

## Nautic Alert X2 Overview

Nautic Alert X2 is the most intelligent and advanced security, monitoring, safety, and tracking system ever created. Designed to give early detection and controls for both onboard and remote use, X2 surpasses the competition in features with custom engineered solutions that lead the industry, and costs thousands less than top priced products. Unlike many other products that use black-box solutions, X2 includes a compact marine-grade MFD with vibrant graphics, a feather-light touch interface, and built-in user and remote roles and permissions.

Submerged bilge pump switches and high-water alarms are severely limited, cryptic technology, and the only solutions provided by all other monitoring products. Every week boats sink after a float gets stuck, a bilge pump burns out, or a high-water alert fails to send with adequate time. Nevata is the first SMART bilge controller that replaces floats from above the waterline, with technology you have to see to believe. It can detect virtually any issue in the bilge when a problem first develops, saving a boat owner weeks or months of time well in advance of high water, and can even auto-switch pumps. It revolutionizes bilge architecture, and is a game-changer for boaters and insurance providers.

Voyagers and chartering customers are often the target of theft of exterior items or interior personal belongings, even while sleeping onboard. X2 introduces the first microwave-intrusion technology that turns the tables and gives occupants a heads-up before an intruder boards, and works with harsh marine factors that make traditional motion technology unreliable or unusable.

Many life-saving products rely on one-way satellite communications and/or limited device intelligence. X2 features an emergency/SOS interface and personal transmitter that can act as a MOB device or even work from a nearby beach to notify GEOS global emergency response with verifiable message delivery. Complete with two-way text messaging and positional redundancy, X2 works in combination with an advanced Nautic Alert cloud solution to extend positional intelligence as well as communication and connectivity to friends and family, so GEOS isn't the only entity notified during an emergency.

X2 doesn't stop there, in fact, it also includes multi-bank DC monitoring and trending, the most precise and accurate anchor alarm in the industry utilizing next-gen GPS technology, vessel tracking that automatically displays previous and current tracks in real-time, and AC shore power detection. X2 is complete with On-Demand communications, delivering real-time information from the device itself, whenever one wants it. Nautic Alert's advanced low-power architecture enables boat owners and charter companies to keep track of their assets and passenger safety, even in remote locations where shore power is not available and solar-panels are relied on. Nautic Alert delivers full peace of mind to boat owners and voyagers, enabling them to stay connected with family and friends all times.

The Nautic Alert is an MTC-E, which stands for monitoring, tracking, control and edge-based for early detection. Unlike other products, the Nautic Alert solution doesn't just report sensor data, its edge-based capabilities enable it to learn, analyze, and makes intelligent decision with measured data in its onboard processing engine, so when you get an alert, you have additional time and information you need about the event to decide how to react. Designed by a lifelong boater and former IBM employee with critical server development experience, the Nautic Alert transforms boat monitoring by introducing technology and innovation never before seen in a marine application bounded by precision engineered principles. X2 is a new product that builds on its bilge-centric predecessor by adding a multitude of new features requested by boaters, customers, and charter companies.

## Nautic Alert Components and Apps

The Nautic Alert Decision Platform consists of three components, Insight, Nevata, and XPulse. All are custom engineered in-house from the ground up utilizing marine-grade materials. Insight is a compact flush mountable or bracket-installable MFD that contains an analytical engine, display, and communication peripherals. Nevata is the industry's first and patented SMART bilge controller designed to replace a float switch from above the waterline and communicate with Insight via secure wireless sync technology. XPulse is a concealable unit that bridges functionality of multi-bank DC monitoring, AC shore power detection, and security and safety functions into Insight via secure wireless sync technology, and also provides redundant power-path management to Insight.



The supported apps include the following, and unique features are discussed below:

- AC Shore Power Detection
- Bilge Management
- Boat Security
- DC Monitoring and Trending (Multi-Bank)
- Geofence/Anchor Alarm
- My Insights Web Portal Access
- Vessel Locator
- Vessel Tracking
- Emergency SOS

## Bilge Management Solution

Another boat sinks in a marina again. This headline seems to show up every week somewhere. Maybe the float switch was stuck, maybe a through-hull gave way, or maybe the bilge pump stopped working, who really knows. This has been the attitude of many boaters, boat manufacturers, and insurance companies for decades, and why wouldn't it be since it was the only technology available for generations with obvious shortcomings. Whatever the boat size, the same inexpensive bilge pump switches are often the only thing keeping a boat from sinking, and when one considers the amount of gunky sludge in which the switch resides, it only makes sense that it's a matter of time before something fails. A high-water alarm can add marginal protection, but it's like an alarm on the front door of a house, there are a lot more ways for burglars to gain entry, but you may be notified once you've been robbed if they run out the front. If one actually gets an alert and happens to see the alert in time, the alert may be considered effective and a story is made, but in many cases engine flooding or worse already occurred. Nautic Alert revolutionizes these problems with a new-age solution that can detect virtually any developing issue as soon as it occurs, saving a boat owner weeks or months of time, and can even notify a third party if high-water does occur and an immediate pump-out is needed.

According to BoatUS studies, most boats that sink do so while docked, and most issues take weeks or months to develop. For the boat owner that just lost his boat, how angry should he be if he learns the bilge pump stopped working weeks ago, and a recent rain caused enough incoming water to sink the boat? What about if the float switch was stuck on and depleted his batteries preventing a high water alert from going out? Most issues start with a developing leak from a through-hull or packing gland, and often go undetected until the leak worsens and burns up the pump or depletes the batteries. Nautic Alert Nevata is the first SMART bilge controller designed to work with existing pumps and replace the float from above the waterline, leaving nothing but the pump to deal with the water and sludge, the way it should be. <http://www.boatus.com/seaworthy/magazine/2014/april/keeping-your-boat-afloat-page-2.asp>



Nevata uses technology one must see to believe. Sitting above the bilge bottom, it can "see" and measure the waterline to 1/10 of an inch and knows if the attached pump is drawing power, giving it human-like intelligence to detect issues with the pump, plumbing, or electrical. Even with no water present, it will check the attached pump once a week so there are no surprises. The Nautic Alert solution learns how often the pump activates, and will let you know the second it starts to pump water more frequently than nominal, detecting a leak in the initial stages. Not only can it monitor an issue and deliver early detection, but it can even do something about it by auto-switching to a backup pump on certain models. When it's not detecting an

issue though, a boat owner can know exactly how much water is in each bilge compartment right to their phone, at any point in time. So now, if a pump fails, knowing how much water is present is information one can use to decide how to react, which is one of many cases a float switch cannot detect, and information it cannot deliver.

## Common Points of Failure Scenarios

To understand how the Nautic Alert Platform can effectively reduce catastrophic claims due to water entry, we must first consider the following list of common points of failure.

### The Developing Leak

When a through-hull, packing, a/c hose, etc... start to give way, there will typically be a gradual increase of pump cycling that can be observed as the leak worsens. Knowing a problem has started is key to getting the upper hand in dealing with it, while there's time. In their study, BoatUS noted that a working bilge pump kept up with a developing leak for weeks or months until the situation worsened, and the pump eventually failed.

### The Faulty Float Switch

Float switches are mechanical switches, and thus, have a finite number of activations they can handle before the electrical contacts degrade. Before this becomes a factor, more times than not, the sludge in the bilge will create a stuck float, either open or closed. This can then cause pump burn-out, DC voltage depleting (especially in a moored situation with limited solar charging and no shore power), or no pump activations with water present and increasing.

Even with non-mechanical pump switches, the makeup of the water in the bilge can be so detrimental that it degrades the performance of these switches over time.

### The Faulty Electrical Connections

From time to time, wires and connections between the float and pump can get submerged. Over time, the connection can corrode to the point where too much impedance is present, and current cannot flow to the pump, despite the float and pump being otherwise functional.

This condition can also be masked by the manual override switch. Many boats use a manual override switch that lights an LED showing voltage is present at the connector, but doesn't say anything relevant about the state of the pump. One can assume the pump is working while it really may not be.

### Blockages

When a pump seems to work correctly, there still may be a problem. Many people use check-valves in their pump outlets to prevent backflow, and these can get stuck. Hair and gunk in the bilge can jam a pump impeller, hoses can get kinked or knocked loose.

Being able to detect a pump is running continuously may be a hint of an issue in these situations, but a proactive solution is to switch to another pump that can effectively remove water in the interim. Doing so and notifying a yacht owner of the details can prevent pump burn-out and draining the boat's DC supply, and provide adequate time to deal with the situation.

### Incoming Water Capacity Overtakes Small Primary Pump

If the rate of incoming water is too much for a small primary pump to handle, switching to a larger backup pump may be necessary. Doing so may result in lowering the water level effectively, but a serious situation is now present that still has not triggered a high-water condition, and thus, a yacht owner has no knowledge of this condition.

**In fact, all of the above situations are not detectable by a high-water alarm.**

## Individual Case Studies

Customer experiences influence the design of the Nautic Alert solution to address boat owner concerns for asset protection.

In one case, a 35 foot sailboat kept on a mooring ball, started to encounter a leaky through-hull. The primary pump kept up with the leak until the pump cycling frequency caused the overall power consumption to deplete the solar-panel setup, and a high-water alert was not issued, since the DC supply was depleted by the time water rose to the high-water float. The boat subsequently sank.

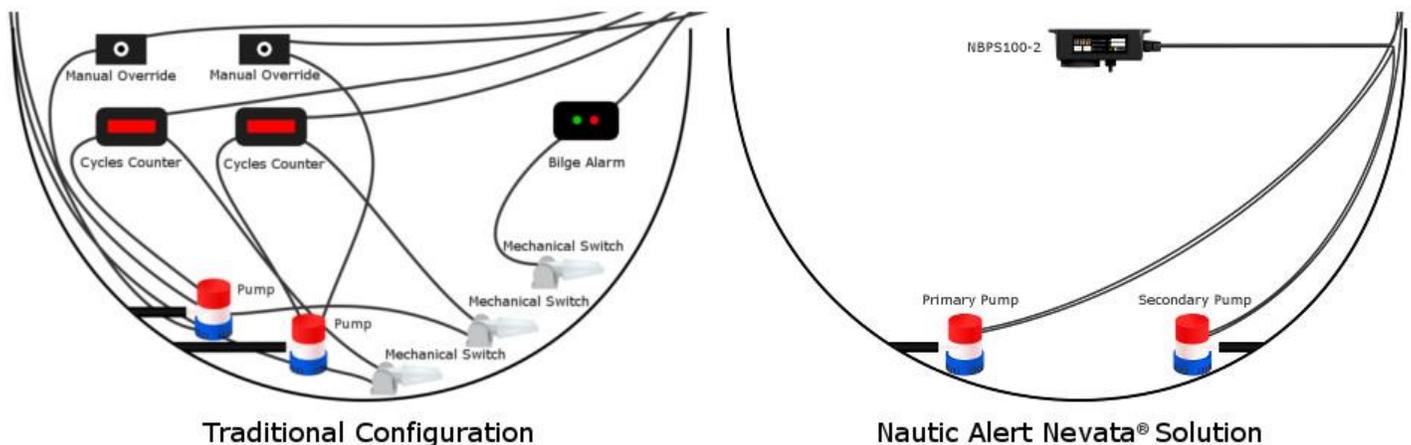
In another case, a 50 foot power yacht sprang a leak in an engine coolant hose, and the bilge pump started running continuously to keep up with the incoming water. The owner had no idea his engine compartment was being flooded and, by the time he was notified of the high-water condition, incurred \$20k in damages that needed to be repaired. In a third case, the owner of a 55 foot center cockpit sailboat had a primary, backup, and high-water alarm present. All float switches failed, and upon entering his boat, noticed there was over 20 thousand gallons present that needed an immediate pump-out. Salvage claims were costly in this case.

In a fourth case, the owner of a 45 foot sailboat was notified of high water, but did not see the message. The boat needed an immediate pump-out, but because of the delay in time, the sailboat sank.

## Comparing the Current Bilge Architecture

Let's take a look at the Nautic Alert Platform, and how it deals with all of the above issues.

Currently, a typical bilge setup will involve at least one float switch, where additional ones are at offset elevations. Additionally, there could be pump cycle counters, manual override switches, etc... The traditional setup also involves having both the pump, switch, and electrical cables located in the bilge sludge.



In the Nautic Alert model, all external components are integrated into a single housing that sits above the waterline, in a UL compliant watertight enclosure and design. The Nevata can “see” and measure the water level from above, where the water level readings are immune to any water impurities, contaminants, or sludge makeup that may be present.

### Less components and safer environment

The first thing the Nautic Alert solution does is re-architect the bilge setup so nothing except a pump or hose needs to be submerged in water. Now, when diesel, oil, or corrosive chemicals spill, the bilge is a safer environment. Imagine, no more combining moving parts with sludge or electrical cables and connectors exposed to flammable liquids, and no more float switch to get stuck on or off.

## **Pump redundancy and trouble detection**

Primary and backup pumps are now co-located at the lowest elevation in the bilge, rather than offset elevations. This gives the advantage of being able to automatically switch pumps without requiring an increase in water volume.

By having two pumps side-by-side, a dual-pump Nevata can evaluate both pumps to determine if one is effective in removing water, whereas the other may not be. If this occurs, either due to a blockage or rate of incoming water, for example, a trouble event will be detected.

## **Developing Leak Detection**

The Nautic Alert Insight keeps track of how often pump activations occur, and gives a user real-time statistics that show how frequent the pump cycles under normal conditions. If any pump starts to cycle more frequently than nominal, a high-activity event is sent to the owner.

## **Pump Failure or Overcurrent Detection**

The Nevata learns the electrical current profile of the attached pump, and therefore, can sense when the pump is working properly, and drawing power. It can even distinguish between a non-functioning pump, pump that's siphoning water, and pump that's not siphoning water. If a pump encounters a serious issue and develops an internal short, this will be detected and the pump will immediately shutdown with periodic activation attempts to follow or will cause a dual-pump Nevata to switch to the other connected pump. Likewise, if a pump fails to power on, a dual-pump Nevata will switch to the other connected pump. A pump fault event is sent to the owner.

## **Pump Burn-Out and Stuck Switches**

Because the Nevata learns the current profile of the attached pump, it knows exactly when to turn the pump off without running it dry—it can literally sense when the pump is no longer siphoning water effectively. The Nevata also implores a pump watchdog feature, so that once water recedes less than 1.6 inches, the pump will be shutoff within 20 seconds no matter what. This ensures that in no case will the pump be run continuously with marginal water in the bilge.

## **Continuous Runtime Detection**

If switching pumps does not resolve getting the water out, and the pump needs to run continuously to keep up with a leak, a continuous runtime event is detected and sent to the owner. If a pump is required to run continuously, it still may encounter a thermal shutdown condition where the pump disables itself momentarily to prevent overheating. During this time, a dual-pump Nevata will continue to try to switch pumps to find a way to get the water out, no matter what.

## **Periodic Pump Testing**

If a connection issue occurs over time, or if the pump simply stops working at some point in time, there are no more surprises. The Nevata will automatically test the attached pumps once a week, to ensure they draw power as expected. Because people don't really inspect their bilge setups as recommended on a regular basis, the Nevata will do it automatically, and issue a fault if one of the pumps does not power-on properly.

## **Peace of Mind**

Even when the Nevata is not detecting or switching pumps to work around an issue, an owner can know EXACTLY how much water is present in each bilge compartment, down to 1/10 of an inch. No other product can do this, or any of the above, in an integrated solution.

## Nevata Features

The Nevata is the marine industry's first SMART Bilge Pump Controller.



All Nevata settings and features are intended to be used from Insight's Remote Nevata Display via Wireless Sync, however, can also be modified on the Nevata itself.

### Nevata Settings

The Nevata features settings for adjusting the bilge pump turn-on level and alert level. This can be especially useful in a situation where water back-feeds after the pump has been turned off, or if less cycling is desired in preference for a longer pump runtime.

### Advanced Filtering and Statistical Analysis

The Nevata features proprietary advanced water level measurement algorithms, making it truly superior technology. It continuously samples the water level and is able to normalize true water level readings from splashing water so that spurious movement in the water does not activate the pump, as can happen with float switches. This is also very important to prevent premature pump burn-out.

Additionally, the Nevata can be used within very shallow and tight bilge compartments where keel bolts make it difficult to use normal bilge pumps, or very deep bilges difficult to reach. The acoustic beam can easily work with tight situations. In fact, the Nevata uses statistical analysis of the water level readings to eliminate readings due to nearby obstacles, such as keel bolts.

### Fail Safe

In the unlikely event something compromises the ultrasonic transducers used to "see" the waterline, the Nevata will respond by periodically turning the pumps on. Because it can sense electrically what the pumps are doing, it knows when to turn the pumps off automatically. If water is detected, the pump activations will occur frequently, otherwise, the activations will back-off in frequency. All-the-while, a transducer fault event will be notified to the yacht owner.

### Power Consumption

Consuming only 20mA at 12V (when not powering the pump), the Nevata can virtually run for years without ever depleting a marine battery. Nevata utilizes the industry's leading lowest power consumption technology.

### Pump Counters

Individual pump counters display for both the primary and backup pumps.

## Ease of Installation

In this case, a customer has a very deep and inaccessible bilge, and was able to replace his faulty float switch from above without ever needing to get to the bottom.





## Insurance Benefits

Nevata has the capability to drastically change boat safety by virtually eliminating costly recovery and salvage claims due to sinkings that are not storm or accident induced. With the widespread adoption of Nevata, insurance companies could see savings well into the millions given salvage and EPA costs associated with even the mildest of claims, and boaters could experience much lower premiums. Nautic Alert's advanced cloud solution enables 3<sup>rd</sup> party integration, which could include notifying service yards, SeaTow, and insurance companies very early in the process when an early event is detected or a high-water pump-out is needed.

## Insight Nevata Features



Insight lets a yacht owner manage up to 10 Nevatas, or up to 20 bilge pumps, right from the bridge. It even contains a loud external siren and visual alarm indicator conforming to Coast Guard CFR requirements for Bilge High Level Alarms, and can notify multiple alert recipients, when it matters.

### Manual Override

When activating the manual override for a pump from the Insight, you get instant verifiable feedback that the pump is working properly, and real-time visualizations of the water level. This gives a user confidence of what's going on in each bilge compartment, without ever having to physically check. It also eliminates the possibility of the manual override light masking a pump issue.

### Real-Time Water Level

The pump activation level, alert level, critical level, pump counters, pump status, and even bilge temperature are all graphically displayed in an easy-to-read avionics style display.

### Harbor Master Critical Water Level Pump Out

If a high water condition occurs, it may be desirable to have a harbor master or other third party notified for an immediate pump-out. The Insight will distinguish a critical water event from all other bilge event types, and a user can designate an emergency contact to only receive critical event messages. All other solutions that rely on high-water detection cannot distinguish other bilge events like the Nautic Alert, and thus, cannot separate an early bilge event, which does not requiring immediate attention, from a critical high-water event that does.

### Nevata Health Reporting

In the unlikely event a Nevata encounters an issue and is unresponsive, the Insight will detect and notify a yacht owner of this condition. Additionally, because Insight also monitors DC levels, a DC alert and critical alert notification can be sent prior to a low voltage condition that would inhibit a Nevata from working properly.

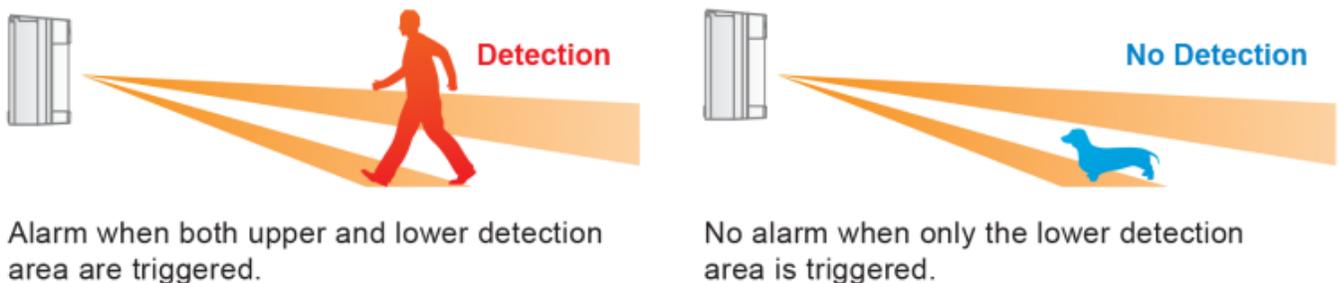
## Boat Security

X2 features the most advanced boat security solution ever created. It enables battery-powered wireless or hardwired sensors to integrate for a full range of installation scenarios. The wireless network used for security is based on Inovonics proven, long-range, commercial-grade proprietary standards. Also, X2 is designed to allow integration with existing hardwired sensors.

X2's boat security feature was created in response to a charter company in the Caribbean that asked for a solution to a unique problem they were facing. Recently, they were experiencing declines in sales due to poor safety PR spreading back to would-be tourists as a result of rampant theft to charter customers while sleeping onboard at night. Pirates were routinely coming onboard and taking customer valuables while customers were present and asleep.

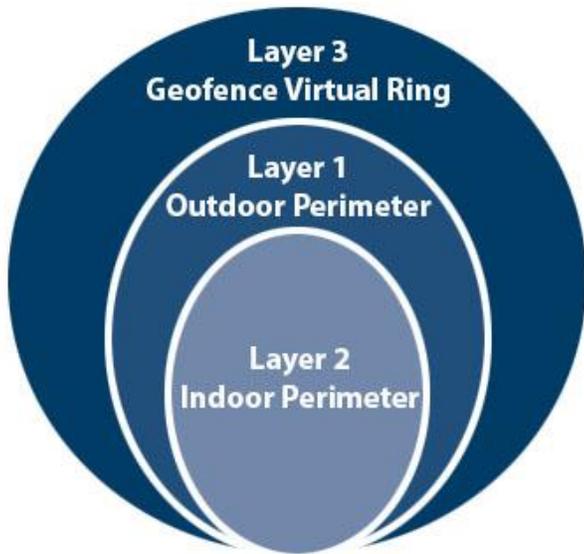
Researching this topic some more revealed that other needs for exterior security included theft of motors, dinghies, and other belongings to travelers and boaters in more broad locations. From this, microwave-intrusion technology became the catalyst to overcome the harshest environmental factors on the planet from a security standpoint, which are only available from select high-end security manufacturers.

Your boat is worth protecting with an advanced boat security system built on the Nautic Alert MTC-E Decision Platform. Nautic Alert is proud to introduce the first marine security solution using next-gen microwave and PIR (passive-infrared) technology working together, which overcomes the harshest factors that often reduce reliability of standalone PIR motion technology. Swaying lines and halyards, open cabin doors and strong marine air conditioners, vibration, and drastic temperature changes that produce large amount of thermal energy can degrade the operation of traditional PIR sensors, making them produce false-positive or missed alerts. Microwave technology enables a sensor to see objects and reject false alerts in this environment, while increasing reliability of detected events.



Nautic Alert is proud to work with established commercial and outdoor specialized security sensor manufacturers such as Inovonics and Optex, to provide one of the most advanced intrusion detection the marine industry has seen, with a 3-layered approach for superior protection.

All certified wireless security and safety sensors are fully supervised, meaning they're monitored for tampering, low battery, or inactivity.



**Layer-1 Early Detection Level of Defense**, the Nautic Alert security strategy enables wired or wireless microwave/PIR motion detection sensors as the 1st level of defense, for the outdoor perimeter, to catch an intruder in the process of coming aboard or in attempt to take an attachment such as a dingy, while the security system is set to “Onboard” mode or “Away” mode to protect crew and passengers while sleeping or the vessel when no one is on board.

**Layer-2 Level of Defense**, provides wired or wireless motion detection sensors and wired contacts positioned in strategic locations within the cabin or in other compartments for indoor perimeter monitoring and detection.

**Layer-3 Level of Defense**, provides the Nautic Alert Geofence, which creates a virtual ring around the vessel and monitors for vessel movement outside of the virtual ring boundaries, which can be set to as little as 50ft. With the combined layers of defense, you get an advanced boat security system with a highly effective strategy. Additional security safety features include smoke detection and personal emergency/ man overboard (MOB) discussed later.

## Precision Detection

Microwave technology enables precise adjustments to the sensor's range, field-of-view, and object size, such that people walking on nearby docks or boats, boats moving nearby, or motion through windows is ignored. As seen here, there are a lot of challenges to reject movement from nearby docks, neighboring boats, moving pilings, and moving boats from astern.



In this case, the detector is mounted near the base of the mast looking aft, and configured with a narrow detection beam of about 30 degrees, detection distance of about 18 feet, and detection size that covers the average size of a human as seen in the cockpit. Tested through Tropical Storm Cindy producing 40kt winds with rocking, rain, and boom vang movement, the detector remained resilient with no false activations. Also, movement on the adjacent dock, boat, or boats entering and exiting the cove produced no false activations over a several month period. Because the detector contains anti-masking, any attempt to compromise the detector would produce a tamper event.

## Security Architecture and XPulse

X2 Supports power-path redundancy and fail-over for high-availability in security and mission-critical applications. A single XPulse supports up to 4 DC inputs and an AC input, which is automatically power-Ored and used to generate a regulated 12 volt output. This output can be used to power Insight, security sensors, or the wireless security receiver on XPulse Plus. Input DC power can consist of mixed battery capacities and voltages, ranging from 6 to 37 volts. A typical configuration could use the boat's dual battery banks, followed by an independent battery/charger for dedicated backup battery redundancy in the event the boat encounters a complete power-loss.

Up to two XPulse sensors can be used, enabling up to 8 DC banks, two AC shore power inputs, 8 security/safety zones, 32 wireless sensors with supervision, as well as two 12V regulators. Alternatively, Insight can be wired directly into the boat's DC input, but for high-precision GPS applications, wiring through XPulse can also provide power supply rejection of conducted emissions originating from other electronic devices onboard that may degrade GPS performance otherwise.

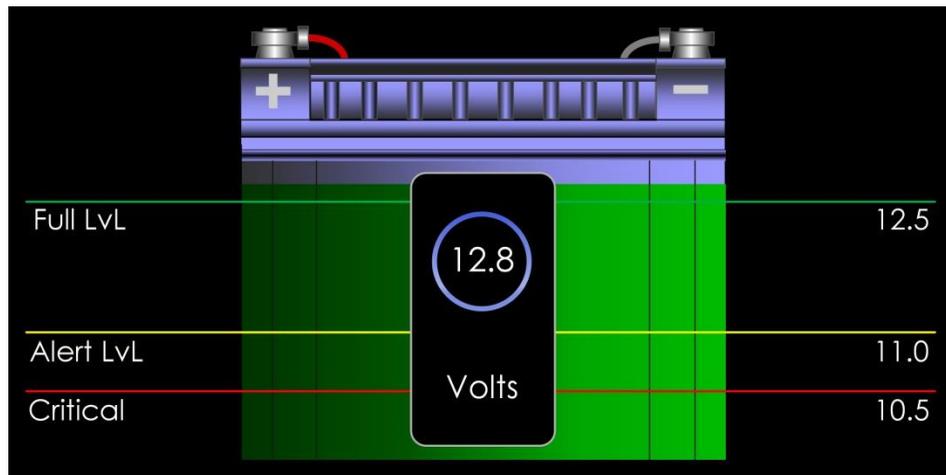


Additionally, a modified version of XPulse could be used to implement a tamper-proof installation, where it could guarantee that the system cannot be moved to another boat without a tamper event being detected.

## DC Monitoring and Trending

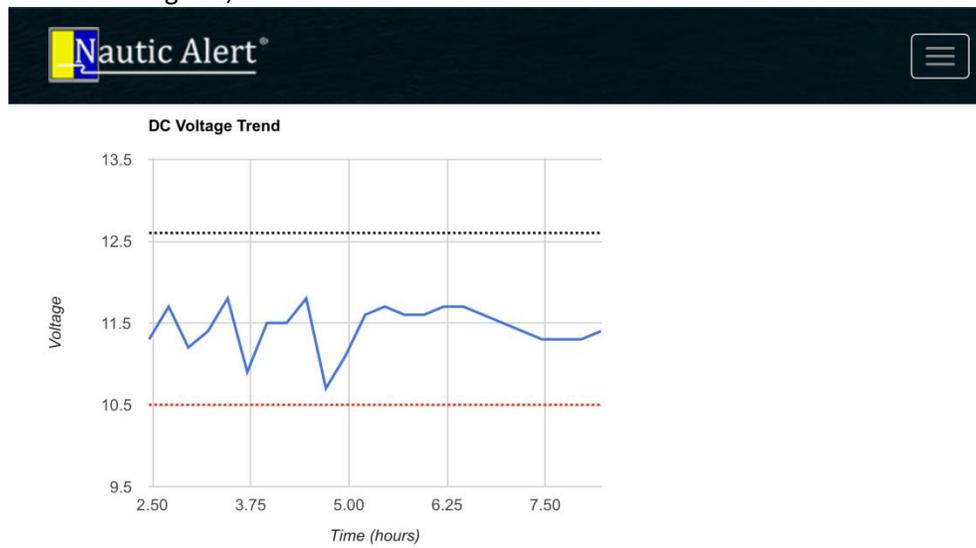
Nautic Alert Insight provides DC monitoring for 12, 24, or 32V lead-acid/AGM, lithium, or customizable battery solutions. DC alerts and critical alert levels can be customized. As another precision engineered feature, DC alerts require a full minute of DC voltage stabilization, so electronic devices putting a load on the DC system do not generate false alerts as commonly observed on other systems.

The averaging feature of the DC monitoring provides immunity against false alerts due to cycling bilge pumps, starting an engine, and other devices.



## DC Early Event Detection

A low-voltage alert is synonymous with a bilge high-water condition. There are several observable cases of voltage behavior that can indicate a charger going bad, battery cell starting to fail, battery capacity no longer adequate for long-term use, or unintended electrical device running and depleting a battery, for example. In this waveform taken from an actual customer and shown in the My Insights Web Portal, an irregular voltage charging profile can indicate a developing issue with the charger or electrical system, and is very useful for diagnosing an issue before one is underway and finds they can no longer start their engines, in a worse case.

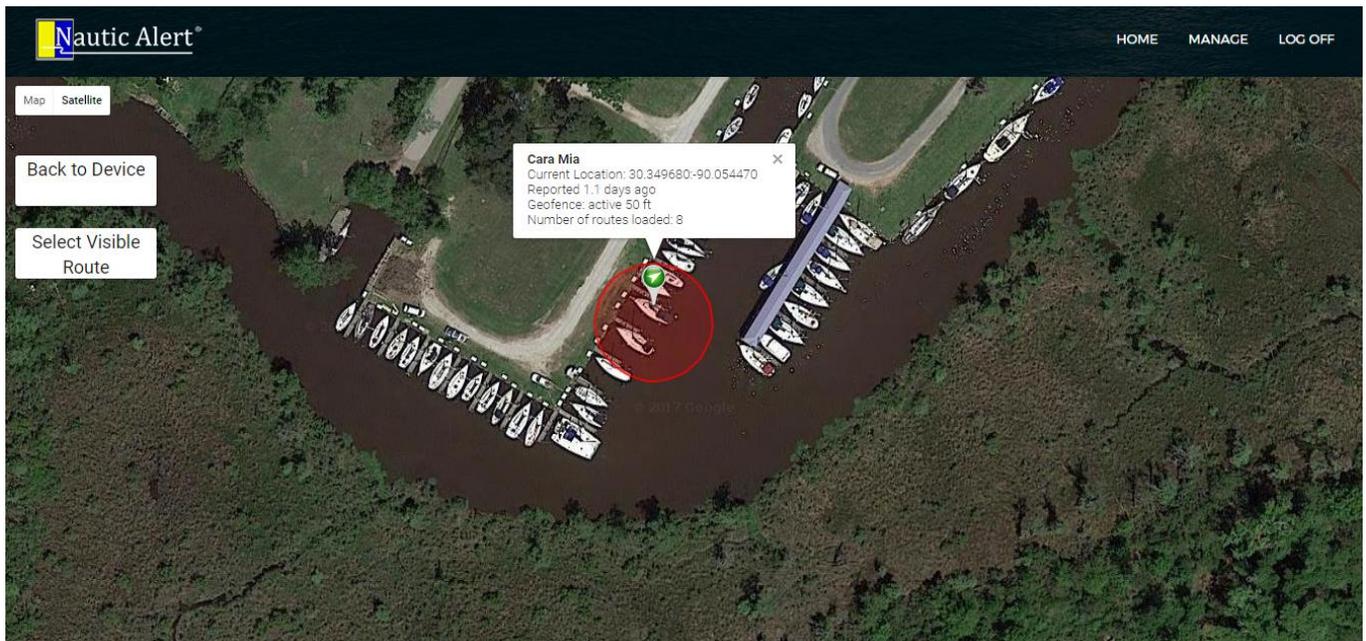
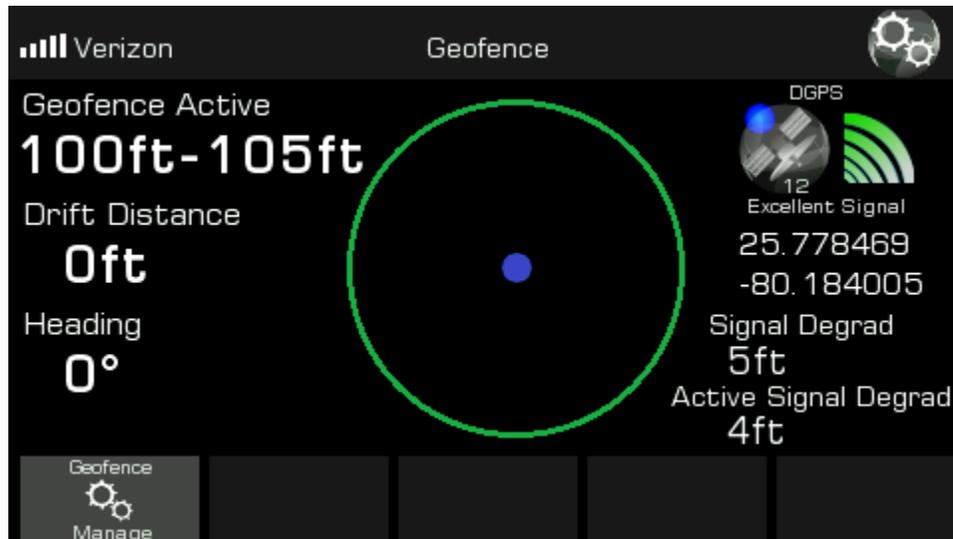


An important point to notice here is that a low-voltage alert threshold is not hit during this event even though a periodic voltage swing is present indicative of something potentially troubling. Insight supports single bank DC monitoring and trending while XPulse features 4-bank inputs to expand the number of batteries monitored.

## Geofence/Anchor Alarm for Early Detection of Unexpected Movement

Nautic Alert Insight processes WAAS based GPS position information and uses proprietary advanced algorithms to eliminate false-positive notifications caused by changing weather conditions and changes in satellite signal strength to ensure high accuracy in reporting and notification. The proprietary algorithms used by Nautic Alert Insight rely on specialized integrated hardware not currently available in NMEA-based GPS solutions or NMEA 2000 networks.

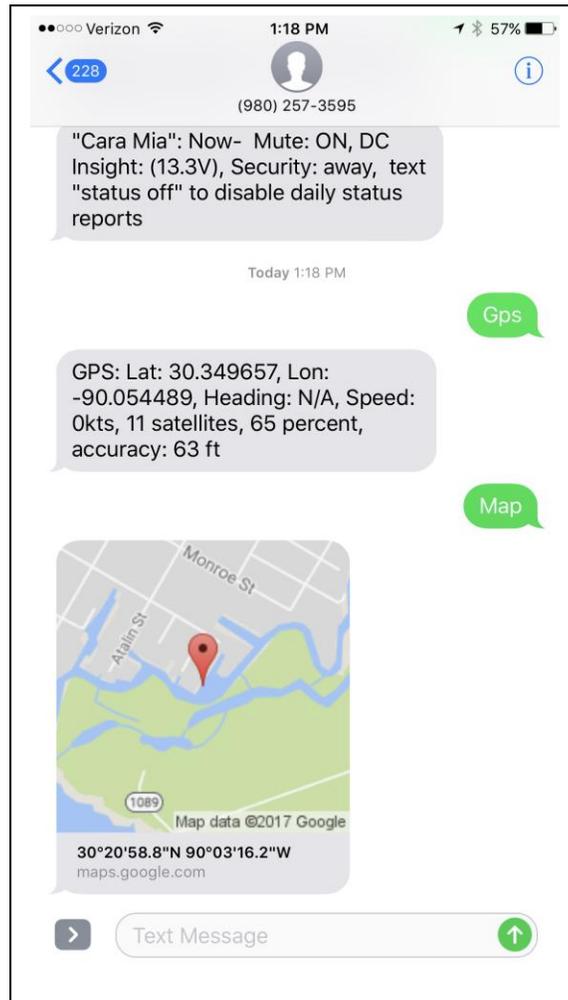
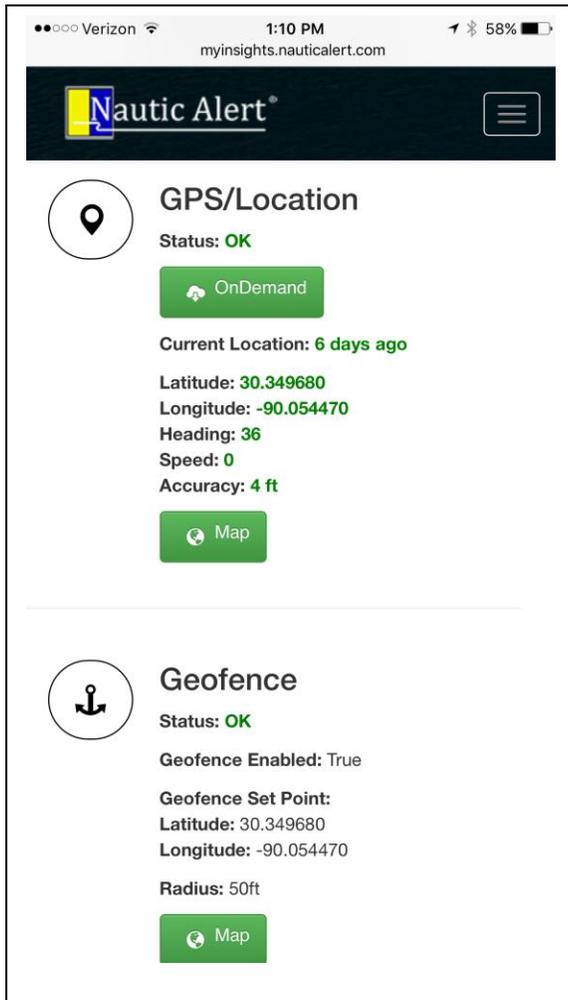
As another precision engineered feature, it is also essentially important that positional data be measured and calculated effectively to prevent false alerts from being sent. NMEA based GPS module's used on NMEA2000 networks are incapable of doing this because they cannot detail precise positional accuracy measurements, which is inherent in the non NMEA-based GPS module utilized by Nautic Alert.



Here, the My Insights Web Portal and Insight screen display examples of what a customer sees when using the geofence feature. The Google Maps image shows how precise the geofence protection radius is, encompassing as little as one boat width side-to-side.

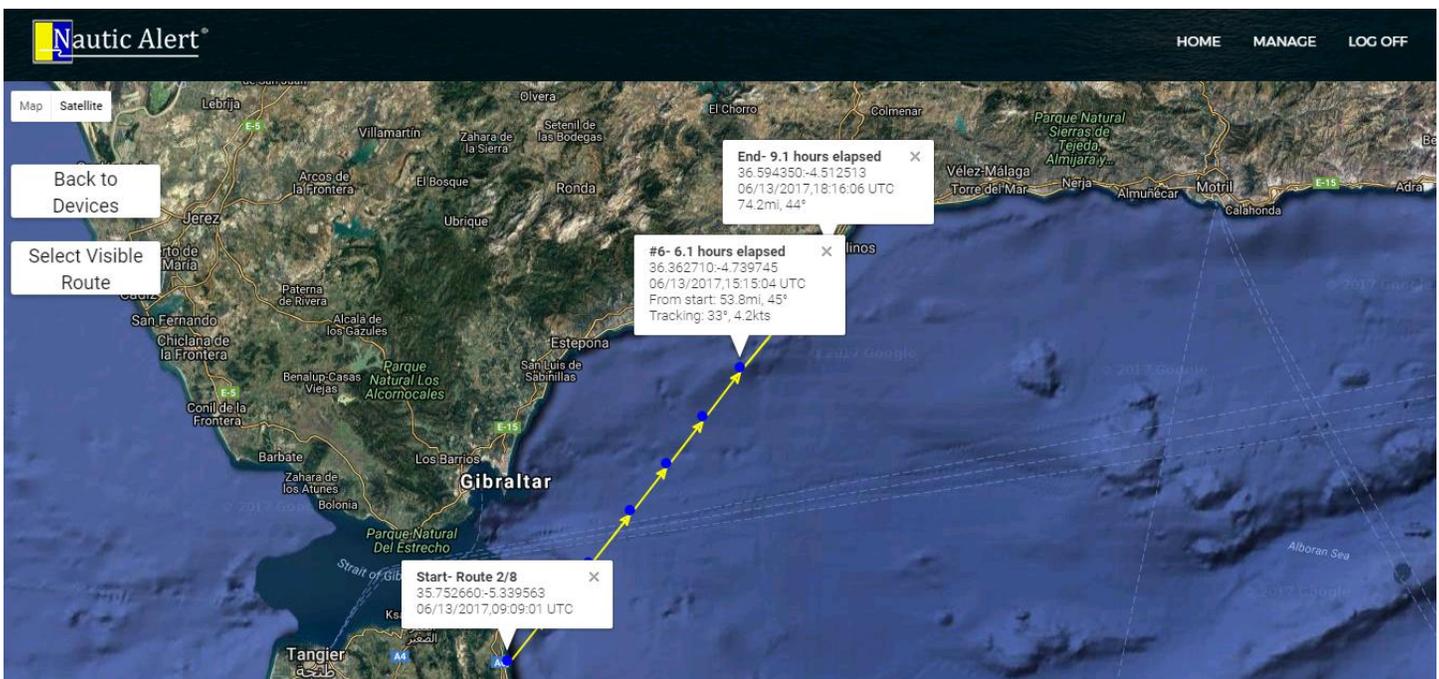
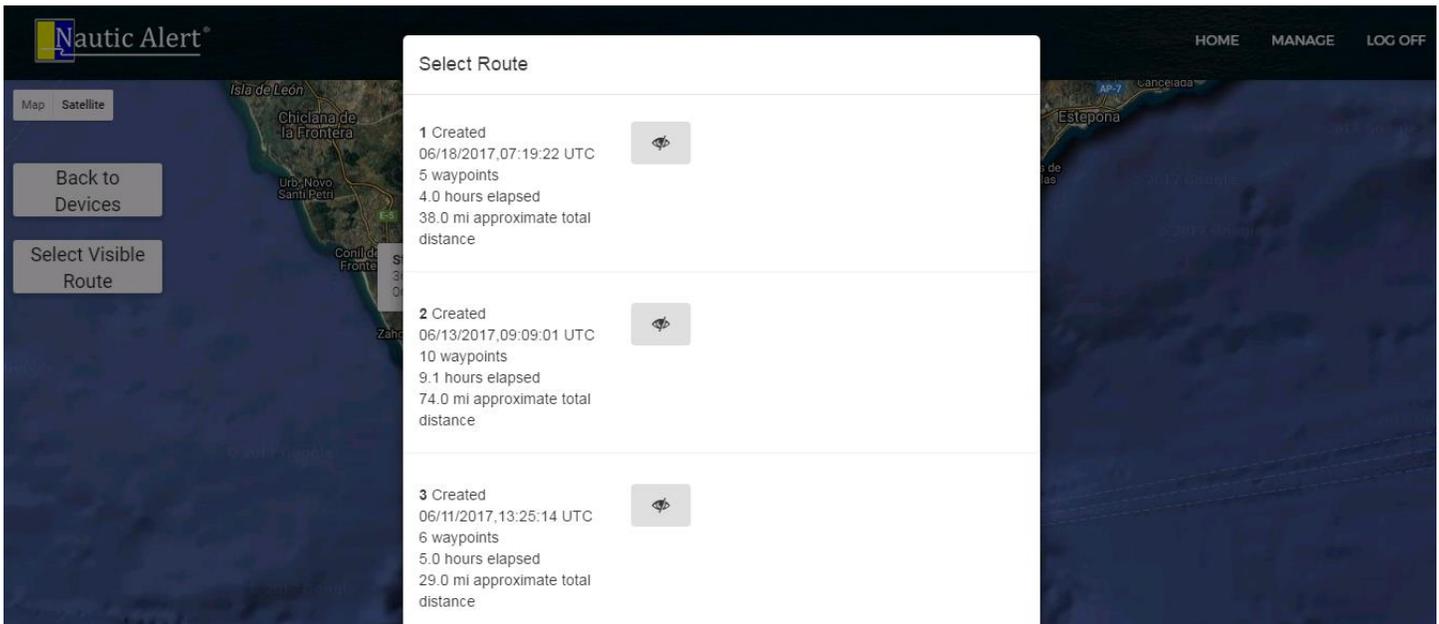
## Vessel Locator And Tracking

Nautic Alert is complete with vessel tracking that only sends location updates when the boat moves. While other solutions solely rely on periodic location updates, Nautic Alert features On-Demand Vessel Locator which enables a user to send a location request to the device itself, guaranteeing the returned location is not from stale data stored on a land-based server, and avoids needing to wait for a periodic location update. The ability to request a location update at any time can be accomplished by texting the device from one's phone, or via the My Insights Web Portal as shown here.



Nautic Alert ensures that device requests are only from authorized devices that have been given access to its remote capabilities.

The Vessel Tracking interface boasts simplicity that automatically calculates and displays current and previous track data without any user intervention. This ensures that friends and family can easily see and keep tabs on a traveling family member and always know their location, if the user wishes to allow this.



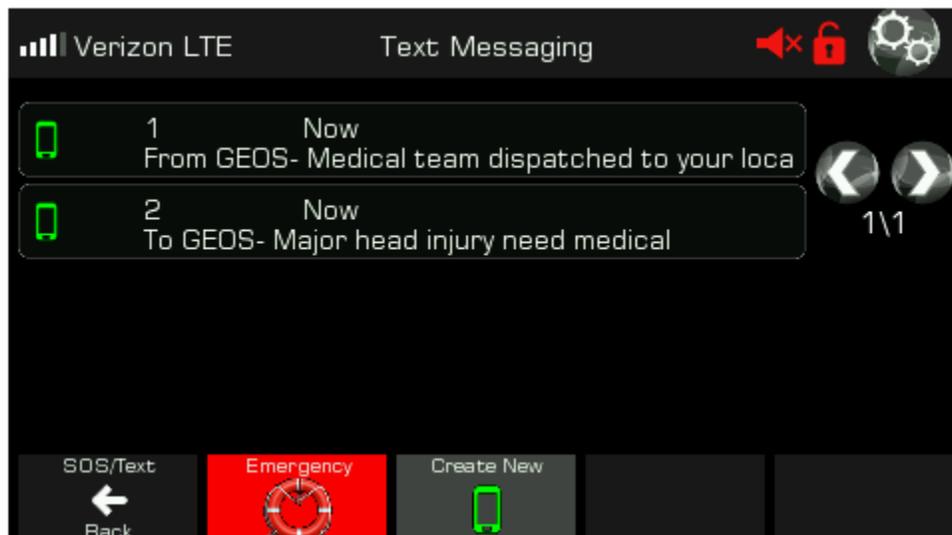
On-Demand location requests automatically add to the periodic location updates inherent in the vessel tracking subscription, and will show up as tracks on the map.

It's important to point out that some solutions buffer tracking data then upload them once the device is connected via Wifi. Nautic Alert buffers waypoints only if connectivity is unavailable, and transmits them similar to VMS type approval standards. At this time, Nautic Alert is planning a VMS type approval submission for its Insight X2.

## Emergency SOS

The new Nautic Alert X2 platform features GEOS worldwide emergency response complete with 2-way messaging, and an optional long-range personal transmitter that can be used in a man overboard (MOB) scenario. You can even text message with any other mobile number from the middle of the ocean using Nautic Alert Insight X2.

The personal transmitter can be worn onboard, used in a dinghy, or carried nearby onshore and concealed to offer protection, especially in remote locations where risk of personal safety is elevated.





Here, the personal transmitter is visible on the life jacket in view. Once activated, Insight will activate the emergency interface and initiate the emergency message sequence.

Through the optional 2-way message interface, an emergency event's details can be described and GEOS can respond with information critical to the response.

## Lifesaving Redundancy

In 2008, four sailors died after signaling for distress using a very popular marine device. They had been competing in a race onboard the Aegean, as written about in Practical Sailor, and ran into unknown trouble later that evening. The device they used could not ascertain their GPS position at the time of the activation, despite previously reporting vessel tracks. Several crucial lessons were learned from this event, including that the monitoring company and first responders can only be as effective as the device communicating information to them.

With Nautic Alert X2, a distress message can be sent out with the push of a button on the device, or from a personal transmitter worn on a lifejacket, but that is where the comparisons stop. When an emergency activation occurs, exceptional intelligence and hardware in the device works in combination with an advanced Nautic Alert cloud solution to offer several redundant countermeasures to avoid exactly what occurred in this noted story.

X2 advanced system starts with reliable and verifiable 2-way messaging, which provides a user with a confirmation that the message was received and a way to directly interact with first responders through text messaging. Some other very popular devices rely on one-way communication satellite solutions with absolutely no message confirmation from the device, and certainly no way to communicate with the responders and give additional crucial details about the event.

Next, upon receiving a distress message, Nautic Alert's advanced cloud solution can choose up to 4 position references to use when communicating to GEOS and alert contacts to describe the vessel's location. This includes the current reported position from the device, but if unknown, it could use the last reported position captured from the device, the previous tracking entry stored in the cloud database, and, in a worse-case, Iridium-based geo-location inherent in the message from the device. This enables 3 redundant positions to be used when reporting the event, and each contain the vessel's heading, speed, timestamp of location, and most important, expected positional accuracy, so a worse-case search circumference can be known. This last piece of information is the result of using next-gen GPS technology, which is not available on many GPS solutions commonly used in maritime networks and equipment.

Nautic Alert offers additional redundancy by reporting the event to multiple alert contacts, complete with location details and a map, right to their phone and inbox. During an emergency, X2 will continue to send location details every few minutes, so both GEOS and friends and family know exactly what's happening in real-time. Nautic Alert's vessel tracking feature enables real-time On-Demand updates, and its X2 enables texting from anywhere in the world, so friends and family have multiple ways to stay connected during normal times and emergencies. Nautic Alert's cloud solution is like an additional safety net built for redundancy, storing vessel tracking data, alert contact information, and more. It enables additional intelligent processing and communications that would otherwise not be possible from the device alone.

## Competitor Key Differentiators

The following shows some of the major differences between the Nautic Alert Decision Platform and other competitors. A very important distinction is that other competitors offer black-box type solutions that are telemetry-only or require tablet style hardware for onboard functions. The Nautic Alert Insight is a marine-grade MFD intended to be physically present and installed in the boat, and offers simultaneous onboard controls and remote operations. An example of this is a user activating the bilge pump overrides or using the anchor alarm while a management company is tracking the device and sensor data details.

Feature	Nautic Alert X2	Competitor (A)	Competitor (B)
Onboard Capacitive Touch Screen Graphical Interface	✓		
Onboard Analytic Engine for Early Event Detection	✓		
Onboard Sensor Data Processing and Computation	✓		
Onboard Data and Alarm Display and Audio	✓		
Onboard Network for Wireless Component Communication	✓		
Onboard Text Messaging	✓		
Onboard System Event Logging	✓		
Onboard Integrated 95dB siren	✓		
Onboard Bilge Pump Manual Override Controls Interface	✓		
2-Way Data Real-Time On-Demand Communication to Device	✓		
1-Way Data Buffered to Land-Based Server		✓	✓
Remote On Demand Real time Information Requests	✓		
Text and Email Notifications	✓		
4G LTE Superior Long Range Shoot Through Hull Cellular Antenna	✓		
Embedded Global Iridium Satellite Shoot-Through Hull Antenna	✓		
3G Cellular Communications		✓	✓
WAAS GPS (used onboard commercial aircrafts)	✓		
Measures Bilge Compartment Water Level with 1/10 Accuracy	✓		
Measures Temperature for Bilge Compartment	✓		
Bilge Water Level Measurements and Analysis	✓		
Bilge High Water Level Detection Less Than 1 Inch	✓		
Bilge High Water Level Float Switch Alarm (requires 4 to 10 inches of water to activate)		✓	✓
Bilge Pump Failure Detection	✓		
Bilge Pump Auto Swapping for Recovery	✓		

Feature	Nautic Alert X2	Competitor (A)	Competitor (B)
Bilge Pump Cycle Counter	✓		
Bilge Pump Cycle and Runtime Analysis	✓		
Bilge Pump Controller Supporting Up to 16A / 300W Pump	✓		
Bilge Pump Controller Managing Up to 20 Pumps	✓		
AC Shore Power Loss	✓	✓	✓
Onboard or Remote Security Arming/ Disarming	✓		
Wired Microwave Based Outdoor/Indoor Security Sensors	✓		
Wireless Microwave Based Outdoor/Indoor Security Sensors	✓		
Passive Infrared Indoor Security Sensors and contacts	✓	✓	✓
Active DC Battery Voltage Monitoring and Trending	✓	✓	
DC Multi-Battery Bank Monitoring and Trending	✓		
Geofence		✓	✓
Geofence High Precision with 50' Detection And Auto Adjusting	✓		
Anchor Alarm		✓	✓
Anchor Alarm, High Precision With Auto Adjusting	✓		
Worldwide Emergency SOS With 2-Way Messaging	✓		
Personal Emergency/Man Overboard (MOB) SOS	✓		
Web Portal	✓	✓	✓
Vessel Locator With Real-Time On-Demand Vessel Location	✓		
Vessel Locator Based on Previous Reported Location		✓	
Vessel Tracking With Real-Time Track Builder	✓		
Vessel Tracking With Buffered Track Data			✓
Standard 2-Year Warranty	✓		
Standard 1-Year Warranty			✓