



WHITE PAPER

Control and Monitoring of Marine Aids to Navigation (AtoN)



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Asset availability and their importance for navigation

National Authorities use the outcome of a risk assessment to identify and categorise their Aids to Navigation assets. These assets appear in paper and electronic navigational charts to help mariners optimise their travel routes and arrive at their destination without incident.

National Authorities worldwide need to ensure their critical assets are present and working as expected. IALA sets availability targets in their guidelines as follows:

Category 1

Vital Significance
99.8% Availability*

Category 2

Important Significance
99.0% Availability*

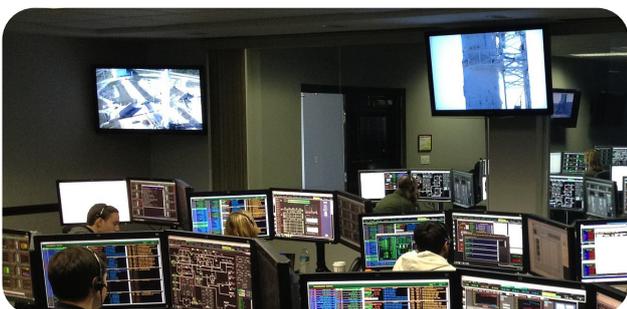
Category 3

Necessary Significance
97.0% Availability*

* Based on a continuous 3 year period. IALA guidelines specify the availability of any individual AtoN should be 95%.

Monitoring and its impact on AtoN availability targets

AtoN managers use monitoring systems to alert them to changes within their asset portfolio. Monitoring in itself does not improve AtoN performance, but it brings AtoN issues to the attention of asset managers more quickly. It is how the asset manager chooses to respond (and how quickly) that has the greatest impact on AtoN availability.



"The minimum availability of any individual AtoN should be 95%. Where the availability of an individual AtoN consistently falls below 95%, consideration should be given to the discontinuance or the replacement of that AtoN."

~ [IALA Recommendation R0130](#)

What options are available for AtoN monitoring?

Monitoring ranges from basic visual reporting, to off the shelf or customised solutions. The options include:

- User monitoring – relies on reports in from the field
- Paid observers – positioned on location
- AIS monitoring – via VHF and message 6
- Proprietary monitoring systems – web-based portals
- Bespoke monitoring systems – SCADA systems

What monitoring option should you choose?

All types of monitoring have an expense attached and should be tailored to the needs of the organisation and their budget. What should be considered is the impact on resources from both a labour and cost perspective. Paid observers for example offer the opportunity of local employment and can be justified if they are more widely utilised for maintenance and grounds management.

Quite often though electronic monitoring systems offer greater value in situations where:

- A large number of assets require monitoring
- Assets are being managed from a central location
- Assets are positioned in remote locations where access is difficult or costly
- Reporting is needed
- Electronic maintenance records are required

What to monitor electronically and why?

The implementation of a monitoring system can be complex, so it is important for AtoN managers to assess their portfolio and define:

- Which assets require monitoring based on their significance
- The AtoN location and the organisations' resources to action
- Maintenance requirements
- The implications if the asset fails
- The impact should the asset drift off station

Based on responses to the above, authorities can better define their reporting and alarm requirements and develop a strategy to support each scenario.

The risk of over-reporting. How can the cost be minimised?

Setting up the asset alarms and reporting in the first instance is critical. This allows the asset manager to get the most out of the system and improve their operations. The following should be considered:

- The asset vitals (battery, solar charge, maintenance intervals)
- The type of alarms required (critical vs maintenance)
- How frequently they report back (hourly, daily, weekly)
- The number of users they report back to

Setting up too much monitoring on an AtoN may mean a heavy load to manage and increases the chance of false alarms. Following up monitoring issues rather than AtoN issues is a waste of time and can have a high cost attached.

Keeping the reporting frequency as low as is necessary can also help to keep costs down. Using email alerts for non-critical messaging and reporting rather than SMS messages is more economical. It also reduces the chances of repeat alarm notifications coming through via phone at any time of the day or night.

Asset management and maintenance over the long term

Monitoring, asset management and maintenance are all important considerations to ensure the longevity and reliability of assets



in the field. Asset management is the long term care of assets at optimum cost. It requires the development of an asset management strategy and a maintenance plan that will differ depending on the type of AtoN, its location and its ease of access.

Asset maintenance plans need to be set out for each AtoN and need to consider:

- What is going to be maintained (lantern, buoy, mooring, structures etc.)
- How it is going to be maintained (serviced, cleaned, replaced)
- How frequently the site will be visited

Maintenance cycles and asset types

Some AtoNs (such as buoys) may have a standard maintenance cycle, but for other assets (such as marine lanterns) used in a variety of applications a more tailored approach is necessary. For example, the maintenance cycle for a lighthouse (exposure to the elements, remote location) is likely to be vastly different to that of port entry light (no moving parts, located in close proximity to the port). The issues to consider are:

- Access challenges and cost of access
- Age of the equipment (obsolescence, reliability, complexity)
- Geological conditions (subsidence, flooding, sea level, gas)
- Environmental challenges (heat, cold, rain, wind, dirt)
- Public access (safety and reflection on brand image)

The FMECA approach in relation to AtoN maintenance

Failure Mode Effects and Criticality Analysis (FMECA) documents the probability of failure based on the severity of the consequence. In the world of AtoN, authorities look at the system and determine that if it should fail, what is the mode it would fail in, what is the effect of that failure and how critical is it to the safety of navigation.

From this assessment, authorities can then determine where they should place their efforts, be that in the design of the system, the installation and/or the maintenance strategy they wish to apply.

The FMECA approach supports the asset management plan and the decision for maintenance and its frequency. Use the approach with information you already have at hand such as:

- Current performance
- Historic failures
- Known design issues
- Spare parts usage, and
- Feedback from maintenance staff

This information helps to build a robust strategic maintenance plan.

Sometimes however, calendar maintenance is still required for legislative reasons or convenience. There may be items onsite that require set maintenance scheduling, whereby AtoN maintenance can be undertaken at the same time.

Asset management plans and electronic record keeping

An asset management plan is key to understanding the costs and requirements for managing the asset. They should include:

- Maintenance and inspection schedules
- Historic running costs
- Previous modernisations and future plans
- Risk and opportunities for the site
- FMECA documents

A central location for storing this information is best practice, as proper document control measures are required to ensure files are not accidentally moved, deleted or overridden.

"The most valuable source of information for developing maintenance plans is your staff. Along with other information you can obtain a sound rationale to arrive at the best maintenance and asset management plan."

~ Simon Millyard
Chairman of the Engineering & Sustainability Committee - IALA

Some larger organisations utilise computer-based management systems that use large mainframes. Although they provide good reporting and maintenance planning, they are expensive and take up significant resources to set up.

Proprietary monitoring and asset management systems are a good alternative for AtoN record keeping. Systems like [Star2M](#) provide asset monitoring functionality and can also be used for records management. Documents can easily be tied to the asset, date stamped and securely stored for future reference. Scheduled reporting then remains up to date and occurs in real time.

Star2M offers remote access, an added convenience for maintenance staff who can upload their notes, photos and schedule future service calls from the field.



Where can further guidance be found?

Watch our [webinar](#) with Simon Millyard as guest presenter. Simon discusses monitoring and asset management in further detail and how Trinity House in the UK manages similar operations.

The Sealite Difference

Sealite is known in the industry for delivering what the others can't. This is the convenience of a complete packaged solution.

The business is in the unique position of being able to match aids to navigation buoys with marine lanterns, mooring, hardware and sinkers to deliver a complete packaged product.

With satellite connectivity and Star2M, the customer can then manage the solution from anywhere at any time.

For customers that require something outside of the range, bespoke products can be designed and manufactured to meet customer specific requirements.

With authorised distributors located in most countries across the globe, the support you need with local knowledge and expertise is not far away.

We are committed to the manufacture and delivery of quality products that are built to last.



About Sealite

Sealite is a global manufacturer of marine aids to navigation. The company is headquartered in Australia, with manufacturing and office locations in the United States, Singapore and the United Kingdom.

The Sealite team is dedicated to servicing the marine industry through the efficient design and production of leading-edge products.

Through close working relationships, maritime authorities and private customers around the globe now trust Sealite to enhance the safety of their operations.

For more information about Sealite, please visit our website at www.sealite.com, email us at info@sealite.com, or call us on one of the numbers below.

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