# Nautic Alert Nevata HD™ targets the root causes for why boats sink with machine-learning intelligence and autonomous controls.

Nautic Alert Nevata HD™ is a new innovative machine-learning controller for the Nautic Alert Platform that monitors and automatically controls bilge pumps intelligently, with full redundancy; it is the first autonomous bilge management system. Never before has a disruptive technology revolutionized bilge architecture and enabled both detection and the ability to do something about a developing situation to prevent a catastrophe, well before any other product can come close. Until now, technology has not existed to be able to detect the root causes of why boats sink. Unlike its predecessors, not only can Nevata HD detect and deal with a multitude of issues with full redundancy, but the detailed cycle data it provides to the cloud enables pre-failure detection of bilge equipment.

Traditional Configuration   Nautic Alert Nevata® Solution
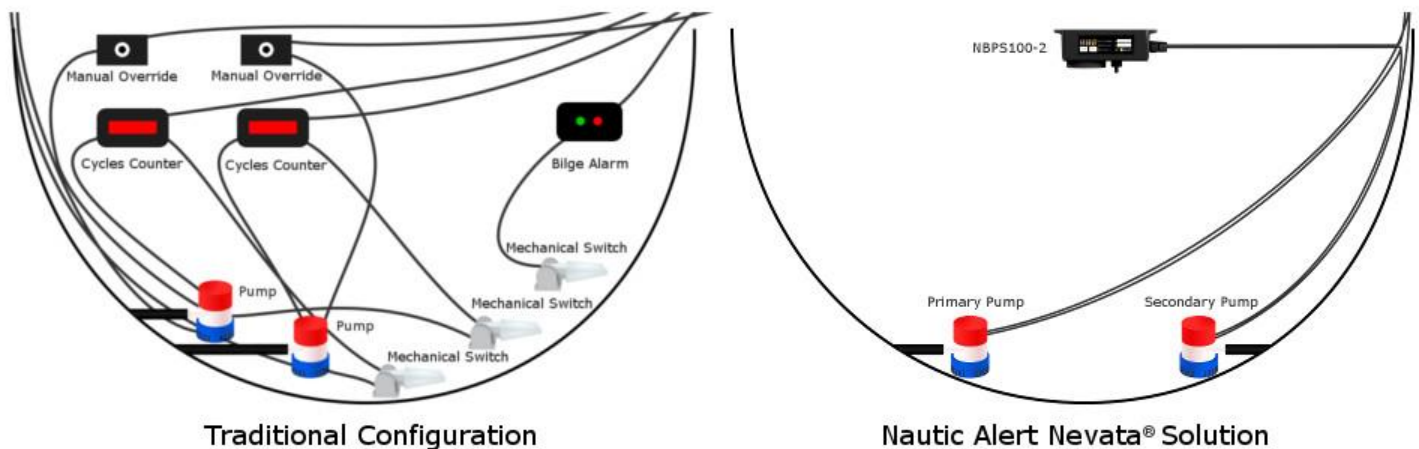
Disregarding collisions and named storms, boats sink simply because of residual water that can't be removed from the bilge. Pump counters and high-water alarms can provide marginal and worse-case *detection*, but fail to effectively and automatically notify when one of many possible conditions ensue because their technology is limited, and as importantly, they lack the ability to *do something* about a problem. Developing leaks, degraded hardware, jammed impellers and hoses, wiring, and batteries are all sources of failure, and need to all be considered, and Nautic Alert does just that.
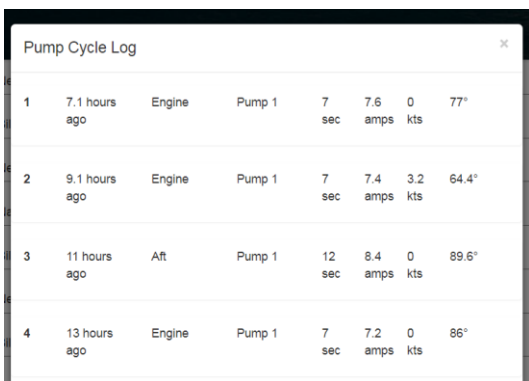
The key to Nautic Alert Nevata HD's unique design that enables machine learning intelligence is its ability to measure the bilge water level to within 1/10 of an inch from above the waterline, where it is immune to bilge elements, measure the current draw of the attached pump directly, and learn what's normal and not normal. With these two inputs, there is no dependency on external switches that can often be the cause of faulty hardware. By measuring the water-level, intelligent decisions can be made about the effectiveness of the pump and plumbing, including when it is necessary to auto-switch to a backup pump and determining and notifying for which pump is more effective in removing the water.

In contrast, consider other products that simply measure current draw to the switch, but make the assumption that the switch, pump, and plumbing are working properly, and cannot measure the water level. These products have no visibility into stuck or faulty float switches, pumps that are ineffective at removing water, failed pumps, and many other factors. They only consider one or two aspects of many components involved, including segregating independent offset pumps and high-water indicators. There is simply no intelligence or uniformity to integrate all components together as is done with Nevata HD. With Nevata, a traditional float switch becomes the backup to a highly redundant and autonomous bilge management system, making it obsolete as a primary line of defense.

Nevata HD learns the current characteristics of the pumps, which enable it to run a weekly test on each pump without any water present. In addition, if Nevata experiences a complete blockage of its ability to measure the water level, it can still run the pumps based on its learned ability. Coupled with Insight, the system learns how often each bilge compartment cycles, and automatically notifies when increased pump activity occurs, as opposed to simply showing pump cycles.

If Nevata HD detects a pump fault or over-current condition, or if the water level will not recede when the pump is activated, it auto-switches to the backup pump and notifies of pump trouble. Each time it notifies, it also sends the water level so the user is fully informed of the current situation and can make an informed decision. In addition, the system can notify a dedicated third party when a critical high water condition occurs and an immediate pump out is needed.

Unlike previous models, Nevata HD and 200 series controllers provide cycle statistics to the Nautic Alert Cloud, which includes cycle duration, total pump runtime and cycles, pump average current draw, bilge temperature, vessel speed, and more. These stats are all available to Nautic Alert users via Nautic Alert's My Insight's App.

Pump Cycle Log							✕
1	7.1 hours ago	Engine	Pump 1	7 sec	7.6 amps	0 kts	77°
2	9.1 hours ago	Engine	Pump 1	7 sec	7.4 amps	3.2 kts	64.4°
3	11 hours ago	Aft	Pump 1	12 sec	8.4 amps	0 kts	89.6°
4	13 hours ago	Engine	Pump 1	7 sec	7.2 amps	0 kts	86°

When a pump reaches its end of life, an increase in current draw can be observed. With adequate cycle data, Nautic Alert's Cloud will be able to predict and notify automatically before this condition occurs, without a user needing to analyze the data above. In addition, the Nautic Alert Cloud will be able to tell pump manufacturers data on their pumps that they are currently unaware, which includes mean time to failure and actual customer usage.

An increasing cycle time can warn of a developing problem with the pump, impeller, or plumbing before the system is unable to remove water and an auto-switch of the pumps is necessary. With a traditional system, this could simply result in a pump runtime notification and depleting the boat's battery supply, burning up the pump, or worse if water is truly entering the boat in an increasing fashion, and without any owner visibility into the changing water level.

Being able to pinpoint an issue by correlating these statistics is valuable for OEMs and warranty mitigation. If a vessel experiences increased pump activity, but only when underway, this information can be analyzed and extracted. In two recent cases, a Nautic Alert customer experienced unexpected water siphoning through his washer machine while underway, and in another case, it was due to an underwater engine hose starting to come loose. The Nautic Alert team was able to detect unusual pump activity in both of these cases, and discuss with the customers enabling them to pinpoint and remediate the issue.

Edge and cloud computing mixed with machine learning is a new concept to the marine industry, and Nautic Alert HD is leading the way with the first major overhaul of the most critical and last line of defense used to keep boats and yachts floating. Nautic Alert designs and manufactures leading marine IoT technologies based on SMART sensor principles.

For more information, visit www.nauticalert.com