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 preceding **$**. File names that are used in Seaglider command, control, or operations are given in **lowercase bold font**. Docu *italicized*.

123 is used throughout this document as a placeholder for Seaglider serial number, and 55 is used as a placeholder for dive digit Seaglider serial number, followed by a four digit dive number, both with preceding zeros (e.g. **p1230055.log**). Numerals represented by 0's and, when additional numerals are needed, 9's. Because they represent various meanings, numerals afte time the file name appears, and in the file description heading.

1.2 Introduction

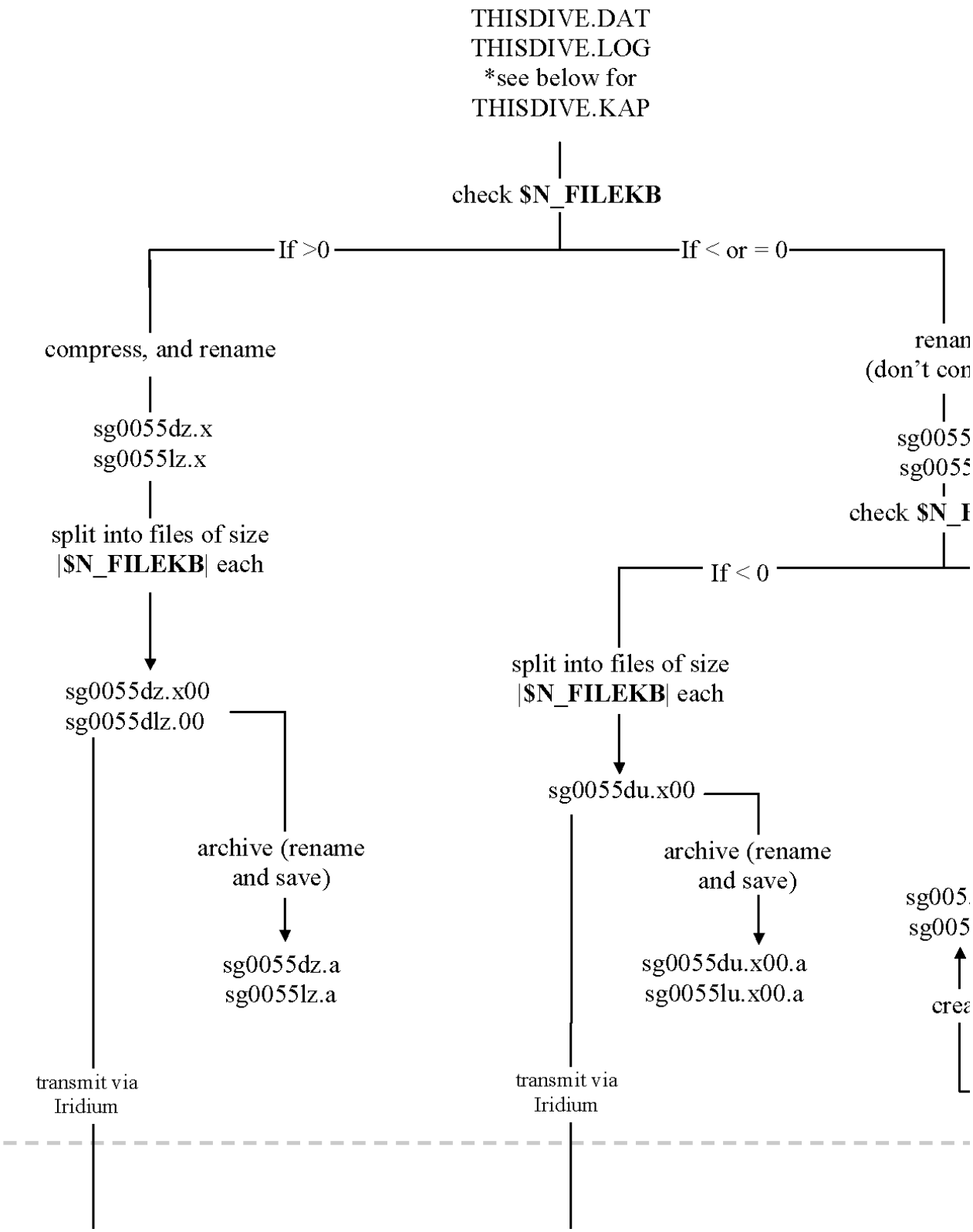
This manual is designed to help the Seaglider user identify and interpret files he or she will encounter on the basestation. It is *Seaglider Pilot's Guide*, *Parameter Reference Manual*, and *Extended PicoDOS Reference Manual*.

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 proc files that contain information from the glide scientist.
	p1230000.prm	This file is sent at the end of a self test. Co settings at the time of the self test, and sor of files during the self test.

	cmdedit.log **targedit.log** **sciedit.log**	These files are made by the basestation, a command file, targets file, and science file
	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 **scie** saved on the basestation and renamed to i **command files** are also saved, but alread saved with a serial number. If there are mu is sent each time, and a serial number is a
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 *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	**st0055du.1a.x00** **st0055du.r** **st0055du.x00**	***d*** indicates that these intermediate files wil
	st0055lu.1a.x00 **st0055lu.x00**	***l*** indicates that these intermediate files will
	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 wil
	st0055kz.x00.PARTIAL.1	Partial files appear when the basestation d the Seaglider, and is unable to process it. T the Communications Log section of this do *Guide*.

1.2.2 Data Flow Map


THISDIVE.DAT
THISDIVE.LOG
*see below for
THISDIVE.KAP
check $N_FILEKB
If >0
If < or = 0
compress, and rename
sg0055dz.x
sg0055lz.x
split into files of size
|$N_FILEKB| each
sg0055dz.x00
sg0055dlz.00
archive (rename
and save)
sg0055dz.a
sg0055lz.a
transmit via
Iridium
renan
(don't con
sg0055
sg0055
check $N_I
If < 0
split into files of size
|$N_FILEKB| each
sg0055du.x00
archive (rename
and save)
sg0055du.x00.a
sg0055lu.x00.a
transmit via
Iridium
sg005
sg005
crea

Chapter 2
File Descriptions

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

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 th
Manual for more information. The second section, beginning with the entry **$GPS1**, contains information concerning the pr
$GC-labeled lines describe motor actions (pitch, roll, or VBD), one line per motor move. The information listed after the $G
the dive (surface maneuver data, final temperature reading, etc). Some of this data is from the previous surfacing (before t
Seagliders will report all of the lines that appear in the example given here, because the devices installed vary among Sea

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
```

- 20 — second (UTC, starting with 0)
- 24 — minute (UTC, starting with 0)
- 19 — hour (UTC, starting with 0)
- 106 — year after 1900
- 17 — day of month
- 7 — 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,-9.175
$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
$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

`$_CALLS,1`	Total number of calls that were made in an attempt to connect on the pı
`_XMS_NAKs,0`	Total number of transfers that ended with a NAK (No Acknowledgemen
`$_XMS_TOUTs,0`	Total number of transfers that ended without a timeout on the previous
`$_SM_DEPTHo,2.36`	Glider-measured depth, in meters, while the glider is at the surface at tl
`$_SM_ANGLEo,-58.8`	Glider-measured angle at the surface, at the end of the previous dive, i

$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 curre
Profile" in the *Seaglider Pilot's Guide* for further details on where the GI

$SPEED_LIMITS,0.260,0.356

The minimum and maximum horizontal speed attainable by the Seaglid
These values are based on the minimum and maximum dive angles an
minimum speed corresponds to the maximum dive angle; the maximum
value of the horizontal speed.

$TGT_NAME,WPT5

The name of the active target of this dive. See the Targets File section f

$TGT_LATLONG,2000.000,-15640.000

The latitude and longitude, in +/- ddmm.mmm and +/- dddmm.mmm for

$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 predicte semidiurnal components of the model
- East position relative to initial position (in meters), at time t
- East position relative to initial position (in meters), at time tk due to semic
- East position relative to initial position (in meters), at time tk due to diurnal currer
- 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 predicte semidiurnal components of the model
- North position relative to initial position (in meters), at time
- North position relative to initial position (in meters), at time tk due to sem
- North position relative to initial position (in meters), at time tk due to diurnal curre
- 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

- 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_sec vbd_i,gcphase,pitch_i,roll_i,pitch_ad, roll_ad,vbd_ad,pitch_retries,pitch_errors,roll_retries,roll_errors, vbd_retri

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_
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,-41.92,0.000,2,0.000,0.000,326,216
$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
$GC,275,-1.70,-219.0,47.8,-22.3,47,281,0.00,2.28,0.00,0.000,6,0.000,0.025,234
$GC,596,-1.70,-219.0,120.2,-20.3,108,601,0.00,2.50,0.00,0.000,4,0.000,0.045,2
$GC,665,-1.70,-219.0,134.5,-21.4,114,672,0.00,2.33,0.00,0.000,6,0.000,0.023,2
```

...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,
$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,
$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**

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,-10.22,0.34,438.3
$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 to determine if devices are being left on.
$HUMID,1789	Pressure inside the pressure hull, in PSIA.
$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 cou 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 (usi

$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 gaug

$FG_AHR_10Vo,6.967 Same as **$FG_AHR_24Vo**, but for 10V battery pack.

$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 t
lines (**$DEVIC**
meaning of ea

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 s
was powered on during t

$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 cu
by each device listed in $

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

Similar to **$DEVICES**, in
titles for the numbers list
two columns (**$SENSOR**
$SENSOR_MAMPS). Ea
one of the sensors instal
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 s
was powered on during t

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

Reports the maximum cu
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

$ERRORS,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0

- Number of times the GPS did not provide data from **$GPRMC** (
  or **$GPGGA** (Fix Data) records within the 2 second timeout.
- Number of VBD retries
- Number of roll retries
- Number of pitch retries
- Number of VBD errors
- Number of roll errors
- Number of pitch errors
- Number of CF8 retries while closing files
- Number of CF8 retries while writing files
- Number of CF8 retries while opening files
- Number of CF8 errors while closing files
- Number of CF8 errors while writing files
- Number of CF8 errors while opening files
- The number of spurious interrupts. Spurious interrupts may result from divide by zero
  or memory dereference problems. They may also arise from interrupt contention.
  Occasional isolated spurious interrupts are normal.
- Buffer Overruns-The number of times the log file output is longer than the internal buffer length.
  For each of the buffer overruns, the output is truncated to fit in the buffer, resulting in lost logfile output.

$GPS,170706,231510,1911.874,-15644.574,40,1.4,40,9.6

- Magnetic variation
  (degrees, positive E)
- UTC

These values
which corresp

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 processin
all following lines are differences. It serves as the primary conduit for the science data collected by the Seaglider. Each **dat**
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 colun
10 columns ("rec" through "GC_phase") are always present. The remaining columns depend on the sensors installed on th

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, reassemble of the data (DAT) files created on the Seaglider. See the Data File section for descriptions of the column names. The entry sample returned for that sensor. Either the sensor was not installed, or the sensor was not enabled for that sample/deployr

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 wi attitude observations converted into engineering units. The column titles are described below. The first 10 columns are alw 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 dowr
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 na

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 ba
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 writte
operating. Capture files are a great source of information on the glider's performance, especially in error analysis and debu
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 f

Output level. There are three letters that can appear in this position: N, C, or D. N indicates normal outpu
that only output considered critical to glider function will be printed. For the most part, this consists of dire
like motor errors or buffer overruns. D stands for Debug, and is used for extended diagnostics. This outp
recommended that this only be set on specific services when it is known that some needed output will be
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
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 ta
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
(University Corporation for Atmospheric Research). The netCDF file is meant primarily for sharing data between scientific u

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 se
basestation (as the logfile may well be). Thus, the data is stripped from the log file and placed in the matched pvt file. The l
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 processe

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 comm
It is a plain-text file that resides in the Seaglider's home directory. Running tail -f comm.log in the Seaglider's home director
communication sessions is a useful monitor.

Example comm.log

```
Connected at Sun Dec 2 19:17:03 PST 2007
0055:0:1:0 GPS,031207,031455,1855.179,12237.359,41,1.3,41,-2.1
```

Date and time of communications session

Magnetic variation

Total time to acquire fix. See **$M**
Manual for details.

HDOP (Horizontal Dilution Of Precis

figure used to compute the fix.

Time to first fix, in seconds

Longitude, as +/- dddmm.mmm; sign (only minu
degrees, minutes, and decimal minutes.

Latitude, as +/- ddmm.mmm (only minuses are shown; positive

Time, as hhmmss in UTC

Date, as ddmmyy(after 2000)

No-comm count: number of calls since last complete data transfer

Calls made

Dive number

```
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] sg0055lz.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] 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
```

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+/- 20k

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to the b

End of transmission

Indicates end of file

Acknowledgement that file was sent

The name of the file is printed after the glider has f

Er
Iric
co

```
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] 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
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] sg0055dz.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
```

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```
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 on the basestation. It does not have a counterpart on the Seaglider. Except for the compass, all of the Seaglider's sensors Fabrication Center. Their calibration numbers can be found in the notebook delivered with the glider, and should be entere recorded when the Seaglider is fully assembled, and the compass is calibrated in the presence of the batteries and other h be checked, and changed if necessary, whenever new sensors are installed, batteries are changed, or other hardware alte

The calib_constants file is also used by various visualization tools (Matlab, GLMPC, etc.) to plot Seaglider data. Incorrect v 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 rejec 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 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;
volmax = 51344;
```

Software limits

Volume, in cc, the glider displaces when fully pumped; see the *Seaglider Pilo* 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 recov (see below). This service is run by the data conversion script, which is invoked by a glider logout or disconnection. L 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 Jones
```

Joe Smith will receive emails to his APL account, and t will not receive messages to his gmail account.

```
jjones@apl.washington.edu,gps,alerts,recov
```

- recov: If the glider goes into recovery, send the most recent G
- alerts: Send an alert when the basestation has a problem converting a
- gps: After every dive, send the most recent GPS position and, if the glider is in

```
#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 specifie processed dive. This can be used for any supported httpd function, and is mainly used to poll for data transfers to support 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 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)
```

- 000000: Date; ddmmyy
- 999999: Time; hhmmss (time zone as kept on basestation)

The baselog_ file is produced by the basestation, and logs the output from the scripts that perform the data conversion anc basestation. It is written during each invocation. This file is the first place to look when debugging problems with the data c 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 timesta

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 cal 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 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 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 provi about a given region of the ocean. The glider may carry up to 999 bathymetry maps (the files are named *bathymap.000*), b These maps are not required for gliders to fly. For more details on how bathymetry maps are used, see the Navigation sec

In addition to bathymetry maps, the glider can carry ice maps which indicate a spatially and temporally varying climatology 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 follow

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

- Optional entry: end date, in decimal yeardays, for period date checking is performed.
- Optional entry: start date, in decimal yeardays, for period of m checking is performed.
- Integer distance between grid points in meters
- Longitude of the lower left corner of the map, specified in decimal degrees
- 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. T

For an ice map the data section contains ice condition values for the time period between the start and end dates at each g stored as 2-bit integers packed sequentially together into sixteen equal length periods spanning the dates between start da are: 0 = always surface, 1 = possibly ice, 2 = probably ice, 3 = always ice. As an example, for a start date = 0.0 and end da 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 nex

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

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 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
```

compass calibration values

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

53.9472 -17.3493 5.8241
```

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 u
the *capvec* and *parse_capvecfile* commands in *Extended PicoDOS Reference Manual* for details on updating the Capture
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 oth
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 th
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 othe
can be included, preceded by a **%**.

SEVEN	**lat=4807.0**	**lon=-12223.0**	**radius=200**
SIX	**lat=4806.0**	**lon=-12222.0**	**radius=200**
FIVE	**lat=4805.0**	**lon=-12221.0**	**radius=200**
FOUR	**lat=4804.0**	**lon=-12220.0**	**radius=200**
KAYAKPT	**lat=4808.0**	**lon=-12223.0**	**radius=100**
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.

Above is a typical version 66 targets file. It has all the fields necessary to direct the Seaglider to targets. There are also thr
as columns in the targets file:

escape=KAYAKPT	**depth=100**	**finish=90**
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	Allows pilot to define the target as a depth.	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

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.

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.

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. C
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.

(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
Reference Manual for information.

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