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**On**

**Key Performance Indicators for AtoNs Services**

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**Key Performance Indicators for AtoNs Services**

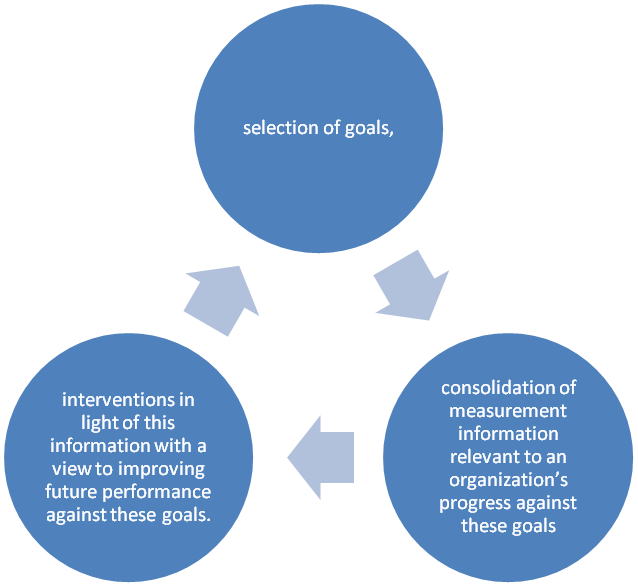
# Introduction

KPIs are commonly used by an organisation to evaluate its success or the success of a particular activity in which it is engaged. Choosing the right KPIs is reliant upon having a good understanding of what is important to the organisation.

KPIs useful to finance will be quite different than the KPIs assigned to maintenance, for example. Because of the need to develop a good understanding of what is important, performance indicator selection is often closely associated with the use of various techniques to assess the present state of the business, and its key activities. These assessments often lead to the identification of potential improvements; and as a consequence, performance indicators are routinely associated with performance improvement initiatives.

KPIs used by AtoN administrations vary depending on the way the business is run and the culture of operation. Irrespective of whether an Administration carries out all its business using in-house resources or outsources some or all of its operations, KPIs provide an invaluable role in ensuring that the Administration achieves its goals.

Business performance management can be considered as in figure 1. Goals or key performance indicators are identified and required performance value set. Performance is measured against these goals. Performance is reviewed periodically and interventions are made in the light of this information with a view to improving future performance against these goals.



1. Business Performance Management

The key performance indicators listed in ANNEX A are grouped under the different headings typically found in an Administration. These are not definitive but are suggested as KPIs that would best suit AtoN providers and individual Administrations may use some, all or other KPIs to ensure cost effective management.

Care should be taken in setting KPIs. A small number of critical measures that effectively measure business performance is much better than a large number where employees’ focus is servicing the KPIs rather than the business.

# Purpose

The purpose of this guideline is to provide guidance in the establishment and use of Key Performance Indicators (KPI) in the provision of Aids to navigation (AtoN) services.

This document is not intended to be prescriptive but to be used as a guide for an organisation interested to implement performance measures with the intent to measure its performance or improve its services.

# SCOPE

This guideline will introduce the principle of KPIs and provide guidance on the establishment of KPI criteria applicable to AtoN.

This document should be considered as complimentary to other IALA quality recommendations and guidelines that are referenced in the relevant sections.

# Definitions

Key Performance Indicators: **Key performance indicator** (**KPI**) is a metric or measure. KPIs are commonly used by an organisation to evaluate its success or the success of a particular activity in which it is engaged. KPIs are also used to set measurable objectives, evaluate progress, monitor trends, make improvements, and support decision making.

**SMART** is a mnemonic used to set objectives, often called Key Performance Indicators. The letters broadly conform to the words Specific, Measurable, Attainable, Relevant and Time-specified. More details are available in chapter 6.

# Principles

## Why do we measure performance?

The reason why we measure performance in organisations is often reduced to simple homilies, such as ‘you can’t manage anything unless you measure it’ or ‘what gets measured gets done’. The three main reasons for measuring performance are:

* To learn and improve
* To report externally and demonstrate compliance
* To control and monitor people

Of these three the first is the most important, the second is something organisations just have to do and the third one can cause major problems.

### Measuring to learn and improve performance

Measuring for learning and improvement is the most natural form of using KPIs and something we do every day in our daily lives. The aim is to equip our employees with the information they need to make better informed decisions that lead to improvements. In this context, KPIs are used internally as the evidence to inform management decisions, to challenge strategic assumptions and for continuous learning and improvement.

### Measuring to report externally and demonstrate compliance

Another reason for collecting KPIs is to inform external stakeholders and to comply with external reporting regulations and information requests. When measuring for external reporting and compliance purposes, any reports and associated indicators either have to be produced on a compulsory basis such as annual financial statements, accounts, or performance reports for regulators; or can be on a voluntary basis such as environmental impact reports, for example.

### Measuring to control and monitor people

KPIs can also be used in a top-down command-and-control fashion to guide and control people’s behaviors and actions. Here, measures are used to set goals or rules, to objectively access the achievement of these goals, and to provide feedback on any unwanted variance between achievements and goals. Here, the aim of measurement is to eliminate variance and improve conformity. In this context, measures are often tightly linked to reward and recognition structures. Research has shown that this approach, if not implemented well, can be dangerous and often leads to a culture in which people focus on delivering the measures but not the performance (i.e. hitting the target but missing the point).

## The SMART method

The SMART method is a simple method that helps when it is time to set goals and objectives. It ensures that all elements are considered at the time the objective is set. It also helps to communicate management’s expectations to employees and stakeholders by using clear statements, numbers and dates.

The first known uses of the term SMART occur in the November 1981 issue of “Management Review” by George T. Doran. In more modern documentation, the letters E, R and S have been added to SMART. They represent “Evaluate”, “Re-evaluate” and “Satisfactory”. For the purpose of this document, we will limit ourselves to the original SMART method but we also encourage the reader to examine the possibility to use the three last letters when defining objectives for its organisation.

### Specific

The first term stresses the need for a specific goal over and against a more general one. This means the goal is clear and unambiguous. To make goals specific, they must tell a team exactly what is expected, why is it important, who’s involved, where is it going to happen and which attributes are important.

A specific goal will usually answer the five "W" questions:

* What: What do I want to accomplish?
* Why: Specific reasons, purpose or benefits of accomplishing the goal.
* Who: Who is involved?
* Where: Identify a location.
* Which: Identify requirements and constraints.

### Measurable

The second term stresses the need for concrete criteria for measuring progress toward the attainment of the goal. The thought behind this is that if a goal is not measurable, it is not possible to know whether a team is making progress toward successful completion. Measuring progress is supposed to help a team stay on track, reach its target dates, and experience the exhilaration of achievement that spurs it on to continued effort required to reach the ultimate goal.

A measurable goal will usually answer questions such as:

* How much?
* How many?
* How will I know when it is accomplished?

### Attainable

The third term stresses the importance of goals that are realistic and attainable. While an attainable goal may stretch a team in order to achieve it, the goal is not extreme. That is, the goals are neither out of reach nor below standard performance, as these may be considered meaningless. When you identify goals that are most important to you, you begin to figure out ways you can make them come true. You develop the attitudes, abilities, skills, and financial capacity to reach them.

An attainable goal will usually answer the question:

* How: How can the goal be accomplished?

### Relevant

The fourth term stresses the importance of choosing goals that matter for your organisation. Goals that are relevant to your boss, your team, your organization will receive the needed support. Relevant goals (when met) drive the team, department, and organization forward. A goal that supports or is in alignment with other goals would be considered a relevant goal.

A relevant goal can answer yes to these questions:

* Does this seem worthwhile?
* Is this the right time?
* Does this match our other efforts/needs?

### Time-specified

The fifth term stresses the importance of grounding goals within a time frame, giving them a target date. A commitment to a deadline helps a team focus their efforts on completion of the goal on or before the due date. This part of the S.M.A.R.T. goal criteria is intended to prevent goals from being overtaken by the day-to-day crises that invariably arise in an organization. A time-specified goal is intended to establish a sense of urgency.

A time-specified goal will usually answer the question:

* When?

# Organisational vision

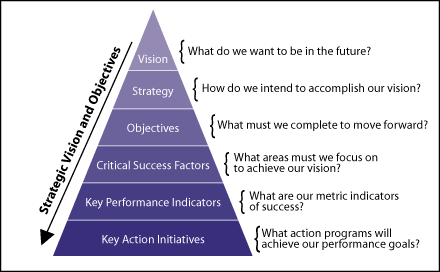
In an organization, when KPI are determined, it is essential that all are informed KPI and adhere to them. It should be noted that the KPI determined must all be aligned by the objectives and the vision of the management. The KPI that will be established may apply to various levels in the organisation. Some may apply to the direction, some at the managerial level and some at the workers level.

KPIs align all levels of an organization (business units, departments, individuals and include processes) with clearly defined and cascaded targets and benchmarks to create accountability and track progress

# Application of kpi

## Strategies

Before we can even begin to discuss numbers and types of metrics, the first and most important challenge is to ensure that that the metrics reflect strategic drivers and are consistent with the vision and goal of the enterprise. In other words, KPIs must emanate from the vision level and cascade through the organization. In the strategic alignment pyramid (see Figure 3), we can see that translating the enterprise vision into KPIs and key action initiatives requires several intermediary steps - creating strategies, objectives and critical success factors. It is not sufficient to just know "where you are headed" and select relevant KPIs. The *vision of the future* (mission) must be supported by the *how* (strategy), the *what* (objectives), the *focus areas* (critical success factors), the *metrics* (KPIs) and the *action plan* (key action initiatives) to realize full actuation. There needs to be comprehensive and consistent alignment up and down the pyramid.



1. Strategic Alignment Pyramid

## Selecting the appropriate KPIs

KPIs accelerate seamless and collaborative planning across the organization to ensure that everyone is operating from the same playbook. The success of any performance management program is thus contingent on selecting the correct KPIs. Selection of the wrong KPIs can result in counterproductive behavior and suboptimized results.

KPIs should be quantifiable and appropriate and should collect information that is useful to your organization and relevant to the needs and expectations of interested parties. They should support the organisation by providing information on the current performance and help determine the possible improvements.

In order to select the appropriate KPI, a good knowledge of the vision of the organisation is required as well as the key activities. It is also important to address the important elements of the organisation to be able to draw conclusion that could lead to the most effective improvements in the future.

These assessments often lead to the identification of potential improvements; and as a consequence, performance indicators are routinely associated with 'performance improvement' initiatives.

## Categorization of indicators

Key performance indicators define a set of values used to measure against. These raw sets of values, which are fed to systems in charge of summarizing the information, are called **indicators**. The most commonly used indicator for Aids to navigation can be summarized into the following sub-categories:

* **Quantitative indicators** which can be presented as a number.
* **Directional indicators** specifying whether an organization is getting better or not (trends).
* **Financial indicators** used in performance measurement and when looking at an operating index.

Key performance indicators, in practical terms and for strategic development, are *objectives* to be targeted that will add the most *value* to the business. These are also referred to as “key success indicators”.

## Domains of KPI

In the AtoN world, there is a large number of potential indicators that are available. In figure 4, we can see various areas of interest that can be used. For each of them and depending of the main goals of the organisation, it is possible to determine one or more indicators that will be used to measure performance. Depending on the mandate of each organisation, they can apply or not.



1. Areas of interest

## Selection of KPIs

As indicated earlier, care should be taken in setting KPIs. A small number of critical measures that effectively measure business performance is much better than a large number where employees’ focus is servicing the KPIs rather than the business.

An organisation introducing Key Performance Indicators should take care of not trying to measure everything in one shot. It should identify the more important areas of interest for the organisation and define a very limited number of indicators in each of them. It might be targeting only one indicator per area of interest at the beginning and probably not all areas of interest.

It is very important to ensure that all the mechanisms are in place to ensure data capture of high quality. For example, if you want to measure how many parts are produced on a production line but your measurement point is placed before the final inspection checkpoint, you may end up with a very high rate of production but it will not take into consideration the number of rejects. In such a case, you may want to put two measurement points: the total production and the number of rejects. With those two indicators, it is easy to set a KPI representing the percentage of rejects over the total production. Obviously, such an objective should be set as low as possible.

## Challenges

One of the common problems in many organisations is the excessive number of KPI that are to be measured. It is better to limit the number of KPI but ensure an appropriate process is in place to collect all the relevant information, ensure the availability of resources to collect, store and analyse the results. Implementing KPIs in an organisation is of no value if those who provide the information do not see an end result from those KPI. This will result in a lack of interest by the people, generating a loss of information and remove all credibility to the results.

In practice, overseeing key performance indicators can prove expensive or difficult for organizations. Some indicators such as staff morale may be impossible to quantify. As such dubious KPIs can be adopted that can be used as a rough guide rather than a precise benchmark.

Organisation needs to be careful in selecting their KPIs to ensure that the information collected remains relevant and comparable in case of changes in their operating mode.

# Collection of information

## Measuring Key Performance Indicators

There are different ways to capture information and end up with quality indicators. On the financial side for example, the introduction of information management systems allow the capture and relatively easy reporting of the financial performance of an organisation.

Financial KPIs should be used in private organisation offering AtoN services as well as in governmental organisations. In the latter case, it is often more difficult to measure performance in a specific domain as those organisations tend to be involved in various activities in parallel.

In the domain specific to AtoN, with the introduction of monitoring and reporting systems, there are more and more possibilities to capture and record precious data. This especially applies to systems ashore (e.g. DGPS or e-Loran systems) but is more difficult for equipment dispersed over large areas without communication facilities.

In some cases, inspection results may be the only source of information to be used as indicators. It would then be important to ensure the data is collected in the same manner everywhere and limit as much as possible subjectivity or personal interpretation of the condition of the assets for example. Reading an hour-meter is pretty straightforward but judging of the condition of an asset following an inspection may result in different result depending on the quality of the guidance given to the inspector and the latitude given. In some cases, the age of an equipment may be used as an indicator, for example when the Mean Time Between Failure (MTBF) of a piece of equipment is known.

At the end, it is to each organisation to identify what applies to them and put in place the proper measures to be taken as indicators for KPI.

## Collecting information

### Consistency of information

It is important that the employees are informed of the measurement points and they should be trained to ensure measurements are taken in a similar manner everywhere in the organisation. It is also important to ensure that information is entered in the appropriate system in a similar manner. As an example, information using different measurement units will not be comparable and will not be useful to compare objectives and results attained.

This is particularly a challenge in organisations that are using manual entry methods that might lead to errors and inconsistencies.

### Completeness of information

An important factor to be able to monitor performance is to ensure all the information is collected, entered in the appropriate system and compiled. Should a part of the information collected be lost, the results obtained might not reflect the actual situation of the enterprise.

## Tools

### Method of collection of information

There are different ways to collect, store and compile the information related to the performance of an organisation. Collection of information can be implemented using a paper system, daily written logs, report sheets, computer reports, audit reports and so on. Whatever the KPI selected, a comprehensive written method for measurement is strongly advised.

### Computerised Maintenance Management Systems (CMMS)

The organisations who want to introduce KPIs should consider the use of a Computerised Maintenance Management Systems (CMMS) for collecting the data as close to source as possible. It is also critical that any piece of data is collected only once but may be used by the CMMS for multiple purposes.

Many companies are selling CMMS systems, each of them offering a multitude of optional modules. An organisation may want to manage only its maintenance activities with such a system but it may also be used to manage Real Property activities, procurement of goods, preventive maintenance, corrective and predictive maintenance activities, work orders and financial activities. It is possible to define KPIs in each of those domains and the use of a CMMS will be of great use for producing reports and track progress on a regular basis.

## Cost of data

Any organisation who wants to start using KPIs must be aware that the information required is not always free. In many cases, the information required is already collected as part of their regular business processes. This is particularly true in the financial domain where the incomes and outcomes are scrupulously recorded. Producing reports from existing information is generally relatively cheap and do not require a large amount of resources to be established.

However, it might be different for data that requires regular manual capture. If not selected properly, recording data from remote locations that would require travel and lodging just for the sake of feeding the KPI system may not be a good idea. In such a case, it would be advisable that the period between collection of information is aligned with regular site visits and the KPIs developed to reflect this reality.

Those in charge of determining the appropriate KPIs to be retained by an organisation should always keep in mind the cost to implement a new KPI and its indicators. It should be kept as low as possible and sometimes, it would be beneficial for an organisation to look at the possibility to install recording or reporting systems to reduce the cost of collecting the information. This should be sees as a long term investment that could bring future savings.

# Interpretation and use of kpi

## Interpretation of the results and action

Once an organisation has set its KPIs and started measuring its performance, it needs to analyse the results very seriously to ensure they really represent the reality. It is recommended to analyse the results of more than one period to see if the trend varies over time or if it is stable. It is necessary to do such an exercise before introducing any major change, especially if the results of one KPI are very different of management’s expectations.

The problem may not be a performance issue but can result in the way the measures are taken. On a production line for example, a defective automatic counter may alter significantly the performance result even if everything work as planned. It is essential to detect inconsistent data before making decisions based on results.

Once the quality of the data is validated and the results are considered reliable, management should focus on the KPIs that are unsatisfactory and address them. And, again, this should be done in a planned manner to avoid making significant changes everywhere in the organisation at the same time. Such a rapid change may affect the morale of the employees and result in a negative impact on other KPIs.

# use of kpi while outsourcing services

KPIs can also be used to measure contractor’s performance over the contract period and can be linked to an annual performance payment, which along with the monthly base fee, forms the annual contract price.

It is extremely important that KPIs and indicators are established before the contract is signed between the parties to ensure common understanding of the expectations and agreement on the method of payment. In the event that indicators are not properly set and understood, litigations may result and be very costly for both sides.

It is recommended that KPI’s are reviewed and agreed on an annual or regular basis. The contract should contain a clause to allow the KPI’s to be discussed, reviewed and altered to address issues or opportunities identified during the previous period or year.

# Challenges of introducing pki

One of the common problems in many organisations is the introduction of an excessive number of KPI. It is better to limit the number of KPI and introduce new ones slowly.

It is also essential to ensure an appropriate process is in place to collect all the relevant information and ensure the availability of resources to collect, store and analyse the results.

Implementing KPIs in an organisation is of no value if those who provide the information do not see an end result from those KPI. This will result in a lack of interest by the people, generating a loss of information and remove all credibility to the results.

In practice, overseeing key performance indicators can prove expensive or difficult for organizations. Some indicators such as staff morale may be impossible to quantify. As such dubious KPIs can be adopted that can be used as a rough guide rather than a precise benchmark. The results of an employee’s survey done regularly (every 3 or 5 years for example) may be used to provide indicators.

Another serious issue in practice is that once a measure is created, it becomes difficult to adjust to changing needs as historical comparisons will be lost. As such measures are kept even if of dubious relevance, because history does exist.

Comparisons between different organizations are often difficult as they depend on specific in-house practices and policies.

# Collecting information

## Consistency of information

It is important to ensure that information is collected and entered in the appropriate system in a similar manner. As an example, information using different measurement units will not be comparable and will not be useful to compare objectives and results attained.

This is particularly a challenge in organisations that are using manual entry methods that might lead to errors and inconsistencies.

## Completeness of information

An important factor to be able to monitor performance is to ensure all the information is collected, entered in the appropriate system and compiled. Should a part of the information collected be lost, the results obtained might not reflect the actual situation of the enterprise. (May need to be expanded)

# tools

## Method of collection of information

There are different ways to collect, store and compile the information related to the performance of an organisation. Collection of information can be implemented using a paper system, daily written logs, report sheets, computer reports, audit reports and so on.

Whatever the KPI, a comprehensive written method for measurement is strongly advised. (review wording)

## Computerised Maintenance Management Systems (CMMS)

In most cases Computerised Maintenance Management Systems (CMMS) will be used for collecting the data as close to source as possible. It is also critical that any piece of data is collected only once but may be used by the CMMS for multiple purposes. (To be completed)

# references

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7. Input paper EEP19/25 - Key Performance Indicators to IALA EEP Committee meeting 19.
8. IALA Recommendation O-132 On Quality Management for Aids to Navigation Authorities, Edition 2, December 2006
9. Presentation Key Performance Indicators for AtoN Provision and Management, Seamus Doyle, IALA Workshop on Short Range AtoN in the e-Navigation Era, 2012.
10. IALA Guideline 1036 on Environmental Management in Aids to Navigation.
11. Possible Aton key performance indicators

You will find below a list of potential KPIs. As mentioned in the main body of this document, readers should carefully select the one (s) that is applicable to their business and ensure a proper system is put in place to capture and analyse the results.

This is not an extensive list and each organisation may decide to use some of them or add their own.

Customer Service

* Number of periodic reviews per year to verify and prioritise AtoNs required.
* Number of marine accidents per year.
* Availability of AtoN in accordance with IALA guidelines. [[1]](#footnote-1)

Financial

* Cost percentage reduction on previous year.
* AtoN unit cost (for comparable AtoN or using “standard” AtoN).
* Capital projects completed on time and budget.
* Return on capital investment.

Equipment performance

* Number of AtoN inspection per year.
* Mean Time Between Failure (MTBF).
* Mean Time to Repair (MTTR).
* Planned maintenance programme on time and budget.

Manpower

* Number of personnel per AtoN.
* Number of back office staff as percentage of total workforce.
* Training budget as percentage of total budget.
* Employee turnover rate.

Safety

* All accident frequency rate per period.
* Lost time injury rate per period.
* Sick Absence as percentage of total time per period.

Logistics/ Services

* Ship working hours as percentage of total hours per year.
* Helicopter flying hours used per year.
* Helicopter operational flying hours as percentage of total helicopter hours flying per year.
* Contractor transport cost compared with previous year.
* Office / Workshop infrastructure cost per unit floor area.
* IT Corporate Service availability.

Environmental

* Number of prosecutions/ enforcement orders.
* Number of environmental assessment performed
* Number of site remediation done

Legal

* Number of audits confirming compliance with defined standards.
* Cost of achieving/ retaining quality standards certification.

Heritage

* Annual cost of non-operational heritage assets.
* Gross and net income from alternative use of heritage assets.

1. Example of KPI used in different countries

This annex provides examples of key performance indicator (KPI) models that are currently in use in Australia and Papua New Guinea for measuring the performance of Aid to Navigation (AtoN) maintenance and management activities.

Australia

The Australian Maritime Safety Authority (AMSA) has an outsourced AtoN maintenance arrangement in place for the provision of AtoN maintenance services. This arrangement includes a performance framework for measuring the contractor’s performance against agreed operational and corporate performance criteria.

Table 1 – AMSA KPI Model, details the current AMSA KPI’s for measuring contractor performance.

Operational Performance Criteria

* The following operational performance criteria are measured through the KPI process:
  + Standard of works
  + AtoN performance levels
  + Quality, safety and environment
  + General reporting requirements
  + Monthly, quarterly and annual reporting requirements
  + Project reporting requirements
  + Incident reporting requirements

Corporate Performance Criteria

* The following management plans are in place to ensure that the agreed contract outcomes are achieved and are also monitored through the KPI process:
  + Contract management plan
    - Risk management plan
    - Contract administration plan
    - Audit program
    - Quality, environment and safety management plan
    - Transition and disengagement plans
  + Human resource management plan
    - Staff management plan
    - Training management plan
    - Occupational health and safety plan
  + Engineering management plan
  + Engineering design review
  + Licensing and certification

KPI Requirements

#### KPI’s are used to measure contractor performance over the contract period and are linked to an annual performance payment, which along with the monthly base fee, forms the annual contract price.

#### KPI’s are reviewed and agreed on an annual basis. The annual contract review process allows for KPI’s to be altered to address issues or opportunities identified during the previous year.

* Performance against the agreed KPI’s are reviewed, discussed and agreed on a quarterly basis.

AtoN Performance Levels

#### Maintenance and fault/failure restoration strategies are required to be in place to achieve the agreed availability and repair times.

#### Performance levels are calculated in accordance with AMSA and IALA guidelines and reported quarterly.

#### Equipment availability and failure restoration time is measured from the issue and cancellation of maritime safety information (Auscoast Warning or ReefVTS failure notification).

* The contractor is not penalised for failures due to unforeseen events such as severe weather events, vandalism or natural disasters

Quality, Safety and Environmental Performance

* The contractor must maintain certification for quality, safety and environmental management systems.
* Lagging indicators such as number of lost time injuries or medical treated injuries are recorded but are not linked to performance payments. Incident and accident reporting information is a critical input to minimising future incidents. Any indicators that encourage non reporting should be avoided in performance payment based systems.
* Positive Performance Indicators (PPI’s) or leading indicators are used to measure actions that the contractor takes to achieve its safety targets.
* Good performance against PPI’s will lead to good safety outcomes. The following PPI’s could be considered for use in a KPI framework:
  + Number of OHS training & programs
  + Incident reports - the numbers of days overdue: > 3 months
  + Hazard reports - the number of days overdue: > 3 months
  + Number of safety inspections/audits conducted
  + Percentage of sub-standard conditions identified and corrected
  + Percentage of employees with adequate OHS training.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Item** | **Sub Item** | **Requirement** | **Q1** | **Q2** | **Q3** | **Q4** | **Measurement** | **Performance Measure** | | **Weighting (%)** |
| **1** | **Availability** | | | | | | | | | |  |
| AtoN performance  Comparison of actual and specified performance levels and response times | **1** | Category 1 Light => 99.8% |  |  |  |  | Days available averaged over 36 months | 99.8% |  | Weighing is to be negotiated between the parties. The sum of all weighing is 100%. |
| MTTR =< 2 days |  |  |  |  | Average mean time to repair over 12 months | 2 days |  |
| **2** | Category 2 Light => 99.0% |  |  |  |  | Days available averaged over 36 months | 99.0% |  |
| MTTR =< 4 days |  |  |  |  | Average mean time to repair over 12 months | 4 days |  |
| **3** | Category 3 Light => 97.0% |  |  |  |  | Days available averaged over 36 months | 97.0% |  |
| MTTR =< 6 days |  |  |  |  | Average mean time to repair over 12 months | 6 days |  |
| **4** | Racons => 99.6% |  |  |  |  | Days available averaged over 36 months | 99.6% |  |
| MTTR =< 4 days |  |  |  |  | Average mean time to repair over 12 months | 4 days |  |
| **5** | Met Ocean Sensors => 99.8% |  |  |  |  | Days available averaged over 36 months | 99.8% |  |
| MTTR =< 2 days |  |  |  |  | Average mean time to repair over 12 months | 2 days |  |
| **6** | DGPS => 99.8% |  |  |  |  | Days available averaged over 36 months | 99.8% |  |
| MTTR =< 2 days |  |  |  |  | Average mean time to repair over 12 months | 2 days |  |
| **7** | REEFVTS Radars => 99.6% |  |  |  |  | Days available averaged over 36 months | 99.6% |  |
| MTTR =< 2 days |  |  |  |  | Average mean time to repair over 12 months | 2 days |  |
| **8** | Unlit Beacons, Daymarks & Topmarks => 97.0% |  |  |  |  | Days available averaged over 36 months | 97.0% |  |
| MTTR =< 6 days |  |  |  |  | Average mean time to repair over 12 months | 6 days |  |
| **9** | AIS Base Stations => 99.6% |  |  |  |  | Days available averaged over 36 months | 99.6% |  |
| MTTR =< 2 days |  |  |  |  | Average mean time to repair over 12 months | 2 days |  |
| **10** | Buoys Installed within 5 metres of charted position |  |  |  |  | All buoys to be installed within tolerance | =< 5m |  |

Table 1 – AMSA KPI Model

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Item** | **Sub Item** | **Requirement** | **Q1** | **Q2** | **Q3** | **Q4** | **Measurement**  (Note: the sub item notes detail the scope, deliverable and timeframe for completion) | **Performance Measure** | | **Weighting (%)** |
| **2** | **Innovation and Information Management** | | | | | | | | | |  |
| Maintenance Methodology and New Technology | **1** | Agreed maintenance and management changes leading to advantages to both the Contractor and AMSA |  |  |  |  | Implementation of maintenance and management improvements that value add to the delivery of contract services agreed by both parties  See Sub Item 1 notes | 5 or more implementations |  |  |
| 3 or 4 implementations |  |
| 1 or 2 implementations |  |
| Computerised Maintenance Management System  (CMMS) – Improvement Opportunities | **2** | Load job plan data for site access report |  |  |  |  | See Sub Item 2 notes |  |  |
| Asset and location updates |  |  |  |  | See Sub Item 2 notes |  |  |
| Heritage fabric register |  |  |  |  | See Sub Item 2 notes |  |  |
| AMSA CMMS upgrade assistance |  |  |  |  | See Sub Item 2 notes |  |  |
| CMMS – Data Validity | **3** | Scheduled – Electronic Data interchange |  |  |  |  | See Sub Item 3 notes |  |  |
| Management Reporting | **4** | Maintenance component |  |  |  |  | See Sub Item 4 notes |  |  |
| Project component – design input |  |  |  |  | See Sub Item 4 notes |  |  |
| Asset management strategy |  |  |  |  | See Sub Item 4 notes |  |  |
| AIS AtoN evaluation |  |  |  |  | See Sub Item 4 notes |  |  |
| AtoN WAN improvements |  |  |  |  | See Sub Item 4 notes |  |  |
| Provision of technical input into IALA initiatives |  |  |  |  | See Sub Item 4 notes |  |  |
| Annual Work Program | **5** | Progress against plan |  |  |  |  | See Sub Item 5 notes |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Item** | **Sub Item** | **Requirement** | **Q1** | **Q2** | **Q3** | **Q4** | **Measurement**  (Note: the sub item notes detail the scope, deliverable and timeframe for completion) | **Performance Measure** | | **Weighting (%)** |
| **3** | **Quality, Safety, Environment and Heritage Management** | | | | | | | | | |  |
| Certification | **1** | Existing certification to be retained |  |  |  |  | Certification retained - checked at audit and copies of certification to be supplied in annual report  See Sub Item 1 | All retained |  |  |
| ISO 9001 |  |
| ISO 14001 |  |
| AS 4801 |  |
| Major and Minor non conformances  (number of sites to be audited is approx 40 +10 heritage sites) | **2** | To reduce the number of minor or major non conformances issued |  |  |  |  | 1 x Major non conformance = score 4  1 x Minor non conformance = score 1  See Sub Item 2 notes | =< 3 points per year |  |
| =< 6 points per year |  |
| =< 8 points per year |  |
| Heritage Sites | **3** | Details of all heritage work to be presented to AMSA along with overall costs as part of AMSA’s adherence to the Heritage act |  |  |  |  | Detailed list of heritage work completed and cost  See Sub Item 3 notes |  |  |
| Continue heritage management initiatives |  |  |  |  | Heritage maintenance works that contributes to the maintenance and heritage aspects of the AtoN e.g. paint striping, reinstating heritage fabric i.e. brass vents, signage etc. |  |  |
| AMSA Assets | **4** | Management of AMSA assets and inventory |  |  |  |  | Annual check during audit  See Sub Item 4 notes |  |  |
| QEL update and equipment price updates for annual asset revaluation |  |  |  |  | See Sub Item 4 notes |  |  |
| Environment/Safety | **5** | AtoN structure access improvements |  |  |  |  | See Sub Item 5 notes |  |  |  |
| Hazardous substance removal |  |  |  |  | See Sub Item 5 notes |  |  |  |
|  |  |  | Reporting and closeout of OHS incidents. |  |  |  |  | See Sub Item 5 notes |  |  |  |

Papua New Guinea (PNG)

The Papua New Guinea National Maritime Safety Authority (NMSA) has also adopted an arrangement where maintenance is outsourced to a suitably qualified contractor. The performance framework is similar to Australia in that it allows measurement of the contractor’s performance against agreed operational performance criteria.

Operational Performance Criteria

* The following operational performance criteria are measured through the KPI process:
  + Availability
  + Maintenance methodology and introduction of new technology
  + Quality, safety and environment improvement proposals
  + Liaison with traditional communities
  + Information management
  + Communication and Reporting

KPI Requirements

#### The KPI’s are used to measure contractor performance over the contract period and are linked to an annual performance payment, which along with the monthly base fee, forms the annual contract price.

AtoN Performance Levels

#### Maintenance and fault/failure restoration strategies are required to be in place to achieve the agreed availability and repair times.

#### Performance levels are calculated in accordance with NMSA and IALA guidelines and reported quarterly.

#### Due to issues with vandalism and the difficulty in confirming outages on isolated sites, failure restoration time is measured from the time NMSA issue a direction to attend to an outage, after they have confirmed the outage, identified the cause. The response is not triggered by the Notice to Mariners.

* The contractor is not penalised for failures due to unforeseen events such as severe weather events, vandalism or natural disasters

Improvement Proposals

* The contractor is required to submit a minimum number of improvement proposals, changes or suggestions for developing quality, safety and environmental management or improving community liaison and engagement programs.
* Measurement is based on the amount of feasible proposals submitted in each quarter and identified in the quarterly report. All proposals count towards performance measure unless rejected in writing by NMSA.

Quality, Safety and Environmental Performance

* The contractor must maintain 3rd party certification for quality management systems or must provide significant evidence that they are under the process of working towards 3rd party ISO9001 accreditation.

1. IALA Recommendation O-130 and IALA Recommendation R-121 [↑](#footnote-ref-1)