 2019 [sg577] Receiving 8192 bytes of sg0008kz.x01
Thu Aug 22 01:23:39 2019 [sg577] Received 8192 bytes of sg0008kz.x01 (350.3 Bps)
Thu Aug 22 01:23:42 2019 [sg577] ready to receive sg0008kz.x02
Thu Aug 22 01:23:44 2019 [sg577] received four size bytes 0 0 32 0
Thu Aug 22 01:23:44 2019 [sg577] Receiving 8192 bytes of sg0008kz.x02
Thu Aug 22 01:24:07 2019 [sg577] Received 8192 bytes of sg0008kz.x02 (350.1 Bps)
Thu Aug 22 01:24:11 2019 [sg577] ready to receive sg0008kz.x03
Thu Aug 22 01:24:13 2019 [sg577] received four size bytes 0 0 32 0
Thu Aug 22 01:24:13 2019 [sg577] Receiving 8192 bytes of sg0008kz.x03
Thu Aug 22 01:24:36 2019 [sg577] Received 8192 bytes of sg0008kz.x03 (344.6 Bps)
Thu Aug 22 01:24:40 2019 [sg577] ready to receive sg0008kz.x04
Thu Aug 22 01:24:42 2019 [sg577] received four size bytes 0 0 32 0
Thu Aug 22 01:24:42 2019 [sg577] Receiving 8192 bytes of sg0008kz.x04
Thu Aug 22 01:25:05 2019 [sg577] Received 8192 bytes of sg0008kz.x04 (344.8 Bps)
Thu Aug 22 01:25:09 2019 [sg577] ready to receive sg0008kz.x05
Thu Aug 22 01:25:10 2019 [sg577] received four size bytes 0 0 18 94
Thu Aug 22 01:25:10 2019 [sg577] Receiving 4702 bytes of sg0008kz.x05
Thu Aug 22 01:25:24 2019 [sg577] Received 4702 bytes of sg0008kz.x05 (348.3 Bps)
8:0:1:0:2:58:1 logout
```

version of glider code on the vehicle

Location obtained by the Iridium phone's geolocation property. This position can be 20 km or more off from the actual glider position.

Describes the transfer of the cmdfile from the basestation to the glider and the parsing of the file by the glider.

Glider logout from the basestation



Example of comm.log using XMODEM (no flow control)

```
ver=66.04l,rev=1243M,frag=4,launch=110908,151311
Iridium bars: 5 geolocation: 1846.424805,12238.228516,031207,020210

Sun Dec 2 19:17:20 2007 [sg123] cmdfile/XMODEM: 128 Bytes, 17 BPS Received cmdfile 17 bytes

Sun Dec 2 19:17:49 2007 [sg123] sector number = 1, block length = 1024
Sun Dec 2 19:17:54 2007 [sg123] sector number = 2, block length = 1024
Sun Dec 2 19:18:00 2007 [sg123] sector number = 3, block length = 1024
Sun Dec 2 19:18:05 2007 [sg123] sector number = 4, block length = 1024
Sun Dec 2 19:18:07 2007 [sg123] received EOT and read timed out

Sun Dec 2 19:18:07 2007 [sg123] sector number = -10,block length = 1024

Sun Dec 2 19:18:07 2007 [sg123] done - sending ACK
Sun Dec 2 19:18:07 2007 [sg123] sg0008lz.x00/XMODEM: 4096 Bytes, 178 BPS

Sun Dec 2 19:18:07 2007 [sg123] Exiting (0)
Sun Dec 2 19:18:14 2007 [sg123] sector number = 1, block length = 1024

Sun Dec 2 19:18:19 2007 [sg123] sector number = 2, block length = 1024
Sun Dec 2 19:18:23 2007 [sg123] sector number = 3, block length = 1024
Sun Dec 2 19:18:28 2007 [sg123] sector number = 4, block length = 1024 Sun Dec 2 19:18:31 2007
    [sg123] received EOT and read timed out
Sun Dec 2 19:18:31 2007 [sg123] sector number = -10, block length = 1024 Sun Dec 2 19:18:31 2007
    [sg123] done - sending ACK

Sun Dec 2 19:18:31 2007 [sg123] sg0008dz.x00/XMODEM: 4096 Bytes, 189 BPS
Sun Dec 2 19:18:31 2007 [sg123] Exiting (0)
Sun Dec 2 19:18:38 2007 [sg123] sector number = 1, block length = 1024
Sun Dec 2 19:18:43 2007 [sg123] sector number = 2, block length = 1024 Sun Dec 2 19:18:49 2007
    [sg123] timeout trying to read next sector

Sun Dec 2 19:18:50 2007 [sg123] finished waiting for next line - cnt = 999
Sun Dec 2 19:18:50 2007 [sg123] got 0x2d sector header
Sun Dec 2 19:18:53 2007 [sg123] finished waiting for next line - cnt = 746
Sun Dec 2 19:18:54 2007 [sg123] got 0x40 sector header
Sun Dec 2 19:18:57 2007 [sg123] finished waiting for next line - cnt = 787
Sun Dec 2 19:18:59 2007 [sg123] sector number = 3, block length = 128
Sun Dec 2 19:19:02 2007 [sg123] timeout trying to read next sector
Sun Dec 2 19:19:03 2007 [sg123] finished waiting for next line - cnt = 999
Sun Dec 2 19:19:04 2007 [sg123] got 0xe6 sector header
Sun Dec 2 19:19:06 2007 [sg123] finished waiting for next line - cnt = -1
Sun Dec 2 19:19:06 2007 [sg123] got 0xb7 sector header
Sun Dec 2 19:19:07 2007 [sg123] finished waiting for next line - cnt = 875
Sun Dec 2 19:19:08 2007 [sg123]  sector number = 4, block length = 128
Sun Dec 2 19:19:10 2007 [sg123] sector number = 4, block length = 128
Sun Dec 2 19:19:10 2007 [sg123] received dup sector = 4
Sun Dec 2 19:19:12 2007 [sg123] timeout trying to read next sector
Sun Dec 2 19:19:13 2007 [sg123] finished waiting for next line - cnt = 999
Sun Dec 2 19:19:13 2007 [sg123] got 0xaf sector header
Sun Dec 2 19:19:15 2007 [sg123] finished waiting for next line - cnt = -1
Sun Dec 2 19:19:15 2007 [sg123] got 0x59 sector header
Sun Dec 2 19:19:17 2007 [sg123] finished waiting for next line - cnt = 543
Sun Dec 2 19:19:17 2007 [sg123] got 0x59 sector header
Sun Dec 2 19:19:21 2007 [sg123] finished waiting for next line - cnt = 130
Sun Dec 2 19:19:23 2007 [sg123] sector number = 6, block length = 128
Sun Dec 2 19:19:23 2007 [sg123] sync error in protocol
Sun Dec 2 19:19:23 2007 [sg123] sg0008dz.x01/XMODEM: got error
Renamed partial file sg0008dz.x01 to sg0008dz.x01.PARTIAL.1
Sun Dec 2 19:19:23 2007 [sg123] processed partial file sg0008dz.x01 (0x0)
Sun Dec 2 19:19:23 2007 [sg123] Exiting (128)
Disconnected at Sun Dec 2 19:19:39 PST 2007
```

Location obtained by the iridium phone's geolocation property. This may be accurate to +/- 20km or more

Describes the transmission of the command file from the basestation to the Seaglider

These lines describe the glider sending a file to the basestation.

End of transmission

Indicates end of file

Acknowledgement that file was sent

The name of the file is printed after the glider has finished sending it to the basestation

Errors in transmission are reported. If the Iridium connection drops, the communications session times out.

Duplicate and/or missing sector numbers indicate loss of synchronization between the Seaglider and the basestation. Errors can also be caused by dropped Iridium connections. The Seaglider will automatically call back and try sending data again until it succeeds or reaches the maximum number of calls (set by the parameter **$CALL_TRIES**).

```
Connected at Sun Dec 2 19:21:39 PST 2007
159:0:2:0  GPS,031207,031455,1855.179,12237.359,41,1.3,41,-2.1
ver=66.03,rev=1243M,frag=4
Iridium bars: 5 geolocation: 1846.424805,12241.375977,031207,070746
Sun Dec 2 19:21:58 2007 [sg123] cmdfile/XMODEM: 128 Bytes, 14 BPS Received cmdfile 17 bytes
Sun Dec 2 19:22:28 2007 [sg123] sector number = 1, block length = 1024
Sun Dec 2 19:22:33 2007 [sg123] sector number = 2, block length = 1024
Sun Dec 2 19:22:37 2007 [sg123] sector number = 3, block length = 1024
Sun Dec 2 19:22:42 2007 [sg123] sector number = 4, block length = 1024
Sun Dec 2 19:22:45 2007 [sg123] received EOT and read timed out
Sun Dec 2 19:22:45 2007 [sg123] sector number = -10, block length = 1024
Sun Dec 2 19:22:45 2007 [sg123] done - sending ACK
Sun Dec 2 19:22:45 2007 [sg123] sg0008dz.x01/XMODEM: 4096 Bytes, 186 BPS
Sun Dec 2 19:22:45 2007 [sg123] Exiting (0)
Sun Dec 2 19:22:53 2007 [sg123] sector number = 1, block length = 1024
Sun Dec 2 19:22:58 2007 [sg123] sector number = 2, block length = 1024
Sun Dec 2 19:23:03 2007 [sg123] sector number = 3, block length = 1024
Sun Dec 2 19:23:07 2007 [sg123] sector number = 4, block length = 1024 Sun Dec 2 19:23:10 2007
    [sg123] received EOT and read timed out
Sun Dec 2 19:23:10 2007 [sg123] sector number = -10, block length = 1024 Sun Dec 2 19:23:10 2007
  [sg123] done - sending ACK
Sun Dec 2 19:23:10 2007 [sg123] sg0008dz.x02/XMODEM: 4096 Bytes, 186 BPS
0:1:1:0:5:396:1 logout
```

In this case, the glider "realizes" that the basestation did not receive a complete file. The glider will automatically resend the file on the next call.

If no error is reported, but the basestation does not receive a complete file, the pilot can command the glider to resend the dive by using a Pdos command (see *resend_dive* in the *Extended PicoDos Reference Manual*).

The file was successfully resent.

- Error code from the last call session (0 no error - non-zero error)
- Reboot count (increments each time the glider code is started)
- Mission number (increments each time glider is launched)
- No-comm count: number of calls since last complete data transfer
- Calls made
- Call cycle
- Dive number

2.2.2. SG Calibration Constants (sg_calib_constants.m)

The "calib constants" file contains calibration information about each of the sensors on the Seaglider. This file is created by the pilot or operator and exists only on the basestation. It does not have a counterpart on the Seaglider. Except for the compass, all of the Seaglider's sensors come calibrated from the original manufacturer. Their calibration numbers can be found in the notebook delivered with the glider and should be entered in this file. The compass values are recorded when the Seaglider is fully assembled, and the compass is calibrated in the presence of the batteries and other hardware. The values in this file should be checked, and changed if necessary, whenever new sensors are installed, batteries are changed, or other hardware alterations are made.

The calib_constants file is also used by various visualization tools (MATLAB, SeaFleet, etc.) to plot Seaglider data. Incorrect values in this file will result in incorrect scientific data in the plots.

A % at the beginning of a line means that the line is commented out and will be ignored. Comment out those sensors that are not installed on your Seaglider, uncomment those that are installed.

Example Calibration Constants File

```
% Last edited on 25-September-2020 abc
% Template file for sg_calib_constants.m, Kongsberg Document No. 4000122
% Applies to SGxxx_trim_sheet_ocean_for_mission_xxx_yyyymmdd.xlsx

% basic glider and mission params
  id_str='888';                          Seaglider serial number
  mission_title='SG577 STSD – HII Corral;  Pilot specified, changed for each mission
  mass=52.000;% kg                       Glider total mass, measured when glider dry, normally only changed after refurbishment
  volmax=51000;% cc                      Volume in cc the glider displaces when fully pumped
  rho0=1022.500;% kg/m3                  Maximum expected density of the operating area
```

```
% initial hydrodynamic model params;
% regression needed to obtain realistic values
  hd_a=3.83600000E-03;
  hd_b=1.00780000E-02;
  hd_c=9.85000000E-06;
```

Seaglider hydrodynamic coefficients. For advanced piloting the a, b & c parameters can be adjusted for optimized flight performance. Normally done when you have enough flight data for regressions to be performed.

```
% GPCTD params - uncomment the following 2 lines if a GPCTD is installed in the glider
%   sg_configuration=3; %  selects GPCTD configuration
%   calibcomm=' GPCTD Serial #: 0220 CAL: 21-July-2017';%  Serial # and cal dat
```

If a GPCTD is installed, uncomment this line

If a GPCTD is installed, uncomment this line

```
% % Seabird CT Sail sensor cal constants Calibration constants for the Seabird OEM CT Sail
calibcomm=' Serial #: 0840  CAL: 17-Jun-18';%  Serial # and cal date
      t_g=4.41369871e-003;
      t_h=6.45065780e-004;
      t_i=2.70026551e-005;
      t_j=3.40227356e-006;
      c_g=-9.92613612e+000;
      c_h=1.08482545e+000;
      c_i=-2.91734417e-003;
      c_j=2.80269117e-004;
```

Meta data included in the CT plots and QC

Temperature calibration coefficients

Conductivity calibration coefficients

```
% % Seabird oxygen cal constants
%    comm_oxy_type='0';% spec "SBE_43f" or "Pumped_SBE_43f"
%    calibcomm_oxygen='0';%  Serial # and cal date
%    Soc=0.000000E+00;
%    Foffset=0.000000E+00;
%    o_a=0.000000E+00;
%    o_b=0.000000E+00;
%    o_c=0.000000E+00;
%    o_e=0.000000E+00;
%    Tau20=0.00;
%    Pcor=0;

% % CONTROS Hydroflash O2 sensor cal constants:
%    comm_oxy_type =' Contros HydroFlash '; % type and model
%    calibcomm_contros_optode =' Serial #: DO-0816-100  CAL: 15-Aug-2016 '; %  Serial # and cal date
%% Static constants used by all Contros Hydroflash
%    contopt_A_0=5.80871E+00;
%    contopt_A_1=3.20291E+00;
%    contopt_A_2=4.17887E+00;
%    contopt_A_3=5.1006E+00;
%    contopt_A_4=-9.86643E-02;
%    contopt_A_5=3.80369E+00;
%
%    contopt_B_0=-7.01577E-03;
%    contopt_B_1=-7.70028E-03;
%    contopt_B_2=-1.13864E-02;
%    contopt_B_3=-9.51519E-03;
%
%    contopt_C_0=-2.75915e-07;
%
% %  Contros Hydroflash sensor serial number specific constants for SN: DO-0816-008
% %  they are used to re-compute pO2 using the glider's CTD temp
%    contopt_CC_0=8.13E-03;
%    contopt_CC_1=6.40E-05;
%    contopt_CC_2=2.30E-07;
%    contopt_CC_3=6.36E-04;
%    contopt_CC_4=-5.45E-02;
%    contopt_CC_5=2.05E-02;
%    contopt_CC_6=3.33E-06;

% % Aanderaa 3830 cal constants
%    comm_oxy_type = ' AA3830 ';  % type and model
%    calibcomm_optode = ' SN: 000  CAL: 31-Feb-2014 '; % serial # and cal date
%
%    optode_PhaseCoef0=0.1;
%    optode_PhaseCoef1=0.1;
%    optode_PhaseCoef2=0.1;
%    optode_PhaseCoef3=0.1;
```

```
%    optode_C00Coef=0.1;
%    optode_C01Coef=0.1;
%    optode_C02Coef=0.1;
%    optode_C03Coef=0.1;
%
%    optode_C10Coef=0.1;
%    optode_C11Coef=0.1;
%    optode_C12Coef=0.1;
%    optode_C13Coef=0.1;
%
%    optode_C20Coef=0.1;
%    optode_C21Coef=0.1;
%    optode_C22Coef=0.1;
%    optode_C23Coef=0.1;
%
%    optode_C30Coef=0.1;
%    optode_C31Coef=0.1;
%    optode_C32Coef=0.1;
%    optode_C33Coef=0.1;
%
%    optode_C40Coef=0.1;
%    optode_C41Coef=0.1;
%    optode_C42Coef=0.1;
%    optode_C43Coef=0.1;

% % Aanderaa cal constants
%    comm_oxy_type=' AA4831 '; make and model e.g. AA4831 or AA4330
   calibcomm_optode=' SN: 123  CAL: 13-Dec-2017 ';%  Serial # and cal date

   optode_PhaseCoef0=-7.670000E-01;
   optode_PhaseCoef1=1.000000E00;
   optode_PhaseCoef2=0.0;
   optode_PhaseCoef3=0.0;

   optode_ConcCoef0=0.0E+00;
   optode_ConcCoef1=1.000000E+00;

   optode_FoilCoefA0=-2.679283E-06;
   optode_FoilCoefA1=-7.483597E-06;
   optode_FoilCoefA2=1.960006E-03;
   optode_FoilCoefA3=-2.072853E-01;
   optode_FoilCoefA4=6.012464E-04;
   optode_FoilCoefA5=-6.604266E-07;
   optode_FoilCoefA6=1.118020E+01;
   optode_FoilCoefA7=-5.148064E-02;
   optode_FoilCoefA8=6.898503E-05;
   optode_FoilCoefA9=8.465012E-07;
   optode_FoilCoefA10=-3.143506E+02;
   optode_FoilCoefA11=2.051116E+00;
   optode_FoilCoefA12=-2.987026E-03;
   optode_FoilCoefA13=-4.449771E-06;

   optode_FoilCoefB0=-1.861349E-06;
   optode_FoilCoefB1=3.814899E+03;
   optode_FoilCoefB2=-3.222806E+01;
   optode_FoilCoefB3=-1.678000E-01;
   optode_FoilCoefB4=1.894820E-02;
   optode_FoilCoefB5=-6.901433E-04;
   optode_FoilCoefB6=1.042693E-05;
   optode_FoilCoefB7=0.000000E+00;
   optode_FoilCoefB8=0.000000E+00;
   optode_FoilCoefB9=0.000000E+00;
   optode_FoilCoefB10=0.000000E+00;
   optode_FoilCoefB11=0.000000E+00;
   optode_FoilCoefB12=0.000000E+00;
   optode_FoilCoefB13=0.000000E+00;

%    % Uncomment "optode_SVU_enabled" to process data using SVU algorithm.
   optode_SVU_enabled
   optode_SVUCoef0=2.773588E-03
```

```
    optode_SVUCoef1=1.174275E-04
    optode_SVUCoef2=2.318324E-06
    optode_SVUCoef3=1.299123E+02
    optode_SVUCoef4=-2.071502E-01
    optode_SVUCoef5=-2.881436E+01
    optode_SVUCoef6=2.565887E+00

% % Rinko ARO-FT Dissolved Oxygen Sensor
%   comm_oxy_type = ' Rinko ARO-FT ';
%   calibcomm.aroft.optode =' SN: 0AA1234, CAL: 27-May-2016 ';
%    aroft_c0=3.020188e-03
%    aroft_c1=1.239442e-04
%    aroft_c2=3.275705e-06
%    aroft_d0=5.928457e-04
%    aroft_d1=-1.461642e-01
%    aroft_d2=1.850662e-01
%    aroft_d3=0.000000e+00
%    aroft_d4=0.000000e+00
%    aroft_e0=1.000000e+00
%    aroft_A=-1.274236e+01
%    aroft_B=1.483120e-03
%    aroft_C=-2.661703e-08
%    aroft_D=6.236005e-13
%    aroft_E=-7.944576e-18
%    aroft_F=5.142597e-23
%    aroft_G=0.000000e+00
%    aroft_H=0.000000e+00

% % Biospherical PAR Calibration Constants and Device Properties
    PARCalData_manufacturer='Biospherical Instruments, Inc';% Manufacturer
    PARCalData_serialNumber=50123;%  Serial #
    PARCalData.calDate='05-May-2018';% cal date
    PARCalData.darkOffset=10.3;% mv
    PARCalData.scaleFactor=9.072E+00;% Volts/uE/cm^2sec

% %  WETLabs wlbb2fl calibration constants.
    WETLabsCalData_wlbb2fl_calinfo = ' SN: BB2FLIRB-1234, CAL: 08-Aug-2018 ';

    % Backscattering cal constants - wavelength 470
    WETLabsCalData.wlbb2fl.Scatter470.wavelength=470;
    WETLabsCalData.wlbb2fl.Scatter470.scaleFactor=1.172E-05;
    WETLabsCalData.wlbb2fl.Scatter470.darkCounts=49;
    WETLabsCalData.wlbb2fl.Scatter470.resolution=1;

    % Backscattering cal constants - wavelength 700
    WETLabsCalData.wlbb2fl.Scatter700.wavelength=700;
    WETLabsCalData.wlbb2fl.Scatter700.scaleFactor=3.327E-06;
    WETLabsCalData.wlbb2fl.Scatter700.darkCounts=56;
    WETLabsCalData.wlbb2fl.Scatter700.resolution=1.1;

    % Chlorophyll cal constants
    WETLabsCalData.wlbb2fl.Chlorophyll.wavelength=695;
    WETLabsCalData.wlbb2fl.Chlorophyll.darkCounts=47;
    WETLabsCalData.wlbb2fl.Chlorophyll.scaleFactor=1.2200E-02;
    WETLabsCalData.wlbb2fl.Chlorophyll.maxOutput=4130;
    WETLabsCalData.wlbb2fl.Chlorophyll.resolution=1;
    WETLabsCalData.wlbb2fl.Chlorophyll.calTemperature=22.8;

% % WETLabs wlbb3 calibration constants.
%   WETLabsCalData_wlbb3_calinfo = ' SN: BB3IRB-123, CAL: 01-May-2014 ';
%
%    % Backscattering cal constants - wavelength 532
%   WETLabsCalData.wlbb3.Scatter532.wavelength=532;
%   WETLabsCalData.wlbb3.Scatter532.scaleFactor=7.560E-06;
%   WETLabsCalData.wlbb3.Scatter532.darkCounts=49;
%   WETLabsCalData.wlbb3.Scatter532.resolution=1.5;
%
%    % Backscattering cal constants - wavelength 650
%   WETLabsCalData.wlbb3.Scatter650.wavelength=650;
%   WETLabsCalData.wlbb3.Scatter650.scaleFactor=3.703E-06;
```

```
%   WETLabsCalData.wlbb3.Scatter650.darkCounts=43;
%   WETLabsCalData.wlbb3.Scatter650.resolution=1.2;
%
%    % Backscattering cal constants - wavelength 880
%   WETLabsCalData.wlbb3.Scatter880.wavelength=880;
%   WETLabsCalData.wlbb3.Scatter880.scaleFactor=2.139E-06;
%   WETLabsCalData.wlbb3.Scatter880.darkCounts=60;
%   WETLabsCalData.wlbb3.Scatter880.resolution=1.3;

% % WETLabs wlbbfl2 calibration constants.
% WETLabsCalData_wlbbfl2_calinfo = ' SN: BBFL2IRB-1234, CAL: 12-July-2017 ';
%
%    % Backscattering cal constants - wavelength 700
%    WETLabsCalData.wlbbfl2.Scatter700.wavelength=700;
%    WETLabsCalData.wlbbfl2.Scatter700.scaleFactor=3.074E-06;
%    WETLabsCalData.wlbbfl2.Scatter700.darkCounts=44;
%    WETLabsCalData.wlbbfl2.Scatter700.resolution=1.0;
%
%    % Chlorophyll cal constants
%    WETLabsCalData.wlbbfl2.Chlorophyll.wavelength=695;
%    WETLabsCalData.wlbbfl2.Chlorophyll.darkCounts=44;
%    WETLabsCalData.wlbbfl2.Chlorophyll.scaleFactor=0.0122;
%    WETLabsCalData.wlbbfl2.Chlorophyll.maxOutput=4130;
%    WETLabsCalData.wlbbfl2.Chlorophyll.resolution=1.3;
%    WETLabsCalData.wlbbfl2.Chlorophyll.calTemperature=21.5;
%
%    % CDOM cal constants
%    WETLabsCalData.wlbbfl2.CDOM.wavelength=460;
%    WETLabsCalData.wlbbfl2.CDOM.maxOutput=4135;
%    WETLabsCalData.wlbbfl2.CDOM.scaleFactor=8.9900E-02;
%    WETLabsCalData.wlbbfl2.CDOM.darkCounts=35;
%    WETLabsCalData.wlbbfl2.CDOM.resolution=1.4;
%    WETLabsCalData.wlbbfl2.CDOM.calTemperature=21.5;
%
% % WETLabs wlfl3 calibration constants.
%    WETLabsCalData_wlfl3_calinfo = ' SN: FL3IRB-1234, CAL: 30-Apr-2014 ';
%
%    % Chlorophyll cal constants ug/l/count
%    WETLabsCalData.wlfl3.Chlorophyll.wavelength=695;
%    WETLabsCalData.wlfl3.Chlorophyll.darkCounts=38;
%    WETLabsCalData.wlfl3.Chlorophyll.scaleFactor=1.2000E-02;
%    WETLabsCalData.wlfl3.Chlorophyll.maxOutput=4130;
%    WETLabsCalData.wlfl3.Chlorophyll.resolution=1;
%    WETLabsCalData.wlfl3.Chlorophyll.calTemperature=21.0;
%
%    % CDOM cal constants ppb/count
%    WETLabsCalData.wlfl3.CDOM.wavelength=460;
%    WETLabsCalData.wlfl3.CDOM.maxOutput=4130;
%    WETLabsCalData.wlfl3.CDOM.scaleFactor=9.8400E-02;
%    WETLabsCalData.wlfl3.CDOM.darkCounts=49;
%    WETLabsCalData.wlfl3.CDOM.resolution=1.0;
%    WETLabsCalData.wlfl3.CDOM.calTemperature=21.0;
%
%    % Phycoerythrin cal constants ppb/count
%    WETLabsCalData.wlfl3.Phycoerythrin.wavelength=570;
%    WETLabsCalData.wlfl3.Phycoerythrin.maxOutput=4130;
%    WETLabsCalData.wlfl3.Phycoerythrin.scaleFactor=4.3200E-02;
%    WETLabsCalData.wlfl3.Phycoerythrin.darkCounts=46;
%    WETLabsCalData.wlfl3.Phycoerythrin.resolution=1.0;
%    WETLabsCalData.wlfl3.Phycoerythrin.calTemperature=21.0;
%
%    % Uranine cal constants ppb/count - wavelength 530 nm
%    WETLabsCalData.wlfl3.Uranine.wavelength=530;
%    WETLabsCalData.wlfl3.Uranine.maxOutput=4130;
%    WETLabsCalData.wlfl3.Uranine.scaleFactor=4.3200E-02;
%    WETLabsCalData.wlfl3.Uranine.darkCounts=46;
%    WETLabsCalData.wlfl3.Uranine.resolution=1.0;
%    WETLabsCalData.wlfl3.Uranine.calTemperature=21.0;
%
%    % Rhodamine cal constants ppb/count - wavelength 570 nm
```

```
%    WETLabsCalData.wlfl3.Rhodamine.wavelength=570;
%    WETLabsCalData.wlfl3.Rhodamine.maxOutput=4130;
%    WETLabsCalData.wlfl3.Rhodamine.scaleFactor=4.3200E-02;
%    WETLabsCalData.wlfl3.Rhodamine.darkCounts=46;
%    WETLabsCalData.wlfl3.Rhodamine.resolution=1.0;
%    WETLabsCalData.wlfl3.Rhodamine.calTemperature=21.0;
%
%    % Phycocyanin cal constants ppb/count - wavelength 680 nm
%    WETLabsCalData.wlfl3.Phycocyanin.wavelength=680;
%    WETLabsCalData.wlfl3.Phycocyanin.maxOutput=4130;
%    WETLabsCalData.wlfl3.Phycocyanin.scaleFactor=4.3200E-02;
%    WETLabsCalData.wlfl3.Phycocyanin.darkCounts=46;
%    WETLabsCalData.wlfl3.Phycocyanin.resolution=1.0;
%    WETLabsCalData.wlfl3.Phycocyanin.calTemperature=21.0;

% % WETLabs SeaOWL calibration constants.
%    WETLabsCalData_wlseaowl_calinfo = ' SN: SEAOWL2K-123, CAL: 12-SEPT-2016 ';
%
%    % Backscattering cal constants - wavelength 700
%    WETLabsCalData.wlseaowl.Scatter700.wavelength=700;
%    WETLabsCalData.wlseaowl.Scatter700.scaleFactor=2.521E-07;
%    WETLabsCalData.wlseaowl.Scatter700.darkCounts=48;
%    WETLabsCalData.wlseaowl.Scatter700.maxOutput=4.03e-02
%
%    % Chlorophyll cal constants
%    WETLabsCalData.wlseaowl.Chlorophyll.wavelength=690;
%    WETLabsCalData.wlseaowl.Chlorophyll.darkCounts=49;
%    WETLabsCalData.wlseaowl.Chlorophyll.scaleFactor=1.601E-03;
%    WETLabsCalData.wlseaowl.Chlorophyll.maxOutput=4130;
%    WETLabsCalData.wlseaowl.Chlorophyll.resolution=1.5;
%
%    % FDOM cal constants
%    WETLabsCalData.wlseaowl.FDOM.wavelength=460;
%    WETLabsCalData.wlseaowl.FDOM.maxOutput=1270;
%    WETLabsCalData.wlseaowl.FDOM.scaleFactor=7.935e-03;
%    WETLabsCalData.wlseaowl.FDOM.darkCounts=49;
%    WETLabsCalData.wlseaowl.FDOM.resolution=1.6;

% % WETLabs wlflntu calibration constants.
%   WETLabsCalData.wlflntu.calinfo = ' SN: FLNTUIRB - 1234, CAL: 20-July-2016 ';

%    Chlorophyll cal constants - wavelength 695 nm
%     WETLabsCalData.wlflntu.Chlorophyll.wavelength=695;
%     WETLabsCalData.wlflntu.Chlorophyll.darkCounts=48;
%     WETLabsCalData.wlflntu.Chlorophyll.scaleFactor=1.2200E-02;
%     WETLabsCalData.wlflntu.Chlorophyll.maxOutput=4130;
%     WETLabsCalData.wlflntu.Chlorophyll.resolution=1.0;
%     WETLabsCalData.wlflntu.Chlorophyll.calTemperature=20.5;
%
%    NTU cal constants - wavelength 700 nm
%     WETLabsCalData.wlflntu.NT.wavelength=700;
%     WETLabsCalData.wlflntu.NT.maxOutput=4130;
%     WETLabsCalData.wlflntu.NT.scaleFactor=6.1000E-03;
%     WETLabsCalData.wlflntu.NT.darkCounts=47;
%     WETLabsCalData.wlflntu.NT.resolution=1.0;
%     WETLabsCalData.wlflntu.NT.calTemperature=20.5;
```

2.2.3. Pagers File (.pagers)

The "dot pagers" file controls the automatic notification system. It allows any of several types of messages to be sent to any valid email address: gps, alerts, comp, critical and recov (see below). This service is run by the data conversion script, which is invoked by a glider logout or disconnection. Lines beginning with a # are comment lines and are ignored in processing.

```
# Joe Smith
# joe@gmail.com,gps,alerts,recov
jsmith@apl.washington.edu,recov
2065551234@messaging.sprintpcs.com,recov
# Jane Smith
jsmith@kongsberg.com,gps,alerts,recov,comp,critical
```

Joe Smith will receive emails to his APL account, and text messages to his Sprint phone, but will not receive messages to his gmail account.

A warning sent when various glider performance parameters are out of spec

Sent when the basestation has completed data processing from the latest dive

If the glider goes into recovery, send the most recent GPS position and the recov code.

Send an alert when the basestation has a problem converting a file or files.

After every dive, send the most recent GPS position and, if the glider is in recovery, the recov code.

```
#2063335555@txt.att.net,gps,alerts,recov
#2061239999@vtext.com,gps,alerts
# Iridium Phone
#881645559999@msg.iridium.com,gps
```

2.2.4. URLS (.urls)

The "Dot URLs" file is read by the basestation, following processing of dive data (triggered by a Seaglider logout). It specifies URLs on which to run GET for each processed dive. This can be used for any supported httpd function and is mainly used to poll for data transfers to support visualization servers. The first entry on the line is the timeout (in seconds) to wait for a response to the GET. It is separated from the URL by a tab. convert.pl adds arguments "instrument_name=sg& dive=" with the proper separator. Comments in the file are indicated by a #.

Example .urls file

```
1   sgbase99.kongsberg.com/~glider/cgi-bin/update.cgi
```

2.2.5. Basestation Log (baselog_hhmmssddmmyy, baselog.log)

The baselog_ file is produced by the basestation and logs the output from the scripts that perform the data conversion and notification functions of the basestation. It is written during each invocation. The file name includes the hours, minutes, seconds, day, month and year for time and date as kept on the basestation.

This file is the first place to look when debugging problems with the data conversion. If the basestation cannot process a file, it sends an alert to any contact listed in the .pagers file that is designated for “alerts”.

Example baselog_ file:

```
INFO: BaseLog.py(92): Process id = 8039
INFO: Utils.py(746): Basestation version: 2.11; QC version: 1.12
INFO: Utils.py(749): Python version 2.7.15
INFO: Utils.py(758): Numpy version 1.13.3
```

```
INFO: Utils.py(767): Scipy version 0.19.1
INFO: Base.py(1394): Invoked with command line [/usr/local/basestation_2.11.REV.E/Base.py --
mission_dir /home/sg577 --verbose --make_dive_profiles --make_mission_profile --
make_mission_timeseries --daemon --base_log baselog_190612235046 ]
INFO: Base.py(1396): PID:8052
WARNING: BaseNetCDF.py(1381): Replacing nc metadata for sg_data_point_dive_number
WARNING: Base.py(1408): Sensor initialization failed
INFO: Base.py(1443): Started processing 23:50:47 12 Jun 2019 UTC
INFO: Base.py(1471): Instrument ID = 577
INFO: Base.py(945): Starting processing on .pagers for  gps recov critical drift
INFO: Base.py(1053): Finished processing on .pagers
INFO: Base.py(1503): Processing comm_merged.log
INFO: Base.py(1523): Finished processing comm_merged.log
INFO: Base.py(1622): Processing seaglider selftests
INFO: Base.py(1645): No new selftests to processed
INFO: Base.py(1647): Processing pdoscmd.bat logs
INFO: Base.py(1663): No pdos logfiles found to process
INFO: Base.py(1670): Processing dive(s)
INFO: Base.py(409): Processing /home/sg577/sg0008lz
INFO: Base.py(732): Checking fragment /home/sg577/sg0008lz.x00
INFO: Base.py(517): Processing /home/sg577/sg0008lz.r in process_file_group
INFO: Base.py(630): Removing secrets from /home/sg577/p5770008.log
INFO: Base.py(299): fragment_size = 8192
INFO: Base.py(409): Processing /home/sg577/sg0008dz
INFO: Base.py(732): Checking fragment /home/sg577/sg0008dz.x00
INFO: Base.py(517): Processing /home/sg577/sg0008dz.r in process_file_group
ERROR: LogFile.py(269): Missing metadata for log entry $LOITER_D_TOP
ERROR: LogFile.py(269): Missing metadata for log entry $LOITER_D_BOTTOM
ERROR: LogFile.py(269): Missing metadata for log entry $LOITER_N_DIVE
ERROR: LogFile.py(269): Missing metadata for log entry $ALTIM_PING_FIT
ERROR: LogFile.py(269): Missing metadata for log entry $TEMP
ERROR: LogFile.py(269): Missing metadata for log entry $SDFILEDIR
INFO: Base.py(299): fragment_size = 8192
INFO: Base.py(409): Processing /home/sg577/sg0008kz
INFO: Base.py(732): Checking fragment /home/sg577/sg0008kz.x00
INFO: Base.py(732): Checking fragment /home/sg577/sg0008kz.x01
INFO: Base.py(732): Checking fragment /home/sg577/sg0008kz.x02
INFO: Base.py(732): Checking fragment /home/sg577/sg0008kz.x03
INFO: Base.py(732): Checking fragment /home/sg577/sg0008kz.x04
INFO: Base.py(732): Checking fragment /home/sg577/sg0008kz.x05
INFO: Base.py(517): Processing /home/sg577/sg0008kz.r in process_file_group
INFO: Base.py(1690): Processed dive(s) [8]
INFO: Base.py(1721): Dives to process = [8]
INFO: Base.py(1738): Processing (/home/sg577/p5770008) for profiles
INFO: MakeDiveProfiles.py(1514): Loading data from original files
INFO: MakeDiveProfiles.py(2093): auxcompass data not present, auxPressure data not present
INFO: MakeDiveProfiles.py(2130): Not using auxcompass Not using auxPressure
INFO: MakeDiveProfiles.py(3586): Changed (2/342) 341 342 to QC_BAD because CT out of water
WARNING: MakeDiveProfiles.py(3599): CTD out of the water after climb (0.672m)
```

INFO: QC.py(418): Changed (3/342) 2 5 174 to QC_PROBABLY_BAD because raw temperature spikes
INFO: QC.py(430): Changed (1/342) 342 to QC_BAD because raw salinity below bound
INFO: QC.py(461): Changed (1/342) 2 to QC_PROBABLY_BAD because raw conductivity spikes
INFO: QC.py(211): Changed (3/342) 2 5 174 to QC_PROBABLY_BAD because changed raw temp implies changed raw salinity
INFO: QC.py(211): Changed (1/342) 341 to QC_BAD because changed raw cond implies changed raw salinity
INFO: QC.py(418): Changed (3/342) 2 5 174 to QC_INTERPOLATED because temperature spikes
INFO: QC.py(430): Changed (1/342) 342 to QC_BAD because salinity below bound
INFO: QC.py(461): Changed (1/342) 2 to QC_INTERPOLATED because conductivity spikes
INFO: MakeDiveProfiles.py(3810): Changed (20/342) 164:183 to QC_BAD because slow apogee CT flow
INFO: MakeDiveProfiles.py(3940): Changed (12/342) 1:12 to QC_BAD because during VBD bleed
INFO: MakeDiveProfiles.py(4048): Changed (34/342) 1:12 164:183 341 342 to QC_BAD because bad corrected temperature and conductivity suggests bad salinity
INFO: QC.py(211): Changed (34/342) 1:12 164:183 341 342 to QC_BAD because changed corrected salin implies changed speed
INFO: TempSalinityVelocity.py(1250): TSV exiting after 2 iterations
INFO: TempSalinityVelocity.py(1252): Changed (1/342) 340 to QC_PROBABLY_BAD because TS bad extrapolation
INFO: TempSalinityVelocity.py(1270): SUGGESTION: 8 interp_salinity data_points in_between 14 21 % suspect thermal-inertia points 16:18
INFO: TempSalinityVelocity.py(1270): SUGGESTION: 8 interp_salinity data_points in_between 337 339 % suspect thermal-inertia points 339
INFO: MakeDiveProfiles.py(4213): 13 (3.80%) HDM speeds are QC_BAD; 0 (0.00%) are stalled (342)
INFO: MakeDiveProfiles.py(4235): Average estimated final speed: 27.30 cm/s
INFO: MakeDiveProfiles.py(4238): RMS observed vs. computed w: 2.50 cm/s
INFO: MakeDiveProfiles.py(4290): Starting sensor extensions data processing
WARNING: aa4831_ext.py(264): No AA4831 data to process.
ERROR: contopt_ext.py(214): Missing one or more expect Contopt variable from SciCon
INFO: aroft_ext.py(173): Starting sensor_data_processing on file <DataFiles.DataFile instance at 0x7f57bfcaa7e8>
INFO: aroft_ext.py(197): No ARO-FT data found in Results data - bailing out
INFO: MakeDiveProfiles.py(4292): Finished sensor extensions data processing
INFO: MakeDiveProfiles.py(4322): Estimated total flight and drift time: 2533.6s (SM: 127.8s)
WARNING: MakeDiveProfiles.py(4520): Estimated DAC magnitude 4.8cm/s below resolution of 7.5cm/s
INFO: Base.py(1816): Backing up /home/sg577/cmdfile to /home/sg577/cmdfile.8
INFO: Base.py(1816): Backing up /home/sg577/targets to /home/sg577/targets.8
INFO: Base.py(1188): Extension script /home/sg577/.post_dive not found
INFO: Base.py(1067): Starting processing on .urls pass 1
INFO: Base.py(1103): Finished processing on .urls pass 1
INFO: MakeDiveProfiles.py(5296): Making mission profile /home/sg577/sg577_SG577_Rev_E_Inaugural_Flight_5.0m_up_and_down_profile.nc from files found in /home/sg577/
INFO: MakeDiveProfiles.py(5571): max_depth_len = 32, max_depth_dive_num = 4
INFO: MakeDiveProfiles.py(5861): Making mission timeseries

/home/sg577/sg577_SG577_Rev_E_Inaugural_Flight_timeseries.nc from files found in /home/sg577/
INFO: Base.py(1127): Starting processing on .extensions
INFO: Base.py(1163): Finished processing on .extensions
INFO: Base.py(2065): Processed files msg:
Processing complete as of 23:50:48 12 Jun 2019 UTC
/home/sg577/p5770008.log
/home/sg577/p5770008.eng
/home/sg577/p5770008.asc
/home/sg577/p5770008.cap
/home/sg577/p5770008.nc
/home/sg577/sg577_SG577_Rev_E_Inaugural_Flight_5.0m_up_and_down_profile.nc
/home/sg577/sg577_SG577_Rev_E_Inaugural_Flight_timeseries.nc
INFO: Base.py(945): Starting processing on .pagers for alerts
INFO: Base.py(1053): Finished processing on .pagers
INFO: Base.py(945): Starting processing on .pagers for alerts
INFO: Base.py(1053): Finished processing on .pagers
INFO: Base.py(945): Starting processing on .pagers for alerts comp
INFO: Base.py(1053): Finished processing on .pagers
INFO: Base.py(922): Starting processing on .ftp
INFO: Base.py(933): Finished processing on .ftp
INFO: Base.py(2109): Starting processing on .mailer
INFO: Base.py(2333): Finished processing on .mailer
INFO: Base.py(1188): Extension script /home/sg577/.post_mission not found
INFO: Base.py(1067): Starting processing on .urls pass 2
INFO: Base.py(1103): Finished processing on .urls pass 2
INFO: Base.py(2355): Finished processing 23:50:48 12 Jun 2019 UTC

The baselog.log is an accumulation of all the basestation conversions reported in the baselog_ files, without the timestamps.

2.3. On-board Glider Information

This section includes files that are stored on the Seaglider. Most of the information in these files is used by the glider in calculations regarding navigation and energy usage.

2.3.1. Processed Files Cache (processed_files.cache)

This file contains the dives that have been processed and the time of processing. To force a file to be re-processed, delete the corresponding line from this file. Comment lines are indicated by a #.

Example processed_files.cache

```
# Written 14:54:28 23 Feb 2008 UTC
st0007pz.000, 19:05:58 21 Feb 2008 UTC
sg0000kl, 14:54:28 23 Feb 2008 UTC
st0007du, 19:05:58 21 Feb 2008 UTC
st0007lu, 19:05:58 21 Feb 2008 UTC
st0009du, 19:40:22 21 Feb 2008 UTC
```

```
st0009kz, 19:16:44 21 Feb 2008 UTC
st0009lu, 19:37:51 21 Feb 2008 UTC
st0010du, 20:21:33 21 Feb 2008 UTC
st0010kz, 20:15:35 21 Feb 2008 UTC
st0010lu, 20:15:34 21 Feb 2008 UTC
st0011du, 14:54:28 23 Feb 2008 UTC
st0011kz, 14:30:35 23 Feb 2008 UTC
st0011lu, 14:30:35 23 Feb 2008 UTC
```

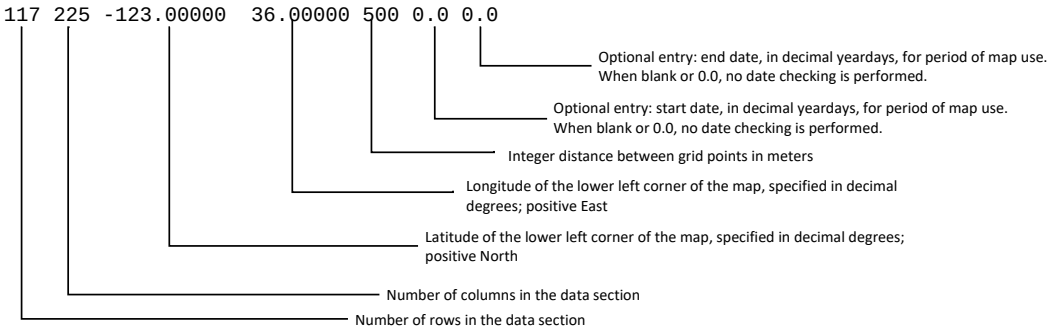
2.3.2. Bathymetry Maps (bathymap.xxx; where xxx = map number)

When the bathymetry map-reading function of the glider is enabled, this file contains the map. It is usually uploaded to the Seaglider's SD Card before deployment but may be uploaded in the field if necessary.

Map files provide the glider with geographic (and sometimes temporal) environmental information. A bathymetry map provides the glider with bathymetry data about a given region of the ocean. The glider may carry up to 999 bathymetry maps (the files are named bathymap.xxx), where xxx is the map number. In practice far fewer than 999 maps are on board. These maps are not required for gliders to fly. For more details on how bathymetry maps are used, see the Navigation section of the Seaglider User's Guide.

Both kinds of maps contain a fixed-size header, followed by a variable-length data section. For a bathymetry map, the data section contains the depth of the bottom at each grid point, expressed in integer meters. The data is stored in column major order.

The header is defined as follows:



2.3.3. Battery File (BATTERY)

The Battery File is used by the glider to keep track of power consumption by subsystems throughout the time the glider is using the battery pack. The Battery File is not intended to be edited by the user.

Example battery file

VBD_pump 2693.889

└ Amp seconds drawn by this device since the battery pack power tracking was initiated

Pitch_motor 269.047
Roll_motor 32.772
Iridium 2052.080
Transponder_ping 85.785
GPS 210.058
Core 445.232
LPSleep 65.606
Compass 158.398
RAFOS 0.000
Transponder 0.990
Compass2 0.000
SBE_CT 94.409
WL_BBFL2 303.321

2.3.4. Compass Calibration File (tcm2mat.xxx)

The compass is calibrated in the assembled glider, to account for effects of the metal on the compass readings. This file is initially generated and stored on the glider by the manufacturer and is not intended to be edited by the user. After each battery refurbishment the compass should be calibrated again. The compass calibration can also be done by the user on land prior to a mission or in the water during a mission. Refer to the compass calibration procedures for details.

The naming convention for the compass calibration file is tcm2mat.xxx where xxx is the glider's three-digit serial number. A glider will only recognize a compass calibration file with this name followed by that specific glider's serial number.

Example Compass Calibration File

"SG506 whirly compass cal using 506composcal04062016 collected at OSB Highbay on 3/4/2016 for SN K895 (IGRF = 539.042)"
0.0000 1.0000 0.0000 0.0000
0.0000 1.0000 0.0000 0.0000
0.9882 -0.0082 0.0049 -0.0004 1.0502 -0.0068 -0.0004 -0.0036 1.0376 22.7895 23.2452 23.1456

2.3.5. Capvec File

The Capvec File is parsed by the glider and updates one or more elements of the Capture Vector. Normally, this file is not used except for glider provisioning. See the capvec and parse_capvecfile commands in Extended PicoDOS Reference Manual for details on updating the Capture Vector, for details how and when to use capture files. The Capvec File is a line-oriented format. Lines may be comment lines, in which case the first character must be a /.

2.4. Command and Control Files

These files are created by the pilot to control the Seaglider mission characteristics. Formats are given here, but usage of these files is discussed in the Seaglider User's Guide.

2.4.1. Targets File (targets)

The targets file is a list of one or more waypoints that describe the desired glider flight path. The Pilot creates the targets file. One target is listed per line, and the target name must be listed first. The order of the other fields does not matter. Comments can be included, preceded by a /.

SEVEN	lat=4807.0	lon=-12223.0	radius=200	goto=SIX
SIX	lat=4806.0	lon=-12222.0	radius=200	goto=FIVE
FIVE	lat=4805.0	lon=-12221.0	radius=200	goto=EIGHT
FOUR	lat=4804.0	lon=-12220.0	radius=200	goto=EIGHT
EIGHT	lat=4808.0	lon=-12224.0	radius=200	goto=KAYAKPT
KAYAKPT	lat=4808.0	lon=-12223.0	radius=100	goto=KAYAKPT
Target name - this can be any string of numbers and/or letters, without whitespace.	Latitude, in +/-ddmm.m; positive North	Longitude, in +/-dddmm.m; positive East	Radius, in meters, within which the Seaglider determines it has reached the target	Next target - this target name must be specified in the Target column

Optional targets file entries:

escape – Under **$USE_ICE**, the **escape** field specifies which target to move to if the glider would otherwise enter recovery, but the error condition is such that the glider can still navigate (voltage cutoffs, current cutoffs, battery exhausted, motor timeouts, fileystem errors). The **escape** field must specify a named target in the file and can vary for each named target. One possible use is to have the standard targets along a cyclical survey route all point to a single **escape** target that then points (through **goto**) to a series of targets that define an entire route to a convenient recovery location. The glider must have a recent navigation fix to escape by target. When a fix is available, a valid escape target overrides **$ESCAPE_HEADING**. When no fix is available (escaping due to **$FIX_MISSING_TIMEOUT**) **$ESCAPE_HEADING** is used to determine the escape route.

Example: escape=CENTER

depth - Specifying a non-zero value for **depth** on a target means that target is achieved once the vehicle crosses a bathymetric contour. If the value is positive the target is achieved when crossing that contour from deep to shallow. When negative, the target is achieved by moving across that contour from shallow to deep. The glider compares the target **depth** against the depth last found by altimetry or by **$T_NO_W** timeout during the dive phase. Specified depth is in meters.

Example: depth=100

finish - Specifies a direction (degrees), and establishes a finish line through the target, perpendicular to the direction specified. The target is considered achieved when the difference between the bearing to the target and the finish direction is greater than 90 (or less than -90) degrees. If finish is -1 or no specification is made, no finish line will be tested.

Example: finish=90 specifies a north-south finish line drawn through the target; the target is achieved when the glider is east of the line.

Example: finish=180 specifies an east-west finish line drawn through the target; the target is achieved when the glider is south of the line.

timeout - Specifies the length of time (in days) that the glider should try to achieve this target. If

the **timeout** is exceeded the glider will proceed to the target named by **goto.** If **timeout** is zero or no specification is made, no time out applies.

Example: timeout=3.0

head - Specifies that the glider should fly a fixed heading rather than point towards a fixed target. This is intended to be used with **depth** or **timeout** fields to define how the target is achieved. If the value is -1 or no value is specified, then **lat** and **lon** must be specified. If **lat**, **lon** and **head** are all specified, heading is ignored.

Example: head=180

Each target must contain **either** lat, lon, radius and goto **or** head and goto.

2.4.2. Science File (science)

This file, created by the pilot, contains instructions for the Seaglider about when to sample the compass, external pressure (depth), G&C (guidance and control) and the science sensors. Comment lines are indicated by a / and columns are separated by tabs.

Example Science File

2.4.2 Science File
(science)

This file, created by the pilot, contains instructions for the Seaglider about when to sample the compass, external pressure (depth), G&C (guidance and control) and the science sensors. Comment lines are indicated by a / and columns are separated by tabs.

Example Science File

// Science for Three Serial Sensors

The bottom limit of each depth bin

The most frequent sample interval in this depth bin. The fastest sampling rate available is 0.25 Hz (one sample every four seconds).

Each digit in this column corresponds to one sensor. Sensors and sensor order vary by Seaglider. Consult $SENSORS in the glider's Log File for sensor order on that vehicle. Multiply this digit by the number in the time column to calculate how often this sensor should sample in this depth bin.

The time interval on which the guidance and control (GC) sensors should sample during the GC phase. These values differ from regular sampling times for the sake of energy conservation.

Each digit in this column corresponds to one sensor and specifies if the sensor is sampled on the downcast only (1), the up-cast only (2) or both the downcast and the up-cast (3). Sensors and sensor order vary by Seaglider.

Each digit in this column corresponds to one sensor and specifies if the sensor is sampled every dive (1), every other dive (2), every third dive (3) etc.

The multiplier used with the time interval (seconds) in column 2 to determine how often the compass is sampled in this depth bin. on which the compass should be sampled, in seconds. Do not change setting from 1.

The multiplier used with the time interval (seconds) in column 2 to determine how often the external pressure should be sampled. This value is converted to depth (in meters) by the glider. Do not change setting from 1.

The time the glider will wait to receive a sample from a sensor. If there is no response from the sensor the glider will continue onward with the sampling sequence. This value is hardcoded to 10 seconds.

/depth	time	sensors	gcint	profiles	dives	compass	pressure	timeout
20	seconds=5	sensors=110	gc=60	profiles=333	dives=111	compass=1	pressure=1	timeout=10
50	seconds=10	sensors=110	gc=180	profiles=312	dives=112	compass=1	pressure=1	timeout=10
200	seconds=10	sensors=123	gc=300	profiles=331	dives=123	compass=1	pressure=1	timeout=10
loiter	seconds=60	sensors=100						

Row 1 indicates that from the surface (0 meters) to 20 meters, the first and second sensors should sample every 5 seconds. The third sensor should be turned off. During GC, all GC sensors should sample every 60 seconds. The data for all three sensors is collected on the down and up-casts. Data should be collected on each dive and the compass and the pressure sensor should be sampled every 5 seconds.

Row 2 indicates that from 20 meters to 50 meters, the first and second sensors should sample every 10 seconds. The third sensor should be turned off. During GC, all GC sensors should sample every 180 seconds. The first sensor is sampled on the down and up-casts. The second sensor is sampled on the downcast only and the third sensor is sampled on the up-cast only. The first and second sensors should be sampled every dive and the third sensor, if it was turned on, should sample every other dive. The compass should be sampled every 5 seconds and the pressure sensor should be sampled every 5 seconds.

Row 3 indicates that from 50 meters to 200 meters, the first sensor should sample every 10 seconds, the second sensor should sample every 20 seconds and the third sensor should sample every 30 seconds. During GC, all GC sensors should sample every 300 seconds. The first and second sensors should sample on both the down and up-casts. The third sensor should sample on the downcast only. The first sensor is sampled every dive, the second every other dive and the third every third dive. Both the compass and the pressure sensor should be sampled every 5 seconds.

Row 4 controls loitering at any apogee depth. This is an optional bin.

In depth description of Guidance and Control (G&C)

G&C intervals control how often a glider evaluates the present position of the pitch, roll and VBD with respect to the desired position of each that is calculated by the glider at the beginning of each dive. The deadband parameters for pitch, roll and VBD (**$PITCH_DBAND**, $**HEAD_ERRBAND** and **$VBD_DBAND** respectively**)** provide the limit allowed between the desired and actual parameter values for each system before a correction is initiated during a dive. Pitch and VBD corrections are completed in seconds, while roll (heading) corrections can take minutes. For pitch and VBD, the glider wakes up (enters active mode) at the G&C time specified in the respective depth bin and checks that the glider's pitch and VBD are within the deadband limits of the calculated desired position. If the position of either is outside of the deadband limit, the respective motor is activated to correct the position and then is shut off (system enters passive mode) for the remainder of the GC cycle once the correction is achieved. For roll, the glider wakes up (enters active mode) at the G&C time specified in the respective depth bin and checks that the glider's heading is within the **$HEAD_ERRBAND**. If the glider's heading is outside of the **$HEAD_ERRBAND** the glider rolls to **$ROLL_DEGREE** and enters passive mode. During the passive turn the heading is measured every **$T_TURN_SAMPINT** seconds up to a total of **$T_TURN** seconds. If the desired heading is reached during one of the **$T_TURN_SAMPINT** intervals the glider goes into active mode, rolls to neutral and then goes back to passive mode. If the desired heading is not reached by **$T_TURN** seconds, the glider goes into active mode at **$T_TURN**, rolls to neutral, and goes back into passive mode for the remainder of that GC cycle. When a roll maneuver is not completed in **$T_TURN** time, the glider reinitiates the turn during the next GC cycle.

2.4.3. PDOS Commands File (pdoscmds.bat)

The file pdoscmds.bat is created by the pilot and uploaded to the Seaglider. It is used as needed by the pilot to, among other things, request the glider resend data from a dive, request present battery voltage, control level of verbosity of information generated in the capture (.cap) file, and send a new file to the glider. See the Extended PicoDOS Reference Manual for information.

3. Summary

If you have any questions, please contact Customer Service at seaglidersupport@hydroid.com.