Piloting Parameters

KONGSBERG

1. PARAMETER CONVENTIONS

1.1. All parameters have a leading $ in their name. This guide uses **boldface** font to denote all parameters, and *italic* font for file names. Most parameters in this manual are provided with nominal values.
Note: Nominal values are not default values. The values for your glider may be different.

1.2. Parameters associated with a dive are reported by Seaglider in the .log file. These include all pilot changeable parameters described in this document. The values generated on board the Seaglider such as glide angle, pitch angle, and desired heading are given parameter-like names with a leading $ for consistent parsing during post-dive data processing.

2. COMMAND FILE (CMDFILE) STATE DIRECTIVES

2.1. The command file (cmdfile) directives control the state of autonomous Seaglider operations. The directives are given as the last (sometimes only) line of the command file. The command file is stored on the basestation and transferred to Seaglider during communication sessions. Directives do not have associated values.

Table-2.1 Directives

Directive	Definition
$GO	This command will cause Seaglider to continue in its current mode of operation. If in an autonomous run, doing repeated dives, it will continue to dive according to its current set of parameters. If a **$GO** command is received while Seaglider is in the recovery state, Seaglider will stay in the recovery state. If **$GO** is received while Seaglider is in the diving state it will continue the dive state. **Note:** error conditions may cause the operating code to change the state of Seaglider from diving to recovery regardless of the directive.
$RESUME	This command will cause Seaglider to resume diving from within the recovery state, using its current set of parameters. If Seaglider is in dive state at the time the **$RESUME** command is received, it will continue diving. If Seaglider is in recovery state at the time it receives a **$RESUME**, it will start diving with existing parameters.
$QUIT	This command will cause Seaglider to go immediately to the recovery state. In recovery, the Seaglider will hold at the surface, sleeping **$T_RSLEEP** minutes between the end of one communication session and the start of the next. There are about two minutes of communication overhead associated with each session, so the sessions are approximately (**$T_RSLEEP+2**) minutes apart.

Replacing the **$QUIT** directive with a **$RESUME** directive will cause Seaglider to initiate a new dive with the existing set of parameters.

2.2. Table 2.2 outlines the effect of each directive on Seaglider in each of the autonomous run states: diving and recovery

Table-2.2 Effect of directive on dive or recovery state

State	Directive		
	$GO	**$RESUME**	**$QUIT**
Diving	Diving	Diving	Recovery
Recovery	Recovery	Diving	Recovery

3. PILOTING PARAMETERS

3.1. Seaglider parameters are modifiable by the pilot via the command file (cmdfile), using the convention **$NAME,value** (Example: **$SM_CC,475**).

Note: There is no space between the comma and the value for the definition of a parameter.

3.2. Table 4.1 lists each parameter alphabetically, defines the parameter, and where appropriate provides nominal, minimum and maximum values.

3.3. Table 5.1 lists the parameters by category and order of frequency of use.

4. ALPHABETIZED PARAMETERS

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$AD7714Ch0Gain *Set by manufacturer. Do not change* The gain assigned to the pressure sensor channel on the AD7714 analog-to-digital converter. The parameter takes three values: 128 for normal Seaglider operations with an installed Paine pressure sensor, 64 for normal Seaglider operations with an installed Druck pressure sensor, 32 for normal Seaglider operations with an installed Kistler pressure sensor, and 1 for bench testing where synthetic voltage is injected in place of the pressure sensor output to simulate diving. If the parameters **$SIM_W** and **$SIM_PITCH** are non-zero, this parameter does not apply.	128, 64, 32, or 1		

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$AH0_10V *Set by manufacturer. Do not change* The capacity of the secondary battery pack (Amp Hr) for a 24V/10V Seaglider system. There is a small safety factor in this number, and its accuracy has been verified in post-recovery depletion testing of Seaglider battery packs. Seagliders with the 24V/10V battery system go into the recovery state if the total secondary (10V) battery pack amp-hours used on a mission equals or exceeds this value. For Seagliders configured with the 15 V shared bus system, when either **$AH0_10V** or **$AH0_24V_**is zero, all of the energy is charged to the other pack. To keep consistency between 15V glider systems, Kongsberg recommends setting **$AH0_10V** to zero and **$AH0_24V** to 350.	10V: 95 15V: 0	1	100
$AH0_24V *Set by manufacturer. Do not change.* The capacity of the main battery pack (Amp Hr) for a 24V/10V Seaglider system. There is a small safety factor in this number, and its accuracy has been verified in post-recovery depletion testing of Seaglider battery packs. Seagliders with the 24V/10V battery system go into the recovery state if the total main battery pack (24 V) amp-hours used on a mission equals or exceeds this value. For Seagliders configured with the 15 V shared bus system, when either **$AH0_10V** or **$AH0_24V** is zero, all of the energy is charged to the other pack. To keep consistency between 15V glider systems, Kongsberg recommends setting **$AH0_24V** to 350 and **$AH0_10V** to 0.	24V: 145 15V: 310	1	150

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$ALT_TEL_NUM The alternate telephone number Seaglider dials to connect to the basestation if it is unable to connect via the primary number, 13 digits maximum. The format for the number is: international country code without leading zeroes (for example, "1" for the US), then city/area code and number. There are no spaces or other interrupting characters between country code, city/area code or number. This parameter is an output from the Seaglider and can be found in each dive's .pvt file. The **$ALT**... mechanism allows for automatic switching between two telephone numbers in the event of a communication failure. If a communication session using the primary phone number (**$TEL_NUM**) does not successfully connect (after **$CALL_TRIES** attempts), the phone number is switched to the alternate number for the next surfacing. If a communication session completes successfully on the alternate phone number, the phone number is switched back to the primary for the next surfacing. **NOTE:** This parameter is not adjustable from the cmdfile. The number is edited using the pdoscmds.bat file or through direct connection to Seaglider using the menus.)			
$ALTIM_BOTTOM_PING_RANGE The range (in meters) from the presumed apogee depth (the nominal depth at which Seaglider begins its apogee maneuver) to ping for the bottom. A value of 0 disables pinging. Only one attempt is made to sound for the bottom, unlike **$ALTIM_PING_DEPTH** which will ping once every **$ALTIM_PING_DELTA** meters until it successfully detects the bottom, or apogee is triggered by another means.	0	0	500
$ALTIM_BOTTOM_TURN_MARGIN The distance (in meters) from the altimeter detected sea floor (or obstacle) at which to initiate the apogee maneuver (bottom turn). A value of 0 disables the use of the altimeter to determine the start of the apogee maneuver.	12	0	100
$ALTIM_FREQUENCY Frequency (kHz) to use for altimeter pings. 13kHz is the most acoustically (and energy) efficient frequency for this transducer. However, if another sensor on the Seaglider operates at this frequency, the altimeter frequency should be changed to another value within its operational range.	13	10	25

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$ALTIM_PING_DELTA If the altimeter does not receive a successful return and confirmation ping return at **$ALTIM_PING_DEPTH**, it continues to issue pings at depth intervals of **$ALTIM_PING_DELTA** meters until it does receive a successful return and confirmation ping or apogee is triggered by another means.	5	0	1000
$ALTIM_PING_DEPTH The depth of the first altimeter ping (meters), if non-zero. If the altimeter gets a return, and a return to an immediate second confirmation ping, it sets the bottom depth equal to the current depth plus the altimeter range to the bottom. The apogee maneuver is initiated at **$ALTIM_BOTTOM_TURN_MARGIN** meters above the bottom. If **$ALTIM_BOTTOM_TURN_MARGIN** = 0, the apogee maneuver is triggered by **$USE_BATHY** if activated, or **$D_TGT**. If **$ALTIM_PING_DEPTH** is non- zero, the altimeter timeout is set so that the maximum range is the larger of 0.75***$ALTIM_PING_DEPTH** and 1.2* **$ALTIM_TOP_PING_RANGE** if set. The first test is meant to exclude surface returns. **NOTE**: **$ALTIM_PING_DEPTH** and **$ALTIM_BOTTOM_PING_RANGE** modes are mutually exclusive. If **$ALTIM_BOTTOM_PING_RANGE** is set, it is honored to the exclusion of **$ALTIM_BOTTOM_PING_DEPTH.**	80	0	1000

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$ALTIM_PULSE Pulse width (ms) of altimeter pings. This parameter is used in conjunction with **$ALTIM_SENSITIVITY** to tune the altimeter. Parameter Value — Pulse Width (ms) 1 — 1 2 — 2 3 — 3 4 — 4 5 — 5 6 — 6 7 — 7 8 — 8 9 — 9 If the altimeter is receiving false hits, the values of **$ALTIM_PULSE** and **$ALTIM_SENSITIVITY** should be increased incrementally. If the altimeter is unable to find the bottom, the values of **$ALTIM_PULSE** and **$ALTIM_SENSITIVITY** should be decreased incrementally. Tuning is often best achieved by alternately adjusting **$ALTIM_PULSE** and **$ALTIM_SENSITIVITY** by one unit until the altimeter returns realistic depth values.	3	1	9
$ALTIM_SENSITIVITY Sensitivity (volts) of the altimeter envelope detector. A value of 0 disables the envelope detector, causing the altimeter to trigger on any return of the receive frequency. Values between 1 and 5 require that the return signal sustain the specified voltage for the duration of the pulse width (**$ALTIM_PULSE**) before a triggering is received. Sensitivity — DC Level 0 — Altimeter circuitry not used 1 — 0.25 V 2 — 0.5 V 3 — 1.0 V 4 — 2.0 V 5 — 4.0 V This parameter is used in conjunction with **$ALTIM_PULSE** to tune an altimeter. If the altimeter is receiving false hits, the values of **$ALTIM_PULSE** and **$ALTIM_SENSITIVITY** should be increased incrementally. If the altimeter is unable to find the bottom, the values of **$ALTIM_PULSE** and **$ALTIM_SENSITIVITY** should be decreased incrementally. Tuning is often best achieved by alternately adjusting **$ALTIM_PULSE** and **$ALTIM_SENSITIVITY** by one unit until the altimeter returns realistic depth values.	2	0	5

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$ALTIM_TOP_MIN_OBSTACLE Minimum obstacle depth (in meters) to honor initiating a subsurface finish.	1	0	100
$ALTIM_TOP_PING_RANGE Depth (meters) to ping the altimeter. A value of 0 disables a ping.	0	0	500
$ALTIM_TOP_TURN_MARGIN Distance (meters) from an altimeter detected obstacle to initiate the sub-surface finish. A value of 0 disables the use of the altimeter to determine the start of the sub-surface finish.	0	0	100
$APOGEE_PITCH The pitch angle the glider transitions to when it observes a depth greater than the apogee depth **($D_TGT**, **$D_GRID** or a bottom detection from the altimeter). During this first stage of the apogee maneuver the Seaglider also rolls to neutral and pumps the VBD to 0 cc (neutral buoyancy). In the second stage of apogee, the pitch angle changes from **$APOGEE_PITCH** to the inverse of the dive angle, the VBD is pumped to the inverse of the amount of oil bled during the dive and the Seaglider begins its ascent.	-5	-20	0
$C_PITCH The center (neutral or flat) position (A/D counts) for pitch. Obtain the initial value from the Seaglider's trim sheet (cal tab) and adjust as needed during the deployment.	2700		
$C_ROLL_CLIMB The center (neutral or straight flight) position (A/D counts) for roll during the climb (positive pitch control) phase. Obtain the initial value from the Seaglider's trim sheet (cal tab) and adjust as needed during the deployment. **NOTE**: The climb and dive roll centers are different due to roll biases induced by physical asymmetries in Seaglider.	2025		
$C_ROLL_DIVE The center (neutral or straight flight) position (A/D counts) for roll during the dive phase (negative pitch control). Obtain the initial value from the Seaglider's trim sheet (cal tab) and adjust as needed during the deployment. **NOTE**: The climb and dive roll centers are different due to roll biases induced by physical asymmetries in Seaglider.	2025		

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$C_VBD The center (neutrally buoyant at a specified density) position (A/D counts) for VBD. Obtain the initial value from the Seaglider's trim sheet (cal tab) and adjust as needed during the deployment.	2900		
$CALL_NDIVES The number of profiles (dive/climb cycles) to perform before attempting communications. Seaglider normally surfaces after each profile. GPS fixes 1 and 2 are obtained at the surface, independent of the value of **$CALL_NDIVES.** **Caution:** If **$CALL_NDIVES** > 1 is used in conjunction with **$N_NOSURFACE** >= |2|, care must be taken to ensure that Iridium calls made by the Seaglider coincide with the glider completing a surface finish. Otherwise, the glider will not be heard from until it enters recovery state due to $N_DIVES or low battery **($MINV_10V** or **$MINV_24V**).	1	1	10
$CALL_TRIES The maximum number of phone calls to attempt between profiles. If the Seaglider is unable to make a call after **$CALL_TRIES**, it resumes diving and the phone number is switched to **$ALT_TEL_NUM** for the next surfacing.	5	1	20
$CALL_WAIT The time (seconds) between call attempts during a communications session. This wait interval provides time to allow the Iridium satellite geometry to change and perhaps improve the connection.	60	0	600
$CAPMAXSIZE Maximum sizes (bytes) prior to compression of the capture file to upload via Iridium. If the capture file exceeds this value, Seaglider creates a new capture file that is of the size requested, per the following strategy: If there are no critical lines of output, the first **$CAPMAXSIZE** bytes are sent. If there are critical lines of output, the new capture file consists of the first 20 lines of the critical output, with a window of output lines surrounding each critical line. Capture files are sent to the basestation automatically in the cases of critical output or the completion of a Self Test, or as requested by **$CAPUPLOAD**.	100000	1024	400000

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$CAPUPLOAD A Boolean value that determines if the capture file from the current dive should be uploaded to the basestation. 0 - do not upload the capture file. 1 - upload the capture file. ⚠ **Warning:** If a critical error occurs during a dive, the Seaglider will override a **$CAPUPLOAD** setting of 0 and force an upload of the capture file per the description in **$CAPMAXSIZE**. **NOTE:** Turn **$CAPUPLOAD** off while the Seaglider is under normal operation to conserve energy and reduce surface time and Iridium charges.	1	0	1
$CF8_MAXERRORS *Set by manufacturer. Do not change.* The maximum (integer) number of Compact Flash (CF8) errors allowed before Seaglider goes into recovery state. A CF8 error is counted against the **$CF8_MAXERRORS** limit when a CF8 open or write call continues to fail (returns an error code) after three retries.	20	0	500
COMM_SEQ Defines the sequence of file transfer. A value of zero indicates the standard communication file transfer sequence: command (*cmdfile*), *targets*, *science*, current dive .log and .dat files, current .cap file if $CAPUPLOAD = 1, earlier un-transferred .log and .dat files, earlier un-transferred .cap files if $CAPUPLOAD = 1, pdoscmds.bat, sgdddd.pz.nnn (the results of the pdoscmds.bat commands), and any other files as commanded in *pdoscmds.bat*. A value of 1 indicates skipping the normal data file transmissions and going directly to *pdoscmds.bat* after the cmdfile, targets, science have been sent , so the sequence for file transfers becomes command (*cmdfile*), *targets*, *science*, *pdoscmds.bat*, sgdddd.pz.nnn and any other files as commanded in *pdoscmds.bat*. This was implemented as a way to quickly get the *pdoscmds.bat* file transferred to the Seaglider. It is a control mode to be used only when communications or other Seaglider problems exist.	0	0	2

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$COMPASS_DEVICE *Set by manufacturer. Do not change.* Configuration flag (integer) specifying the model and port for the compass and transponder/altimeter devices. This integer value is equal to (port_number + 16*type_number). For example, for a TCM2-50 (type **0**) on general purpose port 1, **$COMPASS_DEVICE** = 1 + 16*0 = 1. The array of available models is specific to each device. The compass device must be defined. This parameter cannot be -1. For transponders not connected to a serial port (for example, Benthos ENT- 380), the null port (0) can be specified.	33		
$COMPASS2_DEVICE *Set by manufacturer. Do not change.* **This feature is not available on Kongsberg Seagliders.** Defines the second compass, as in **$COMPASS_DEVICE**. -1 means the device is not installed.	-1		
$COMPASS_USE During Seaglider development this parameter was used to assess compass problems. It allows manipulation of inputs and outputs in compass calibration and reporting. For normal operations, use 0 for calibrated values from the compass. $COMPASS_USE allows for faking input and outputs in compass calibration and reporting. The value is bitmapped as follows: **Bit 0 Heading source:** 0 = calibrated magnetic field w/PR corrections 1 = direct from compass (effectively ignores PR bits) **Bit 1 Autocalibration mode (experimental):** 0 = no autocalibration 1 = leave compass on throughout flight and run autocalibration **Bit 2 Offboard cal mode (experimental):** 0 = do not report mag values in data file 1 = report mag values in data file for use in off board cal **Bits 3-4 pitch source for heading correction:** 0 = calibrated from sensor inputs per normal routine 1 = use value direct from compass 2 = calculate based on pitch mass position and gain	0	0	4045

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
Bits 5-6 roll source for heading correction 0 = calibrated from sensor inputs per normal routine 1 = use value direct from compass 2 = calculate based on pitch mass position and gain **Bits 7-8 pitch to report in data stream** 0 = calibrated from sensor inputs per normal routine 1 = use value direct from compass 2 = calculate based on pitch mass position and gain **Bits 9-10 roll to report in data stream** 0 = calibrated from sensor inputs per normal routine 1 = use value direct from compass 2 = calculate based on pitch mass position and gain **Bit 11 which compass device to use** 0 = COMPASS_DEVICE 1 = COMPASS2_DEVICE A value of 40 (0x28) will calculate a pitch and roll from control positions for use in the heading calibration but will report calibrated pitch and roll in the data stream. A value of 680 (40 + 640) will use the control position calculated attitudes for reporting as well.			
$COURSE_BIAS A heading bias (degrees) to compensate for an observed tendency of Seaglider to veer to one side. This value is subtracted from the desired heading to produce the target heading.	0	-360	360
$CURRENT An output from Seaglider of depth averaged current (m/s, degrees, Boolean validity check) calculated by the glider when **$NAV_MODE,2** is used. For example, an output of **$CURRENT**,0.035, 283.8,1 means the Seaglider calculated a depth averaged current of 3.5 cm/s at 283.8 degrees east of north and it judged the calculation to be valid.			
$D_ABORT The maximum depth (meters) for Seaglider operations. If this depth is reached, the dive is aborted and Seaglider immediately enters the recovery state.	1020	0	1020

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$D_BOOST A VBD system parameter to define the depth (meters) above which only the boost pump will run. **$D_BOOST** is set based on the pump characteristics of the VBD system. The nominal values listed represent the most efficient use for the Standard Boost Pump (SBP) and the High Pressure Boost Pump (HPBP). The maximum values are hardware limits set at the factory and may not be exceeded. Doing so can mean loss of your glider. If **$D_BOOST**=0, both the boost pump and the main pump run simultaneously at all depths. If Seaglider VBD starts pumping at a depth greater than **$D_BOOST**, both pumps are used. Both the boost and main pumps are used following a retry. **NOTE**: The standard boost pump is not capable of pumping oil by itself below 5 m depth. The high pressure boost pump is not capable of pumping oil by itself at depths greater than 120 m.	SBP: 5 HPBP: 120	0 0	5 120
$D_CALL A depth (meters) above which the glider will initiate the GPS acquisition and Iridium phone call portion of the surface maneuver. If this depth is not reached, a subsurface finish is executed A value of 0 means the glider initiates the GPS acquisition and Iridium phone call at the surface.	0	0	5
$D_FINISH The depth (meters) at which a dive is considered completed. Normally, this is 0, but can be a number greater than zero to specify the depth at which subsurface finish maneuvers should be started. Used only when an additional trigger to initiate a subsurface finish is present (see **$N_NOSURFACE**). **NOTE**: If a subsurface finish has been triggered by **$N_NOSURFACE** and **$D_FINISH >=$D_SURF**, the dive will complete a subsurface finish. However, if a subsurface finish has been triggered by **$N_NOSURFACE** and **$D_FINISH < $D_SURF**, the dive will finish at the surface.	0	0	1000

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$D_FLARE The depth (meters) at which Seaglider flares to the target pitch angle. The guidance and control (G&C) action at the start of the dive phase maintains full pitch forward as VBD bleeding takes place. As soon as Seaglider reaches **$D_FLARE**, a new G&C action is initiated. Pitch is adjusted first (the flare), then VBD is adjusted (bleed to the target VBD as necessary), and finally roll is actuated to turn Seaglider to the correct heading.	3	0	50
$D_NO_BLEED The depth (meters) below which Seaglider will not bleed (move) oil from the bladder into the internal reservoir on dives. This parameter also defines the depth at which the **$T_NO_W** parameter takes effect. ⚠ **Caution:** Do not exceed the specified maximum value. Opening the bleed valve when at pressure can cause it to stick in the open position.	200	10	500
$D_OFFGRID The depth (meters) that the bathymetry map look-up routine returns in the event that the Seaglider is outside the area covered by loaded bathymetry map/s. This parameter is used with **$USE_BATHY**.	100	10	1000
$D_PITCH Depth (meters) to initiate a surface pitch maneuver. If a depth shallower than this value is not reached, then a subsurface maneuver is executed. A value of 0 means the surface pitch maneuver is executed at the surface.	0	0	5
$D_SAFE The target depth (meters) to use when flying an escape route and limiting the dive depth for VBD safety reasons. The escape is triggered by either VBD max errors exceeded or uncommanded bleed. If set to 0, the parameter is disabled.	0	0	990

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$D_SURF The depth (meters) at which Seaglider begins its approach to the surface. In order to collect data all the way to the surface, at **$D_SURF** Seaglider computes how many more data samples to take, based on the observed vehicle vertical speed, depth, and the data sample interval. The number of additional points is limited to 50. Seaglider then goes into passive guidance and control (G&C) mode and collects that number of data points at the appropriate sample interval for the depth range. When complete, Seaglider enters the surface phase. **NOTE**: This approach occasionally results in the last few data samples being taken when the conductivity sensor is actually in air, giving unrealistic conductivity values. These samples can be removed in shore-side processing.	3	0.5	10
$D_TGT The nominal depth (meters) at which Seaglider begins the apogee phase, the transition from the negatively buoyant, pitch down dive to positively buoyant, pitch up climb. This parameter is used in conjunction with **$T_DIVE** to determine the target vertical velocity for the dive and climb. The actual depth of the apogee maneuver starting point may be triggered by one of three means: **$D_TGT**, reading a digital bathymetric map (**$D_GRID**), or using the altimeter. If more than one depth trigger is in use, the apogee maneuver begins when the depth exceeds that of the shallowest depth returned by the activated trigger(s). In any case, the vertical velocity specified by the combination of **$D_TGT** and **$T_DIVE** is retained by appropriate scaling of **$T_DIVE**.	30	1	990
$DBDW Overrides the hydro model calculated derivative of buoyancy with respect to w (vertical speed) used as a gain term in adjusting buoyancy to achieve the desired vertical speed. If the parameter is zero, then the on-board calculated value is used. Units are grams per m/s. Typical on-board calculated values are 2000-4000.	0	0	1000

Caution: Do not exceed the specified maximum value. The glider continues its descent during apogee until enough oil has been pumped into the bladder to make it neutrally buoyant. The pumping process takes several minutes. Setting **$D_TGT** to 990 allows the glider to descend several meters during the pumping activity without running the risk of exceeding the 1000m depth rating.

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$DEEPGLIDER *Set by manufacturer. Do not change.* Indicates whether the glider is a standard Seaglider or a Deepglider. A zero indicates the glider is standard; 1 indicates the glider is a Deepglider. **NOTE**: All Seagliders produced by Kongsberg Underwater Technology Inc. are standard gliders with a maximum depth capability of 1000 m.	0	0	1
$DEEPGLIDERMB *Set by manufacturer. Do not change.* A Boolean value that indicates whether the main board is intended for use in Deepglider. A zero indicates the motherboard is intended for a standard glider; 1 indicates the motherboard is intended for a Deepglider. **NOTE**: All Seagliders produced by Kongsberg Underwater Technology Inc. are standard gliders with a maximum depth capability of 1000 m.	0	0	1
$DEVICE[1/2/3/4/5/6] *Set by manufacturer. Do not change.* Configuration flags specifying device type and port for each of the six possible attached science sensors. Empty device slots are indicated with a parameter value of -1. Non-negative integer entries indicate that a device is attached. The encoding is specific to the version of the Seaglider software. These entries are set through the Seaglider menu system at Kongsberg.		-1	1024

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$DIVE The number of the next dive. **Note:** The dive number is updated to this value immediately after the *cmdfile* is picked up by the glider. This means that the dive number for the just completed dive (data not yet transferred) will be updated to this new value. For example: The glider is underwater collecting data on dive number 7. At the completion of dive 7 the glider obtains a GPS position and initiates a call to the basestation. The glider picks up the *cmdfile* waiting for it on the basestation. In the *cmdfile* is the parameter **$DIVE,12**. The glider immediately changes the number of the just completed dive from 7 to 12. The dive data is then downloaded with the processed file name pxxx0012.y not pxxx0007.y. At the completion of the data download, the glider obtains another GPS position and begins dive 13. After the *cmdfile* with this parameter has been picked up by the glider (glider has started the next dive), the parameter should be deleted from the cmdfile unless further manipulation of dive numbers is desired. If **$DIVE,12** is left in the *cmdfile*, at the next surfacing the data collected on dive 13 will be renamed to dive 12 and overwrite the previous dive 12 data. If **$DIVE** is not listed in the *cmdfile*, the dive number will automatically increment by 1 at the start of a dive and the data from that dive will retain that dive number.	1	0	9999
$ES_PROFILE An echosounder command that specifies when the sensor will record data: never, downcast only, upcast only or both down- and upcast. 0 = never 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed echosounder.	3	0	3

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$ES_RECORDABOVE An echosounder command that sets the depth (meters) to which the passive acoustics sensor will begin sampling. A positive value indicates the glider will sample above this depth. A negative value indicates the glider will sample below this depth. A value of 0 turns the sensor off. **Note:** This parameter is only present in the log files of gliders with an installed echosounder.	1000	0	1000
$ES_STARTS A diagnostic value output by the GPCTD, that keeps track of the number of times the sensor restarts during a mission. There should be two restarts per dive: one for the downcast and one for the upcast. **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.			
$ES_XMITPROFILE An echosounder command that specifies which passive acoustic data snippets are transmitted to the basestation: none, downcast only, upcast only or both down- and upcast. 0 = none 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed echosounder. Note: Since transferring an entire acoustic data file is impractical, Seaglider will send a 'snippet' of data to assist in validating that the echosounder hardware is operating correctly and recording valid data. The data is taken from the first acoustic data file for the descent or ascent (the acoustic data file with sequence number 1). At the start of a mission you may want to enable snippets briefly to ensure that audio collection is working. After receiving a snippet or two you can then turn snippets off by setting **$ES_XMITPROFILE,0**.	3	0	3
$ESCAPE_HEADING This feature is not available on Kongsberg manufactured Seagliders. The base heading the Seaglider steers in an escape recovery situation when either no position fix is available or no escape target was supplied in the *targets* file.	0	0	360

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$ESCAPE_HEADING_DELTA This feature is not available on Kongsberg manufactured Seagliders. An offset, determined by the pilot, that is added or subtracted from **$ESCAPE_HEADING** to achieve the actual heading steered by Seaglider in an escape recovery situation. The **$ESCAPE_HEADING_DELTA** sign will switch (and thus the heading will toggle) when the bottom depth (as detected by altimetry or **$T_NO_W**) shallows by 5% relative to the depth at the last toggle.	10	0	360
$FERRY_MAX Maximum correction (degrees) to apply to the rhumb line to the active (next) waypoint when **$NAV_MODE =** 2. This is a safety limit to prevent spurious depth-averaged current calculations from providing Seaglider a heading in the wrong direction.	45	0	90
$FG_AHR_10V *Set by manufacturer. Do not change.* Does not apply to Rev B mainboards which are installed in all Kongsberg Seagliders.	0		
$FG_AHR_24V *Set by manufacturer. Do not change.* Does not apply to Rev B mainboards which are installed in all Kongsberg Seagliders.	0		
$FILEMGR *Set by manufacturer. Do not change.* An integer parameter for on-board file system management. 0 = No file management 1 = Only store compressed files 2 = Delete splits on failed phone call	0	0	2
$FIX_MISSING_TIMEOUT Time in days to tolerate a lack of any valid navigation fix (GPS, RAFOS, Iridium geolocation) before triggering recovery. 0 disables this feature.	0	0	365
$GLIDE_SLOPE The absolute value of the maximum glide slope (degrees) that may be commanded. The glide slope is calculated on-board Seaglider to best achieve the goals of the next dive. The stall angle provides the lower limit; this parameter is the upper limit.	30	10	90

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$GPS_DEVICE *Set by manufacturer. Do not change.* A configuration value specifying the model of the attached GPS device. A GPS device must be defined; a value of -1 is not permitted. These devices have dedicated hardware ports on all motherboard revisions and as such a port specification is not necessary.	32	0	1023
$HD_A The hydrodynamic parameter representing the lift coefficient determined empirically and used in Seaglider's on-board performance prediction and guidance calculations.	0.003836	0.001	0.007
$HD_B The hydrodynamic parameter representing the drag coefficient determined empirically and used in Seaglider's on-board performance prediction and guidance calculations.	0.010078	0.004	0.02
$HD_C The hydrodynamic parameter representing the induced drag coefficient determined empirically and used in Seaglider's on-board performance prediction and guidance calculations	9.85E-06	1.0E-06	3.0E-05
$HEAD_ERRBAND Deadband for heading (degrees). This value is used to determine if a correction to heading is required during an active guidance and control (G&C) mode. If the absolute value of the difference between the actual heading and the desired heading is less than or equal to **$HEAD_ERRBAND**, no heading correction is made. If the difference is greater than **$HEAD_ERRBAND**, a turn is performed until the desired heading is passed, or until the amount of time **$T_TURN** has elapsed.	10	0	180

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$HEADING A floating point value between -1.0 and 360.0 (true degrees, 0.0 and 360.0 are equivalent values) used in conjunction with the **$NAV_MODE** parameter to determine the course steered by the Seaglider. If **$NAV_MODE** is 0, 1, or 2 and the value of **$HEADING** is between 0.0 and 360.0, the glider will use this value to synthesize a waypoint 20 km distant on the specified bearing from the current location. If **$NAV_MODE** is 3, **$HEADING** is added to the depth-averaged current calculated for the previous dive, to generate a current corrected heading for the present dive that is the specified amount to the right of the current. Note: If **$HEADING** = -1, the Seaglider will navigate using the *targets* file. If **$HEADING** does not equal -1 and a *targets* file is present, the value in **$HEADING** will take precedence.	-1	-1	360
$HEAPDBG *Set by manufacturer. Do not change.* A Boolean value set during fabrication that toggles extended heap debugging. When set to 1, the glider maintained heap is checked for integrity before each memory allocation and free operation. 0 disables this checking. **NOTE**: Due to extensive output, it is not recommended that this parameter be used in conjunction with a DEBUG level output on the SGLMALLOC service during field operations.	0	0	1
$ICE_FREEZE_MARGIN *Set by manufacturer. Do not change.* This feature is not available on Kongsberg manufactured Seagliders. Temperature margin (°C) to apply to the freezing point calculation, weighted by the ice condition for surfacing decisions. For in situ freezing point Tf and temperature T, the glider will only surface if: $T > Tf + (\$\mathbf{ICE\_FREEZE\_MARGIN})(ic - 1)$ Where: ic is the ice condition defined by the ice map and parameter **$USE_ICE**.	.3	-2	2
$ID *Set by manufacturer. Do not change.* Seaglider identification (serial) number. Leading zeroes are not required. This identification number is used in many ways, including creating Seaglider's login on the basestation, in file naming conventions and as a serial number for manufacturing purposes.		0	999

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$INT_PRESSURE_SLOPE *Set by manufacturer. Do not change.* The slope calibration of the internal pressure sensor (psia per A/D count). The sensor has an operation range of 0 to 30 psia, with a 90 mV output at full-scale, at 12V excitation. The output is proportional to the supply. The Seaglider excitation is 4.096 V and the gain is 100; therefore: 30 psia = 90*4.096/ 12*100*1. Fullscale = 90*4.096*gain*counts/mV. The nominal slope is 0.009766 psia per A/D count.	0.009766	0.001	1
$INT_PRESSURE_YINT *Set by manufacturer. Do not change.* The y-intercept of the linear calibration of the internal pressure sensor.	0	-5	5
$KALMAN_USE A bitmask that defines the control parameter for the run state of the Kalman filter navigation program. The **$NAV_MODE** parameter controls whether the Kalman filter output heading is used to control Seaglider. If $NAV_MODE,1 then the Kalman filter output heading is used. If $NAV_MODE,0, 2 or 3 then the Kalman filter output heading is not used. This separation of functions allows the Kalman filter to be run, but not used, while it "learns" the currents. Bits 0 and 1 together indicate the command mode of the filter and control its operation while bits 2 and 3 control whether to employ (0) or disable (1) the diurnal and semidiurnal components of the model, respectively. The complete bitmask is described below. 0 = Reset the Kalman state vector and origin of local Kalman coordinate system to 0 and restart the filter. 1 = Run the Kalman filter 2 = Do not run the Kalman filter 4 = Reset the Kalman state vector and origin of local Kalman coordinate system to 0, disable diurnal component of the model and restart the filter 5 = Run the Kalman filter with the diurnal component of the model disabled 6 = Do not run the Kalman filter 8 = Reset the Kalman state vector and origin of local Kalman coordinate system to 0, disable semi-diurnal component of	2	0	2

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
the model and restart the filter 9 = Run the Kalman filter with the semi-diurnal component of the model disabled 10 = Do not run the Kalman filter 12 = Reset the Kalman state vector and origin of local Kalman coordinate system to 0, disable the diurnal and semi-diurnal components of the model and restart the filter 13 = Run the Kalman filter with the diurnal and semi-diurnal components of the model disabled 14 = Do not run the Kalman filter**Examples** If **$KALMAN_USE** is 0 or 1, and **$NAV_MODE** is 1, the **$KALMAN_USE** filter results are used to determine the Seaglider heading. If **$KALMAN_USE** is 2 and **$NAV_MODE** is 1, Seaglider acts as though **$NAV_MODE,0** and flies, using either **$HEADING** or *targets,* without attempting to make any corrections for currents.			
$KERMIT *Set by manufacturer. Do not change.* **The Kermit file transfer method is not available on Kongsberg Seagliders.**	0		
$LOGGERS A bit mask to define which Autonomous Logger Interface (ALI) devices to enable or disable. When **$LOGGERS** is set to 0, no ALI devices run during self tests, simulation dives or regular dives. When **$LOGGERS** > 0, the installed ALI sensors are turned on according to the following bitmask. An X means the ALI sensor is running.	7	0	15

$LOGGER, value	Sensor 1	Sensor 2
0		
1	X	
2		X
3	X	X

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$LOGGERDEVICE[1/2/3/4/5/6] *Set by manufacturer. Do not change.* Configuration flags specifying the logger device on each port. Empty device slots are indicated with a parameter value of -1. Non-negative integer entries indicate that a device is attached. The encoding is specific to the version of the Seaglider software. These entries are set through the Seaglider menu system at Kongsberg.	-1	-1	1024
$MASS The mass of Seaglider in grams. This value is glider specific and can be found on the trim sheet (Weight Sheet tab, location H1). It is used in on-board buoyancy and current estimation calculations.	52000	50000	54000
$MASS_COMP *Set by manufacturer. Do not change.* **This feature is not available on Kongsberg Seagliders.**	0	0	80000
$MAX_BUOY The absolute value of the maximum negative buoyancy (cc) that Seaglider is allowed to develop during the dive phase. There is no restriction on positive buoyancy during the climb phase.	150	0	600
$MINV_10V The minimum allowable observed voltage on the secondary battery pack. At this voltage the glider will stop diving and go into recovery. A zero disables the check. **Caution:** Reducing this number could result in the loss of a Seaglider.	10/24 V: 8.2 15V: 11.5		
$MINV_24V The minimum allowable observed voltage on the main battery pack. At this voltage the glider will stop diving and go into recovery. A zero disables the check. **Caution:** Reducing this number could result in the loss of a Seaglider.	10/24 V: 19 15V: 11.5		
$MISSION The current Seaglider mission number. This value is intended to be unique for each deployment of a particular Seaglider and is reported back in data files to distinguish data from each mission.	0	0	999
$MOTHERBOARD *Set by manufacturer. Do not change.* An integer value indicating the motherboard revision carried by Seaglider.	4		

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$N_DIVES The number of dives to complete before entering recovery state. A value of zero (default) means dive until stopped by the pilot command (**$QUIT**) or some other recovery condition.	0	0	999
$N_FILEKB An integer value representing the size (kilobytes) and type (gzip compressed or uncompressed) of file used for data uploading. Positive values direct Seaglider to gzip compress the data file, then split it into **$N_FILEKB**-sized pieces. Negative values disable the gzip compression. The binary data file is split into **$N_FILEKB**-sized pieces before transmission. A value of 0 means no splitting or compression is performed.	4	-16	16
$N_GPS The maximum number of seconds to wait after the first GPS fix is received for a GPS fix with HDOP less than 2.0. If no such fix is acquired, the most recent GPS fix is used. The software assumes the last fix is the most accurate fix.	20	1	60
$N_NOCOMM The number of dives that are allowed to occur without a complete and successful data communication session before actions are taken to improve communications, enter recovery state, or navigate to a rescue position according to the value of **$NOCOMM_ACTION**. The default (and traditional) behavior with a value for **$NOCOMM_ACTION** of 0 is for the surface buoyancy parameter **$SM_CC** to be set to the maximum allowed by the software limit of **$VBD_MIN**. This is a safety provision in the event **$SM_CC** is not sufficient to fully expose the antenna above the surface. A value of 0 disables this function.	1	0	10

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$N_NOSURFACE	0	-20	20
An integer value that determines when the Seaglider will finish at dive depth **$D_FINISH** (subsurface dives**)** and when it will finish at the actual surface. When **$N_NOSURFACE** is greater than 1, the glider will finish the profile at depth **$D_FINISH** when the remainder of **$DIVE/$N_NOSURFACE** = 0 and at the surface for non-zero remainders. For example, if **$DIVE** = 8 and **$N_NOSURFACE** = 4, the glider will complete the dive at **$D_FINISH**. If **$DIVE** = 5, 6 or 7 and **$N_NOSURFACE** = 4 the glider will complete the dive at the surface. When **$N_NOSURFACE** is less than -1, the logic is reversed. The Seaglider will finish the profile at the surface when the remainder of **$DIVE / $N_NOSURFACE** = 0 and at **$D_FINISH** when the remainder is non-zero. **NOTE: $D_FINISH** must be greater than or equal to **$D_SURF** for Seaglider to complete a subsurface finish. If **$D_FINISH** < **$D_SURF**, the Seaglider will always surface. **NOTE: $N_NOSURFACE** values of 1 and -1 are invalid. A value of 0 disables this behavior. **NOTE**: The glider only acquires a GPS fix and calls the basestation at the surface. Subsurface dive data is transmitted the next time the dive surfaces. Due to the infrequent GPS updates**,** current correction should not be turned on for dives using N_NOSURFACE. This can be accomplished by: 1) Setting **$NAV_MODE,0** and **$HEADING** to desired value greater than -1 or 2) Setting **$NAV_MODE,1**; **$KALMAN_USE,2**; **$HEADING,-1** and flying to a waypoint using the *targets* file **Caution:** If **$N_NOSURFACE** > 1 is used in conjunction with **$CALL_NDIVES** > 1, care must be taken to ensure that Iridium calls made by the glider coincide with at least some of the Seaglider's surface finishes. Otherwise, the glider will not be heard from until it reaches **$N_DIVES** or it goes into recovery state due to low battery **($MINV_10V** or **$MINV_24V**).			
$NAV_MODE	2	0	3
An integer specifying the method used to generate the heading for the next dive. The methods are defined by the following values: **0 = Steer constant heading** by: a. setting **$HEADING** to desired value between 0 and 360. Seaglider will synthesize a waypoint 20 km away in the direction of **$HEADING** and steer to that waypoint. No current correction is done. b. Setting **$HEADING** to -1 and using the targets file. If the target is greater than 20 km away from the glider, the glider			

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
will synthesize a waypoint 20 km away in the direction of the target. No current correction is done. Note: If **$HEADING** is not set to -1, it determines the direction the glider will travel regardless of what is in the *targets* file. **1 = Use Kalman filter:** The mode is most often used in tidally dominated environments (mean, diurnal and semi-diurnal components). Seaglider uses past current information gathered by the Kalman filter to correct the flight path for the next dive. Seaglider can use either waypoint (*targets* file) or heading (**$HEADING**) navigation with this mode. **$KALMAN_USE** must be set to 1. If the user sets **$NAV_MODE,1** and **$KALMAN_USE,2** the glider will fly a constant heading (using input from either **$HEADING** or the targets file) with no current correction. See **$KALMAN_USE** for more information on Kalman filter options. **2 = Ferry angle correction with respect to calculated depth-averaged current:** This mode is most often used in non-tidally dominated constant current environments. Seaglider uses the depth averaged current (DAC) information from the previous dive to calculate a ferry angle correction for the upcoming dive. The ferry angle correction is applied to the **$HEADING** or waypoint (*targets* file) value to obtain the corrected bearing to target. To prevent spurious depth-averaged current calculations from giving Seaglider a heading in the wrong direction, the maximum value for the ferry angle correction is governed by **$FERRY_MAX**. In addition, in **$NAV_MODE,2 $SPEED_FACTOR** is applied to the target speed limits to account for the fact that the Seaglider will not achieve its ideal speed over the entire dive. Set corrections are iteratively calculated as a function of the horizontal speed through the water so that the Seaglider's travel toward the target is optimized (just as we chose our slope above). At each speed setting the code uses a nonlinear solver to calculate the ferry angle. Each iteration starts with predicted speed = to the maximum glider speed. If the predicted distance over ground (DOG) with the set correction is less than the range to target (typical case) the computation is complete. If not, the predicted speed is set to the minimum glider speed and if the DOG is greater than the range to the target, the speed is accepted. If neither limit applies, iteration is done via bisection to settle on the best speed. At convergence, Seaglider has a ferry angle to steer and a horizontal speed to apply. The predicted horizontal speed is used to calculate a new value for the glide slope. **Note:** If a good DAC is not obtained during the previous dive (a flag			

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
will be reported in place of the DAC value in the .log file of the previous dive), the glider will revert to **$NAV_MODE,0** and head to the target with no correction for current. The change to the **$NAV_MODE** is not reflected in the parameter listing in the .log file of the present dive. **3 = Steer relative to the depth-averaged current** The Seaglider steers **$HEADING** direction with respect to the previous dive's DAC (calculated heading = DAC direction + bearing from **$HEADING)**. This mode does not use the *targets* file.			
$NOCOMM_ACTION A bitmask parameter to control the behavior after **$N_NOCOMM** dives have finished without successful communication with the basestation. The parameter is a logical OR of the bits described below: **Bit 0: pump to max behavior:** 0 = Pump to maximum vehicle buoyancy (defined by **$VBD_MIN**) after **$N_NOCOMM** dives. 1 = Pump to maximum vehicle buoyancy after 1 dive with no communication. This setting allows the value of **$N_NOCOMM** to be greater than 1 while still getting the typical behavior of pumping to maximum buoyancy after a single dive with failed communications The remaining behaviors defined by **$NOCOMM_ACTION** only take effect when **$N_NOCOMM** dives occur without communication. **Bit 1: recovery:** 0 = Use behavior defined by other **$NOCOMM_ACTION** bits. 1 = Seaglider enters recovery state after **$N_NOCOMM** dives without communications. This bit takes precedence over any values in bits 2-4. **Bit 2, EPIRB mode:** 0 = Do not use EPIRB mode. 1 = Seaglider will loiter at the surface in low power sleep mode for **$T_EPRIB** seconds immediately before GPS2 acquisition. This feature is intended to enable visual, acoustic, or ARGOS based recovery while still keeping the Seaglider diving and navigating. This bit can be used independently or in conjunction with bits 3 and 4. **Bit 3, escape:** This feature is not available on Kongsberg manufactured Seagliders. 0 = Seaglider continues to navigate as before. 1 = Seaglider navigates to the escape target defined in the *targets* file. If no escape target is present, Seaglider navigates by heading	3	1	255

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
according to the **$ESCAPE_HEADING** parameter. **Bit 4, moor at position** This feature is not available on Kongsberg manufactured Seagliders. 0 = Do not moor at position. 1 = Set the current GPS position as the current waypoint. Seaglider will try to virtually moor at this position. **Bit 5, clear flow control** 0 = Do not clear flow control. 1 = Clear the flow control bits on **$PHONE_DEVICE**.**NOTE**: For units where flow control is not supported by the hardware, the flow control option is ignored. **Bit 6, increase $T_RSLEEP** 0 = Maintain current **$T_RSLEEP**. 1 = Increase **$T_RSLEEP** by a factor of 30. **Bit 7, send SMS** 0 = Do not send SMS. 1 = Send SMS containing the GPS status line to the sms_email address configured in NVRAM. The message is identical to the GPS status line that is emitted to the comm.log on the basestation. SMS is not available on all Seagliders. Example: If **$N_NOCOMM**,10 and **$NOCOMM_ACTION**,21, the glider will reset **$SM_CC** to maximum buoyancy any time one dive passes with no communications. If 10 dives pass with no communications, the glider will try to stay at its current position, and loiter at the surface in low power sleep $T_EPRIB seconds between station keeping dives.			
$P_OVSHOOT The distance (cm) that the pitch mass is allowed to overshoot its target after the pitch motor is turned off.	0.04	-0.1	0.1
$PA_FILE_FORMAT A PAM command that specifies the file format of the recorded data. Data is recorded in either .wav format or compressed into FLAC format. 0 = .wav 1 = FLAC **Note:** This parameter is only present in the log files of gliders with an installed PAM.	1	0	1

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$PA_GAIN A PAM command specifying the pre-amplifier gain to use. Valid values are: **Gain setting** / dB of gain 0 / 0 1 / 6 2 / 12 3 / 18 **Note:** This parameter is only present in the log files of gliders with an installed PAM.	3	0	3
$PA_PROFILE A PAM command that specifies when the passive acoustics sensor will record data: never, downcast only, upcast only or both down- and upcast. 0 = never 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed PAM.	3	0	3
$PA_RECORDABOVE A PAM command that sets the depth (meters) to which the passive acoustics sensor will begin sampling. A positive value indicates the glider will sample above this depth. A negative value indicates the glider will sample below this depth. A value of 0 turns the sensor off. **Note:** This parameter is only present in the log files of gliders with an installed PAM.	1000	0	1100
$PA_RECORDAPOGEE A PAM command that specifies whether the sensor should be sampled during apogee or turned off. If the value is set to 1, PAM will sample through apogee. If the value is set to 0, PAM will be turned off during apogee. **Note:** This parameter is only present in the log files of gliders with an installed PAM.	0	0	1
$PA_STARTS A diagnostic value output by the PAM, that keeps track of the number of times the sensor restarts during a mission. There should be two restarts per dive: one for the downcast and one for the upcast. **Note:** This parameter is only present in the log files of gliders with an installed PAM.			

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$PA_UPLOADMAX A PAM command that specifies the number of bytes of passive acoustic data file that should be transferred from Seaglider to shore over the satcomms link – i.e. the size of the 'snippet'. Use this parameter to keep file transfer times reasonable, thus limiting how long Seaglider remains on the surface uploading data. **Note:** This parameter is only present in the log files of gliders with an installed PAM. **Note:** The PAM software limits this value to 10240 bytes.	3116	0	10240
$PA_XMITPROFILE A PAM command that specifies which passive acoustic data snippets are transmitted to the basestation: none, downcast only, upcast only or both down- and upcast. 0 = none 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed PAM. Note: Since transferring an entire acoustic data file is impractical, Seaglider will send a 'snippet' of data to assist in validating that the PAM hardware and software are operating correctly and recording valid data. The data is taken from the first acoustic data file for the descent or ascent (the acoustic data file with sequence number 1). For additional information refer to the section 'File Naming on WISPR Board'. At the start of a mission you may want to enable snippets briefly to ensure that audio collection is working. After receiving a snippet or two you can then turn snippets off by setting **$PA_XMITPROFILE,0**.	3	0	3

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$PC_INTERVAL A pumped CTD command that specifies the sampling interval in seconds. ***1-4 second sampling intervals***: The CTD is in Continuous Sampling Mode. The pump and all sampling circuitry remain on continuously. Power consumption for any of these sampling intervals is the same. However, memory usage decreases with increasing sampling interval. ***5-14 second sampling intervals***: The CTD is in Fast Sampling Mode. The pump runs continuously and measurements are made at the chosen interval. ***15-3600 second sampling intervals***: The CTD is in Slow Interval Sampling Mode. In this mode, CTD samples are taken but DO samples are not. The pump runs for 11.3 seconds prior to a measurement and an additional 2.1 seconds during the measurement. In-between sampling intervals, the pump is off and the CTD is in low power state. **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.	5	1	3600
$PC_MINCONDFREQ Minimum conductivity frequency detected to cause the GPCTD pump to run. To turn the GPCTD pump on the value of this parameter should be 500 Hz greater than the frequency response of the sensor in fresh water. This value is listed in the OEM sensor calibration sheet. To disable the GPCTD pump, for example during in air testing, this parameter should be set to 10000. **Note:** The GPCTD pump should never be operated in air. Doing so will cause damage to, and possibly failure of, the pump. **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.	3000	500	10000
$PC_PROFILE A GPCTD command that specifies when the CTD will record data: never, downcast only, upcast only or both down- and upcast. 0 = never 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.	3	0	3

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$PC_RECORDABOVE A GPCTD command that sets the depth (meters) at which the sensor will begin sampling. A positive value indicates the glider will sample above this depth. A negative value indicates the glider will sample below this depth. A value of 0 turns the sensor off. **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.	1000	0	1100
$PC_RECORDAPOGEE A GPCTD command that specifies whether the sensor should be sampled during apogee or turned off. If the value is set to 1, the GPCTD will sample through apogee. If the value is set to 0, the GPCTD will be turned off during apogee. **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.	1	0	1
$PC_STARTS A diagnostic value output by the GPCTD, that keeps track of the number of times the sensor restarts during a mission. There should be two restarts per dive: one for the downcast and one for the upcast. **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.			
$PC_UPLOADMAX Specifies the size limit for uploaded GPCTD files. It is applied when the glider requests a file from the GPCTD via the .cnf file *xmodem=* or *download=* commands. The parameter value is sent to the logger via the '%m' command string substitution operator. The Seaglider does not process this value itself, it is strictly for use by the logger. Limiting the file size this way can be used to reduce the size of data files transferred from the GPCTD to the Seaglider compact flash, and from Seaglider compact flash to shore over an Iridium link. The procedure for using this parameter is: 1. Write a data transfer program from the logger that has a command-line option for maximum file size. 2. Add a 'xmodem=' or 'download=' command string to the logger's .cnf file that invokes the logger's data transfer program and include the '%m' substitution operator. 3. Add the **$PC_UPLOADMAX** parameter to the cmdfile in the glider's home directory on the basestation and specify the desired maximum file size. **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.			

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$PC_XMITPROFILE A GPCTD command that specifies which data profiles are transmitted to the basestation: none, downcast only, upcast only or both down- and upcast. 0 = none 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.	1	0	3
$PHONE_DEVICE *Set by manufacturer. Do not change.* A configuration value specifying the model of the phone. These devices have dedicated hardware ports on all motherboard revisions and, as such, a port specification is not necessary.	48	0	1023
$PHONE_SUPPLY A parameter that controls the source of power to the Iridium phone. In the 24V/10V system, this option is intended to load balance the energy consumption between the two battery packs. |1| means that the phone is powered by the 10V battery. |2| means the phone is powered by the 24V battery. In the shared bus 15V system the user can select a value of either |1| or |2|. A positive value means that model value of current is used to compute power consumption. A negative value means that current draw of the phone is measured directly.	2	1	2
$PITCH_AD_RATE *Set by manufacturer. Do not change.* The pitch rate (A/D counts/second) used as the threshold for retries when pitching. If the observed rate is less than this number, the pitch motor is stopped and restarted. The glider continues to monitor speed and execute retries if the speed dips below the set value until the timeout is reached; then an error is declared.	175	0	200

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$PITCH_ADJ_DBAND This parameter (degrees), along with **$PITCH_ADJ_GAIN**, enables and adjusts active (closed-loop) control of Seaglider pitch during dive and climb. Seaglider automatically seeks to maintain the pitch angle by moving the pitch mass whenever |Pitch Observed – Pitch Desired| > **$PITCH_ADJ_DBAND.** **NOTE**: A value of 0 disables automatic pitch adjustment.	1	0	40
$PITCH_ADJ_GAIN This parameter (cm/degree), with **$PITCH_ADJ_DBAND**, enables and adjusts active (closed-loop) control of Seaglider pitch during a dive and climb. The amount of the adjustment is given by: (Pitch Desired - Pitch Observed)*** $PITCH_ADJ_GAIN** Adjustments are calculated at the beginning of the active guidance and control (G&C) phase, based on the pitch observed over the same samples for which observed vertical speed is calculated. Adjustments are not made during the first two active G&C phases following the start of a dive or climb. A value of zero disables automatic pitch adjustment. If the glider is driven into pitch oscillation by adjustments during a dive, reduce **$PITCH_ADJ_GAIN** until the system becomes stable. If the glider is not achieving the desired pitch during the dive, adjust **$PITCH_ADJ_GAI**N upward until the system becomes stable at the desired value over course of dive.	0.03	0	0.1
$PITCH_CNV *Set by manufacturer. Do not change.* The pitch position conversion factor, from A/D counts to centimeters (cm/AD count). This is a constant determined by the pitch of the worm gear that drives the pitch motion, and is set at the factory.	0.003125763 Old Version Mass Shifter: 0.0046		
$PITCH_DBAND The pitch position deadband (cm). Fine pitch adjustments are not commanded within the deadband.	0.01	0	1
$PITCH_GAIN The vehicle pitch (degrees) corresponding to a 1 cm movement of the pitch mass.	30	5	40

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$PITCH_MAX *Set by manufacturer. Do not change.* Aft pitch software limit (A/D counts). **NOTE**: Value determined by the physical parameters of the system. Obtain this value from the vehicle's trim sheet (cal tab).	4000		
$PITCH_MAXERRORS *Set by manufacturer. Do not change.* The number of pitch motor errors allowed before Seaglider goes into recovery state. An error occurs when the **$PITCH_TIMEOUT** expires prior to achieving the commanded pitch A/D position. **Caution:** An error of pitch could result in the loss of a Seaglider.	1	0	100
$PITCH_MIN *Set by manufacturer. Do not change.* Forward pitch software limit (A/D counts). This is also the pitch used for surface maneuvers (fully forward for maximum pitch down). **NOTE**: Value determined by the physical parameters of the system. Obtain this value from the vehicle's trim sheet (cal tab).	100		
$PITCH_TIMEOUT *Set by manufacturer. Do not change.* Pitch mass timeout (seconds). If the mass shifter does not achieve the desired pitch position before **$PITCH_TIMEOUT** seconds, a pitch error occurs.	18	5	20
$PITCH_VBD_SHIFT Parameterization of the pitch compensation (cm/cm^3) required to balance the mass of hydraulic oil moving forward and aft with the VBD driven changes in buoyancy as an equivalent mass shifter displacement. During each guidance and control (G&C) maneuver, pitch control (cm) is computed as the sum of the pitch desired (in degrees, see the third field in **$MHEAD_RNG_PITCHd_Wd** in the .log file) divided by pitch gain (**$PITCH_CNV**) plus the VBD control (cc) times **$PITCH_VBD_SHIFT** (cm/cc). Use this parameter to fine tune pitch on well-trimmed vehicles exhibiting asymmetric dives. Start by reducing the nominal parameter value (0.00123) by 50%. If needed, continue to reduce the parameter value by 50% increments until the dive is symmetrical or the minimum value of 0.00005 is reached. It is used on ogive fairing gliders more often than on standard fairing gliders.	0.00123	0	0.1

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$PITCH_W_DBAND Deadband for pitch adjustments used to control vertical speed of the Seaglider with units of cm/s. If the observed vertical speed is outside the deadband, but not beyond **$W_ADJ_DBAND**, the glider will adjust pitch according to **$PITCH_W_GAIN** to try to maintain speed. This parameter is only valid when **$PITCH_W_GAIN** is also non-zero. A value of 0 means this parameter is not used.	0	0	40
$PITCH_W_GAIN Gain on pitch adjustments used for vertical speed control with units of cm/ m/s. If the observed vertical speed is outside **$PITCH_W_DBAND** then this parameter controls the adjustment made to pitch control to maintain the desired glider speed. If this parameter is negative, adjustments will be made to both slow and speed the glider. If positive, adjustments will only be made if the glider is moving too slowly. This parameter is only used during climbs. This parameter cannot be used at the same time as **$PITCH_ADJ_GAIN**. A value of 0 means parameter is not used.	0	-20	20
$PRESSURE_SLOPE *Set by manufacturer. Do not change.* Slope of linear fit between psig and pressure sensor output (after digitization to A/D counts through AD7714). The fit is calculated from calibration data received with each pressure sensor, and converted to A/D counts via the known configuration of the AD7714 and associated circuitry. This number is a constant for each pressure sensor and associated calibration.		0.0	1
$PRESSURE_YINT Y-intercept of linear fit between psig and pressure sensor output (after digitization to A/D counts through AD7714). This is the value that is adjusted in the field at launch to correct the pressure sensor relative to atmospheric pressure at 0 m depth.		-100	50

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$PROTOCOL *Set by manufacturer. Do not change.* This feature uses RAW mode to transfer files and is only available on Kongsberg gliders with flow control installed. To use flow control, the modem must be wired for DTR, RTS, CTS and DCD, and the parameter **$PHONE_DEVICE** set to 49. The flow control option enables the communications code to continuously check for dropped connections by examining the state of the DSR pin. This is a more robust and efficient method of data transfer than no flow control data transfer. In no flow control data transfers XMODEM is used to transfer files and the system only becomes aware of a dropped call when the XMODEM times out. For gliders without flow control this parameter value must be set to 0.	No flow control: 0 Flow control: 9		
$R_PORT_OVSHOOT Roll mass overshoot (A/D counts) to port after roll motor is turned off. Overshoots are assumed to be positive, past the desired position. The sign of the **$R_PORT_OVSHOOT** parameter indicates how the code handles the overshoots. It does not indicate direction of overshoot. Positive values allow the Seaglider operating software to automatically compute the roll overshoots and apply them after each roll maneuver. Negative values allow the pilot to specify a static overshoot value to be applied uniformly to each roll maneuver. In the case where Seaglider is computing and applying the roll overshoots, the value reported in the log file is the last overshoot value computed during a dive.	25	-100	100
$R_STBD_OVSHOOT Roll mass overshoot (A/D counts) to starboard after motor is turned off. This follows the same method as **$R_PORT_OVERSHOOT**.	25	-100	100
$RAFOS_CORR_THRESH **This feature is not available on Kongsberg Seagliders.** Correlation threshold to use when selecting RAFOS hits for navigation solutions.	0		
$RAFOS_DEVICE **This feature is not available on Kongsberg Seagliders.** Configuration parameter specifying the model of the attached RAFOS device. These devices have dedicated hardware ports on all motherboard revisions and, as such, a port specification is not necessary. -1 specifies that the RAFOS device is not installed.	-1		

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$RAFOS_HIT_WINDOW **This feature is not available on Kongsberg Seagliders.** Size of the search window, in seconds, to use when clustering hits for navigation solutions.	0		
$RAFOS_PEAK_OFFSET **This feature is not available on Kongsberg Seagliders.** Offset, in seconds, of actual arrival time from the receiver reported arrival index due to receiver firmware artifacts.	0		
$RELAUNCH *Set by manufacturer. Do not change.* A Boolean value, the **$RELAUNCH** parameter controls the behavior of the Seaglider when a reboot condition occurs. When **$RELAUNCH** is 0 the Seaglider automatically enters recovery state in the event of a crash to TOM8 or other watchdog timer reset. When **$RELAUNCH** is 1, the Seaglider automatically resumes diving in the event of a crash to TOM8 or other watchdog timer reset. Internally the Seaglider 'ORs' the Boolean value with a 2 during a commanded reboot and a 4 to indicate the glider is in recovery. If the internal indication for recovery is true, then the glider will enter into recovery on reboot, regardless of the original value of the **$RELAUNCH** parameter. The internal indicator for commanded reboot is cleared (reset to the specified 0 or 1) after reboot is complete, at self test and at launch. The internal indicator for recovery is cleared (reset to the specified 0 or 1) upon exiting recovery, at self test and at launch. **Caution:** Do not change default value of 0. Loss of Seaglider can result if this parameter is changed.	0	0	1
$RHO The water density (g/cm^3) for converting buoyancy force in grams to seawater displacement in cm^3. This parameter is also used in the on-board performance prediction computations. Set this value to match the predicted bottom water density of the Seaglider operating environment.	1.026	1	1.04
$ROLL_AD_RATE The roll rate (A/D counts per second) used as the threshold for roll retries. If the observed rate is less than **$ROLL_AD_RATE**, the roll motor is stopped and restarted (retry). If the roll rate continues to be below threshold, Seaglider will continue retries until it times out and an error is declared.	350	100	450

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$ROLL_ADJ_DBAND **$ROLL_ADJ_DBAND (**degrees/second), used in conjunction with **$ROLL_ADJ_GAIN**, controls the automatic adjustment of the roll centers based on observed turn rate. At the end of a complete passive phase, a full guidance and control (G&C) interval, Seaglider adjusts the appropriate dive or climb roll center based on the turn rate over the last half of the passive phase if: \|turn rate\| > **$ROLL_ADJ_DBAND**. A value of zero disables automatic adjustment of the roll centers.	0	0	1000
$ROLL_CNV *Set by manufacturer. Do not change.* Roll position conversion factor, from A/ D counts to degrees. This is a constant determined by the configuration of the roll gear train, motor, and potentiometer.	0.028270001	0	0.1
$ROLL_DEG The number of degrees to roll the mass shifter during a turn. The roll software limits, found on the trim sheet (cal tab) provide the effective roll maximums.	40	0	60
$ROLL_MAX *Set by manufacturer. Do not change.* Starboard roll software limit (A/D counts). The glider operating software prevents the mass shifter from rolling past this limit. **$ROLL_MAX** value is determined by the physical parameters of the system. This value can be found on the vehicle's trim sheet (cal tab).	4000		
$ROLL_MAXERRORS *Set by manufacturer. Do not change.* The number of roll motor errors allowed before Seaglider goes into recovery state. An error occurs when **$ROLL_TIMEOUT** expires prior to achieving the commanded roll A/D position.	1	1	100
$ROLL_MIN *Set by manufacturer. Do not change.* Port roll software limit (A/D counts). The glider operating software prevents the mass shifter from rolling past this limit. **$ROLL_MIN** value is determined by the physical parameters of the system. This value is found on the vehicle's trim sheet (cal tab).	100		

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$ROLL_TIMEOUT *Set by manufacturer. Do not change*. Roll maneuver timeout (seconds). If the mass shifter does not achieve the desired roll position before **$ROLL_TIMEOUT** seconds, a roll error occurs.	15	5	20
$RS_PROFILE A RSI Micro-T command that specifies when the micro-turbulence sensor will record data: never, downcast only, upcast only or both down- and upcast. 0 = never 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed RS Micro-T.	3	0	3
$RS_RECORDABOVE A Micro-T command that sets the depth (meters) to which the micro-turbulence sensor will begin sampling. A positive value indicates the glider will sample above this depth. A negative value indicates the glider will sample below this depth. A value of 0 turns the sensor off. sample. **Note:** This parameter is only present in the log files of gliders with an installed RSI Micro-T.	1000	0	1100
$RS_RECORDAPOGEE A RS Micro-T command that specifies whether the micro-turbulence sensor should be sampled during apogee or turned off. If the value is set to 1, the sensor will sample through apogee. If the value is set to 0, the sensor will be turned off during apogee. **Note:** This parameter is only present in the log files of gliders with an installed RS Micro-T.	1	0	1
$RS_STARTS A diagnostic value output by the RS Micro-T, that keeps track of the number of times the sensor restarts during a mission. There should be two restarts per dive: one for the downcast and one for the upcast. **Note:** This parameter is only present in the log files of gliders with an installed RS Micro-T.			

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$RS_UPLOADMAX Specifies the size limit for uploaded RS Micro-T files. It is applied when the glider requests a file from the RS MICRO-T via the .cnf file *xmodem=* or *download=* commands. The parameter value is sent to the logger via the '%m' command string substitution operator. The Seaglider does not process this value itself, it is strictly for use by the logger. Limiting the file size this way can be used to reduce the size of data files transferred from the RS Micro-T to the Seaglider compact flash, and from Seaglider compact flash to shore over an Iridium link. The procedure for using this parameter is: 4. Write a data transfer program from the logger that has a command-line option for maximum file size. 5. Add a 'xmodem=' or 'download=' command string to the logger's .cnf file that invokes the logger's data transfer program and include the '%m' substitution operator. 6. Add the **$PC_UPLOADMAX** parameter to the cmdfile in the glider's home directory on the basestation and specify the desired maximum file size. **Note:** This parameter is only present in the log files of gliders with an installed RS Micro-T.			
$RS_XMITPRFILE A RS Micro-T command that specifies which micro-turbulence data profiles are transmitted to the basestation: none, downcast only, upcast only or both down- and upcast. 0 = none 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed RS Micro-T.	3	0	3
$SEABIRD_[C_G/ C_H/ C_I/ C_J/ T_G/ T_H/ T_I/ T_J] Sea-Bird Electronics provides calibration coefficients for their free flow conductivity and temperature sensor (CT Sail) installed on Seaglider. These values are used to compute calibrated temperature and salinity for hardware tests and in situ density for self-trimming applications. They are also used for subsurface finish maneuvers in which Seaglider attempts to become neutral at a fixed depth below the surface. The parameters are installed at the factory, based on CT sensor calibration data and should only be changed if the sensor is re-calibrated by Sea-Bird Electronics.			

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$SIM_PITCH Simulated Seaglider desired pitch angle (degrees) during a simulated run. A value of 0 disables this feature. For simulated dives, a **$SIM_PITCH** value of -20 is often used. This parameter is automatically zeroed during the Sea Launch procedure.	-20	-90	0
$SIM_W Simulated Seaglider vertical velocity (m/s) desired for deck dives. For simulated dives a value of 0.1 is often used. A value of 0 disables this feature. This parameter is automatically zeroed during the Sea Launch procedure.	0.1	0	1
$SM_CC The specified minimum buoyancy position of the VBD (cm^3) that Seaglider attains at the surface. If Seaglider enters the surface maneuver with less buoyancy than **$SM_CC**, it pumps to this value. If Seaglider enters the surface maneuver with more than **$SM_CC**, it does not change the VBD and continues to the next part of the surface maneuver.	650	150	800
$SPEED_FACTOR A factor to compensate for Seaglider's inability to maintain the desired horizontal velocity during a profile. It is a measure of efficiency of Seaglider progress along a specified track. Factors that lower the efficiency of Seaglider include: turns, leaving the surface at arbitrary headings, and reduced horizontal speed during the apogee maneuver. Over long dives the effects of these factors are minimal and $SPEED_FACTOR approaches zero. For short dives, however, the effects of these factors are substantial and so the $SPEED_FACTOR is typically 0.8 which implies that the glider will only make 0.8 of the distance Kalman desires. **$SPEED_LIMITS** are multiplied by this factor and **$KALMAN_CONTROL** components are divided by it.	1	0.1	1
$STROBE **This feature is not available on Kongsberg Seagliders.** Controls the blinking LED function available on Seagliders with Rev. C motherboards. 0 disables all blinking 1 turns on strobe when Seaglider in recovery 2 turns on strobe whenever Seaglider is at the surface	0	0	2

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$SURFACE_URGENCY **This feature is not available on Kongsberg Seagliders.** Active on under ice Seagliders only, this parameter controls the number of dives to accumulate before trying extra surfacings.	0	0	5000
$SURFACE_URGENCY_FORCE **This feature is not available on Kongsberg Seagliders.** Active on under ice Seagliders only, this parameter is the dive number modulo for forced surfacing attempts.	0	0	5000
$SURFACE_URGENCY_TRY **This feature is not available on Kongsberg Seagliders.** Active on under ice Seagliders only, this parameter is the dive number modulo for extra surfacing attempts.	0	0	5000
$T_ABORT The maximum time (minutes) to elapse on a profile before the Seaglider enters recovery state. This is a safety feature used to bring the glider back to the surface in the event that too much time has passed.	720	60	4320
$T_BOOST Time (seconds) to run the boost pump when the glider is deeper than **$D_BOOST** meters. **$T_BOOST** must = 0 (not active) for Kongsberg Standard boost pump systems and iRobot Standard Buoyancy Engine (SBE) systems. If **$T_BOOST** = 0 for Kongsberg High Pressure (HP) boost pump systems and iRobot Enhanced Buoyancy Engine (EBE) systems, then the boost pump will run continuously. If **$T_BOOST** is > 0 for Kongsberg High Pressure (HP) boost pump systems and iRobot Enhanced Buoyancy Engine (EBE) systems, the boost pump runs by itself for the first 2 seconds. Then, both pumps (main and boost) run simultaneously for the remainder of **$T_BOOST** seconds. At the end of **$T_BOOST** seconds, the boost pump turns off while the main pump continues to run. **NOTE**: If **$T_BOOST** is active, Kongsberg recommends a minimum **$T_BOOST** value of 3 seconds. This allows a 1 second operational overlap of the main and boost pumps.	0	0	20

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$T_DIVE The time (minutes) for Seaglider to make one dive-climb cycle to the depth **$D_TGT** and back to the surface. This value does not include the time for pumping during the apogee phase. The value is used to calculate the desired vertical velocity (w_d) in a particular dive using the naive calculation: w_d (cm/s) = 2***$D_TGT***100/(***$T_DIVE***60). **$MAX_BUOY** is applied in conjunction with w_d, the range to the target and the Seaglider hydrodynamic model to calculate the Seaglider's desired pitch angle on any given dive.	10	5	2820
$T_EPIRB The time (seconds) to loiter on the surface when **$N_NOCOMM** is exceeded and bit 2 (EPIRB mode) of **$NOCOMM_ACTION** is set.	0	0	14400
$T_GPS The maximum allowed time (minutes) to obtain a GPS position (GPS timeout). **$T_GPS** is typically set longer than 12.5 minutes, in order to ensure that the GPS receiver has time to receive a complete set of almanac entries in the event that a new almanac is required.	15	1	30
$T_GPS_ALMANAC Time to wait (minutes) for GPS almanac acquisition. The wait happens the next time the GPS is turned on. After the wait, the parameter resets to zero and the regular GPS operation (presumably a fix) will proceed. If the parameter is greater than zero, the almanac sentences are checked every minute. The wait halts when the time has expired or at least ten satellites have recent almanac sentences. If the parameter is negative, the wait only halts after the time has expired. A negative value also forces a complete NVRAM reset before the wait starts.	0	-15	15
$T_GPS_CHARGE The time to wait (seconds) before trickle-charging the GPS receiver (for Garmin GPS25 engines only). Negative values mean the GPS25 does not need charging. The GPS units now installed in Seagliders run on a button battery so there is no need to charge the system.	-0.0033		

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$T_LOITER The time (seconds) to loiter after going neutral at apogee and before pitching up and becoming positively buoyant for the climb. While in the loiter state Seaglider will attempt to maintain zero vertical velocity. It will pump, but never bleed to do this. Seaglider does not servo on depth in this state. All other timeouts and depths are honored in this state. **$T_MISSION** and **$T_ABORT** need to be adjusted manually to account for the total dive duration of **$T_DIVE + $T_LOITER**. G&C and sampling intervals during the loiter state are controlled by the appropriate depth bins in the *science* file.	0	0	86400
$T_MISSION The maximum mission time (minutes) allowed. If time **$T_MISSION**/2 elapses during a dive, the Seaglider transitions from dive phase to apogee phase and then to the climb phase. If **$T_MISSION** is reached before the Seaglider reaches depth, **$D_SURF**, Seaglider immediately enters the surface phase. **$T_MISSION** time includes the dive, apogee, and climb phases.	15	10	4320
$T_NO_W The time (seconds) for Seaglider to wait with no significantly non-zero vertical velocity (less than 1 cm/s, as measured by dP/dt) before proceeding to the next phase of a dive. This is primarily used to move from the dive phase to the climb phase (initiate an apogee maneuver) when Seaglider unexpectedly encounters the bottom. **NOTE**: This protection is only in place at depths below **$D_NO_BLEED.**	120	30	86400
$T_RSLEEP The sleep time interval (minutes) during the recovery phase. During the recovery phase, Seaglider gets a GPS fix, calls the basestation up to **$CALL_TRIES** times to upload the GPS fix, then goes into low power sleep for **$T_RSLEEP** minutes. The surface evolution has about 2 minutes of "overhead," so that Seaglider calls are actually (**$T_RSLEEP** + 2) minutes apart.	3	0	14400
$T_TURN The maximum amount of time (seconds) allowed for the vehicle to complete a turn during the active G&C mode.. If this timeout is reached before the desired heading is reached, Seaglider rolls back to neutral and continues until the next G&C maneuver.	500	10	720

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$T_TURN_SAMPINT The sample interval (seconds) for pitch, roll and VDB measurements when the vehicle is turning during active and passive G&C. This should be short enough so that Seaglider cannot pass entirely through the heading deadband without sampling. If the parameter is positive, the sampled data are used by the vehicle to determine how much of the turn has been completed and then discarded. If the parameter is negative, the sampled data are used to determine how much of the turn has been completed and then saved as a line of output in the data file.	5	-60	60
$T_WATCHDOG *Set by manufacturer. Do not change.* The watchdog timer (minutes). This is an information only parameter so the Seaglider software knows the watchdog timer value. The watchdog timer is set with DIP-switches on the main board. If the watchdog timer expires, the main processor is reset, and Seaglider goes into recovery. This is a fail-safe against unexpected software or hardware failures.	10	0	60
$TCM_PITCH_OFFSET *Set by manufacturer. Do not change.* Static offset in pitch axis (degrees) between the compass output and the actual Seaglider body, as measured during fabrication.	0	-10	10
$TCM_ROLL_OFFSET *Set by manufacturer. Do not change.* Static offset in roll axis (degrees) between the compass output and the actual Seaglider body, as measured during fabrication.	0	-10	10

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$TEL_NUM The primary telephone number Seaglider dials to connect to the basestation, 13 digits maximum. The phone number starts with the international country code, without leading zeros (for example, 1 for the US), then city/area code and number. There are no spaces or other interrupting characters between the country code, city/area code, or number. This parameter is an output from the Seaglider and can be found in each dive's .pvt file. If a communication session using **$TEL_NUM** does not successfully connect (after **$CALL_TRIES** tries), the phone number switches to the alternate number (**$ALT_TEL_NUM**), if available, for the next surfacing. If a communication session completes successfully on the alternate phone number, the phone number is switched back to the primary for the next surfacing. **NOTE**: This parameter is not adjustable from the *cmdfile*. The number is edited using the pdoscmds.bat file, or through direct connection to Seaglider using the menus.			
$TGT_AUTO_DEFAULT A Boolean parameter. **$TGT_AUTO_DEFAULT,1** automatically updates the default target in NVRAM. **$TGT_AUTO_DEFAULT,0** does not update the default target in NVRAM.	0	0	1
$TGT_DEFAULT_LAT **T**he latitudinal component of the default waypoint target when the *targets* file cannot be read. It is a floating point value (degrees decimal minutes) between -9000.000 and 9000.000. For example, latitude 47 degrees 43.456 minutes is 4743.456. Latitudes in the northern hemisphere use positive values, while latitudes in the southern hemisphere use negative values.	4212	-9000.00	9000.00
$TGT_DEFAULT_LON The longitudinal component of the default waypoint target when the *targets* file cannot be read. It is a floating point value (degrees decimal minutes) between -18000.000 and 18000.000. For example, longitude -122 degrees 23.456 minutes is -12223.456. Longitudes in the eastern hemisphere use positive values, while longitudes in the western hemisphere use negative values.	-7043	-18000.00	18000.00

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$UNCOM_BLEED *Set by manufacturer. Do not change.* The uncommanded change in A/D counts of VBD bleed triggers the following actions in an attempt to save Seaglider: 1. Stop whatever motor is running (the assumption is that electrical noise from one of the motors causes the Skinner valve to open) and disable it. 2. Close the Skinner valve. 3. Enter the recovery state (go to the surface and call home).	60	0	400
$UPLOAD_DIVES_MAX The maximum number of dives to upload at one surfacing. A value of -1 means upload all available dives that have not been previously uploaded.	-1	-1	9999
$USE_BATHY This parameter defines the use of the bathymetry maps. If **$USE_BATHY** is 0, the feature is disabled and Seaglider either dives to **$D_TGT** or uses the on-board altimeter to command a depth-based apogee maneuver. If **$USE_BATHY** is -4, the software searches for an on-board bathymap.nnn that includes the current position of Seaglider. This is the standard usage in operating areas covered by more than one map. If **$USE_BATHY** is a positive integer, the software searches for that particular on-board bathymap. If the map is present, the glider will use it to determine $D_GRID. If $USE_BATHY does not equal 0 but there is no map available for the present location of the glider, the glider will use the depth value in **$D_OFFGRID**. If bathymaps and/or the altimeter are used in conjunction with **$D_TGT**, the glider will begin the apogee maneuver based on the shallowest of the bottom depth values provided.	0	-50	50
$USE_ICE **This feature is not available on Kongsberg Seagliders.** This parameter has the same functionality as **$USE_BATHY** but is used for ice maps.	0	-50	50
$VBD_BLEED_AD_RATE The bleed rate (A/D counts per second) threshold for retries when bleeding. If the observed rate is less than this number, the bleed is stopped and restarted.	8	0	20

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$VBD_CNV *Set by manufacturer. Do not change.* VBD position conversion factor from A/D counts to cm^3. This is a constant determined by the geometry of the internal hydraulic fluid reservoir and the potentiometers. The sign is negative to mean that higher A/D counts reflect more oil in the internal reservoir, hence, less oil in the external bladder, a lower Seaglider displacement, and thus lower Seaglider buoyancy.	-0.245296	-1	0
$VBD_DBAND VBD deadband ($cm^3$).	2	0	10
VBD_MAX *Set by manufacturer. Do not change.* Variable Buoyancy Device (VBD) position software limit (A/D counts) when the internal reservoir is almost full (external bladder fully bled/minimum Seaglider buoyancy). The Seaglider operating software closes the VBD main bleed valve (Skinner valve) when this value is reached. **NOTE:** Value determined by physical parameters of the system. Obtain the value from the vehicle's trim sheet (cal tab).	4000		
$VBD_MAXERRORS Number of VBD errors permitted before the Seaglider enters recovery state. This is an attempt to keep Seaglider at the surface (prevent another dive) when it reports a VBD error. ⚠ **Caution:** Loss of VBD function can result in the loss of a Seaglider.	1	0	5
$VBD_MIN *Set by manufacturer. Do not change.* Variable Buoyancy Device (VBD) software limit (A/D counts) when the internal reservoir is almost empty (external bladder fully pumped). The Seaglider operating software stops the VBD pump when this value is reached. **NOTE:** Value determined by physical parameters of the system. Obtain the value from the vehicle trim sheet (cal tab).	500		

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$VBD_PUMP_AD_RATE_APOGEE *Set by manufacturer. Do not change.* The pump rate (A/D counts per second) threshold for pumping at apogee. If the observed rate is less than this number, the pump is stopped and restarted. The glider continues to monitor speed and retry if speed dips below the threshold value until the timeout limit is reached, then an error is declared.	4	1	6
$VBD_PUMP_AD_RATE_SURFACE *Set by manufacturer. Do not change.* The pump rate (A/D counts per second) threshold for pumping at the surface. If the observed rate is less than this number, the pump is stopped and restarted. The glider continues to monitor speed and retry if speed dips below the threshold value until the timeout limit is reached, then an error is declared.	5	1	8
$VBD_TIMEOUT The time (seconds) allowed for any commanded change in VBD position. If the VBD does not achieve the desired position before **$VBD_TIMEOUT** seconds, a VBD error occurs.	720	180	900

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$W_ADJ_DBAND Seaglider adjusts its buoyancy to maintain a desired vertical velocity (w) in the presence of strong density changes. In particular, if the observed w is too low, the glider may attempt to bleed on dives (subject to **$D_NO_BLEED** and **$MAX_BUOY**) or pump on climbs. However, in the presence of strong internal waves, the glider may appear to slow transiently because of upwelling on the dive or down welling on the climb, triggering unneeded buoyancy adjustments. Unnecessary buoyancy adjustments can also occur after the apogee VBD pump from neutral to positive buoyancy when the glider's vertical velocity is still accelerating from near 0 to the desired value but is seen in snapshot data grabs by the glider as being too slow. This parameter limits active control on VBD changes during a dive and climb. The Seaglider will automatically seek to maintain the desired vertical velocity by changing the VBD when: $$\|Wobserved\| < \|Wdesired\| - \$\boldsymbol{W_ADJ_DBAND}$$ **$W_ADJ_DBAND** has units of cm/s, should be positive, and correspond to the typical RMS variance of observed w found in VBD regressions. A value of 0 ignores internal wave effects (assumes still water). NOTE: If W_ADJ_DBAND is negative, it will force higher w on climbs (since w is limited by MAX_BUOY on dives) but this will cause an expensive extra pump at depth immediately after apogee. If that is what is desired, consider changing C_VBD instead.	0	0	40
$XPDR_DEVICE *Set by manufacturer. Do not change.* A configuration value specifying the model of the attached device. These devices have dedicated hardware ports on all motherboard revisions and, as such, a port specification is not necessary.	24	-1	1023
$XPDR_INHIBIT A configuration value specifying the transponder inhibit time in deciseconds. The inhibit time is the time after a transponder reply during which the transponder will not reply to subsequent interrogation. Shorter times mean the transponder can be interrogated more rapidly.	90	0	99 (9.9 seconds)

Table 4.1 Parameters in alphabetical order

Parameter	Nominal Value	Min Value	Max Value
$XPDR_PINGS This is an output from the glider, representing the number of times the glider's transducer responded to an external stimulus at the interrogate frequency during a dive. The interrogate and respond frequencies can be found on the vehicle's trim sheet (cal tab). During missions, this value should be zero. While an occasional ping is acceptable, frequent pings are not as they consume battery power. If excessive pings are seen in **$XPDR_PINGS**, tune the transponder using **$XPDR_INHIBIT** and **$XPDR_VALID**.	0	0	No limit
$XPDR_VALID A configuration value specifying the transponder interrogation validation sensitivity in units of 0.5 ms. Valid values are from 0 (no validation) to 6 (3 ms). The validation value is the total time over a 10 ms window following initial triggering that the detector circuit must remain triggered. Longer validation times reduce spurious interrogation replies, but could result in decreased range.	2	0	6

5. PARAMETERS BY CATEGORY

Table 5.1 Parameters listed by category

Class	Category	Parameter
Factory Set	⚠ **Caution:** Use caution when changing these parameters.	
		$AD7714Ch0Gain,*value* **$AH0_10V**,*AmpHours* **$AH0_24V**,*AmpHours* **$COMPASS_DEVICE**,*integer* **$COMPASS2_DEVICE**,*integer* **$DEEPGLIDER**,*boolean* **$DEEPGLIDERMB**,*Boolean* **$DEVICE[1/2/3/4/5/6]**,*integer* **$FILEMGR**,*integer* **$GPS_DEVICE**,*integer* **$HEAPDBG**,*boolean* **$ID,***integer* **$INT_PRESSURE_SLOPE**,*calibration value* **$INT_PRESSURE_YINT,***value* **$LOGGERDEVICE1**,*integer* **$LOGGERDEVICE2**,*integer* **$LOGGERDEVICE3**,*integer* **$LOGGERDEVICE4**,*integer* **$MINV_10V**,*voltage* **$MINV_24V**,*voltage* **$MOTHERBOARD**,*boolean* **$PHONE_DEVICE**,*integer* **$PITCH_AD_RATE**,*AD counts* **$PITCH_CNV**,*cm/AD counts* **$PITCH_MAX**,*AD counts* **$PITCH_MIN**,*AD counts* **$PRESSURE_SLOPE**,*calibration value* **$PRESSURE_YINT**,*value* **$ROLL_AD_RATE**,*integer* **$ROLL_CNV**,*degree,AD counts* **$ROLL_MAX**,*AD counts* **$ROLL_MIN**,*AD counts* **$T_WATCHDOG**,*minutes* **$TCM_PITCH_OFFSET**,*degrees* **$TCM_ROLL_OFFSET**,*degrees* **$VBD_CNV**,*cc/AD counts* **$VBD_MAX**,*AD counts* **$VBD_MIN**,*AD counts* **$XPDR_DEVICE**,*integer*

Table 5.1 Parameters listed by category

Class	Category	Parameter
Not Used By Kongsberg		**$FG_AHR_10V**,*amp-hr* **$FG_AHR_24V**,*amp-hr* **$ICE_FREEZE_MARGIN**,*degrees* **$KERMIT**,*integer* **$MASS_COMP**,*integer* **$RAFOS_CORR_THRESH**,*value* **$RAFOS_DEVICE**,*integer* **$RAFOS_HIT_WINDOW**,*seconds* **$RAFOS_PEAK_OFFSET**,*seconds* **$STROBE**,*boolean* **$SURFACE_URGENCY**,*integer* **$SURFACE_URGENCY_FORCE**,*integer* **$SURFACE_URGENCY_TRY**,*integer* **$USE_ICE**,*integer*
Piloting	Altimeter / Transponder	**$ALTIM_BOTTOM_PING_RANGE**,*0/off or meters* **$ALTIM_BOTTOM_TURN_MARGIN**,*0/off or meters* **$ALTIM_FREQUENCY**,*kHz* **$ALTIM_PING_DELTA**,*0/off or meters* **$ALTIM_PING_DEPTH**,*0/off or meters* **$ALTIM_PULSE**,*milliseconds* **$ALTIM_SENSITIVITY**,*integer* **$ALTIM_TOP_MIN_OBSTACLE**,*0/off or meters* **$ALTIM_TOP_PING_RANGE E**,*0/off or meters* **$ALTIM_TOP_TURN_MARGIN**,*0/off or meters* **$D_OFFGRID**,*meters* **$USE_BATHY**,*integer* **$XPDR_VALID**,*integer* **$XPDR_INHIBIT**,*1/10 seconds*
	Buoyancy Limits	**$MAX_BUOY**,*cc* **$SM_CC**,*cc*
	Communications and File Management	**$CALL_NDIVES**,*integer* **$CALL_TRIES**,*integer* **$CALL_WAIT**,*seconds* **$CAPMAXSIZE**,*bytes* **$CAPUPLOAD**,*boolean* **$COMM_SEQ**,*integer* **$D_CALL**,*integer* **$N_FILEKB**,*integer* **$PROTOCOL**,*integer* **$T_RSLEEP**,*minutes* $UPLOAD_DIVES_MAX,*integer*

Table 5.1 Parameters listed by category

Class	Category	Parameter
	Dive Profile	**$D_TGT**,*meters* **$T_DIVE**,*minutes*
	Dynamic flight feedback system	**$DBDW**,*gm / m/s* **$PITCH_ADJ_GAIN,***0/off or cm/deg* **$PITCH_ADJ_DBAND**,*0/off or degrees* **$PITCH_W_DBAND**,cm/s **$PITCH_W_GAIN**,*cm / m/s* **$ROLL_ADJ_GAIN**,*0/off or deg/seconds* **$ROLL_ADJ_DBAND**,*0/off or degrees* **$W_ADJ_DBAND**,*integer*
	Flight Behavior and Improvement	**$APOGEE_PITCH**,*degrees* **$C_PITCH**,*AD counts* **$C_ROLL_CLIMB**,*AD counts* **$C_ROLL_DIVE**,*AD counts* **$C_VBD**,*AD counts* **$D_BOOST**,*meters* **$D_FINISH**,*meters* **$D_FLARE**,*meters* **$D_PITCH**,*meters* **$D_SURF**,*meters* **$GLIDE_SLOPE**,*degrees* **$N_NOSURFACE**,*integer* **$P_OVSHOOT**,*degree* **$PITCH_DBAND**,*cm/AD counts* **$PITCH_GAIN**,*degrees/cm* **$PITCH_VBD_SHIFT**,*value* **$ROLL_DEG**,*degrees* **$SPEED_FACTOR**,*value* **$T_BOOST**,*seconds* **$T_LOITER**,*seconds* **$VBD_DBAND**,*cc*
	G&C Turn Length and Sampling Rate	**$T_TURN**,*seconds* **$T_TURN_SAMPINT**,*seconds*

Table 5.1 Parameters listed by category

Class	Category	Parameter
	Navigation	**$COMPASS_USE**,*value* **$COURSE_BIAS**,*degrees* **$FERRY_MAX**,*degrees* **$FIX_MISSING_TIMEOUT**,integer **$HEADING**,*-1 or degrees* **$HEAD_ERRBAND**,*degrees* **$KALMAN_USE**,*integer* **$N_GPS**,*seconds* **$NAV_MODE**,*integer* **$T_GPS**,*minutes* **$T_GPS_ALMANAC**,*integer* **$TGT_AUTO_DEFAULT**,*boolean* **$TGT_DEFAULT_LAT**,*degrees decimal minutes* **$TGT_DEFAULT_LON,***degrees decimal minutes*
Safety	 **Caution:** Use caution when changing these parameters.	

Table 5.1 Parameters listed by category

Class	Category	Parameter
		$CF8_MAXERRORS,*integer*
		$D_ABORT,*meters*
		$D_NO_BLEED,*meters*
		$D_SAFE,*meters*
		$ESCAPE_HEADING,*degrees*
		$ESCAPE_HEADING_DELTA,*degrees*
		$N_DIVES,*integer*
		$N_NOCOMM,*integer*
		$NOCOMM_ACTION,*integer*
		$PITCH_MAXERRORS,*integer*
		$PITCH_TIMEOUT,*seconds*
		$RELAUNCH,*integer*
		$ROLL_MAXERRORS,*integer*
		$ROLL_TIMEOUT,*seconds*
		$T_ABORT,*minutes*
		$T_EPIRB,*seconds*
		$T_MISSION,*minutes*
		$T_NO_W,*seconds*
		$UNCOM_BLEED,*AD counts*
		$VBD_MAXERRORS,*integer*
		$VBD_BLEED_AD_RATE,*integer*
		$VBD_PUMP_AD_RATE_APOGEE,*integer*
		$VBD_PUMP_AD_RATE_SURFACE,*integer*
		$VBD_TIMEOUT,*seconds*
		$XPDR_INHIBIT,*integer*
		$XPDR_VALID,*integer*
Seaglider Hydrodynamics	⚠ **Caution:** Use caution when changing these parameters. Always save a copy of the old values and update the new ones in the cmdfile and sg_calib_constants.m.	
	Flight and Model	**$HD_A**,*value*
		$HD_B,*value*
		$HD_C,*value*
		$MASS,*grams*
		$RHO,*gm/cc*

Table 5.1 Parameters listed by category

Class	Category	Parameter
Seaglider modified		**$DIVE**,*integer* **$MISSION**,*integer* **$T_GPS_ALMANAC**,*minutes* **$T_GPS_CHARGE**,*seconds* **$R_PORT_OVSHOOT**,*AD counts* **$R_STBD_OVSHOOT**,*AD counts*
Sensors (Loggers)	These parameters are only visible when the respective logger is installed in the Seaglider	
	Passive Acoustic Monitoring (PAM)	**$PA_GAIN**,*integer* **$PA_PROFILE**,*integer* **$PA_RECORDABOVE**,*meters* **$PA_UPLOADMAX**,*bytes* **$PA_XMITPROFILE**,*integer*
	GPCTD (Glider Payload Conductivity, Temperature, and Depth) parameters	**$PC_INTERVAL**,*seconds* **$PC_MINCONDFREQ,***integer* **$PC_PROFILE**,*integer* **$PC_RECORDABOVE**,*meters* **$PC_STARTS**,*integer* **$PC_UPLOADMAX**,*bytes* **$PC_XMITPROFILE**,*integer*
	Rockland Scientific Micro-Turbulence	**$RS_PROFILE**,*integer* **$RS_RECORDABOVE**,*meters* **$RS_RECORDAPOGEE**,*integer* **$RS_STARTS**,*integer* **$RS_UPLOADMAX**,*bytes* **$RS_XMITPROFILE**,*integer*
Sensors (Serial)	CT Sail Coefficients (coefficient values located on OEM calibration sheets)	**$SEABIRD_T_G**,*calibration value* **$SEABIRD_T_H**,*calibration value* **$SEABIRD_T_I**,*calibration value* **$SEABIRD_T_J**,*calibration value* **$SEABIRD_C_G**,*calibration value* **$SEABIRD_C_H**,*calibration value* **$SEABIRD_C_I**,*calibration value* **$SEABIRD_C_J**,*calibration value*

Table 5.1 Parameters listed by category

Class	Category	Parameter
Simulated Dives		**$SIM_W**,off/0 or *cm*/*seconds*)
		$SIM_PITCH,off/0 or *degrees*)
Output From Glider		**$CURRENT**,*m/s*,*degrees*,*Boolean*
		$FG_AHR_24Vo,*amp-hr*
		$FG_AHR_10Vo,*amp-hr*
		$HUMID,*value*
		$INTERNAL_PRESSURE,*value*
		$MEM,*bytes*
		$TCM_TEMP,*value*
		$10V_AH,*voltage,amphr*
		$24V_AH,*voltage,amp-hr*
		$XPDR_PINGS,*integer*

Table 5.2 Parameters listed by frequency of change

Class	Category	Parameter
Adjusted During a Mission		**$APOGEE_PITCH**,*degrees* **$C_PITCH**,*AD counts* **$C_ROLL_CLIMB**,*AD counts* **$C_ROLL_DIVE**,*AD counts* **$C_VBD**,*AD counts* **$CALL_NDIVES**,*integer* **$D_FINISH**,*meters* **$D_TGT**,*meters* **$HEADING**,*-1 or degrees* **$MAX_BUOY**,*cc* **$N_DIVES**,*integer* **$N_NOSURFACE**,*integer* **$PITCH_GAIN**,*degrees/cm* **$PITCH_VBD_SHIFT**,*value* **$SM_CC**,*cc* **$SPEED_FACTOR**,*value* **$T_DIVE**,*minutes* **$T_LOITER**,*seconds* **$T_MISSION**,*minutes* **$T_RSLEEP**,*minutes*
Checked/Adjusted Prior to Start of Mission		**$MASS**,*grams* **$RHO**,*gm/cc* **$SIM_W**,off/0 or *cm/seconds*) **$SIM_PITCH**,off/0 or *degrees*)

Checked/Adjusted at Beginning of Mission but Rarely Later in Mission	**$ALTIM_BOTTOM_PING_RANGE**,*0/off or meters* **$ALTIM_BOTTOM_TURN_MARGIN**,*0/off or meters* **$ALTIM_PING_DELTA**,*0/off or meters* **$ALTIM_PING_DEPTH**,*0/off or meters* **$ALTIM_PULSE**,*milliseconds* **$ALTIM_SENSITIVITY**,*integer* **$ALTIM_TOP_MIN_OBSTACLE**,*0/off or meters* **$ALTIM_TOP_PING_RANGE E**,*0/off or meters* **$ALTIM_TOP_TURN_MARGIN**,*0/off or meters* **$CALL_TRIES**,*integer* **$CALL_WAIT**,*seconds* **$CAPMAXSIZE**,*bytes* **$CAPUPLOAD**,*boolean* **$COMM_SEQ**,*integer* **$COMPASS_USE**,*value* **$COURSE_BIAS**,*degrees* **$ES_PROFILE**,*integer** **$ES_RECORDABOVE**,*meters** **$ES_STARTS**,*integer** **$ES_XMITPROFILE**,*integer** **$D_ABORT**,*meters* **$D_BOOST**,*meters* **$D_CALL**,*integer* **$D_FLARE**,*meters* **$D_OFFGRID**,*meters* **$D_PITCH**,*meters* **$D_SAFE**,*meters* **$D_SURF**,*meters* **$ESCAPE_HEADING**,*degrees* **$FERRY_MAX**,*degrees* **$FIX_MISSING_TIMEOUT**,integer **$GLIDE_SLOPE**,*degrees* **$HEAD_ERRBAND**,*degrees* **$KALMAN_USE**,*integer* **$LOGGERS**,*boolean* **$N_FILEKB**,*integer* **$N_GPS**,*seconds* **$NAV_MODE**,*integer* **$P_OVSHOOT**,*degree* **$PA_GAIN**,*integer** **$PA_PROFILE**,*integer** **$PA_RECORDABOVE**,*meters** **$PA_UPLOADMAX**,*bytes**

$PA_XMITPROFILE,*integer**
$PC_INTERVAL,*seconds**
$PC_MINCONDFREQ,*integer**
$PC_PROFILE,*integer**
$PC_RECORDABOVE,*meters**
$PC_RECORDAPOGEE,*meters**
$PC_STARTS,*integer**
$PC_UPLOADMAX,*bytes**
$PC_XMITPROFILE,*integer**
$PITCH_DBAND,*cm/AD counts*
$PROTOCOL,*integer*
$ROLL_DEGREE,*degrees*
$RS_PROFILE,*integer**
$RS_RECORDABOVE,*meters**
$RS_RECORDAPOGEE,*integer**
$RS_STARTS,*integer**
$RS_UPLOADMAX,*bytes**
$RS_XMITPROFILE,*integer**
$SEABIRD_T_G,*calibration value*
$SEABIRD_T_H,*calibration value*
$SEABIRD_T_I,*calibration value*
$SEABIRD_T_J,*calibration value*
$SEABIRD_C_G,*calibration value*
$SEABIRD_C_H,*calibration value*
$SEABIRD_C_I,*calibration value*
$SEABIRD_C_J,*calibration value*
$T_BOOST,*seconds*
$T_EPIRB,*seconds*
$T_GPS,*minutes*
$T_GPS_ALMANAC,*integer*
$T_TURN,*seconds*
$T_TURN_SAMPINT,*seconds*
$TGT_AUTO_DEFAULT,*boolean*
$TGT_DEFAULT_LAT,*degrees decimal minutes*
$TGT_DEFAULT_LON,*degrees decimal minutes***$UPLOAD_DIVES_MAX**,*integer*
$USE_BATHY,*integer*
$VBD_DBAND,*cc*
$XPDR_INHIBIT, *deciseconds*
$XPDR_VALID,*integer*
*Parameter present only when sensor is installed in the Seaglider

Never Changed During a Mission Unless Directed to do so by Kongsberg Customer Support	**$AD7714Ch0Gain**,*value* **$AH0_10V**,*AmpHours* **$AH0_24V**,*AmpHours* **$ALTIM_FREQUENCY**,*integer* **$CF8_MAXERRORS**,*integer* **$COMPASS_DEVICE**,*integer* **$COMPASS2_DEVICE**,*integer* **$D_NO_BLEED**,*meters* **$DEEPGLIDER**,*boolean* **$DEEPGLIDERMB**,*Boolean* **$DEVICE[1/2/3/4/5/6]**,*integer* **$ESCAPE_HEADING**,*degrees* **$ESCAPE_HEADING_DELTA**,*degrees* **$FG_AHR_10V**,*amp-hr* **$FG_AHR_24V**,*amp-hr* **$FILEMGR**,*integer* **$GPS_DEVICE**,*integer* **$HEAPDBG**,*boolean* **$ICE_FREEZE_MARGIN**,*degrees* **$ID,***integer* **$INT_PRESSURE_SLOPE**,*calibration value* **$INT_PRESSURE_YINT,***value* **$KERMIT**,*integer* **$LOGGERDEVICE1**,*integer* **$LOGGERDEVICE2**,*integer* **$LOGGERDEVICE3**,*integer* **$LOGGERDEVICE4**,*integer* **$MASS_COMP**,i*nteger* **$MINV_10V**,*voltage* **$MINV_24V**,*voltage* **$MOTHERBOARD**,*boolean* **$N_NOCOMM**,*integer* **$NOCOMM_ACTION**,*integer* **$PHONE_DEVICE**,*integer* **$PHONE_SUPPLY**,*integer* **$PITCH_AD_RATE**,*AD counts* **$PITCH_CNV**,*cm/AD counts* **$PITCH_MAX**,*AD counts* **$PITCH_MAXERRORS**,*integer* **$PITCH_MIN**,*AD counts* **$PITCH_TIMEOUT**,*seconds* **$PRESSURE_SLOPE**,*calibration value* **$PRESSURE_YINT**,*value* **$RAFOS_CORR_THRESH**,*value* **$RAFOS_DEVICE**,*integer* **$RAFOS_HIT_WINDOW**,*seconds* **$RAFOS_PEAK_OFFSET**,*seconds* **$RELAUNCH**,*integer*

	$ROLL_AD_RATE,*integer* **$ROLL_CNV**,*degree,AD counts* **$ROLL_MAX**,*AD counts* **$ROLL_MAXERRORS**,*integer* **$ROLL_MIN**,*AD counts* **$ROLL_TIMEOUT**,*seconds* **$STROBE**,*boolean* **$SURFACE_URGENCY**,*integer* **$SURFACE_URGENCY_FORCE**,*integer* **$SURFACE_URGENCY_TRY**,*integer* **$T_ABORT**,*minutes* **$T_EPIRB**,*seconds* **$T_NO_W**,*seconds* **$T_WATCHDOG**,*minutes* **$TCM_PITCH_OFFSET**,*degrees* **$TCM_ROLL_OFFSET**,*degrees* **$UNCOM_BLEED**,*AD counts* **$USE_ICE**,*integer* **$VBD_BLEED_AD_RATE**,*integer* **$VBD_CNV**,*cc/AD counts* **$VBD_MAX**,*AD counts* **$VBD_MAXERRORS**,*integer* **$VBD_MIN**,*AD counts* **$VBD_PUMP_AD_RATE_APOGEE**,*integer* **$VBD_PUMP_AD_RATE_SURFACE**,*integer* **$VBD_TIMEOUT**,*seconds* **$XPDR_DEVICE**,*integer*
Expert Mode Used Only After Glider is Well Trimmed; Settings Based on Dive Plot and Regression Analysis	**$DBDW**,*gm/m/s* **$HD_A**,*value* **$HD_B**,*value* **$HD_C**,*value* **$PITCH_ADJ_DBAND**,*0/off or degrees* **$PITCH_ADJ_GAIN,***0/off or cm/deg* **$PITCH_W_DBAND**,cm/s **$PITCH_W_GAIN**,*cm / m/s* **$ROLL_ADJ_GAIN**,*0/off or deg/seconds* **$ROLL_ADJ_DBAND**,*0/off or degrees* **$W_ADJ_DBAND**,*integer*
Seaglider Modified but can be Overridden by Expert Users	**$DIVE**,*integer* **$MISSION**,*integer* **$R_PORT_OVSHOOT**,*AD counts* **$R_STBD_OVSHOOT**,*AD counts* **$T_GPS_CHARGE**,*seconds*