Systems for Aiding Safe Marine Navigation

This section covers our provision of technical, maintenance and engineering project management services supporting the provision of the national network of integrated aids to navigation and traffic management measures to meet the needs of commercial shipping for safe and efficient coastal navigation.

Objectives

- Maintain a national network of integrated marine aids to navigation systems consistent with international standards.
- Maintain a vessel traffic management system in the Great Barrier Reef and Torres Strait consistent with international standards.
- Maintain vessel tracking systems consistent with international standards.
- Maximise the benefit of communications and technological advances to improve navigational and ship safety.
- Contribute to whole of government initiatives to improve maritime domain awareness for the benefit of maritime safety and environment protection.
- Provide Maritime Safety Information (MSI) to ships consistent with international standards.
Highlights

In 2007-2008 we:

► sponsored an ‘Aids to Navigation’ Symposium in Fremantle, Western Australia (ATON 2007), focusing on improving cross-jurisdictional cooperation, innovations in technology and improved service delivery to mariners;

► completed major aids to navigation (AtoN) projects including replacement of a spar buoy at Port Hedland, Western Australia, and the installation of a fibreglass tower at Cape Bowling Green in Queensland;

► contributed to the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) work program through the development of the e-Navigation concept and guidelines on the use of Geographical Information Systems (GIS) and simulation tools in aids to navigation planning;

► facilitated the Australian Vessel Traffic Services (VTS) and Automatic Identification System (AIS) Working Groups for state and port aids to navigation authorities;

► initiated the non-AMSA AIS data acquisition project to make best use of existing AIS infrastructure;

► cooperated with Commonwealth agencies to promote vessel tracking initiatives including:
  • the introduction of Long Range Identification and Tracking (LRIT) with the Australian National Data Centre;
  • the development of the Australian Maritime Identification System (AMIS) through provision of live AIS and AUSREP data; and
  • participating in the Australian AIS Integrated Project Team, developing a whole of government National AIS Strategy.

► improved the capability and corporate governance of the Great Barrier Reef and Torres Strait Vessel Traffic Service (REEFVTS) through achieving certification to ISO 9001 (quality management), integrating VMS data into the REEFVTS surface picture and benchmarking REEFVTS processes against international standards.

Overview

We entered into a new long term contract with our aids to navigation maintenance provider, Australian Maritime Systems Ltd (AMS) from 1 July 2006. In line with contract requirements for 2007-2008, AMS:

► replaced the five REEFVTS radars;

► completed the remote monitoring of the most critical (Category 1) aids to navigation; and

► completed condition assessments for all of AMSA’s historic lighthouses to inform future preventative maintenance programs.
Under our contract with AMS, we continued to achieve very high availability of aids to navigation for mariners as well as high standards of environmental protection and occupational health and safety.

We operate under a rolling five-year program of major capital and maintenance works that, together with an annual aids to navigation review process, helps ensure the continued relevance and integrity of the aids to navigation network. During 2007-2008 several major projects were completed, including:

- replacing the E2 spar buoy at Port Hedland, Western Australia at a cost of $1 million. The spar buoy is a key element of the aids to navigation network that helps ships mitigate navigation safety risks in their approach to this major resources export port; and

- installation of a new tower at Cape Bowling Green, Queensland utilising AMSA-designed low maintenance fibreglass components.

A large number of small and medium scale projects were also undertaken to enhance the reliability and efficiency of the aids to navigation network including modernisation of power supplies and optical equipment in historic lighthouses to improve energy efficiency and expanded use of low maintenance self contained Light Emitting Diode (LED) lightbeacons.

Our strategy to improve the environmental performance of the aids to navigation network continued with projects including the removal of asbestos from Goods Island and Hammond Island in the Torres Strait and the removal of diesel generators and fuel tanks from numerous sites.

Projects and regular maintenance activities at aids to navigation sites were undertaken in consultation with relevant stakeholders to protect environmental, indigenous and cultural heritage values at those sites while still achieving operational objectives.

*The E2 spar buoy at Port Hedland, Western Australia was replaced in June 2008.*
We participated in several IALA committees covering aids to navigation management, e-Navigation, Automated Identification Systems, vessel traffic services, engineering, environmental management and historic lighthouse preservation. During 2007-2008 we contributed significantly to the IALA work program including:

- the continued development of an e-Navigation Strategy and the definition of user requirements aimed at delivering the following three key outcomes:
  - **Onboard** - navigation systems that benefit from the integration of a ship’s own sensors, supporting information, a standard user interface, and a comprehensive system for managing guard zones and alerts. Core elements of such systems will include high integrity electronic positioning, electronic navigational charts (ENCs) and system functionality with analysis reducing human error, actively engaging the mariner in the process of navigation while preventing distraction and overburdening.
  - **Ashore** - the enhanced management of vessel traffic and related services by shore-based operators through better provision, co-ordination, and exchange of comprehensive, more easily understood data.
  - **Communications** - an infrastructure providing authorised seamless information transfer onboard ship, between ships, between ship and shore and between shore authorities and other parties with many related benefits, including a reduction of single person error.

- the review of the Maritime Buoyage System to remove current inconsistencies and areas of confusion for mariners with a revised MBS scheduled to be introduced from 2010;
- participating in an international workshop which developed guidelines on the use of Geographical Information Systems (GIS) and simulation tools in aids to navigation planning;
- development of a guideline on the use of AIS as an aid to navigation; and
- participating in an international workshop which updated guidelines on the effective management of floating aids to navigation.

AMSA is required under the *Environmental Protection and Biodiversity Conservation Act 1999* to preserve the heritage values of its historic lighthouses and artefacts. We are committed to facilitating public access to this important element of Australia’s maritime history. During 2007-2008 there were a number of projects undertaken and events supported by AMSA, including:

- the refurbishment of the historic Macquarie Lighthouse in Sydney, NSW including establishing a permanent lighthouse heritage display, with the opening ceremony being performed by the visiting Secretary-General of IALA, Mr Torsten Kruuse;
- the design and installation of interpretative panels at numerous historic lighthouses accessible to the public;
- the cataloguing of AMSA’s extensive collection of lighthouse artefacts and auditing of items on loan to other organisations; and
- evaluating options for the major refurbishment of the unique North Reef (Queensland) and Cape Don (Northern Territory) historic lighthouses.
We have an ongoing objective to enhance the level of cooperation between the different jurisdictions providing aids to navigation in Australia. Ensuring high quality, accessible information on aids to navigation to mariners is an important part of Australia’s international obligations under the United Nations’ Safety of Life at Sea Convention 1974. During 2007-2008, we contributed to the achievement of this objective through:

- sponsoring ATON 2007 which was attended by New Zealand, Papua New Guinea, state government marine safety agencies, ports and equipment and service providers and focussed on improving cross-jurisdictional cooperation, innovations in technology and improved service delivery to mariners;
- progressing development of national aids to navigation data standards and a database that will be accessible by the Australian Hydrographic Service, state marine safety agencies and ports via an internet portal; and
- continuing to provide an internet forum for AMSA staff, state marine safety agencies and ports to exchange better practice information and ideas in relation to aids to navigation management, policy and technical issues.

Following the ATON 2007 Symposium, we were asked to facilitate the development of a number of state and port AtoN authority working groups. The VTS working group had its inaugural meeting in November 2007, hosted by Sydney Ports Corporation. The AIS working group met for the first time in March 2008 in conjunction with the second meeting of the VTS working group, hosted by Maritime Safety Queensland in Brisbane. These working groups are continuing to respond to work programmes set by the members.

AMSA Chairman Mr Ted Anson AM and Secretary-General of IALA, Mr Torsten Kruuse at the re-opening ceremony of the historic Macquarie Lighthouse in Sydney, NSW in April 2008.
At the Commonwealth level, we have been active in the development of a whole-of-government approach to AIS shore infrastructure through the AIS Integrated Project Team. The National AIS Strategy includes making best use of existing AMSA, state and port infrastructure, identifying areas where coverage is required with the inclusion of radar stations to provide further surveillance capabilities.

To support this best use of existing infrastructure, we have initiated the non-AMSA AIS Data Acquisition project. This project will provide a means of accessing existing AIS base station data for integration into our Vessel Tracking System, and subsequent forwarding of AMIS in support of the whole of government approach.

As interest in AIS grows, we have developed an on-line interactive tutorial to provide basic information on the technology. In conjunction with this, AIS Brochures and updated AIS Fact Sheets are available at: www.amsa.gov.au/shipping_safety/Vessel_tracking/

REEFVTS is a cooperative arrangement with AMSA and Maritime Safety Queensland (MSQ). In March 2008 REEFVTS achieved ISO 9001:2000 quality management accreditation, one of the few VTS centres in the world to achieve such an accreditation. Activity in 2007-2008 included significant work in the area of sensor upgrades, including radar and AIS and integration of the Vessel Monitoring System (VMS) into the REEFVTS surface picture.

![AMSA on-line AIS Tutorial](image-url)
We are involved with MSQ to move REEFVTS from Hay Point to Townsville. As part of the ongoing support, AMSA and MSQ agreed to a full review of REEFVTS to benchmark the system against international standards in terms of equipment, service delivery, human resources and ergonomics.

Developments in maritime surveillance and monitoring, AtoN monitoring and e-navigation are all dependent on communications and we are working closely with the Australian Communications Management Authority (ACMA) on a number of maritime spectrum frequency issues. As technology develops, the need for protected maritime spectrum will continue to grow, moving from analogue to digital means. Our ongoing work with ACMA, APT (Asia – Pacific Telecommunity) and the International Telecommunication Union is critical to ensuring continued use of maritime spectrum in an effective manner.

We provide Australia’s Global Maritime Distress and Safety System (GMDSS) maritime safety communications services broadcasting and receiving safety or navigation information to and from ships at sea. This includes Maritime Safety information covering distress broadcasts, navigational warnings and other important safety information for vessels. The service fulfils Australia’s obligations under international maritime conventions which establish the IMO/International Hydrographic Organisation World-Wide Navigational Warnings Service. We are the coordinator for regional area NAVAREA X (navigational area ten) with responsibility for coordinating, collating and issuing long-range navigational warnings.

We also provide Australian coastal navigation warnings to the network of State and Northern Territory Limited Coast Radio Stations operated to provide High Frequency and Very High Frequency voice radio services for small craft.
## Performance Review

### National Aids to Navigation Network

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<th>Measure</th>
<th>Performance 2007-2008</th>
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| Aids to navigation network meets requirements of the five-year Navigation Safety Strategic Plan for Marine Aids to Navigation (quality). | 100% of priority strategies executed on time and within budget.  
75% – Major heritage projects at North Reef and Cape Don deferred pending resolution of heritage funding issue. Installation of new pile beacons at Joan Reef and Miles Reef delayed due to extended adverse weather. |
| Availability of the marine aids to navigation network (quality).       | Visual: Category 1 – 99.8%  
Category 2 – 99.0%  
Category 3 – 97.0%  
Racons: 99.6%  
Tideguages: 99.6%  
Differential Global Positioning System: 99.6%  
REEFVTS Coastal Vessel Traffic Service: 98.0%  
Automatic Identification System (non REEFVTS): 99.8%  
Unit Beacons: 95.0%  
Topmarks and daymarks: 95.0%  

Visual: Category 1 – 99.9%  
Category 2 – 99.9%  
Category 3 – 99.8%  
Racons: 99.6%  
Tideguages: 99.8%  
Differential Global Positioning System: 99.8%  
REEFVTS Coastal Vessel Traffic Service: 99.4%  
Automatic Identification System (non REEFVTS): 99.8%  
Unit Beacons: 100%  
Topmarks and daymarks: 100% |
| All historic property in relation to lighthouses maintained in accordance with AMSA Heritage Strategy (quality). | 100% of historic property managed in accordance with AMSA Heritage Strategy and specific conservation management plans where relevant.  
100% – Key stakeholders consulted on heritage-related projects. Audits of maintenance works undertaken at 33% of heritage sites have provided assurance that heritage requirements are being observed. |
| Availability of Long Range Identification and Tracking of Ships in line with the IMO timetable (quality). | Timetable established for LRIT to be operational by December 2008.  
Australian National Data centre went live on 11 February 2008. Ongoing effort to ensure full integration into the developing system. |
| Cost to provide a network of aids to navigation (price).               | 2007-2008 estimates: $22.3 million.  
$21.8 million. |
## Safety Communications Network

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<tr>
<th>Measure</th>
<th>Performance 2007-2008</th>
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<tr>
<td>Median time taken to distribute safety information messages (quality).</td>
<td>Thirty (30) minutes.</td>
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<tr>
<td>Capability to monitor successful transmission of safety messages (quantity).</td>
<td>100%.</td>
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<tr>
<td>Cost to provide maritime safety messages (price).</td>
<td>2007-2008 estimates: $0.3 million.</td>
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