# SANDSHARK™

## Table of Aborts and Actions

If an abort occurs during a mission, the thruster will stop spinning and the vehicle will float to the surface with the red LED on. To check which abort occurred and at what time it transpired, ssh into the vehicle and enter the command:

```
rostopic echo /health/last_abort
```

The possible aborts are enumerated in the table below, as well as corresponding causes and suggested troubleshooting steps for each abort are provided.

The trigger value for each abort is configurable via the Parameters menu in QGroundControl. Bluefin recommends not changing these values unless absolutely necessary and after careful deliberation, as the defaults have been picked to prevent harm to the vehicle.

| Abort | Typical Causes | Troubleshooting / Suggestions |
|---|---|---|
| **Overtemperature Abort** | Ambient pressure vessel temperature has risen too high | This abort triggers if the ambient temperature inside the pressure vessel has exceeded 40°C. This typically only occurs if the vehicle is operated in air for an extended length of time. To cool the pressure vessel, either shut the vehicle down for around ten minutes, or place the vehicle into water |
| **High Pressure Abort** | Ambient pressure inside the pressure vessel has risen too high, indicating a leak | Bluefin typically operates its vehicles with a vacuum in the pressure vessel. The recommended vacuum for Sandshark is an absolute pressure of 85 kPa. The high pressure abort will occur if a pressure of greater than 90kPa is detected within the pressure vessel, as this indicates that a leak is present. If Bluefin has stated that your vehicle should be run at with a vacuum, set the Low Pressure abort to 70 kPa so that it does not trigger.<br>When the high pressure abort occurs, immediately remove the vehicle from the water and check for water intrusion and leaks. If no obvious issues are detected, use a vacuum pump to decrease the pressure in the pressure vessel until the /environmental/environmental pressure reading is at ~85 kPa. Ensure that the vehicle can hold pressure for an extended period of time before continuing operations |
| **Low Pressure Abort** | Ambient pressure inside the pressure vessel has dropped too low, indicating a leak | If, due to a known sealing issue with your vehicle, Bluefin has recommended that you operate with positive pressure in the vehicle's pressure vessel rather than a vacuum, this abort will apply instead of the High Pressure one. In this scenario, the High Pressure abort should be set to 120 kPa so that it does not trigger. The low pressure abort occurs when the vehicle senses a lower than expected internal pressure, indicating that some air has leaked out of the pressure vessel.<br>In the event of a low pressure abort, immediately remove the vehicle from the water and check for leaks or water |

| | | |
|---|---|---|
| | | intrusion. If there are no obvious physical issues with the pressure vessel, use a pump to increase the pressure inside the pressure vessel until the /environmental/environmental pressure reading is at ~108 kPa. Ensure that the pressure is not dropping at over 1kPa / 10 hours before continuing operations |
| **Low Altitude Abort** | Water depth different than expected, operator error when planning the mission | This abort triggers when the vehicle senses that it is at an altitude lower than 1 meter in order to prevent accidental collisions with the sea floor. If it occurs, double check that the mission was planned correctly and that the water depth is actually as deep as the charts state. |
| **High Depth Abort** | Operator error when planning the mission | The depth abort triggers when the vehicle reaches a depth greater than 100 meters to prevent the vehicle from exceeding its depth rating. When the depth abort occurs, double check that the mission was planned correctly. |
| **Low Battery Abort** | The battery's percent state of charge has fallen too low to continue the mission | When the battery percent of charge falls below 5%, the low battery abort will trigger. When the vehicle comes to the surface, charge the battery before continuing operations |
| **Mission Length Abort** | The vehicle was physically stuck during part of the mission, operator error when planning the mission | The mission length abort triggers when a mission has been running for an amount of time longer than this threshold is set to. If it occurs, double check that the planned mission can actually be completed within the allotted time slot and adjust it accordingly. Additionally, the mission data should be checked to ensure that the vehicle is not getting stuck during any point in the mission. One example would be if a waypoint was planned with a capture radius smaller than necessary, the vehicle might have to loop around it several times before considering it as having been reached |
| **Leak Abort** | Water intrusion into the pressure vessel | This abort occurs when the leak sensor inside of the pressure vessel has detected water intrusion. Immediately remove the vehicle from the water and verify that no water is entering the pressure vessel before continuing operations |
| **Navigation Integrity Abort** | Sudden jerk or twist of the vehicle during a mission, loss of altimeter or depth sensor communications, detection of impossible vehicle dynamics | Download the vehicle data and view the /navigation/navState publication throughout the mission. This publication contains a detailed string as to why this abort occurs. If impossible vehicle dynamics or sudden jerks or twists have occurred, ensure that the area of operations is free of anything that could hit the vehicle during its mission such as a boat or a steep slope on the sea bed. If any sensor data was lost, power cycle the vehicle and ensure the vehicle comes up in the running state with the green LED on before running another mission |