

Outsourcing of AtoN maintenance services – Innovation in tendering, contracting and managing these services in Australia

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ABSTRACT

The provision of Aids to Navigation (AtoN) maintenance is widely outsourced by aids to navigation authorities within Australia at the national, state and individual port authority level.

The Australian Maritime Safety Authority (AMSA) has outsourced its AtoN maintenance service since 2001. In outsourcing this service AMSA has faced numerous challenges in ensuring ongoing value for money, meeting IALA's AtoN availability levels and managing contractor performance. AMSA has had the same contractor over two separate, long term contract periods and has completed a third tender process in 2013/14 for its next maintenance contract which has seen AMSA re-engage the incumbent contractor. With each tender process, AMSA has undertaken research and analysis in order to enhance the cost effectiveness of its AtoN network through reviewing service model and maintenance regime options. This paper will highlight the key learnings from these tender processes.

AMSA has also evolved its contract management model and processes in seeking to achieve an optimal balance between allowing the contractor the autonomy and flexibility necessary for them to be made fully accountable for the maintenance task, while fostering an in-house technical capability necessary to enable robust scrutiny and assessment of the contractor's performance and to maximise the economic life of AMSA's AtoN assets. This paper examines how AMSA is achieving this balance and potential enhancements in the future.

AMSA's latest tender process was characterised by extensive review of AtoN service levels, asset maintenance needs and cost analysis. An example of key issues considered was whether the existing fixed price contract model was still the most appropriate for a mature service delivery arrangement. Extensive market consultation was undertaken to help ensure a competitive tender process.

Many other Australian AtoN authorities have outsourced the provision of AtoN maintenance services utilising varying service model. Some of their experiences are also discussed in this paper.

In summary, this paper identifies the lessons learnt, successful maintenance strategies and practices, the pros and cons of various service models and strategic and operational issues expected to impact AtoN authorities' outsourced services in the future.

INTRODUCTION

The Australian Maritime Safety Authority (AMSA) is responsible for the operation and maintenance of the Australian government's coastal marine aids to navigation (AtoN) Network. AMSA AtoN network consists of some 500 AtoN at approximately 400 sites around the Australian coastline (refer Figure 1).

AMSA's AtoN generally lie outside port limits and serve the phases of navigation that are described as landfall, coastal navigation and port approach. AMSA's AtoN sites are situated on a range of different types of locations including headlands, promontories, offshore islands, sand cays, drying reefs and coastal waters generally less than 20 metres deep.

AMSA aims to provide a cost effective system of marine AtoN to the commercial shipping industry in accordance with Regulation 13, Chapter V of SOLAS obligations and international best practice (e.g. IALA guidance).

AMSA's responsibilities in this regard are also prescribed in domestic legislation (Navigation Act 2012). The costs of performing this function are recovered from the commercial shipping industry through the Marine Navigation Levy.

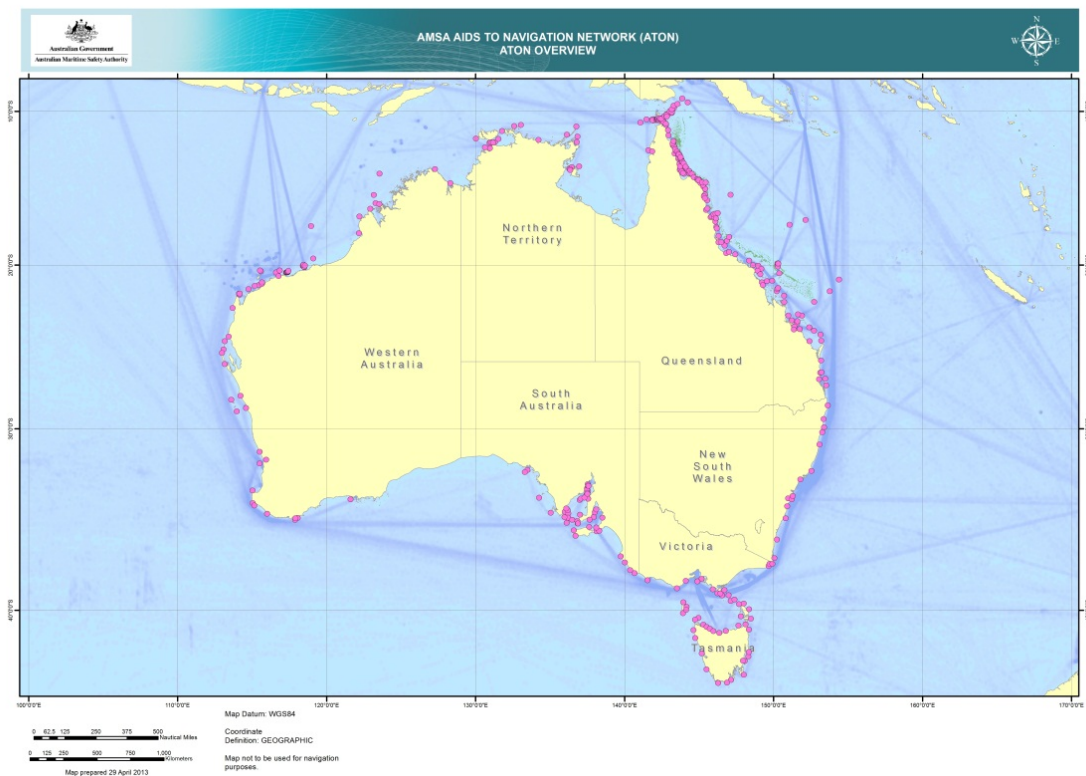


Figure 1: Location of AMSA Aids to Navigation Network

AMSA'S ATON MAINTENANCE SERVICE DELIVERY MODEL

AMSA's decision to outsource its AtoN the maintenance services was an outcome of an extensive internal business review process covering corporate and operational functions. These business reviews were in response to whole of government policy of contestability of government services involving benchmarking internal service delivery with the option of delivery by the private sector.

AMSA's objectives of outsourcing included reduction in overall costs whilst improving quality of service delivery, increased flexibility, meeting industry expectations of cost effective use of funding generated by the Marine Navigation Levy and access to specialist skills and expertise.

AMSA outsourced the delivery of AtoN maintenance services from July 2001 to Australian Maritime Systems Limited (AMS) following an open tender process. AMSA also sold its AtoN maintenance vessel to P&O Maritime and re-contracted the vessel for the same role from July 2001 for a similar period as the initial AtoN maintenance contract.

AMSA re-tendered the AtoN maintenance service in 2005 following a review of the service model. The frequency of the planned maintenance services was changed by extending maintenance intervals for some sites from one year to two years. However, the scope of the maintenance services remained largely unchanged

AMSA also modified its approach to providing a vessel for AtoN maintenance whereby the sole AtoN maintenance vessel was discontinued. Instead the AtoN maintenance contractor would now be responsible for sourcing suitable vessels for AtoN maintenance around the Australian coast where required. The key exception to this approach was within the northern region of the Great Barrier Reef and in Torres Strait where AMSA's new, dedicated emergency towing vessel would be made available for AtoN maintenance for a minimum of 100 days per year.



Figure 2: Emergency Towing Vessel *Pacific Responder*

During 2012/13 AMSA undertook a review of the service model for the delivery of AtoN maintenance services in preparation for tendering its next maintenance contract which needed to commence on 1 July 2014. This review encompassed:

- review of the current arrangements in light of technology changes;
- the outcomes of nautical reviews;
- new environmental and workplace health and safety requirements;
- consultation with other AtoN authorities on their service models; and
- a study to identify and assess the pricing impact of existing and future cost drivers.

To inform the development of the service model and help ensure a competitive tender process, AMSA also undertook an extensive marketing phase involving contacting potential service providers and providing extensive background information and conducting one-on-one meetings with these organisations. Input sought from potential tenderers covered aspects such as:

- what the next service model should comprise;
- what current aspects of the service model were most likely to impact risk pricing in their tender response;
- fixed versus variable pricing;
- the use of thresholds for major maintenance and unforeseen events; and

- the condition of the existing asset base.

Following the review there was only one change to the broad scope of the maintenance services from the previous contract. This change involved including the maintenance of communications devices purchased by AMSA and located at third party AIS sites (ports). This equipment enables AMSA to incorporate third party AIS data in its vessel tracking systems. However, some fundamental changes to the service model were reflected in the tender specification that was released to the market in April 2013 including:

- Provision for annual cost increases based on a combination of labour, equipment and transport cost indices.
- A reduction in the major maintenance threshold from \$220,000 to \$150,000.

The tender process was completed at the end of 2013 with the contracting of the incumbent provider (Australian Maritime Systems Ltd) for a further ten years.

A comparison of key aspects of AMSA's AtoN maintenance contracts are summarised in Table 1 below:

Contract	Contract Term (years)	Annual Price \$m	Price Basis	Scope of services				Major maintenance threshold \$'000
				Planned	Corrective	Fault & Failure	Other	
2001/02-2005/06	3+1+1	7.5	Fixed	Y	Y	Y	<ul style="list-style-type: none"> • AMSA funds vessel support Australia wide. • AMSA funds consumables. • AMSA funds new and replacement assets (>\$3000) 	100
2006/07–2013/14	8 (no option to extend)	9.5	Fixed	Y	Y	Y	<ul style="list-style-type: none"> • Contractor funds vessel support outside ETV area. • Contractor funds consumables. • AMSA funds new and replacement assets (>\$3000) 	220
2014/15-2023/24	10 (no option to extend)	12.9	Fixed	Y	Y	Y	<ul style="list-style-type: none"> • Contractor funds vessel support outside ETV area. • Contractor maintains data communications equipment at 3rd party AIS sites. • Contractor funds equipment upgrades (buoys, lighting, remote monitoring, AIS) including installation. • AMSA funds new and replacement assets (>\$3000). 	150

Figure 1: Comparison of AMSA's AtoN maintenance contracts

Table

CONTRACT MANAGEMENT

AMSA employs a small team of engineering and other specialist staff to perform its AtoN management functions. Their prime responsibilities are management of the AtoN network in accordance with IALA Recommendations and Guidelines and defined industry standards through contract and project management, strategic and operational planning, development of AtoN policy, liaison with the commercial shipping industry and liaison and participation in regional and international standard setting organisations such as IALA and the IMO.

AMSA's current AtoN maintenance service contract is a fixed price contract that includes the delivery of AtoN preventive and corrective maintenance, fault and failure response and inventory management.

The contractor's performance is monitored and measured through a range of activities and reporting requirements, including:

- detailed reporting – monthly, quarterly and annual;
- monthly meetings;
- quarterly and annual performance review meetings;
- AtoN site audits;
- desktop process audits; and
- Key Performance Indicator (KPI) framework.

The contractor must meet or exceed the agreed KPI's to access an at-risk component of the contract price (annual performance payment). The annual performance payment is made to the contractor following an annual review process. The KPI's are based generally on the following areas and have clearly defined targets and timeframes for deliverables:

- AtoN availability;
- quality;
- safety;
- environment;
- heritage;
- innovation;
- information management; and
- reporting.

AMSA and the contractor review and agree KPI's on an annual basis. This provides an opportunity to tailor the KPI's for the following year to address any emerging issues e.g. introduction of new technology, management of specific hazards or safety concerns.

The monthly reporting process provides AMSA with a detailed view of all AtoN maintenance activities undertaken for the month and any fault and failure rectification activities. AMSA meets with the contractor on a monthly basis to discuss the monthly report and any issues that have been experienced in delivering the AtoN maintenance services. In addition to the annual AtoN program, the monthly reporting and meeting process is seen as a critical process for ensuring compliance with the contract and confirming that the required quality, safety and environmental outcomes are being met. It also provides the contractor with a regular

opportunity to discuss areas of concern with AMSA, confirm requirements and align expectations.

The contractor is required to identify risks and plan for contingencies that may affect the provision of the AtoN maintenance services (such as unavailability of resources and situations of emergency) throughout the contract term. The contractor must identify, manage and mitigate all risks associated with delivery of the AtoN maintenance services. Detailed risk assessments must be undertaken for all work undertaken under the contract.

The Contractor must develop and maintain detailed AtoN site risk assessments for each AtoN site that take into consideration, at a minimum, the nature of work being performed, known AtoN site hazards, topography, flora and fauna, and be updated as risks become apparent or local conditions change.

Over the course of the outsourced maintenance service arrangements the contractor has performed at a high level on a consistent basis, achieving well in excess of 90% of the agreed performance targets. AMSA has strengthened its performance management regime over time with the benefit of experience and in response to changing legislation and community expectations. This has been achieved through a variety of measures including through annually reviewing KPI's, enhanced auditing practices and requiring more substantial deliverables in terms of strategic asset management, workplace health and safety, environmental and heritage compliance.

The Contractor must eliminate or mitigate identified risks and implement appropriate risk management strategies. Some of the key risks for AMSA and the contractor and therefore an area of high focus in contract management activities include:

- potential for reduction and capability gaps in contractor resources;
- major refurbishment or replacement of assets inside useful life;
- potential injury to contractor's staff, AMSA staff or third parties e.g. other contractors, general public; and
- potential environmental incident.

INNOVATION

Since AMSA embarked on outsourcing of AtoN maintenance it has had a strong focus on innovation and continuous improvement in delivering the AtoN maintenance service.

In addition to AMSA identified innovations, AMSA's contract arrangements call for the contractor to proactively identify and propose innovations to AMSA throughout the contract term. To date, the following improvements have been made:

- a number of AtoN Sites and equipment have been upgraded to enable the service intervals to be extended from annual to biennial;
- in many cases low voltage light sources have replaced the mains powered 1000 watt lamps in heritage lenses;
- use of LED beacons;

- a number of mild steel towers have been replaced with modular fibreglass towers;
- changes to buoy maintenance have resulted in a doubling of the service intervals for most buoys;
- obsolete equipment such as old back-up diesel generators, optic drive motors and switch boards have been removed from the network;
- implementation of polyethylene buoys instead of steel buoys in open waters (where feasible); and
- trialling of AIS AtoN technology.

AMSA is also very conscious of safety and the environment. The AtoN maintenance contractor is required to proactively propose innovations in these areas. Improvements to date include:

- identification of AtoN site hazards;
- establishment and ongoing maintenance of detailed hazard registers, for example, for asbestos, radiation, lead and mercury;
- removal of hazardous substances from AtoN sites; and
- improvements to safety for AtoN site access, improved walkways, ladders and the introduction of fall arrest systems.

Requiring the AtoN maintenance contractor to innovate and continuously improve has allowed AMSA to share some of the risk of the introduction of new technology. The contractor bears the risk of responding to AtoN faults and failures for all AMSA AtoN equipment.

Over the next five to ten years AMSA will continue to refine its AtoN network through the introduction of:

- LED lights both sectorised and non-sectorised for medium range lights;
- LED light sources for large heritage flashing and rotating optics;
- replacement of steel buoys with polyethylene buoys;
- development of a next generation remote monitoring system;
- expanding the coverage of its AIS base station network; and
- the targeted introduction of AIS AtoN for specific applications.

All of the above enhancements with the exception of AIS AtoN deployments will be funded by the maintenance contractor. These enhancements will be implemented within the next five years with the exception of the replacement of AIS base stations which will occur progressively over 10 years. Benefits to AMSA include reduced capital expenditure and project resource effort and more timely implementation than if it was to implement these innovations itself.

ASSET MANAGEMENT

Due to the nature of their locations, AtoN sites and infrastructure are subject to severe sea and weather conditions which require a range of asset management strategies in order to keep them operating at the required levels and maximise their useful life.

In addition to the AtoN structures and equipment, an AtoN site may include other infrastructure and improvements such as fencing, retaining walls and roads.

AtoN sites are mostly serviced on an annual or biennial basis depending on their nature and specific maintenance requirements. Publicly accessible heritage lighthouses are visited by the contractor every six months as are the five radar sites which support operations of the coastal vessel traffic service in the Great Barrier Reef and Torres Strait (REEFVTS).

AMSA's maintenance service contract calls for the contractor to develop, implement and review detailed asset management strategies for each AtoN site. The site asset management strategies must be reviewed and updated at least every two years or following any major changes to the AtoN site infrastructure or environmental conditions.



Figure 3: Clerke Island – Modular Fibreglass AtoN structure

The asset management strategies for each AtoN site include the following information:

- general overview of the site including;
 - AtoN site establishment date and major events / modifications;
 - navigational objectives;
 - AtoN characteristics;
 - property details, leases, land ownership, access etc.;
- list of assets on the AtoN site e.g. structure, AtoN equipment, fencing, roads etc.;
- design life estimates for each asset;
- performance requirements for each asset;
- factors identified which affect access or maintenance tasks e.g. restrictions, climate, environmental controls, traditional land owners, heritage listings etc.;
- asset maintenance regimes for each asset including rationale for maintenance intensity and frequency;
- reference to job plans (work method statements) applicable to maintenance regime for each individual asset;
- proposed disposal/recycling approach for each asset; and
- forward outlook for replacement of each asset, including timing and options.

AMSA operates a computerised asset management system (Maximo) for managing and recording maintenance on its AtoN assets. Maximo is used for the following:

- recording all assets and spare parts and their location in the AtoN network;
- tracking the movements of assets in the AtoN network;
- recording faults and failures with AtoN assets;
- calculating AtoN availability;
- recording planned maintenance and corrective maintenance activities;
- storing preventive maintenance schedules for assets;
- storing job plans (work method statements) for maintenance activities; and
- storing individual AtoN site information registers – site specific information e.g. site contacts, hazards etc.

The contractor is required to ensure that Maximo is updated when changes occur due to undertaking the AtoN maintenance services, new AtoN site installations or decommissioning of AtoN sites. This occurs through an integration process between the contractor's information systems and AMSA's Maximo system.

Maximo is AMSA's master database or central repository for AtoN asset information. Other AMSA systems draw information from this data base for other applications e.g. issuing of maritime safety information (MSI) and GIS applications.

The AtoN asset management strategies detail the core requirements for AtoN asset maintenance; they are also one of the planning tools that are used for providing input into AMSA's capital works program for the replacement and major upgrades of AtoN assets



Figure 4: North Reef Lighthouse after major refurbishment in 2011

AN ALTERNATIVE OUTSOURCED SERVICE MODEL

The outsourcing of Western Australian Department of Transport's (DoTWA) AtoN maintenance services has been driven by the state government's policy on private sector delivery which has sought greater private sector involvement in the provision of government-funded services, long term relationships/partnerships, innovative agreements, better overall management of assets i.e. asset management over whole of life of assets. The ultimate objective was and remains value for money.

The outsourced AtoN maintenance service for WA Department of Transport covers 1,382 AtoN, comprising buoys, 650 lit beacons/leads, 602 unlit beacons and 37 marine facilities.

DoTWA first outsourced the maintenance of their AtoN and other marine facilities in 1995. DoTWA's first contract (with Transfield) was essentially a "labour hire" contract which involved paying the contractor a management fee which covered the contractor's staff, corporate overheads, profit, insurance, office costs etc. All work was carried out by work order only. The management fee and labour rates were reviewed annually.

The second contract with Transfield (August 2001- November 2010) involved an increase in scope to include inspections, condition assessments, development of maintenance strategies, planning, budgeting and annual programming. The basis of the management fee largely remained as per the first contract although the schedule of rates was expanded to encompass plant and equipment. Materials were to be supplied at cost. The contract was also expanded to include new works up to a value of \$100,000.

The current contract (also with Transfield) runs from 2010-2019 subject to performance at an estimated value of \$140 million. There are three main areas of service delivery; Asset Management Services, Maintenance Services and Project Delivery Services (up to a maximum value of \$5 million per project).

Asset Management Services is a precursor to the delivery of maintenance services and involves: condition assessments, analysis of maintenance history and costs, development of whole-of-life asset management strategies and planning and budgeting. The contractor must also update the asset register and AtoN register, develop and update annual maintenance programs and budgets and provide 10-year asset management plans and budget forecasts for the Government.

Maintenance Services comprises Routine Maintenance, Programmed Maintenance (which comprises larger period works for example: buoy change outs, repainting of light houses and large beacons) and Reactive Maintenance which comprises urgent and unforeseen activities for example: vandalism and damage caused by severe weather events.

Project Services involves the contractor undertaking works up to a maximum \$5 million per project for upgrading existing assets or delivery of new assets, for example installation of new AtoN. DoTWA issues a project brief for the contractor to quote on. If DoTWA determine the proposal represents value for money. .

The WA government was seeking long term relationship-based contract management models

rather than the usual adversarial type of contract. The contract management approach involves a two-layered structure:

1. A joint **Agreement Leadership Team** who operate at the strategic level providing guidance, driving improvement and change in culture and reviewing performance.
2. A joint **Agreement Management Team** who implement the agreement, deliver services, meet monthly. DoTWA and the contractor have equal representation.

The contract management approach also includes integrated teams including co-location of personnel, decisions must be unanimous and issues are resolved jointly.

Cost transparency is achieved through ‘Open Book’ accounting and defined at-risk corporate overhead and profit percentages which are reviewed and adjusted annually. Performance management is covered in the contract price through the Incentive Scheme. The Incentive Scheme is designed to:

- focus the contractor on achieving excellent outcomes for both contractor and principal;
- reward the contractor for outstanding performance; and
- determine whether the Agreement is to be extended (Performance is assessed at end of years 2, 4 and 6 to determine extensions for years 7, 8 and 9).

The contractor’s performance is assessed in three key result areas (KRA’s) using the agreed key performance indicators shown in Table 2 below:

KRA 1 Agreement Management	KRA 2 Asset Management Services	KRA 3 Maintenance Services
KPI’s <ul style="list-style-type: none"> • Health of relationship survey • Financial management • Safety • Environment • Innovation 	KPI’s <ul style="list-style-type: none"> • Quality & efficiency in development of asset management plans • Annual budgets • Input into Transports systems 	KPI’s <ul style="list-style-type: none"> • Monthly budget performance • IALA Performance • Timeliness in delivery • Backlog maintenance

Table 2 – Key Result Areas and key performance indicators

Performance will determine increase or decrease in profit and overhead components of Management Fee.

Lessons learnt to date include:

- relationship contracting requires change in culture to ensure success;
- co-location and embedment of staff in the same office is highly beneficial;
- pursuing continuous improvement is a strong motivator in a team environment; and
- ageing infrastructure and developing appropriate asset management strategies will be a key challenge moving forward.

CONCLUSION

There are various outsourced contracting models that can be used to deliver AtoN maintenance services. Aspects such as the scope of services, pricing basis, performance management regimes can vary depending on an organisation's AtoN infrastructure maintenance needs, asset management strategy, funding, stakeholder expectations etc.

It is worth noting that the nature, challenges and risks associated with maintaining AMSA's AtoN network can be different in some areas from those of other AtoN providers such as ports and state marine safety authorities where the logistics for servicing, prevailing climatic conditions, funding source and the specific needs of users may warrant or enforce a different service model to that used by AMSA.

AMSA is very confident that its outsourced AtoN maintenance arrangements have served it well since inception in 2001. The fixed price, all inclusive nature of the two contracts to date has provided a high degree of certainty in budgeting and actual costs for delivering the AtoN maintenance services.

The outsourced arrangement works for AMSA in a number of ways. For example, AMSA is not able to supplement its revenue base through tendering for other work due to Government competition policy which reduces the opportunity for an insourced arrangement to be more cost effective. Also, by not having to manage a large workforce, internal AtoN resources can focus solely on strategic asset management and innovative, cost effective delivery of maintenance services.

Taking into account its experience gained in the course of the previous contracts, AMSA has some key future challenges in relation to its outsourced AtoN maintenance services. AMSA needs to ensure the required value is extracted from the new contract over a contract term two years longer than its existing eight year contract and twice as long as its original maintenance contract. AMSA also needs to maintain a fully effective working relationship with the contractor over this period noting that the new contract will have a much higher at-risk performance component than the existing contract. AMSA also needs to ensure the significant longer term maintenance efficiencies inherent in the innovation deliverables of the next maintenance contract are thoroughly assessed and then harvested through the pricing of future contracts.

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