Navigational Services in Australian Waters 2010 – 2025

Delivering High Quality Services for Commercial Shipping
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# Glossary of Terms

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<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>AHS</td>
<td>Australian Hydrographic Service</td>
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<td>AIS</td>
<td>Automatic Information System</td>
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<td>AMSA</td>
<td>Australian Maritime Safety Authority</td>
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<td>ATSB</td>
<td>Australian Transportation safety Bureau</td>
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<tr>
<td>DGPS</td>
<td>Differential Global Positioning System</td>
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<td>ECDIS</td>
<td>Electronic Chart Display and Information System</td>
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<tr>
<td>GNSS</td>
<td>Global Navigational Satellite System</td>
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<tr>
<td>GPS</td>
<td>Global Positioning System</td>
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<tr>
<td>IALA</td>
<td>International Association of Marine Aids to Navigation and Lighthouse Authorities</td>
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<tr>
<td>IHO</td>
<td>International Hydrographic Organization</td>
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<td>IMO</td>
<td>International Maritime Organization</td>
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<tr>
<td>MNL</td>
<td>Marine Navigational Levy</td>
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<td>MSI</td>
<td>Maritime Safety Information</td>
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<tr>
<td>NSAC</td>
<td>Navigational Services Advisory Committee</td>
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<tr>
<td>OH&amp;S</td>
<td>Occupational Health and Safety</td>
</tr>
<tr>
<td>REEFVTS</td>
<td>Coastal VTS in the Great Barrier Reef and Torres Strait</td>
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<tr>
<td>SOLAS</td>
<td>Convention for the Safety of Life at Sea, 1974</td>
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<tr>
<td>VTS</td>
<td>Vessel Traffic Services</td>
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<tr>
<td>UKCM</td>
<td>Under Keel Clearance Management</td>
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<tr>
<td>VIMSAS</td>
<td>Voluntary IMO Member State Audit Scheme</td>
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Executive Summary

AMSA’s responsibility for its aids to navigation (AtoN) network and navigational systems is described in *Navigational Services in Australian Waters 2010-2025*.

This planning document is a collection of principles and strategies for the provision of navigational services by AMSA. It articulates the authority’s aspirations and provides a basis for prioritising activities. *Navigational Services in Australian Waters 2010-2025* aligns with AMSA’s *Strategic Vision 2010-2025* and *Corporate Plan 2010-2013*. A separate operational plan will underpin and give effect to the strategies.

*Navigational Services in Australian Waters 2010-2025* will contribute towards fostering a safe, efficient, sustainable and secure transport system for Australia.

The following principles will guide AMSA in the delivery of the strategies. In no particular order of importance, they are:

1. Continue to provide high quality, cost effective navigational services, which will contribute to the safety of life at sea by facilitating safe and efficient navigation in Australian waters.
2. Provide aids to navigation in accordance with IMO obligations (SOLAS 74 as amended, Chapter V Regulations 10, 11, 12 and 13) and internationally accepted best practice (IALA guidance).
3. Introduce new practices and technologies to enhance the appropriateness, reliability and efficiency of the aids to navigation network and reduce its environmental impact.
4. Engage with stakeholders and ensure that the needs of the commercial shipping industry are met.
5. Actively participate at International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and other international forums to influence the development of international standards and best practice.
6. Maintain close links with the Australian Hydrographic Service (AHS) to ensure that nautical information is available to meet the needs of commercial shipping in Australian waters.
7. Engage with the states, Northern Territory and ports to deliver harmonised navigational services around Australia.
8. Cooperate with national, state and local authorities and comply with relevant legislation.

In preparation for expected changes to the strategic environment, AMSA has identified the top five priorities for navigational services. In no particular order of importance, they are:

1. Achieving further efficiencies in the maintenance of AMSA’s network through a new service provider contract from 1 July 2014.
2. Enhancing the environmental safety and sustainability of the aids to navigation network.
3. Developing and implementing the e-Navigation concept, in particular the shore based aspects.
4. Enhancing maritime safety and environment protection in the waters off the north-west coast of Australia and in the Great Barrier Reef and Torres Strait, in response to a projected increase in shipping and off-shore activity.
5. Implementing an Under Keel Clearance Management (UKCM) system for the Torres Strait.
1. Introduction

1.1 AMSA’s Obligations

AMSA is the national safety agency with a primary role in maritime safety, protection of the marine environment and maritime and aviation search and rescue.

In the context of maritime safety, one of the areas of primary responsibility is to provide the national aids to navigation network and navigational systems.

In this context, the objectives of AMSA are to:

- maintain a national network of integrated marine aids to navigation systems consistent with international standards to ensure safe navigation in Australian waters;
- maintain vessel traffic services in the Great Barrier Reef and Torres Strait consistent with international standards;
- take advantage of the advances in technology to enhance navigation and ship safety; and
- provide information for the promulgation of Maritime Safety Information (MSI) to ships, consistent with international requirements.

Navigational Services in Australian Waters 2010-2025 is a collection of principles and strategies for AMSA’s delivery of navigational services. It gives effect to the above responsibility and objectives for the next fifteen years. It articulates the authority’s aspirations and provides a basis for activity and setting priorities.

Navigational Services in Australian Waters 2010-2025 aligns with AMSA’s Strategic Vision 2010-2025 and Corporate Plan 2010-2013. It will be reviewed periodically to ensure this alignment with AMSA’s overall direction and priorities is maintained.

A separate operational plan will underpin and give effect to these strategies. It will provide details of AMSA’s operational processes and time frames for any proposed changes to AMSA’s navigational services. The operational plan will have a five year outlook and will be subject to an annual review.

Navigational Services in Australian Waters 2010-2025 will contribute towards fostering a safe, efficient, sustainable and secure transport system for Australia.
1.2 The Aids to Navigation Regulatory Environment

The existing arrangements in Australia are that AMSA is responsible for the provision of aids to navigation necessary for ocean and coastal navigation, while the states, ports and territories provide aids necessary for the safe entry and navigation of ports and those required by fishing vessels and pleasure craft. This division of responsibilities stems from a 1934 Agreement between the Prime Minister and state Premiers. The arrangement has proved to be a sound basis for the provision of aids to navigation in Australia for all vessels.

The costs of providing and maintaining the AMSA aids to navigation network are met by the commercial shipping industry through the Marine Navigation Levy.¹

Responsibilities for the provision of aids to navigation in Australia

¹The Marine Navigation Levy is a charge against commercial shipping which is levied to recover all costs of operating the Commonwealth’s marine aids to navigation system. It is government policy that the “user pays” principle is applied and all costs are recovered.
2. The Strategic Environment

Over the coming years, some of the main issues that can be expected to influence AMSA’s provision of navigational services are:

- an increase in the size, speed and draughts of commercial ships, in particular container vessels;
- a reduction in manning levels and declining crew competencies;
- the need to manage the movement of shipping in certain areas and the community’s zero tolerance for shipping accidents and ship-sourced marine pollution, prime examples being the pristine waters of the Great Barrier Reef and Torres Strait and waters off north western Australia;
- an increase in the numbers of recreational vessels;
- the use of GNSS as the primary means of navigation, complemented by visual aids;
- the continuing trend for introducing more electronic aids to navigation;
- the availability of multiple GNSS and the development of new terrestrial and space-based GNSS augmentation services;
- the contribution of spatial information tools to improve network planning;
- new policy initiatives, including the move to a single national jurisdiction for commercial vessels;
- the proliferation of offshore oil and gas production and loading facilities;
- the proliferation of offshore aquaculture and renewable energy installations;
- the increase in the volume of shipping at the commodity export ports;
- the use of internationally recognised risk assessment models;
- innovation and improvements in floating structures, moorings, lighting and power technologies;
- the potential increase in AIS units on board non-SOLAS vessels; and
- the desire for increased harmonisation of maritime-related policies, for example vessel traffic management measures, maritime domain awareness and maritime spatial planning.

Top Five Priorities

In preparation for expected changes to the strategic environment in the coming years, AMSA’s top five priorities for navigational services (in no particular order of importance), are:

1. Achieving further efficiencies in the maintenance of AMSA’s network through a new service provider contract from 1 July 2014.

2. Enhancement in the environmental safety and sustainability of the aids to navigation network.

3. The development and implementation of the e-Navigation concept.

4. Enhancing maritime safety and environment protection in the waters off the northwest coast of Australia and in the Great Barrier Reef and Torres Strait, in response to a projected increase in shipping and off-shore activity.

5. The implementation of an Under Keel Clearance Management (UKCM) system for the Torres Strait.
3. Guiding Principles and Strategies

A set of eight principles will guide AMSA in delivering the strategies contained in Navigational Systems in Australian Waters 2010-2025. Collectively, this is what AMSA will strive towards in the coming years². In no particular order of importance, they are:

Guiding Principle 1

**Continue to provide high quality, cost effective navigational services, which will contribute to the safety of life at sea by facilitating safe and efficient navigation in Australian waters.**

AMSA manages the provision of a network of integrated aids to navigation and traffic management measures to meet the needs of commercial shipping.

Regular feedback from the commercial shipping industry and pilots indicates that AMSA provides a reliable and cost effective network of aids to navigation and traffic management measures that meet the needs of commercial shipping. Further, an analysis of Australian Transport Safety Bureau (ATSB) investigation reports suggests that there are no incidents which show any inadequacy in these services.

The nature of shipping and user requirements change with time which implies that navigational services need to be reviewed regularly.

3.1 Strategy

AMSA will continue to:

- undertake an incremental annual review of its navigational services. This is typically a desk-top exercise and takes into account AMSA's own analysis of traffic, feedback from industry and ad-hoc input from other stakeholders (e.g. pilots).
- seek innovative and cost effective solutions for the provision of navigational services.

²The scope of Navigational Services in Australian Waters 2010-2025 is limited to the existing aids to navigation network that AMSA is responsible for. It does not include aids to navigation provided by the states, Northern Territory and ports.
Shipping routes to and from Australian ports
Guiding Principle 2

Provide aids to navigation in accordance with IMO obligations (SOLAS 74 as amended, Chapter V Regulations 10, 11, 12 and 13) and internationally accepted best practice (IALA guidance).

A central element of the navigational services that AMSA provides is its aids to navigation network. This network is currently made up of a mix of fixed and floating aids, visual and electronic aids and a coastal Vessel Traffic Service.

As at 30 June 2010, there were 477 aids in AMSA’s network located across 388 sites consisting of:

<table>
<thead>
<tr>
<th>Aid Type</th>
<th>数量</th>
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<tbody>
<tr>
<td>Lit beacons</td>
<td>296</td>
</tr>
<tr>
<td>Unlit beacons</td>
<td>8</td>
</tr>
<tr>
<td>Navigation buoys</td>
<td>53</td>
</tr>
<tr>
<td>Auxiliary lights</td>
<td>10</td>
</tr>
<tr>
<td>Great Barrier Reef and Torres Strait Ship Reporting System (REEFREP) and Vessel Traffic Service (REEFVTS)</td>
<td>1</td>
</tr>
<tr>
<td>Differential GPS stations</td>
<td>16</td>
</tr>
<tr>
<td>Racons</td>
<td>45</td>
</tr>
<tr>
<td>Transmitting tide gauges</td>
<td>5</td>
</tr>
<tr>
<td>Current meter</td>
<td>1</td>
</tr>
<tr>
<td>Wave rider buoys</td>
<td>2</td>
</tr>
<tr>
<td>Radars</td>
<td>5</td>
</tr>
<tr>
<td>AIS base stations</td>
<td>35</td>
</tr>
<tr>
<td><strong>Total number of aids to navigation</strong></td>
<td>477</td>
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AMSA consistently meets all IALA availability targets for the various categories of aids to navigation, as shown in the graph below:

Note: This graph represents data that is calculated on a rolling three year average

The Voluntary IMO Member State Audit Scheme (VIMSAS) audit of Australia, conducted in August 2008, provided independent assurance that AMSA meets its responsibilities in regard to SOLAS 1974 as amended.

**AMSA’s Outsourced Aids to Navigation Maintenance Arrangements**

Since 2001, AMSA has maintained the aids to navigation network through a contracted service provider - Australian Maritime Systems Ltd (AMS). The current service contract with AMS expires in June 2014. AMSA’s strategies to ensure the contractor continues to deliver a high level of performance include:

- monitoring the performance of the contractor against internationally accepted key performance indicators, including an annual review of the appropriateness of each indicator and performance target;
- evaluating new options for enhancing performance and efficiency in the next maintenance contract, due to commence 1 July 2014;
- undertaking a rolling review of the network, including asset condition, responding to emerging trends and dealing with specific issues and risks identified;
- ensuring that the contractor has quality, environment and safety management systems in place and up to date; and
- ensuring the contractor complies with environmental and heritage obligations in management of the network.
3.2 Strategies

Going forward, AMSA will:

► as a general rule, provide aids to navigation in accordance with IALA Manuals, Recommendations and Guidelines;
► assess the volume of traffic, routes used and degree of risk on an on-going basis;
► use contemporary risk assessment models such as those provided by IALA;
► respond to new wrecks in a timely manner, so as to minimise risk to shipping;
► provide timely and accurate input for the promulgation of Maritime Safety Information (MSI);
► and
► maintain a close working relationship with the Australian Hydrographic Service (AHS).

Refurbishment of historic Macquarie Lighthouse Sydney, NSW
Guiding Principle 3

Introduce new practices and technologies to enhance the appropriateness, reliability and efficiency of the aids to navigation network and reduce its environmental impact.

Developments in technology will influence the nature and mix of aids to navigation that will be incorporated in the network. It is essential that the technologies used are appropriate to the delivery of safety standards required by regulation, industry and community expectation.

3.3 Strategies

AMSA will continue to implement new methodologies, materials and equipment to enhance the performance and efficiency of the aids to navigation network. Strategies to be adopted will include:

- implementing an Under Keel Clearance Management System (UKCM) in the Torres Strait;
- providing an appropriate mix of visual and radio aids to navigation by continually assessing the need for visual aids against the availability of alternative aids to navigation;
- providing aids to navigation in an e-navigation environment; this entails delivering aids to navigation information on board ship in a timely and accurate manner;
- recapitalising the DGPS network, to maintain the capability of the existing system in the medium term, in line with IALA guidance;
- increasing the use of Geographical Information Systems (GIS) and simulation to inform traffic analysis and aids to navigation planning;
- evaluating and where appropriate, introducing virtual aids to navigation as an alternative to physical aids. This will improve responsiveness and coverage in high risk areas and increase efficiency through lower establishment and ongoing maintenance costs;
- replacing steel buoys with lower cost polyethylene buoys where appropriate, generating both purchase and maintenance cost savings. This will also result in a lower environmental impact;
- continuing to increase the maintenance intervals for aids to navigation at appropriate sites by the use of more durable materials and effective protection techniques (e.g. extending the mooring change interval for buoys, greater use of fibreglass modular towers), whilst maintaining availability levels; and
- continuing to identify opportunities for reducing the range of traditional long range lights, while maintaining the required level of service for mariners.
Penrith Island light including radar and AIS stations
AMSA is responsible for the provision of navigational services necessary for ocean and coastal navigation. The aids to navigation that AMSA provides represent only a small percentage of the total number of aids to navigation in Australia. State and Northern Territory marine safety authorities and ports have responsibility for the vast majority of aids.

3.4 Strategies

AMSA will continue to actively engage with its stakeholders to ensure that it:

- meets the needs of the levy paying shipping industry; and
- achieves the most efficient use of the levy collected.

Key stakeholders include:

- the Australian government, through the Minister for Infrastructure, Transport, Regional Development and Local Government;
- the shipping industry through the Navigational Services Advisory Committee; and
- the Australian Hydrographic Service.

AMSA also receives ad-hoc input from pilots and ship managers.

AMSA will also continue to:

- benchmark its performance against other aids to navigation authorities via IALA’s questionnaires; and
- engage with state marine safety agencies regarding the transfer of aids to navigation no longer required by the levy paying shipping industry.

Navigational Services Advisory Committee (NSAC)

The Navigational Services Advisory Committee (NSAC) is the peak consultative body to AMSA for matters relating to the safety of navigation in Australian waters.

The role of the committee is to provide expert maritime industry advice on requirements for navigational services matters. The membership of the committee is reviewed from time to time to ensure that it adequately represents the interests of the levy paying maritime industry.

Currently, membership comprises of representatives from the commercial shipping industry, pilots and the Australian Hydrographic Service.

AMSA organises and chairs the meetings of NSAC, which are held bi-annually.
Guiding Principle 5

**Actively participate in IALA and other international forums to influence the development of international standards and best practice.**

In order to achieve a safe and efficient maritime transport regime in Australia, a general philosophy adopted by AMSA is to provide navigational services in accordance with internationally accepted principles and best practices.

The component of foreign owned vessels engaged in Australia’s import and export trade is very high. AMSA recognises that the quality of international shipping cannot be influenced unilaterally. Therefore, the preferred method for influencing standards and implementing change is through AMSA’s active participation in international forums, including the relevant committees of IMO and IALA.

The aim of IALA is to foster the safe, economic and efficient movement of vessels, through improvement and harmonisation of aids to navigation worldwide. IALA is secular and non-political. IALA brings together services and organisations concerned with the provision or maintenance of marine aids to navigation to develop technical manuals, recommendations and guidelines.

The benefits of such engagement are:

- an opportunity to influence the development of regulations and best practice for shipping and navigational services providers; and
- the ability to build and maintain a network of professional contacts. This is invaluable for Australia, being geographically isolated from the world’s major economic regions.

### 3.5 Strategy

AMSA will assess IALA’s quadrennial work programmes for alignment with AMSA’s own vision and charter. AMSA will then participate at relevant IALA forums, as required, contributing to developments and influencing outcomes.
Guiding Principle 6

Maintain close links with the Australian Hydrographic Service to ensure that nautical information is available to meet the needs of commercial shipping in Australian waters.

The AHS is responsible for the conduct of hydrographic surveys, as well as providing Australia’s national charting service.

3.6 Strategies

AMSA will continue to liaise closely with AHS, to ensure survey and charting requirements of the commercial shipping industry are included in AHS’ forward planning processes (e.g. Hydroscheme). Liaison will comprise of consultation on issues of mutual concern, regular meetings and attendance at each other’s conferences / symposiums.

AMSA will consider providing assistance to AHS to undertake surveys in areas identified in AMSA’s risk assessment process. Assistance may be considered where the commercial shipping industry’s requirements do not align with AHS’ surveying and charting program (e.g. the additional regular re-surveying required in the Torres Strait, to support AMSA’s UKCM system).
Guiding Principle 7

Engage with states, territories and ports so as to deliver harmonised navigational services around Australia.

To date, AMSA’s working relationship with other aids to navigation regulatory agencies has been guided by the spirit of a 1934 agreement between the Commonwealth and the states. This agreement, while not legally binding, addresses the division of responsibility for the provision and maintenance of aids to navigation. In essence, the Australian Government is responsible for the provision of those aids to navigation that are necessary for ocean navigation, while the provision of port, river and inner aids to navigation is a matter for state or local governments. The Australian Government also accepts responsibility for the efficient marking of coastal shipping tracks and ocean highways in its waters, used by vessels making or navigating the coast of Australia.

Over the past decades, these arrangements have served the maritime community well.

3.7 Strategies

In an endeavour to harmonise navigational services around Australia, AMSA will:

- continue to lead working groups that aim to develop and implement an agreed program of initiatives addressing:
  - the strategic and operational issues associated with the management of navigational services
  - the operational, technical and personnel aspects of Vessel Traffic Services
  - the implementation of the Automatic Identification System (AIS) in Australia
- seek opportunities to share best practice and provide technical assistance, both within Australia and neighbouring regions;
- conduct biennial symposiums to enable the sharing of information on the provision of aids to navigation, including new technologies and allowing practitioners the opportunity to build and maintain effective working relationships; and
- explore the need for formalising the 1934 agreement with the states and the potential benefits that could flow from any new arrangements.

In the future, AMSA will continue to build upon these strategies. In particular, it will develop a national aids to navigation information system, which will, in the longer term, support the implementation of e-Navigation.
Guiding Principle 8

Cooperate with national, state and local authorities and comply with relevant legislation.

In carrying out its role, AMSA is required to comply with a range of Australian government and state legislation covering planning, the environment and heritage conservation, indigenous land claims and OH&S.

3.8 Strategies

AMSA will:

- ensure that it is fully aware of its obligations across the various regulatory regimes by being aware of potentially relevant legislative changes and assessing the implications of those changes for AMSA’s provision of navigational services;
- maintain good working relationships with relevant agencies and proactively consult with those agencies and other stakeholders in the provision of navigational services; and
- pursue the removal of hazardous materials such as asbestos, mercury and fuel oil from its aid to navigation sites, wherever practicable.

Clerke Island (Northern Great Barrier Reef)
4. Conclusion

The Australian Government and state and territory agencies, with a mandate for the safety of navigation and protection of the marine environment, are responsible for ensuring the provision of appropriate navigational services (such as reliable aids to navigation, vessel traffic services and professional pilotage services).

Navigational services play a key role in facilitating the safe and efficient transit of shipping, including mitigating the inherent risks associated with transporting dangerous cargoes through some of the world’s most environmentally sensitive areas.

AMSA will press for greater observance of existing international standards in maritime safety, including ship and navigational safety.

AMSA will continue to remain active in international forums and help formulate best practice in the provision of navigational services. AMSA contributes significantly to the achievements of these forums; the benefits include developing and maintaining networks, increased technical knowledge, access to business improvement tools and case studies and professional development for key staff. These benefits are achieved for a relatively small outlay.

The shipping industry benefits from its investment in the aids to navigation network by AMSA’s provision of a reliable, cost-effective system, which is aligned to their needs and also serves the ‘collective good’ of the nation.

Over the coming years, AMSA will continue to provide high quality navigational services, which facilitate the safety and efficiency of navigation, whilst introducing new practices and technologies to enhance the reliability and efficiency of the aids to navigation network and reduce its environmental impact.

AMSA has been, and will continue to be, an innovative organisation in finding cost-effective solutions to this challenge.
Annex 1. Background and outlook for Australian shipping

Background

Australia, being geographically remote from major world suppliers and markets, relies heavily on sea-borne trade. Therefore shipping, which is among the most international of industries, is extremely important to the Australian economy. Over 99.5 percent of Australia’s trade by volume is carried by sea. Indeed, it can be said that exports drive the Australian economy and that the nation’s prosperity relies heavily on sea-borne trade.

Foreign-flag shipping activity in Australia has grown strongly in recent years, largely due to the commodities boom. Although tempered to some extent by the recent global financial crisis, shipping activity still showed growth over the last financial year, due mainly to the continuing strong demand from China for coal and iron ore, even though activity by container ships and vehicle carriers dropped by around 10 percent in 2008-09.

Total port visits by foreign-flag ships in 2008-09 were 22,360, while the total gross tonnage of those ships was to 823.4 million tons.

4,100 individual ships called into Australian ports over the last year; but there was also considerable turnover in the fleet, in that around 37 per cent of the ships that visited Australia in 2008-09 had not visited in the previous year. This turnover represented a continuation of the improvements in recent years in the age and risk profiles of the foreign-flag fleet visiting Australia. The number of ships less than 5 years of age increased by 25 per cent to 1,241 in 2008 while the number of ships of 15 or more years of age fell by 16 per cent to 803.

Outlook

Demand for shipping is dependent upon domestic and international economic activity. In general, while trade conditions may fluctuate from season to season and depend on the economic cycle, the pattern of shipping remains relatively static over time.

The growth in shipping activity around the Australian coastline has increased by 130 percent over the ten years to 2008-09. It is likely to continue to grow at that rate or more in the foreseeable future. The commodities boom has driven strong growth at the iron ore export ports and also at the major coal export ports, with new mining developments expected to result in the construction of a new iron ore port in the north west and a new coal port in central Queensland over the next ten years. Bulk carriers account for more than 60 percent of the ships that visit Australia and 45 percent of port visits, and they are the largest ships on average, with more than half of the world fleet of capesize bulk carriers calling at an Australian port each year. The next most active are container ships, followed by general cargo vessels, oil tankers and vehicle carriers. Activity by container and vehicle ships tends to fluctuate more with changing economic conditions, but still show steady growth over time. Oil tankers and general cargo ships tend to maintain more even operating patterns.
Growth in the volume of shipping over the last 10 years
Annex 2. Coverage Diagrams
Australian DGPS Network