Seaglider File Formats Manual

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Chapter 1
Conventions and 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*.

123 is used throughout this document as a placeholder for Seaglider serial number, and 55 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. **p1230055.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 Pilot's Guide*, *Parameter Reference Manual*, and *Extended PicoDOS Reference Manual*.

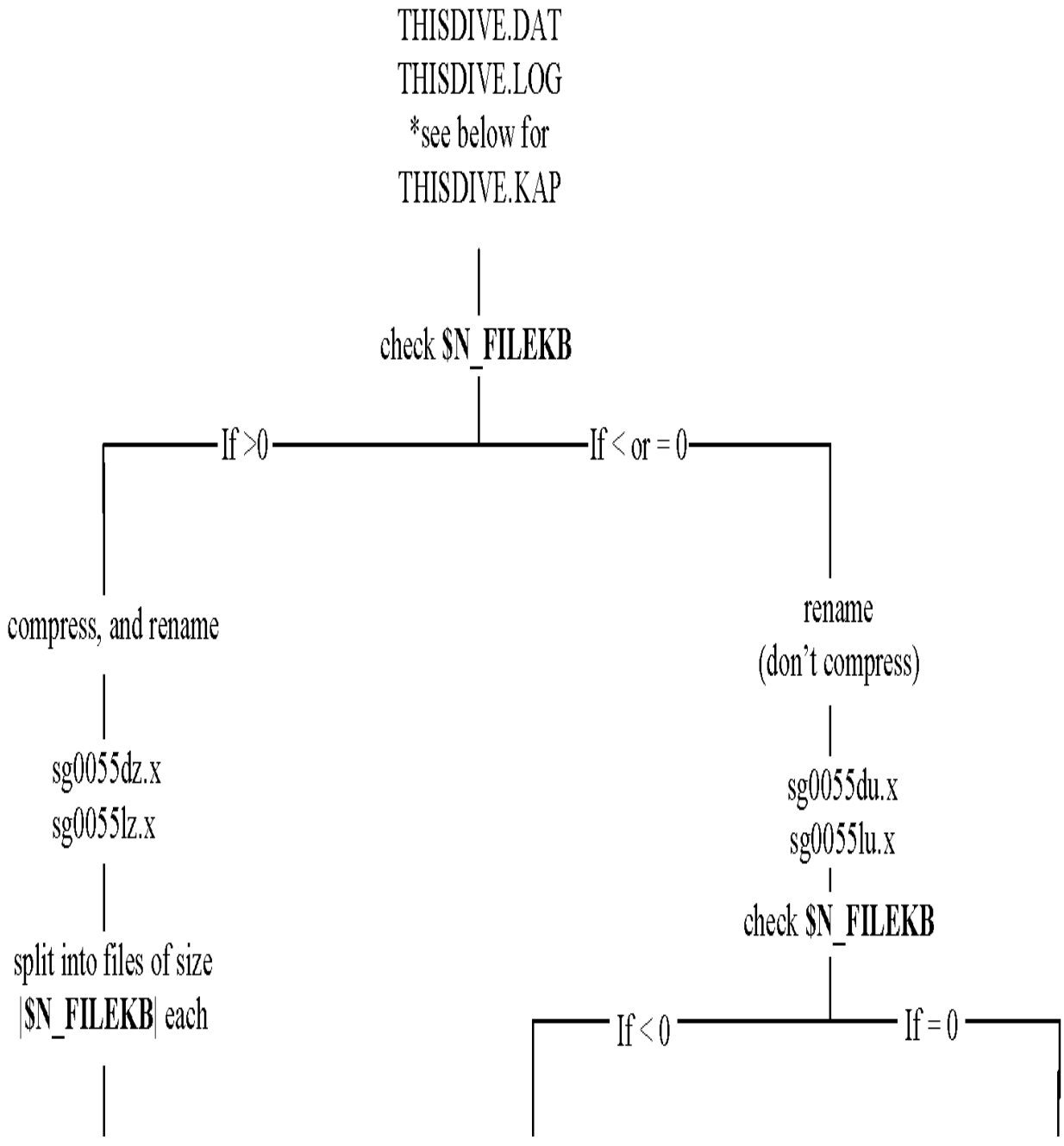
1.2.1 List of Files Found on the Basestation

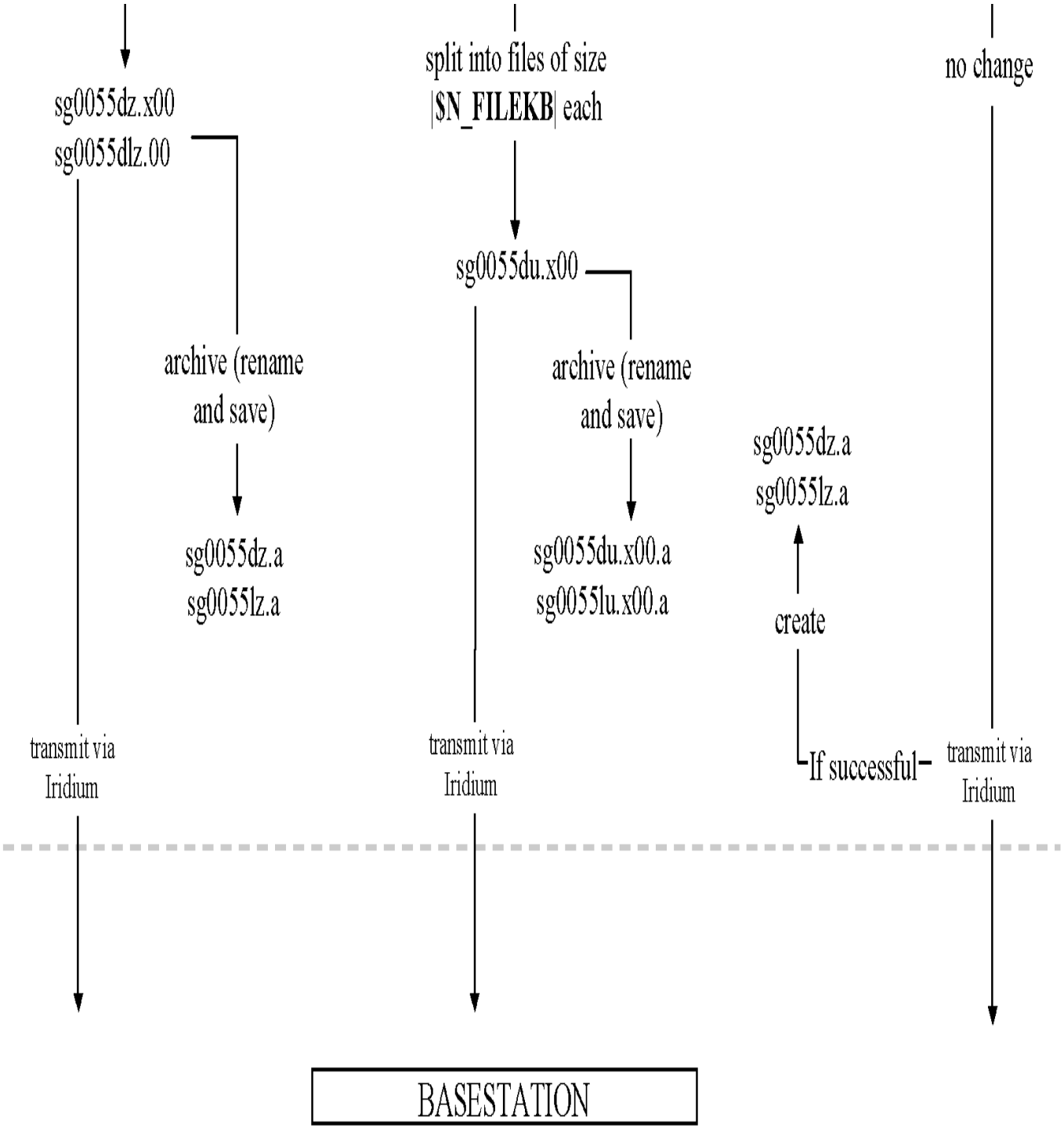
(using SG132, dive 55, for example file names)

These files are described in the document below.	**processed_files.cache** **baselog_080221110101** **baselog.log** **sg_calib_constants.m** **cmdfile** **comm.log**	
	p1230055.asc **p1230055.cap** **p1230055.dat** **p1230055.eng** **p1230055.log** **p1230055.pro** **p1230055.bpo** **p1230055.pvt**	p indicates that these files have been processed by the basestation. They are the files that contain information from the glider, for use by the pilot, operator, and scientist.
	p1230000.prm	This file is sent at the end of a self test. Contains a list of the parameters and their settings at the time of the self test, and some information about the transmission of files during the self test.
	cmdedit.log **targedit.log** **sciedit.log**	These files are made by the basestation, and document each change made to the command file, targets file, and science file using cmdedit, targedit, and sciedit.
	comm_merged.log	Merged comm log and history
	history.log	Record of shell commands
	cmdfile.0 **targets.0** **science.0** **p1230055.000.pdos**	Every time a **cmdfile**, **targets file**, or **science file** is taken up by the glider, it is saved on the basestation and renamed to include the dive number. **PDOS command files** are also saved, but already include the dive number, so they are saved with a serial number. If there are multiple calls on one surfacing, a **cmdfile** is sent each time, and a serial number is added after the dive number.
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:	**st0055du.1a.x00** **st0055du.r** **st0055du.x00**	***d*** indicates that these intermediate files will be used to create a data file.
	st0055lu.1a.x00 **st0055lu.x00**	***l*** indicates that these intermediate files will be used to create a log file.

st : The file is from a self-test. If from a normal dive, this prefix will be *pt* *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 hexidecimal system	**st0055kz.1a.x02** **st0055kz.1a.x03** **st0055kz.b.1a.x04** **st0055kz.b.x04** **st0055kz.r** **st0055kz.x00** **st0055kz.x01**	***k*** indicates that these intermediate files will be used to create a capture file.
	st0055kz.x00.PARTIAL.1	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 Pilot's Guide*.

1.2.2 Data Flow Map




sg0055dz.x00
sg0055dlz.00
archive (rename and save)
sg0055dz.a
sg0055lz.a
transmit via Iridium
split into files of size |$N_FILEKB| each
sg0055du.x00
archive (rename and save)
sg0055du.x00.a
sg0055lu.x00.a
transmit via Iridium
sg0055dz.a
sg0055lz.a
create
If successful
no change
transmit via Iridium
BASESTATION

Chapter 2
File Descriptions

This section describes the files relevant to the Seaglider user. Where appropriate, excerpts from real files, with explanatory annotation, are shown.

2.1 Processed Files

2.1.1 Log File
(p1230055.log)

One **log file** is made for each dive. The first portion of the data is a list of the Seaglider's 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). Some of this data is from the previous surfacing (before the start of the current dive). Not all Seagliders will report all of the lines that appear in the example given here, because the devices installed vary among Seagliders.

Example Log File

```
version: 66.06 Seaglider operating code
glider: 123    Seaglider serial number
mission: 1     counter settable by pilot or launch operator
dive: 055      dive number
start: 7 17 106 19 24 20, day and time (UTC) of start of dive
                          second (UTC, starting with 0)
                       minute (UTC, starting with 0)
                    hour (UTC, starting with 0)
                 year after 1900
              day of month
           month
data:
$ID,123
$MISSION,1
$DIVE,55
$D_SURF,2
$D_FLARE,3
$D_TGT,990
$D_ABORT,1090
$D_NO_BLEED,500
$D_FINISH,0
$T_DIVE,220
$T_MISSION,275
$T_ABORT,1440
$T_TURN,225
$T_TURN_SAMPINT,5
$T_NO_W,120
$USE_BATHY,0
$USE_ICE,-1
$D_OFFGRID,1001
$T_WATCHDOG,10
$RELAUNCH,1
$APOGEE_PITCH,-5
$MAX_BUOY,225
$COURSE_BIAS,0
$GLIDE_SLOPE,30
$SPEED_FACTOR,1
$RHO,1.0275
$MASS,52202
$NAV_MODE,0
$FERRY_MAX,60
$KALMAN_USE,1
$HD_A,0.003
```

```
$HD_B,0.0099999998
$HD_C,9.9999997e-06
$HEADING,-1
$ESCAPE_HEADING,0
$ESCAPE_HEADING_DELTA,10
$TGT_DEFAULT_LAT,21
$TGT_DEFAULT_LON,-158.3
$TGT_AUTO_DEFAULT,0
$SM_CC,400
$N_FILEKB,4
$FILEMGR,0
$CALL_NDIVES,1
$COMM_SEQ,0
$N_NOCOMM,1
$N_NOSURFACE,0
$PITCH_MIN,331
$PITCH_MAX,3664
$C_PITCH,2720
$PITCH_DBAND,0.1
$PITCH_ADJ_DBAND,0.5
$PITCH_ADJ_GAIN,0.03
$PITCH_MAXERRORS,1
$ROLL_DEG,45
$ROLL_MAX,4000
$ROLL_MIN,120
$PITCH_CNV,0.0046000001
$P_OVSHOOT,0.039999999
$PITCH_GAIN,16
$PITCH_TIMEOUT,20
$PITCH_AD_RATE,150
$UPLOAD_DIVES_MAX,-1
$CALL_TRIES,5
$CALL_WAIT,60
$CAPUPLOAD,0
$CAPMAXSIZE,100000
$T_GPS,15
$N_GPS,20
$T_GPS_ALMANAC,0
$T_GPS_CHARGE,-47579.566
$T_RSLEEP,3
$C_ROLL_DIVE,2150
$C_ROLL_CLIMB,2225
$HEAD_ERRBAND,10
$ROLL_CNV,0.028270001
$ROLL_TIMEOUT,15
$R_PORT_OVSHOOT,62
$R_STBD_OVSHOOT,42
$ROLL_AD_RATE,500
$ROLL_MAXERRORS,0
$ROLL_ADJ_GAIN,0
$ROLL_ADJ_DBAND,0
$VBD_MIN,704
$VBD_MAX,3940
$C_VBD,2956
$VBD_DBAND,2
$VBD_CNV,-0.24529999
$VBD_TIMEOUT,720
$PITCH_VBD_SHIFT,0.0020000001
$VBD_PUMP_AD_RATE_SURFACE,5
$VBD_PUMP_AD_RATE_APOGEE,4
$VBD_BLEED_AD_RATE,8
$UNCOM_BLEED,20
$VBD_MAXERRORS,1
$CF8_MAXERRORS,0
$AH0_24V,91.800003
$AH0_10V,61.200001
$MINV_24V,19
$MINV_10V,8
$FG_AHR_10V,6.94801 $FG_AHR_24V,6.73398 $PHONE_SUPPLY,2 $PRESSURE_YINT,-9.1756201
$PRESSURE_SLOPE,9.1530041e-05
$AD7714Ch0Gain,64
$TCM_PITCH_OFFSET,0
$TCM_ROLL_OFFSET,0
$ALTIM_BOTTOM_PING_RANGE,0
$ALTIM_TOP_PING_RANGE,0
```

See *Parameter Reference Manual* for information on parameters reported in the **log file**.

```
$ALTIM_BOTTOM_TURN_MARGIN,0
$ALTIM_TOP_TURN_MARGIN,0
$ALTIM_TOP_MIN_OBSTACLE,1
$ALTIM_PING_DEPTH,0
$ALTIM_PING_DELTA,0
$ALTIM_FREQUENCY,13
$ALTIM_PULSE,2
$ALTIM_SENSITIVITY,4
$XPDR_VALID,0
$XPDR_INHIBIT,90
$INT_PRESSURE_SLOPE,0.0097660003
$INT_PRESSURE_YINT,0
$MOTHERBOARD,4
$DEVICE1,2
$DEVICE2,20
$DEVICE3,37
$DEVICE4,-1
$DEVICE5,-1
$DEVICE6,-1
$COMPASS_DEVICE,33
$PHONE_DEVICE,48
$GPS_DEVICE,32
$RAFOS_DEVICE,-1
$XPDR_DEVICE,24
$SIM_W,0
$SIM_PITCH,0
$SEABIRD_T_G,0.004327164
$SEABIRD_T_H,0.00064159534
$SEABIRD_T_I,2.4326842e-05
$SEABIRD_T_J,2.4823044e-06
$SEABIRD_C_G,-10.256908
$SEABIRD_C_H,1.181479
$SEABIRD_C_I,-0.0036624616
$SEABIRD_C_J,0.00030102869
$GPS1, 191808,1910.592, -15645.222,55, 1.0, 59,
```

- Total time to acquire fix. See **$N_GPS** in the *Parameter Reference Manual* for details
- HDOP (Horizontal Dilution Of Precision) - a measure of the strength of the figure used to compute the GPS fix.
- Time to first fix, in seconds
- Longitude, as +/- dddmm.mmm; sign (only minuses are shown; positive East) degrees, minutes, and decimal minutes
- Latitude, as +/- ddmm.mmm (only minuses are shown; positive North)
- Time, in hhmmss UTC

These values are from the first of two GPS fixes prior to the start of the current dive.

`$_CALLS,1`	Total number of calls that were made in an attempt to connect on the previous surfacing.
`_XMS_NAKs,0`	Total number of transfers that ended with a NAK (No Acknowledgements) on the previous surfacing.
`$_XMS_TOUTs,0`	Total number of transfers that ended without a timeout on the previous surfacing.
`$_SM_DEPTHo,2.36`	Glider-measured depth, in meters, while the glider is at the surface at the end of the previous dive.
`$_SM_ANGLEo,-58.8`	Glider-measured angle at the surface, at the end of the previous dive, in degrees
`$GPS2,192327,1910.511, -15645.083,18,1.5,19,9.6`	These values are from the second GPS fix prior to the start of the current dive. See the "Canonical Dive Profile" in the *Seaglider Pilot's Guide* for further details on where the GPS fix is taken.
`$SPEED_LIMITS,0.260,0.356`	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.
`$TGT_NAME,WPT5`	The name of the active target of this dive. See the Targets File section for details.
`$TGT_LATLONG,2000.000,-15640.000`	The latitude and longitude, in +/- ddmm.mmm and +/- dddmm.mmm format, for the target of this dive.
`$TGT_RADIUS,1852.000`	The radius for the active target for this dive, in meters.

```
$KALMAN_CONTROL,-0.082,0.346
```

- The glider's desired speed to the north, in m/s.
- The glider's desired speed to the east, in m/s.
- Desired heading is derived from these speeds.

```
$KALMAN_X,194116.0,-264.0,95.2,-71195.6,1396.7
```

X displacement from present position to predicted position due to mean, diurnal and semidiurnal components of the model
East position relative to initial position (in meters), at time tk due to glider speed through water
East position relative to initial position (in meters), at time tk due to semidiurnal current
East position relative to initial position (in meters), at time tk due to diurnal current
East position relative to initial position (in meters), at time tk due to mean current

$KALMAN_Y,194116.0,-264.0,95.2,-71195.6,1396.7

Y displacement from present position to predicted position due to mean, diurnal and semidiurnal components of the model
North position relative to initial position (in meters), at time tk due to glider speed through water
North position relative to initial position (in meters), at time tk due to semidiurnal current
North position relative to initial position (in meters), at time tk due to diurnal current
North position relative to initial position (in meters), at time tk due to mean current

$MHEAD_RNG_PITCHd_Wd,337.1,92079,-20.1,-15.000,-18.000

Glide angle (theta0)
Desired vertical velocity on dive (cm/s)
Desired vehicle pitch angle
Distance, in meters, to the target
Desired magnetic heading (degrees)

$D_GRID,990 The depth, in meters, to the apogee maneuver, as read from the currently active bathymetry map.

$GCHEAD,st_secs,pitch_ctl,vbd_ctl,depth,ob_vertv, data_pts,end_secs,pitch_secs,roll_secs,vbd_secs, vbd_i,gcphase,pitch_i,roll_i,pitch_ad, roll_ad,vbd_ad,pitch_retries,pitch_errors,roll_retries,roll_errors, vbd_retries,vbd_errors

st_secs: Elapsed time from the start of the dive to the start of the GC
pitch_ctl: Position of the pitch mass, in centimeters, relative to **$C_PITCH** (positive aft)
vbd_ctl: Position of the VBD, in cc, relative to **$C_VBD** (positive buoyant)
depth: Depth at the start of GC, in meters
ob_vertv: Observed vertical velocity, in centimeters per 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 the GC
pitch_secs: Number of seconds the pitch motor was on
roll_secs: Number of seconds the roll motor was on
vbd_secs: Number of seconds the VBD was on
vbd_i: Average current used by the VBD, in amps
gcphase: GC phase, encoded as follows
1: Pitch change
2: VBD change
3: Roll
4: Turning (passive)
5: Roll back (to center)
6: Passive mode (waiting)
pitch_i: Average current used by the pitch motor, in amps
roll_i: Average current used by the roll motor, in amps
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_ad: Position of the VBD, in AD counts, at the end of the motor move
pitch_retries: number of retries (instantaneous AD rate of move less than $PITCH_AD_RATE) during this motor move
pitch_errors: number of pitch motor errors (timeouts) during this motor move
roll_retries: number of retries (instantaneous AD rate of move less than $ROLL_AD_RATE) during this motor move
roll_errors: number of roll motor errors (timeouts) during this motor move
vbd_retries: number of retries (instantaneous AD rate of move less than $VBD_PUMP_AD_RATE_APOGEE, $VBD_PUMP_AD_RATE_SURFACE, or $VBD_BLEED_RATE as appropriate) during this motor move
vbd_errors: number of VBD errors (timeouts) during this motor move

```
$GC,15,-1.70,-218.4,0.0,0.0,0,59,0.00,0.00,-41.92,0.000,2,0.000,0.000,326,2165,2436,0,0,0,0,0,0
$GC 60,-1.70,-219.0,3.2,-3.9,7,115,11.95,2.45,-34.53,0.000,4,0.180,0.062,2341,3533,3851,0,0,0,0,0,0
$GC,275,-1.70,-219.0,47.8,-22.3,47,281,0.00,2.28,0.00,0.000,6,0.000,0.025,2341,2181,3853,0,0,0,0,0,0
$GC,596,-1.70,-219.0,120.2,-20.3,108,601,0.00,2.50,0.00,0.000,4,0.000,0.045,2341,759,3854,0,0,0,0,0,0
$GC,665,-1.70,-219.0,134.5,-21.4,114,672,0.00,2.33,0.00,0.000,6,0.000,0.023,2342,2149,3855,0,0,0,0,0,0
...lines omitted...
$GC,13111,2.12,489.2,70.3,12.2,557,13165,0.00,2.53,46.45,0.633,4,0.000,0.048,3183,832,959,0,0,0,0,0,0
$GC,13278,2.24,526.9,48.1,13.3,588,13317,0.08,2.38,31.85,0.607,6,0.047,0.025,3213,2229,806,0,0,0,0,0,0
$STATE,20661,end climb,SURFACE_DEPTH_REACHED
$STATE,20661,begin surface coast
$FINISH,1.9,1.008786
```

Density of water, in grams per cc, at the first sample taken after reaching **$D_SURF** (or **$D_FINISH**, if enabled)
Depth of glider, in meters at the first sample taken after reaching **$D_SURF** (or **$D_FINISH**, if enabled)

$SM_CCo,2031,75.53,0.653, 0,0,239,530.09

Final position of the VBD after the SM pump in cc's
Final position of the VBD after the SM pump, in AD counts
Number of errors during the SM pump
Number of retries during the SM pump
Average current for the VBD during the SM pump, in amps

Time in seconds for the SM pump

Time in seconds from the start of the dive to when the Surface Maneuver (SM) pump was started

$SM_GC 1.25,11.30,0.00,0.00,0.038,0.000,0.000,424,2272,1263,-10.22,0.34,438.35
$IRIDIUM_FIX,1904.66,12231.77,091207,191902

$TT8_MAMPS,0.02301 Power draw on the 10 V power pack, in amps, measured at the end of the dive. This measurement can be used to determine if devices are being left on.

$HUMID,40.11 Relative humidity inside the pressure hull, in percent.

$INTERNAL_PRESSURE,7.15848 Pressure inside the pressure hull, in PSIA.

$TCM_TEMP,23.60 Last temperature reading taken from the compass, in degrees C.

$XPDR_PINGS,8 Number of times the transponder commanded a ping on the dive. This could be altimeter pings, or pings in response to something that sounded like an interrogation.

$ALTIM_BOTTOM_PING, 875.1,26.8 Depth of the glider, and altimeteter-detected distance to bottom.

$24V_AH,23.3,21.710

Total amp-hours consumed on the 24V battery since the last reset of the battery meters (usually when new batteries are installed).

The minimum measured battery voltage (measured during active phase) on the 24V battery pack, in volts.

$10V_AH,10.0,17.969 Same as **$24V_AH**, but for 10V battery pack.

$FG_AHR_24Vo,6.819

Cumulative A-hr consumed from the 24V battery pack as tracked by the supervisor fuel gauge and recorded at the end of the dive. Only meaningful for RevC and later motherboards

$FG_AHR_10Vo,6.967 Same as **$FG_AHR_24Vo**, but for 10V battery pack. Only meaningful for RevC and later motherboards

$DEVICES,Pitch_motor,Roll_motor,VBD_pump_during_apogee,
VBD_pump_during_surface,VBD_valve,Iridium_during_init,
Iridium_during_connect,Iridium_during_xfer, Transponder_ping,
Mmodem_TX,Mmodem_RX,GPS,TT8,LPSleep,
TT8_Active,TT8_Sampling,TT8_CF8,TT8_Kalman,Analog_circuits,
GPS_charging,Compass,RAFOS,Transponder.

Provides the titles of the numbers in the next two lines (**$DEVICE_SECS** and **$DEVICE_MAMPS**). The meaning of each title is listed below.

Pitch_motor: All use of the pitch motor, in the units given in the next two lines
Roll_motor: All use of the roll motor, in the units given in the next two lines
VBD_pump_during_apogee: Use of the VBD pump during active mode
VBD_pump_during_surface: Use of the VBD pump outside of the dive
VBD_valve: Any use of the VBD valve
Iridium_during_init: Use of the phone related to turning the phone on
Iridium_during _connect: Use of the phone while connecting to the basestation
Iridium_during_xfer: Use of phone during a file transfer
Transponder_ping: Use of the transponder during an active ping
Mmodem_TX:
Mmodem_RX:
GPS: All use of the GPS for fix acquisition
TT8: Use of the TT8 at 2 MHz
LPSleep: Use of the TT8 under low power sleep
TT8_Active: Use of the TT8 in active mode
TT8_Sampling: Use of the TT8 while sampling sensors
TT8_CF8: Use of the TT8 while accessing the flash
TT8_Kalman: Use of the TT8 while running the Kalman filter code
Analog_circuits: Use of the analog circuitry, including the pressure sensor
GPS_charging: Use of the auxiliary GPS charging circuit
Compass: Use of the compass
RAFOS: Use of the RAFOS receiver
Transponder: Total use of the transponder (including ping time)

$DEVICE_SECS,28.900,130.775,625.775,0.000,0.000,
32.521,48.298,129.845,2.000,81.068,563.712,9134.856,
711.991,3431.997,344.516,33.374,1911.731,0.000,
3107.613,0.000,0.186

Reports the number of seconds each device was powered on during the dive.

$DEVICE_MAMPS,180.245,87.438,1307.735,0.000,0.000,103.000,
160.000,223.000,420.000,50.000,19.800,2.190,19.800,
39.800,45.800,81.800,12.000,0.000,8.000,0.000,30.000

Reports the maximum current (in mA) drawn by each device listed in **$DEVICES**.

$SENSORS,SBE_CT,SBE_O2,WL_BB2F,nil,nil,nil

Similar to **$DEVICES**, in simply providing titles for the numbers listed in the following two columns (**$SENSOR_SECS** and **$SENSOR_MAMPS**). Each title represents one of the sensors installed on the Seaglider, as described here.

SBE_CT: Seabird CT sensor. By convention, this is configured as the first device.
SBE_O2: Seabird O2 sensor.
WL_BB2F: Wetlabs BB2F combination backscatter sensor and fluorometer.
Optode: Optode oxygen sensor.
nil: indicates that no sensor is installed in this position.

$SENSOR_SECS,2182.877,1551.421,748.579,0.000,0.000,0.000

Reports the number of seconds each sensor was powered on during the dive.

$SENSOR_MAMPS,24.000,19.000,105.000,0.000,0.000,0.000

Reports the maximum current drawn by each sensor during the dive.

$DATA_FILE_SIZE,36111,664

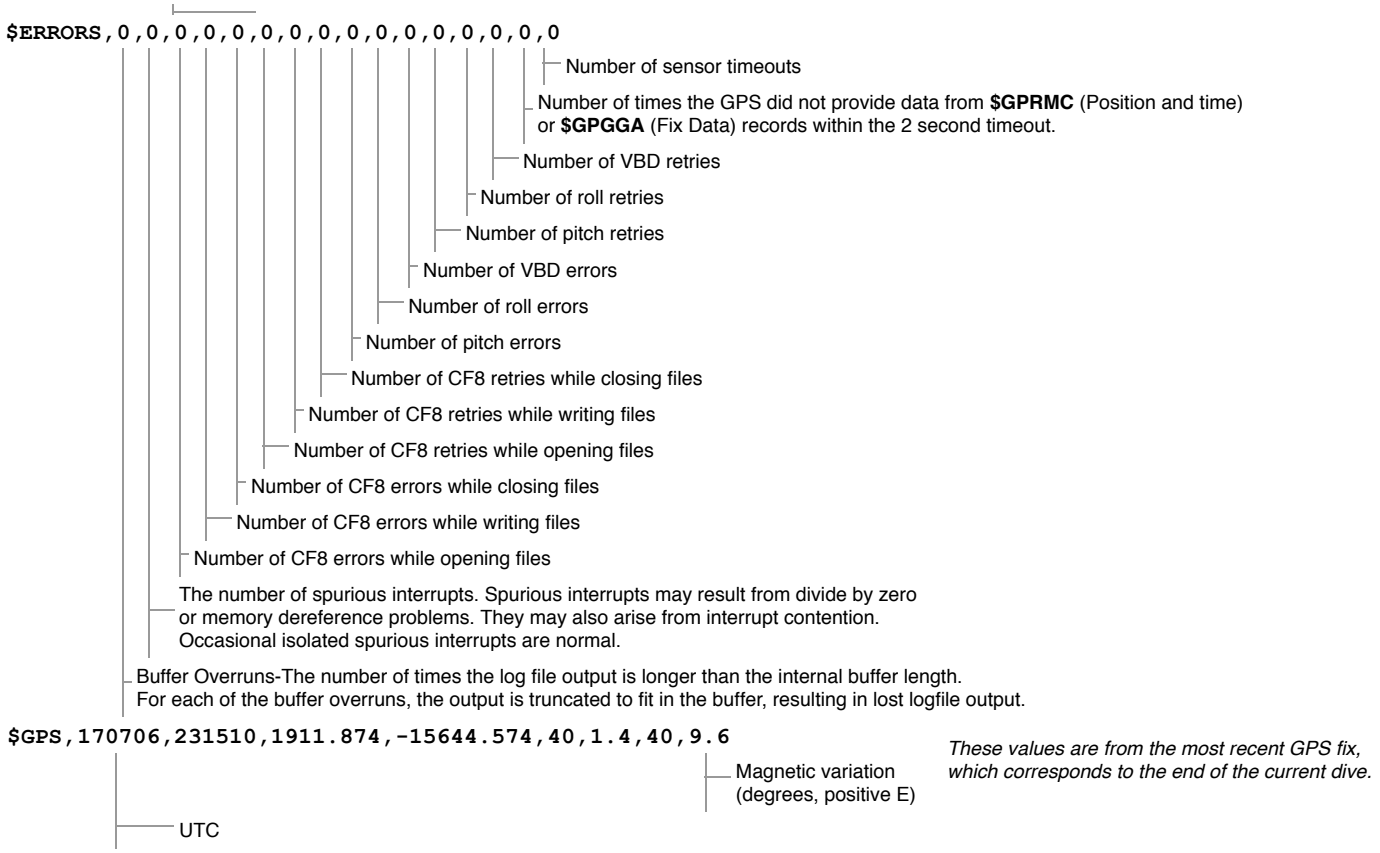
The number of data samples taken during the dive

The total size of the data file in bytes

$CFSIZE,260165632,248328192

The available free space on the compact flash card

The total capacity of the compact flash card



2.1.2 Data File
(p1230055.dat)

The **.dat file** is an ASCII text file that is 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. The meaning of each column title is summarized below. The first 10 columns ("rec" through "GC_phase") are always present. The remaining columns depend on the sensors installed on the individual glider.

rec: the record number of the individual sample
elaps_t: time since the start of the dive
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
AD_pitch: Pitch mass position, in A/D counts
AD_roll: roll mass position, in A/D counts
AD_vbd: VBD position, in A/D counts
GC_phase: GC phase, encoded as follows
- 1: Pitch change
- 2: VBD change
- 3: Roll
- 4: Turning
- 5: Roll back (to center)
- 6: Passive mode

TempFreq: Temperature, in cycle counts of 4 MHz, in 255 cycles of signal frequency
CondFreq: Conductivity, in cycle counts of 4 MHz, in 255 cycles of signal frequency
redRef: red reference, in A/D counts
redCount: red backscatter, in A/D counts
blueRef: blue reference, in A/D counts
blueCount: blue backscatter, in A/D counts
FluorCount: Fluorometer, A/D counts
VFtemp: BB2F temperature
O2: optional Aanderaa optode oxygen concentration
Temp: optional Aanderaa optode temperature
Dphase: optional Aanderaa optode dphase

2.1.3 ASC File
(p1230055.asc)

The .asc, or ASCII, files are created on the basestation. They are essentially the reconstituted (uncompressed, reassembled, and differentially summed) versions of the data (DAT) files created on the Seaglider. See the Data File section for descriptions of the column names. 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.

2.1.4 Eng File
(p1230055.eng)

The .eng, or engineering, files are created on the basestation. They restate data contained in the .asc and .log files, but with the Seaglider control state and attitude observations converted into engineering units. The column titles are described below. The first 10 columns are always present, while the remaining 10 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
condFreq: Conductivity frequency, in Hertz.
tempFreq: Temperature frequency, in Hertz.
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)
pitchCtl: Pitch mass position relative to **$C_PITCH**, in centimeters; positive nose up
rollCtl: Roll mass position, in degrees relative to **$C_ROLL_DIVE** or **$C_ROLL_CLIMB**; positive starboard wing down
vbdCC: VBD value relative to $C_VBD, in cc's; positive buoyant
O2Freq: Oxygen concentration (in Hertz)
redRef: Red reference, in A/D counts
redCount: Red backscatter, in A/D counts
blueRef: Blue reference, in A/D counts
blueCount: Blue backscatter, in A/D counts
FluorCount: Fluorometer, in A/D counts
VFtemp: BB2F temperature, in degrees C
O2: Aanderaa optode oxygen concentration
temp: Aanderaa optode temperature
dphase: Aanderaa optode dphase

2.1.5 Profiles File
(p1230055.pro)

The .pro files contain the scientific data that was acquired during the dive, such as temperature and salinity. The column names are as follows:

elapse_time_s_v: time, in seconds, since the beginning of the dive (before the first sample is taken)
Pressure_v: pressure, in decibars
depth_m_v: depth, in meters
TempC_Cor_v: temperature, in degrees C, corrected for 1st order time lag (response time of sensor)
Cond_Cor_v: conductivity, corrected as above
Salinity_v: salinity, calculated
SigmaT_v: density at the current temperature
dive_pos_lat_dd_v: estimated latitude, in decimal degrees. It should be noted that 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.
dive_pos_lon_dd_v: estimated longitude (see above).

2.1.6 Binned Profiles File
(p1230055.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.

2.1.7 Capture File
(p1230055.cap)

The capture file contains information about all of 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. For more information on the use of capture files, please see the Capture File section in the *Seaglider Pilot's Guide*.
The format of the capture file is not as hard and fast as other file formats, but it usually conforms to that shown below:

time, service, output level, text

Example Capture File

```
2966.752,N,Capture file opened
```

Descriptive text; often what action was taken, and sometimes the reason for the action.

Output level. There are three letters that can appear in this position: N, C, or D. N indicates normal output level. C stands for critical, and means that only output considered critical to glider function will be printed. For the most part, this consists of dire problems with hardware or software, like motor errors or buffer overruns. D stands for Debug, and is used for extended diagnostics. This output can be quite voluminous and it is recommended that this only be set on specific services when it is known that some needed output will be captured. Most services do not have output in this level currently, but work is ongoing to add extended diagnostics under this output level.

Time, in seconds, since the start of the dive

```
2967.080,HTT8,N,Writing NVRAM...done.
2995.325,HGPS,N,Acquiring GPS fix ...
2998.197,HGPS,N,VVVVA
270407, 140904, 4806.097168, -12222.047852 1.500000 13/13 seconds
3009.584,HTT8,N,Updating parameter $T_GPS_CHARGE to -13320.147
```

The capture file gives the following information regarding every pitch, roll and VBD maneuver:

```
876.356,HROLL,N,Roll commanded from 39.80 deg (3384) to 0.00 deg (1976)...
877.415,HROLL,N,34.5 deg (ad: 3195) Updating parameter $R_PORT_OVSHOOT to 18
880.082,SMOTOR,N,MOTOR_DONE: ticks: 1 max 24v: 0.006A avg 24v: 0.006A
880.215,SMOTOR,N,GC TICKS/TIME: 117/119500
880.304,HROLL,N,done.
```

If problems occur, they are reported here.

```
132.434,HPITCH,N,Pitch completed from -8.87 cm (1472) to -1.24 cm (3130) took 17.0 sec 0.292A (0.377A
peak) 97 AD/sec 681 ticks; 10 retries
```

The capture file also describes changes between dive phases:

```
839.259,SDIVE,N,Leaving climb state due to SURFACE_DEPTH_REACHED
839.402,SDIVE,N,Entering surface coast state
839.570,SDIVE,N,Reached SD,Wo = 0.064493,6 more points
```

- Seaglider calculated that it should take this many more samples before beginning surface maneuver
- Vertical velocity when surface depth reached
- Surface depth

2.1.8 NetCDF File
(p1230055.nc)

The netCDF file captures all processed files, 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.

2.1.9 Private File
(p1230055.pvt)

PVT, or private, files are created on the basestation. They contain data that was originally in the logfile that 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. The lines in the pvt file correspond with parameters that are listed in the *Parameter Reference Manual*.

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)

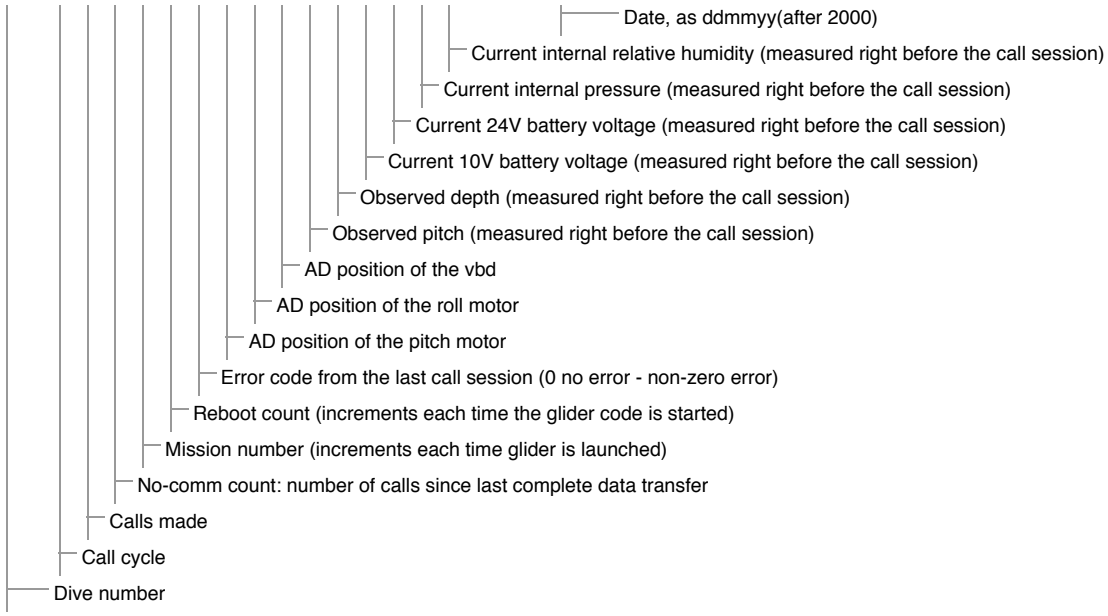
The "comm log" file is appended during each communication session, and so is a complete record of the Seaglider's communications over an entire deployment. It is a plain-text file that resides in the Seaglider's home directory. Running tail -f comm.log in the Seaglider's home directory during (or while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

Example comm.log

`Connected at Sun Dec 2 19:17:03 PST 2007` Date and time of communications session

```
0055:0:0:1:0:0:0:0:0:0:0:0:0:0:0: GPS,031207,031455,1855.179,12237.359,41,1.3,41,-2.1
```

- Magnetic variation
- Total time to acquire fix. See **$N_GPS** in the *Parameter Reference Manual* for details.
- HDOP (Horizontal Dilution Of Precision) - a measure of the strength of the figure used to compute the fix.
- Time to first fix, in seconds
- Longitude, as +/- dddmm.mmm; sign (only minuses are shown; positive East), degrees, minutes, and decimal minutes.
- Latitude, as +/- ddmm.mmm (only minuses are shown; positive North).
- Time, as hhmmss in UTC




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

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

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

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

```
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
```

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

```
Sun Dec  2 19:18:07 2007 [sg123] received EOT and read timed out
```

End of transmission

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

Indicates end of file

```
Sun Dec  2 19:18:07 2007 [sg123] done - sending ACK
```

Acknowledgement that file was sent

```
Sun Dec  2 19:18:07 2007 [sg123] sg0055lz.x00/XMODEM: 4096 Bytes, 178 BPS
```

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

```
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] sg0055dz.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
```

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

```
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
```

data again until it succeeds or reaches the maximum number of calls (set by the parameter **$CALL_TRIES**).

```
Sun Dec 2 19:19:23 2007 [sg123] sg0055dz.x01/XMODEM: got error
Renamed partial file sg0055dz.x01 to sg0055dz.x01.PARTIAL.1
Sun Dec 2 19:19:23 2007 [sg123] processed partial file sg0055dz.x01 (0x0)
Sun Dec 2 19:19:23 2007 [sg123] Exiting (128)
Disconnected at Sun Dec 2 19:19:39 PST 2007
```

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.

```
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
```

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*).

```
Sun Dec 2 19:22:45 2007 [sg123] sg0055dz.x01/XMODEM: 4096 Bytes, 186 BPS
```

The file was successfully resent.

```
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] sg0055dz.x02/XMODEM: 4096 Bytes, 186 BPS
```

2.2.2 SG Calib 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 to the Seaglider Fabrication Center. 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, GLMPC, etc.) to plot Seaglider data. Incorrect values in this file will result in incorrect scientific data in the plots.

Example Calibration Constants File

```
% sg_calib_constants.m
% establishes glider calibration constants
```

```
id_str = '128';
```

Seaglider serial number

```
mission_title =' Port Susan Aug 15 2007';
```

pilot or operator specified

```
calibcomm =  'SBEs/n0041,  calibration 25 April 2006';
```

Sensor serial number (found in SG notebook)

Sea-Bird Electronics

```
t_g = 4.37369092e-03 ;
t_h = 6.48722213e-04 ;
t_i = 2.63414771e-05 ;
t_j = 2.83524759e-06 ;
```

SBE temperature sensor calibration coefficients

```
% Minimum and maximum frequencies (kHz) for reasonable
% oceanographic values of temperature from SBE calibration
% for C/T s/n 041
```

```
sbe_temp_freq_min = 3.214274; % kHz
sbe_temp_freq_max = 6.081845; % kHz
```
From SBE sensor calibration. Basestation processing will reject observed temperature frequencies outside of this range.

```
c_g = -9.97922732e+00 ;
c_h = 1.12270684e+00 ;
c_i = -2.35632554e-03 ;
c_j = 2.37469252e-04 ;
```
SBE conductivity sensor calibration coefficients

```
% Minimum and maximum frequencies (kHz) for reasonable
% oceanographic values of conductivity SBE calibration
% for C/T s/n 041

sbe_cond_freq_min = 2.98792; % kHz
sbe_cond_freq_max = 7.95840; % kHz
```
From SBE sensor calibration. Basestation processing will reject observed temperature frequencies outside of this range.

```
cpcor = -9.57e-08 ;
ctcor = 3.25e-06 ;

calibcomm_oxygen = '0106';

Soc = 2.1921e-04;
Boc = 0.0;
Foffset = -825.6362;
TCor = 0.0017;
PCor = 1.350e-04;

mass = 52.173;
```
measured mass of glider

```
hd_a = 0.003836;
hd_b = 0.010078;
hd_c = 9.8541e-6;
```
lift, drag, induced drag (by lift) — Seaglider hydrodynamic parameters

```
rho0 = 1027.5;
```
Greatest expected water density in area of operation

```
pitch_min_cnts = 426;
pitch_max_cnts = 3705;
roll_min_cnts = 157;
roll_max_cnts = 3897;
vbd_min_cnts = 550;
vbd_max_cnts = 3875;
vbd_cnts_per_cc = -4.0767;
```
Software limits

```
volmax = 51344;
```
Volume, in cc, the glider displaces when fully pumped; see the *Seaglider Pilot's Guide* for tank and ballasting information.

2.2.3 Pagers File
(.pagers)

The "dot pagers" file controls the automatic notification system. It allows any of three types of messages to be sent to any valid email address: gps, alerts, and recov (see below). This service is run by the data conversion script, which is invoked by a glider logout or disconnection. Lines begininning 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
```
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.

```
# Jane Jones
jjones@apl.washington.edu,gps,alerts,recov
```
- 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@vtext.com,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 http://iop.apl.washington.edu/~glider/cgi-bin/update.cgi
```

2.2.5 Basestation Log

```
baselog_000000999999,baselog.log)
```

- Time; hhmmss (time zone as kept on basestation)
- Date; ddmmyy

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. 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.

The baselog.log is an accumulation of all of 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.

2.2.6 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
```

2.3.1 Bathymap

When the bathymetry map-reading function of the glider is enabled, this file contains the map. It is usually uploaded to the Seaglider's compact flash 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.000*), but in practice far fewer 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 Pilot's Guide*.

In addition to bathymetry maps, the glider can carry ice maps which indicate a spatially and temporally varying climatology of ice cover. The glider can use this information to make decisions about surfacing.

Both kinds of maps contain a fixed-size header, followed by a variable-length data section. The header is defined as follows:

```
117 225 -123.00000   36.00000 500 0.0 0.0
```

- Optional entry: end date, in decimal yeardays, for period of map use. When blank or 0.0, no date checking is performed.
- Optional entry: start date, in decimal yeardays, for period of map use. When blank or 0.0, no date

checking is performed.
Integer distance between grid points in meters
Longitude of the lower left corner of the map, specified in decimal degrees; positive East
Latitude of the lower left corner of the map, specified in decimal degrees; positive North
Number of columns in the data section
Number of rows in the 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.

For an ice map the data section contains ice condition values for the time period between the start and end dates at each grid point. Ice condition values are stored as 2-bit integers packed sequentially together into sixteen equal length periods spanning the dates between start date and end date. Valid condition codes are: 0 = always surface, 1 = possibly ice, 2 = probably ice, 3 = always ice. As an example, for a start date = 0.0 and end date = 365.0, the lowest two bits of the value at any grid point encode the ice condition for the first 23 days of the year. Bits 2 and 3 cover the condition for the next 23 days, etc.

2.3.2 Battery File
(BATTERY)

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

```
Pitch_motor 3041.069
```
Amp seconds drawn by this device since the battery pack power tracking was initiated
See **$DEVICES** and **$SENSORS** in the Log File section of this document.

```
Roll_motor 990.029
VBD_pump_during_apogee 216074.641
VBD_pump_during_surface 82015.531
VBD_valve 0.000
Iridium_during_init 17540.021
Iridium_during_connect 9597.448
Iridium_during_xfer 48699.711
Transponder_ping 873.774
Mmodem_TX 0.000
Mmodem_RX 0.000
GPS 5227.668
TT8 11375.065
LPSleep 3565.161
TT8_Active 9204.906
TT8_Sampling 30932.490
TT8_CF8 25142.061
TT8_Kalman 2861.964
Analog_circuits 10045.106
GPS_charging 0.000
Compass 5552.722
RAFOS 0.000
Transponder 126.060
SBE_CT 5738.196
SBE_O2 4966.481
WL_BB2F 59876.422
```

2.3.3 Compass Calibration File

```
(TCM2MAT).123
```
Seaglider serial number

The compass is calibrated in the assembled glider, to account for effects of the metal on the compass readings. This file is stored on the glider by the assembler, and is not intended to be edited by the user.

Example Compass Calibration File

```
tcm2mat.sparton_SN100.sg123.080807
```
Date of last calibration (ddmmyy)
Seaglider serial number
compass type and serial number

```
-0.0184 0.8424 0.1660 0.0466

0.0133 0.9603 0.0447 -0.0185

0.0984 -0.0018 0.0018 0.0010 0.1054 -0.0004
-0.0008 0.0012 0.1040

53.9472 -17.3493 5.8241
```
compass calibration values

2.3.4 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, and the section Capture Files in the *Seaglider Pilot's Guide* 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 */*. All other lines are updates to the Capture Vector and are documented under the *capvec* command in the *Extended PicoDOS Reference Manual*.

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 Pilot's Guide*.

2.4.1 Targets File
(targets)

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**
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.

Above is a typical version 66 targets file. It has all the fields necessary to direct the Seaglider to targets. There are also four optional fields, which can be added as columns in the targets file:

escape=KAYAKPT	**depth=100**	**finish=90**	**timeout=3.0**
The escape_target specifies what target to move to if the glider has been unable to navigate for a specified length of time (e.g. if it is stuck under the ice). The escape_target must be a valid named target in the file and can vary for each named target. One possible future use is to have the standard targets along a cyclical survey route all point to a single escape target that then points (through next_target) to a series of targets that define an entire route to a convenient recovery location.	Specifying a value for depth on a target means that target can be achieved by crossing a bathymetric contour. If the value is positive the target is achieved when crossing that contour from deep to shallow. When negative, target achievement is defined by moving across that contour from shallow to deep. The glider measures its depth for comparison against the target depth either by altimetry or via a $T_NO_W timeout during the dive phase.	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. Example 1: finish direction of 90 specifies a north-south finish line drawn through the target; the target is achieved when the glider is east of the line. Example 2: finish direction of 180 specifies an east-west finish line; target is achieved when glider is south of the line. A value of -1 or no specification of finish means that no finish line will be tested.	Timeout specifies a 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 not specified or is given as zero then the glider will try to achieve the target with no time limit.

2.4.2 Science File
(science)

This file, created by the pilot, contains instructions for the Seaglider about when to sample with the scientific instruments. Comment lines are indicated by a**/**, and columns are separated by tabs.

Example Science File

```
// Science for Port Susan
```

The bottom limit of each depth bin

The most frequent sample interval in this depth bin

Each digit in this column corresponds to one sensor. Sensors and sensor order vary by Seaglider. Consult $SENSORS in the Log File. 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 sensors should sample during the GC phase.

These values differ from regular sampling times for the sake of energy conservation. See the Pilot's Guide for more information.

```
/depth time sample gcint
 20     6    100    60
 50     12   100    180
 200    12   120    300
```

This row indicates that from the surface (0 meters) to 20 meters, the first sensor should sample every 6 seconds. The second and third sensors should be turned off. During GC, all sensors should sample every 60 seconds.

This row indicates that from 50 to 200 meters, the first sensor should sample every 12 seconds, the second should sample every 24 seconds, and the third sensor should be turned off. During GC, all sensors should sample every 300 seconds.

2.4.3 Command File
(cmdfile)

Refer to the *Pilot's Guide* for more information on the Command File.

2.4.4 Pdos Commands File
(pdoscmds.bat)

The file pdoscmds.bat is created by the pilot, and uploaded to the Seaglider. It is used to deal with the Seaglider's software. See the *Extended PicoDOS Reference Manual* for information.

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