The theft and vandalism of aids to navigation (AtoN) sites has been a troublesome challenge for ports and AtoN operators around the world for a number of years. Aids to navigation sites are installed to warn mariners of hazards where both visual and audible signals are critical to the safe navigation of vessels, from large tanker ships to fishing and recreational craft. In addition to the financial impact to port AtoN programs and operations, episodes of theft and vandalism of AtoN sites raise serious implications for shipping safety and protection of the marine environment. It can be compared to someone stealing the traffic light on a busy main street.

Today, Aids to Navigation equipment is an asset that can come at a considerable cost to the operator and if a lantern, moorings and perhaps a Racon is installed onto a floating AtoN, then the cost of this ‘asset’ could easily reach into the tens of thousands of dollars – a similar amount to a vehicle or truck that the operator would also consider as an ‘asset’. However, whilst precautions such as alarms, immobilizers and insurance are taken to cover the threat of theft and vandalism of a vehicle, it appears that no such consideration is taken to cover the threat and vandalism of an AtoN. An aid to navigation can be made up of a number of components that could be attractive to potential thieves such as batteries, solar panels and valuable materials such as stainless steel that can be re-sold by the perpetrators.

**BENEFITS**

- Reduces the episodes of theft and vandalism of batteries, solar panels & lanterns in a non-self-contained set-up
- Self-contained lanterns reduce the risk of theft and vandalism as batteries are installed inside of lantern housing and integral solar panels cannot be removed
- Low power LED lanterns reduced the battery and solar power required and therefore reduces the attractiveness to potential theft
- Educated local fishing community on AtoN operations
- Built trust with local community
- Reduces labour costs through remote monitoring of AtoN assets
- Allows AtoN installed in remote locations to be monitored in a cost-effective manner
By having somebody responsible for the markets where theft and vandalism is often associated, Tideland Signal has taken these challenges head on and is offering solutions to deter the threat of theft and vandalism to clients around the world.

Theft is principally associated with the removal of AtoN equipment or power supplies (including solar panels and batteries), whereas vandalism would normally be associated with either deliberate or unprovoked damage of the AtoN equipment or the AtoN site.

The major causes of vandalism may be attributed to:

- Theft of the buoy system or its equipment
- Vessels colliding with AtoN
- Fish operations using the buoys as fish aggregating devices (FADs) - A fish aggregating (or aggregation) device (FAD) is a man-made object used to attract ocean going pelagic fish such as marlin, tuna and mahi-mahi (dolphin fish). They usually consist of buoys or floats tethered to the ocean floor with concrete blocks. Over 300 species of fish gather around FADs. FADs attract fish for numerous reasons that vary by species

Theft and vandalism is an issue that generally affects many areas around the world, it is more prevalent in some regions, most notably Africa where Tideland has dedicated extensive travel over the last two years to experience examples and witness first hand the growing threat of theft and vandalism of AtoN equipment. With the knowledge and research collected, Tideland is well-informed to provide solutions in which will improve marine navigation safety and safeguard our clients investment. Upon gathering and reviewing extensive research and data, Tideland has introduced new strategies and innovative remote monitoring and control applications for countering theft and vandalism that would benefit marine safety around the world. Tideland has witnessed immediate results in the African region by providing practical deterrents to operators of these affected AtoNs.

The following is a selection of the examples witnessed from the multiple travels to the African region and the deterrents that have been implemented to positively overcome this significant challenge to an operators AtoN operation and safety of navigation.
Northern Angola – Theft of Batteries and Solar Panels from Navigational Buoys

An AtoN operator in northern Angola was experiencing excessive theft of the power supplies that were installed upon the buoys to provide power to the installed lanterns with an estimated $1,000 worth of batteries disappearing at the very peak.

Tideland’s solution to this particular challenge was through the introduction of self-contained LED lights with integral solar systems that have no other application that in the provision of being an AtoN. The solar panels are ‘useless’ if removed and the small 24Ah batteries proved to be less attractive that the larger 105Ah batteries that they replaced. The theft and vandalism did continue for a few more weeks, but then steadily slowed once the culprits discovered that there was indeed no real use for this equipment, other than for what it was intended.

As an additional security for the operator, Tideland also installed a GSM ‘remote monitoring’ device inside of the lantern housing that is powered by the same lantern battery. This unique GSM system provides the operator with valuable information on the operators AtoN including GPS position, lantern status and battery voltage and is displayed in a user friendly format by either a web based server or a simple SMS text to a mobile phone.

This system has also been recently incorporated by the authorities in Maputo to monitor over 30 floating aids in the Maputo Channel that are vulnerable to theft.

Western Ghana – Vandalism of AtoN by fishing operations using the buoys as fish aggregating devices (FADs)

In 2008, a Tideland representative was involved in supplying of $800,000 worth of AtoN supply to an organisation that wanted to mark a gas pipeline that travelled from Ghana to Togo through to Benin. This project experienced severe challenges with local fishing operations using the buoys as fish aggregating devices (FADs). Local fishermen were using these buoys as FADs and were either tying their own FADs to the buoys or were tying their vessels off of the buoys and utilising a “sling shot” method to harvest a larger amount of fish. The “sling shot” method is applied in the following steps: (1) a fishing vessel ties to the buoy; (2) the vessel moves away and stretches the mooring; (3) the vessel releases the buoy; (4) the buoy settles back over the anchor while the buoy is returning to the original position; and (5) the vessel sets nets to catch the fish following the buoys, we were frequently finding buoys with hawsers attached to the buoys which is an indication of a sling shot. This method places a tremendous amount of stress on the buoy structure and its anchor system. These actions were damaging the lantern equipment and ripping the buoys from their moorings and making them go adrift. From the 22 buoys that were initially supplied, only 3 remained during a visit early 2013.
The solution that we are currently implementing within this project is one of ‘community engagement’. Community Engagement of local coastal communities is a means to mobilising social infrastructure to protect and preserve AtoN and as such is an effective part of a strategy to deal with theft and vandalism. Educating the community in an effort to understand the impacts of safety at sea promotes responsible action by all who are aware of the problem.

The community engagement program effort is designed to promulgate how unsuitable the constituents of a self-contained AtoN system are for any use other than that for which the latter is intended, is essential to dispel ignorance - both to discourage theft and, also, to forestall the vandalism that occurs when attempts are made to remove solar modules from SC units. It may also ignite awareness to local heads of community and landowners of the role of AtoN in making the marine environment safe and free of pollution; to encourage them through the discharge of simple maintenance tasks, perhaps, to take responsibility for their AtoN, effectively acting as guardians; and in so doing, to provide a measure of deterrence to local potential criminals. Within this project, we have worked with the local authorities to nominate a local guardian for the newly installed AtoN, who is supplied regularly with a sack of the local staple diet, as long as the equipment remains intact. If the equipment goes missing, then the ‘local guardian’ does not profit from this gift-in-kind. This is a project that is currently evolving and we have seen positive results towards the beginning of 2014.

Projects At A Glance

Group of buoys destroyed by vessel collision in Cameroon.

A buoy in Northern Angola where the operators used a ‘cable tie’ in an attempt to stop access to the buoys battery compartment.

Community Engagement Program in Ghana.

A buoy beached in Ghana after being ripped from its moorings following an example of fishing aggregating devices (FAD).

Buoy showing signs of being “sling shot” highlighting the abrasions at the top of the buoy structure.