- **CHANGE:** Automatically turns on the unit when the absolute ambient pressure is greater than 1100 mbar (previously was 1300 mbar). Result is faster auto-on when dive starts with Predator turned-off. As a reminder, this auto-on feature is designed as a backup. We always recommend turning your Predator on before a dive starts to confirm functionality and setup.

Important Notice – Change to surface pressure determination

- **IMPROVEMENT:** Improvements have been made to ensure the surface pressure (i.e. the atmospheric air pressure) determination is more reliable for divers at high altitudes, regardless of how the Predator is turned on.

  The surface pressure is now determined by the following:
  - When in sleep mode (off), the pressure is sampled every 15 seconds.
  - The last 10 minutes of pressure samples are saved.
  - Upon turn-on (regardless of the cause), the minimum pressure from the 10 minute pressure history is set as the surface pressure.

The exception is when the battery is changed, since there is no 10 minute history. In this case it is assumed that the unit is on the surface, so the current pressure is used as the surface pressure.

- **FIX:** Fixed wrong CNS calculation in Dive Planner during diving.
- **FIX:** Fixed wrong CNS and gas usage calculation in Dive Planner after the Salinity is changed.
- **FIX:** Fix to Dive Planner where in certain dives ascent to first stop takes place in one minute rather than actual expected time.
- **FIX:** Fixed Dive Planner didn't show depth available for the best gas switch in certain dives
- **FIX:** Fixed some VPM-B dives are more conservative issue.
- **IMPROVEMENT:** Now can display dive time more than 999 minutes (16h40m). When dive time exceeds 999 minutes, shows as XXhXXm, up to 99h99m. However, a smaller font must be used to fit the time in the hours and minutes format.
- **IMPROVEMENT:** Display one decimal place for max and average depth when using meters.
- **CHANGE:** Added limitation that PPO2 calibration cannot be performed when pressure is above 1080 mbar.
- **CHANGE:** When surface pressure is less than 960 millibar, now forces the use of auto altitude setting (i.e. cannot use the SeaLvl setting). This does not change the saved setting.

- **CHANGE:** The dive planner now inserts ascent legs in the results table to perform gas switches during the initial ascent to the first deco stop. The decompression calculations always included these switches, but the planner results were only showing a single ascent to the first deco stop using the bottom gas. This change results in more accurate gas usage results for some dives.

DiveCAN Controller Models:

Important Notice – Change to auto setpoint switching

- **CHANGE:** Changes to auto setpoint switch behaviour. The reasons for these changes are:
    - Allows each setpoint switch to occur more than once per dive, but under more controlled circumstances.
    - More intuitive behaviour.
    - Fights less with manual setpoint switches.

  The changes are:
    - The switch down depth is now enforced to be less than the switch up depth, by at least 20ft (6m).
    - The minimum switch down depth is 5ft (2m). Thus, the minimum switch up depth is 25ft (8m).
    - Each auto setpoint switch can now occur as many times per dive as the switch depth is crossed. The 20ft (6m) enforced gap between the up and down depths prevents oscillations.
    - A switch up will only occur while *descending* (going deeper) across the switch up depth.
    - A switch down will only occur while *ascending* (going shallower) across the switch down depth.
    - If a manual setpoint switch occurs, the auto switch will be cancelled if within 6ft (2m) of the auto switch depth.

Previously, each auto switch direction could only occur once per dive. Also, previously the auto setpoint switches could fight with manual switches under certain conditions, requiring the manual switch to be performed twice. This fighting could also lead to the one auto switch being inadvertently consumed, which could cause confusion later in the dive when the auto switch would not occur as expected.

rEvo rMS Model:

- **FIX:** Fixed an rMS roll-under bug that could occur if rMS system lost connection with probes during dive and was operating in the countdown mode.
- **CHANGE:** If an rMS probe fails its power-up test (i.e. “TEMP PROBE FAIL” message), then the entire rMS system is locked out and does not provide information. Predator must be turned off and back on to clear this state.

APPENDIX B: Previous Release Notes

Version 59:

CHANGE: For rebreather controller models, the 0.19 setpoint is no longer automatically promoted up to the low setpoint when wet.

In V56, a change was made to promote the 0.19 PPO2 setpoint up to the low setpoint (e.g. 0.7) whenever the wet contacts detected water. This change proved to be unpopular to the point that divers refused to update, so we have decided to remove this feature. The intent was to improve safety by preventing a diver from performing a surface swim with the setpoint at 0.19.

As a reminder, the 0.19 setpoint is only for maintenance and storage, and should never be selected when breathing on the loop, even if just pre-breathing out of the water.

As in all other versions, the 0.19 setpoint is automatically promoted to low setpoint when a dive begins.

CHANGE: For rebreather controller models, a "SetP = .19" warning is shown on the main screen when the PPO2 setpoint is 0.19.

A yellow "SetP = .19" warning is displayed whenever the PPO2 setpoint is set to 0.19.

This is to make it very obvious that the 0.19 setpoint is selected, as the 0.19 setpoint should never be used when breathing on the loop. See above.

FIX: Fixed a problem that could cause the dive log to be closed incorrectly, preventing that log from appearing on the Predator or in the downloaded logs.

FIX: Made changes to how non-volatile memory is updated during dive logging to improve long term reliability of the memory.

Version 56:

All Models:

- **NEW FEATURE:** Added tissues bar graph to info screens.
- **NEW FEATURE:** Surface Interval now displays on main screen (in place of deco STOP TIME) when not diving.
- **NEW FEATURE:** Added optional new style gas select (like in Petrel).
- **NEW FEATURE:** Added Clear Log menu option (cannot be undone). Doesn't actually delete data, but flags records so does not display on Predator or desktop software. However, logs can still be recovered from .swlogdata file. Reason for the ability to recover is in the case of a diving accident, where logs have been accidentally or maliciously deleted.
- **IMPROVEMENT:** Changed VPM-B convergence criteria to handle corner cases better.
- **CHANGE**: When within 1m of surface, do not update average depth. Prevents surface intervals from being included in average depth.
- **FIX:** Improvements to GF and VPM-B NDL calculations for more accurate NDL times, especially during ascents.
- **FIX:** In VPM-B, if a better gas was available, but user remained on a different gas, then when approaching a stop, the deco calculations would switch back and forth between using the better gas and using the current gas depending on slight changes to depth. Proper behavior is to assume user will select the better gas, and always use that for deco calculations.
- **FIX:** For Deco Planner in Buhlmann GF, fixed problem where on some units the first run of the Deco Planner would result in slightly different results from all subsequent (and correct) runs.

Standalone and Fischer Models:

- **NEW FEATURE:** Added gauge mode. With stopwatch and resettable average depth.
- **NEW FEATURE:** Added configurable centre row displays. Unused space on main screen centre row can be user configured (not available when 3 external O2 sensors are used, as there is no unused space).
- **CHANGE:** Slight menu reorganization. Added a Mode setting (OC, OC/CC, OC/SC, Gauge) like on the Petrel. This replaces two older menu items, 'OC Only' and 'Closed\Semi'.

Analog Rebreather Controller Models:

- **IMPROVEMENT:** Added solenoid current measurements when solenoid is expected to be off. Used to detect if solenoid MOSFET switch has failed as a short circuit. Issues a Solenoid Alert warning.
- **IMPROVEMENT:** O2 injection is more aggressive when using 0.19 setpoint (since overshoot is not a problem, but allowing PPO2 to fall below 0.19 is a problem).
- **FIX:** For Hollis liability screen, flip buttons when screen is flipped.
- **CHANGE:** When bailing out to OC, automatically switch to low setpoint (to make buoyancy

control easier).

- **CHANGE:** If setpoint is 0.19, and wet contacts detect water, then promote setpoint to low setpoint.
- **Reminder that the 0.19 setpoint is not intended for use when breathing on the loop. The 0.19 setpoint is a convenience feature for use when setting up and storing the rebreather only.**

DiveCAN Rebreather Controller Models:

- **FIX:** Fixed problem with very high CAN bus loads (> 40%) which can cause watchdog reset. Never reported in the field, as typically bus loads are under 0.5%.

Version 46:

- Changed Bluetooth Class of Device from 0 to 0x80704 (Wearable Wrist Watch with Capturing Service). This change to allow Bluetooth connections to older Android phones which have a bug in their Bluetooth stack.
- Fixed problem where Missed Deco Stop error would be generated if last deco stop cleared while diver slightly shallower than last stop.

Version 45: (note: V45 was not a general release)

- Added optional “Start-Up Text”. Custom text that displays on splash screen during start-up. Set text using Shearwater Desktop program.
- Changed default GF conservatism from 30/85 to 30/70.
- Fixed problem where first run of Dive Planner sometimes different than subsequent runs.
- Fixed problem with CNS tracking when unit turned off between dives.
- Changed behavior when switching from CC to OC during dive, and no gas is available with PPO2 of less than 1.6. Previously was choosing the first gas (highest PPO2), now chooses the lowest PPO2 gas.
- Removed Adv Config option “O2 Show PPO2” for models that do not support it. Previously this option appeared in the menu but did nothing for those models.
- Improved stability of final few stops when using VPM-B on dives with little deco.

- Improved accuracy of VPM-B NDL calculations.
- Fixed bug where Bluetooth uploads and downloads would fail when performed at high altitude.
- Fixed JJ external low battery warning level.
- Removed Clear Dive Log option from menus.
- In Dive Planner, bailout out ascent legs now display the gas as the gas that was in use at the start of the ascent, not the end of it.
- DiveCAN/rMS: controllers now use wet contacts for auto turn-on.
- DiveCAN/rMS: Now displays a ? or X for each scrubber to indicate connection status. First ? or X is exhale scrubber, next is inhale.
- DiveCAN/rMS: If scrubber not fully ready when dive ends, still show results in Scrubber Times page.
- DiveCAN/rMS: New warm-up conditions.
- DiveCAN/rMS: Added biometric parameters for adjusting scrubber times to metabolism.
- DiveCAN/rMS: New scrubber reset conditions.
- DiveCAN/rMS: Don't allow scrubber reset while diving.
- DiveCAN/rMS: Bus Devices screen now shows firmware versions.
- DiveCAN/rMS: Added depth compensation option for solenoid control.
- DiveCAN/rMS: Enabled VPM-B for rMS systems.

Version 42:

- Added VPM-B decompression model.
- Also, VPM-B is available as a hybrid model with Gradient Factor Surfacing (VPM-B/GFS).
- Added Advanced Configuration menus.
    - Salinity
    - Title Colors
    - OC Only PPO2 display
    - End Dive Delay time
    - rEvo Solenoid Depth compensation

  - PPO2 limits

- Changed external PPO2 sampling rate. Previous versions sampled once per second and displayed the average of the last 4 samples. Now 4 samples are done in 1 second, with the average displayed.
- Top-level menus (Turn Off, Switch Setpoint, Dive Setup, etc) timeout after 10 seconds (down from 60 seconds). Once a menu is entered, timeout is still 60 seconds.
- Time can now be displayed in AM/PM as well as 24 Hour format.
- Changed the date format from (mm/dd/yy) to (dd-mon-yy). For example, what was 08/27/11, is now 27-Aug-11.
- Added “End Dive” menu option. Only available when Predator is still in dive mode and is at the surface. Dive will also end when the computer has been on the surface for the “end dive delay” time.

Version 40:

- Update only for rebreather controllers with automatic calibration. Corrects problem where PPO2 calibration is accepted prematurely if a low external battery warning occurs during automatic calibration.

Version 37:

- Corrects a bug that affected the PROCT-SA and Kiss GEM models when turning off the “OC Only” mode.

Version 36:

- Nicer Fonts.
- Option to turn gases on/off.
- 20ft (6m) last stop option.
- When only 0.5ft (0.2m) below stop depth, do not flash red warning.
- Dive planner now uses maximum PPO2 of 1.4 to pick bottom gas in OC mode (was using the deco gas value of 1.6).
- When gas is off or cleared to 00/00, display dimmer to indicate off state.

- Use yellow font to indicate when more appropriate deco gas is setup but not currently selected (previously flashed red).
- Added seconds bar graph above dive time.
- Moved ascent rate graph to beside depth. Changed ascent rate graph to up arrows.
- New “OC Only” option on some models. Simplifies operation when diving OC only.
- Display “OC” in yellow, on models when CC or SC is available (if diving only OC, use the new “OC Only” option).
- In SC mode, new option to display both PPO2 and FiO2 on the main screen.
- Improved TTS deco calculations for SC mode when using multiple gases.
- The conservatism settings (GF Low and GF High) can now be edited in the Dive Setup menu. While diving, the GF High value can now be edited. This allows changing the surfacing conservatism during a dive. For example, if you worked much harder on the bottom segment than expected, you may wish to add conservatism by reducing the GF High setting.
- Increase ADC sampling time. Improves reading stability by a few tenths of a millivolt, especially for O2 sensor 3.
- Added permanent warning to center line of main screen for conditions that persist. For example, Low PPO2, High PPO2 and Solenoid problem. These warning clear automatically when condition goes away.
- When all sensors voted out, alternate centre line between PPO2 values and “VOTING FAILED” in yellow.
- For PROCTE, when in external PPO2 mode, remove high and low setpoint settings from menu.
- Use yellow for system menu arrows and underlining into increase visibility.
- In System Menu, show error conditions in yellow.
- Gas definition fails if duplicate gas.
- Gas sorting prefers gases with less helium if O2 is equal (that is, lower helium gas to be used at shallower depth).
- Fixed bug where clearing dive log would lead to blank spots in displayed dive logs when viewed in Desktop application.

- Changed the label “Cal PPO2” to “Cal FO2”. Since the Predator compensates for altitude or weather changes in atmospheric pressure automatically, the FO2 label is correct.
- After upgrade, show alternating “FAIL FAIL FAIL” and “NEEDS CAL.” on centre line.
- Fixed transition point between showing percentage and ‘on gas’ for GF99.
- Don’t show GF99 in place of NDL when on surface. Was too confusing, just show NDL.

Version 32:

- Added Dive Planner.
- Modifications to Buhlmann GF code to better match Erik Baker’s original implementation (when his program set to short Minimum_Deco_Stop_Time. i.e. to mimic “real-time” calculations). Biggest change is to profiles with minimal decompression obligations. Also, in some cases the deep stop may be shallower by a few stops versus previous Shearwater products, although total deco time roughly the same.
- Added @+5 display (based on Dan Wible’s CCR2000). This shows the TTS if diver was to remain at current depth for 5 minutes more. Can be set to replace NDL on main screen once deco is required.
- Added info screen to show all deco displays (GF99, CEIL, @+5/TTS).
- In Semi-closed mode, the external sensors can optionally display FiO2 instead of PPO2.
- Increased menu timeout when in Dive Planner and on surface to 3 minutes.
- Models heat transfer between water and battery compartment to account for insulation provided by case. Purpose is to reduce false low battery internal warnings caused by changes in water temperature.
- Adjusted levels of low battery internal warnings.
- Added averaging of internal battery reading.
- Fixed bug where menu time-out during gas editing resulted in improperly sorted gases.
- When writing error to info log, update error flags before writing log (or else error flags do not appear properly in log).
- Added “Searching…” animation while looking for next dive log to display.

- Info screens now time-out after 10 seconds (was 6 seconds). Also, can jump from any info screen back to main screen by pressing left button.
- Fixed bug where pressing confirm button during the very short time window between error being set and being displayed caused the wrong error to be acknowledged.
- When on surface, do not correct AvgPO2 or GasPO2 with CE_WATER_CORRECTION (Since there is no water to correct).

Version 30:

- Added Brightness setting with fixed values of Low, Med and High and an Auto-adjusting setting. All previous versions of the Predator firmware used the Auto setting.
- Added Altitude setting. When set to 'Auto', pressure changes due to altitude will be used for depth and decompression calculations. When set to 'SeaLvl', the surface pressure will always be assumed to be 1013mBar (1 atmosphere). **Important:** The default value is SeaLvl. If you will be diving at altitude, please ensure this value is set to Auto.
- Added button labels to make navigating menus and changing settings easier.
- Changed system menu to make changing settings easier.
- OC/CC Gases setup added to system menu. All gases can now be edited on one screen.
- Added dive plots to Dive Log viewer. Also added average depth to dive log.
- Added option to clear dive log.
- Added option to manually set dive number (useful when dive log cleared or to sync dive number with another computer).
- Added average depth to info screens.
- Added average depth in atmospheres to info screens.
- Added fraction inspired O_2 (FiO_2) to info screens.
- Reorganized info screens to show information most relevant to current diving situation.
- Added reset to defaults option.
- Changed internal battery level measurement to compensate for temperature. Was giving false low-battery warnings when in cold water.

- PROT model (OC only model) now shows the gas PPO2 on the center line of the display.
- In OC mode, changed warning level for high PPO2 (was warning at 1.6, now warns at 1.65).

NOTE: Before upgrading, please download all existing dive logs.

The dive log format has changed so there is a possibility of corrupting the existing dive logs on the Predator. If after upgrading to V30 you have troubling viewing the dive log, use the new 'Clear Log' function.

Version 29:

- Fixed external battery display for ISC users.

Version 28:

- Flash red PPO2 value when outside range 0.4 to 1.6.
- A voted-out PPO2 sensor will display as yellow (unless outside 0.4 to 1.6, then it will flash red).
- During calibration, display of O2 Cell millivolts turns yellow when millivolts are outside of acceptable range (range varies with O2% and altitude, but at 1 ATM and 98% O2, the acceptable range is 30mV to 70mV).
- Fixed saving of Auto Setpoint Switch settings.
- Changed so external (solenoid) battery is only updated when the solenoid is firing. This is done because the battery voltage can be erroneously high when solenoid is not on. If you see Ext. V = 0.0 after turning Predator on, this may be because the solenoid has not yet fired.
- Separated ascent rate graph into distinct bars for easier reading.